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Productivity Commission

November 2021

Wealth transfers and their economic effects

Research paper

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Contents

The chart data and the code underpinning the analysis in this report are available online at: www.pc.gov.au/research/completed/wealth-transfers.

In brief

Until now, little has been known about how much wealth Australians transfer while they are alive (gifts) or after they die (inheritances), let alone how those transfers affect those who receive them, or the impact on the distribution of wealth in society. This report sheds light on these questions.

Wealth transfers are large and growing — over $120 billion was passed on in 2018, more than double that in 2002. Inheritances in particular, which account for around 90 per cent of all transfers, have increased steadily in line with the growing wealth of older Australians. In 2018-19 the value of the average inheritance was $125 000 compared to $8000 for gifts.

Conventional wisdom suggests that wealth transfers make the richest Australians even better off. And in fact wealthier Australians do receive larger transfers on average. But by the time people receive an inheritance, they will be well into middle age — about 50 years old on average — already established in their careers and housing, and many will potentially be nearing retirement themselves. So while inheritances weigh on economic mobility — by increasing the likelihood that wealthy parents have wealthy children — the effect is moderated by the lateness in life at which they are received.

What about inequality? Wealth transfers have unambiguously increased the *amount* of wealth held by richer Australians. However, when measured against the amount of wealth they already own — and this may surprise — the less well-off get a much bigger boost from wealth transfers. That is, wealth transfers increase the *share* of wealth held by poorer Australians, reducing relative wealth inequality. And we are not an outlier. This finding is replicated in every other country studied around the world. That said, in Australia, the moderating effect is quite small: a one percentage point change in the rate of return to housing wealth — a fraction of the average annual historical return — would have a much larger impact on relative wealth inequality.

What does the future hold? Older Australians are projected to hold a growing share of total wealth. They will also account for a larger share of total deaths, and consistent with falling fertility rates, they will also have fewer children to pass their wealth onto. These factors are projected to drive a four-fold increase in the total value of inheritances, which could lead to a significant increase in the total value of wealth transfers when compared to lifetime earnings. Nevertheless, absent a significant change in how wealth transfers are distributed or saved in the future — for example, because the wealthiest Australians receive a much larger share of total inheritances than in the past, or save a much larger share of their inheritances compared to less wealthy people — they are unlikely to significantly worsen wealth inequality in Australia in the coming decades.

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This paper uses unit record data from the Household, Income and Labour Dynamics in Australia Survey (HILDA) conducted by the Australian Government Department of Social Services (DSS) (DOI: 10.26193/0LPD4U). This paper also uses data from the Australian Taxation Office (ATO) Longitudinal Information Files. The findings and views reported in this paper, however, are those of the Commission and should not be attributed to the Australian Government, DSS, any of DSS' contractors or partners, ATO or any other agencies.

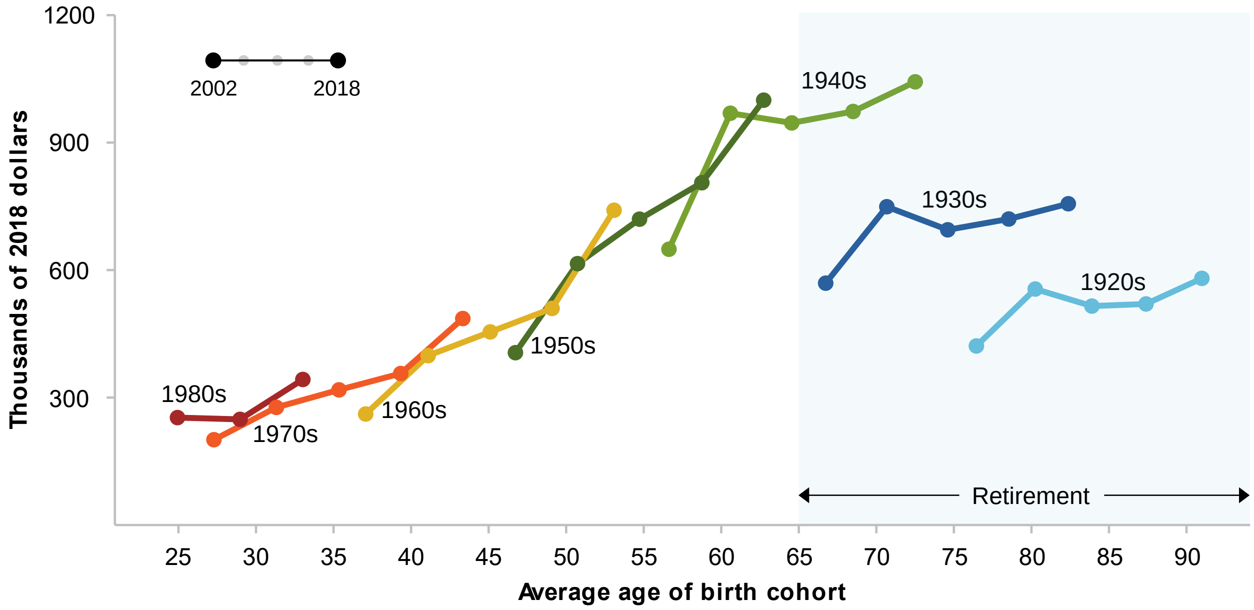
Executive summary

Why are we doing this research?

The wealth of the average older Australian has grown remarkably since the turn of the century. It has been buoyed by strong real growth in house prices and almost three decades of growth in superannuation balances, alongside low rates of asset drawdown to fund retirement. As such, many older, retired Australians, at a time of life where one would expect them to be drawing down their wealth to fund consumption, have actually accumulated increasingly large stores of wealth (figure 1). They transfer their increased wealth while they are alive (known as inter vivos gifts — 'gifts' henceforth) and at death (inheritances).

Figure 1 – Older Australians continue to build wealth in retirement[a]

Average equivalised wealth by age and birth decade



a. Data points follow the same group of people at 4-year intervals between 2002 and 2018 based on their birth decade.

Although research into wealth transfers has a relatively long history overseas, little is known in Australia. This report seeks to fill that gap by creating a wealth transfer fact base for Australia to answer basic questions, such as: how much wealth is transferred between Australians each year, when, and to whom? And how do people respond to receiving a wealth transfer — for example, by immediately consuming it, or investing it to consume later?

We also investigate the contribution of wealth transfers to wealth inequality in Australia in the past and the (simulated) future. Previous work by the Commission found that wealth inequality had likely increased in the opening decades of the 21st century. Academic work by Piketty and others has argued that wealth transfers, and inheritances in particular, might contribute to worsening wealth inequality in the future. We do not find compelling evidence for this. As is commonly believed, wealth transfers do largely go to the rich, but on some measures wealth transfers actually reduce wealth inequality.

While there are many factors at work, government policies affect the accumulation of wealth and the terms and conditions of its transfer to younger generations (through the tax and transfer system, superannuation policies and the treatment of housing over the lifecycle, among other factors). Of particular relevance is the extent to which policies may be contributing to the accumulation of large stores of wealth by many households and individuals, which are increasingly persisting until death. This has led to debate about policy settings that encourage retirement savings. These policy issues are complex and are not covered in this report (box 1).

Box 1 – Public policy relevant to wealth transfers

Superannuation tax and contribution arrangements have led to higher levels of private saving than would occur in their absence. As many people draw down only the minimum allowable amount of their superannuation, larger inheritances result.

Precautionary saving (in anticipation of high aged care deposits, unknown medical expenses and concern that the money might run out given an uncertain time of death) contributes to unintended inheritances as does uncertainty about asset returns. To the extent that people have poorly-informed views about risks or are unable to manage these risks through different retirement products, some older Australians can be deprived of higher consumption and wellbeing in their retirement.

Moreover, some older people use their liquid savings to meet their current consumption needs, but not draw down on their housing wealth because of a lack of attractive financial approaches to liquidate housing wealth, such as equity withdrawal. This behaviour is likely influenced by the favourable treatment of owner-occupied housing in asset tests for access to the Age Pension.

What we do in this study

We undertake backward-looking empirical analysis over the past two decades to create a fact base on wealth transfer behaviour (chapter 1), and investigate how wealth transfers have affected the distribution of wealth over that time (chapter 2). We also undertake forward-looking empirical analysis by projecting wealth outcomes to 2050 to examine the potential impact of future wealth transfers on inequality under different scenarios (chapter 3).

The data

The key data sources for this analysis are: the Melbourne Institute’s Household, Income and Labour Dynamics in Australia (HILDA) survey; two probate datasets, which provide partial information about wealth at death for a representative Australian sample in 2010 and for Victoria in 2016; and tax file return data, which provides information about wealth held in superannuation accounts.

The breadth and depth of information about the wealth transfer behaviour of individual Australians in these data sources is somewhat limited. But, as this report shows, a wide range of economic analysis is still possible and there is good evidence that the constraints imposed by the data do not undermine the robustness of the findings. Indeed many of the findings in this paper about the impact of wealth transfers in Australia are similar in nature (if not magnitude) to the research findings from other countries, including research undertaken with much more extensive datasets.

Richer insights about wealth transfers in Australia could be facilitated at relatively low cost in the future by including additional questions in the HILDA survey — the only household level dataset for analysing wealth transfers in Australia — and linking administrative datasets with probate records (as the latter are progressively digitised).

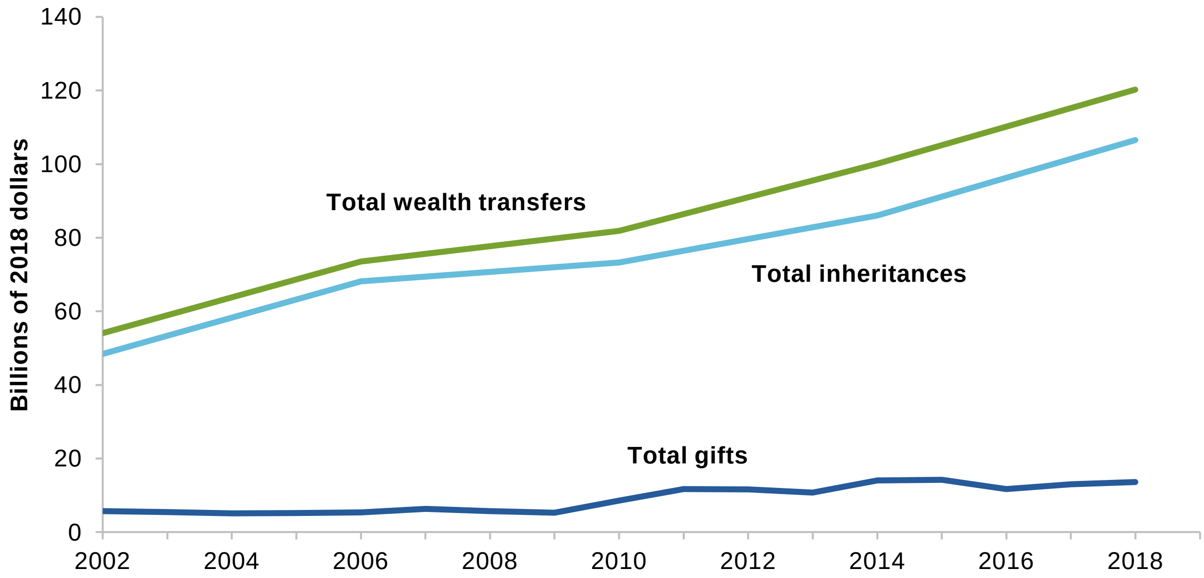
What we find

Australian wealth transfers are large and growing

More than $120 billion was transferred in 2018 alone (figure 2) — to put this sum in perspective, this is significantly more than Australian government expenditure in 2018-19 on health ($80 billion) and about 30 per cent less than total spending on social security and welfare ($170 billion).

The aggregate annual value of wealth transfers has more than doubled in real terms since 2002, as Australians have accumulated larger amounts of wealth. The cumulative impact on wealth transfers is immense, with slightly less than $1.5 trillion being transferred since 2002.

Figure 2 – The annual value of wealth transfers has more than doubled since 2002



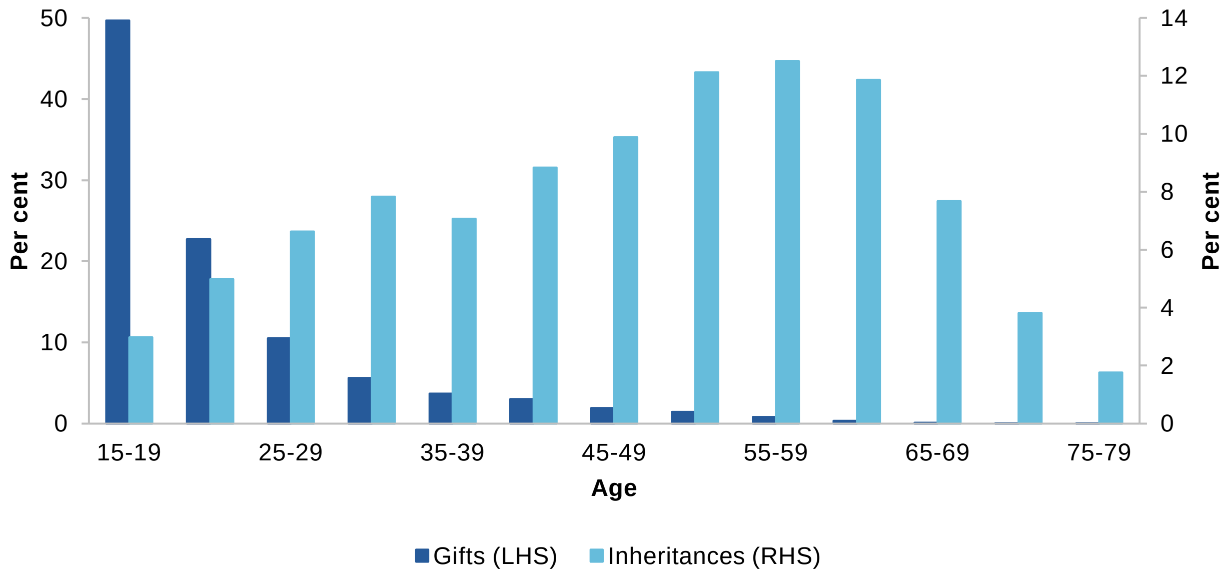
Most transfers are inheritances given to (adult) children and spouses of the deceased

Close to 90 per cent of transferred wealth — just over $100 billion in 2018 — was in the form of inheritances, passed on following death. And about half of all inheritances immediately went to the children of the deceased. The remainder went to a surviving spouse or to other family and friends. About 2 per cent went to charity. The vast majority of reported gifts went to children.

Gift recipients are much younger

Children are the key recipients of both inheritances and gifts, but they tend to receive them at different stages of their life. The average recipient of an inheritance was, at about 50 years old, close to peak earning capacity, established in a house, and received about $125 000 (the median was much lower, at about $45 000 in 2018-19). In contrast, the average recipient of a gift was about 20 years of age, at the beginning of their career, yet to start a family or purchase a house, and received about $8000 (again, the median was much lower, at about $1000) (figure 3).

Figure 3 – Gift recipients are younger than inheritance recipients



Wealth transfers have increased absolute wealth inequality but decreased relative wealth inequality

Over the past two decades, wealthier people typically received more via wealth transfers than poorer people, increasing *absolute* wealth inequality (figure 4, panel a) (box 2). This is intuitive because wealthier parents have more wealth to transfer to their children, and their children tend to be wealthier even in the absence of those transfers.

That wealth transfers increased absolute wealth inequality is consistent with recent work by the Grattan Institute and the Treasury, which found that inheritances increase absolute wealth inequality because 'they are not distributed equally' (The Treasury 2020, p. 51) and they 'tend to go to people who are already wealthy' (Wood, Griffiths and Emslie 2019, p. 3).

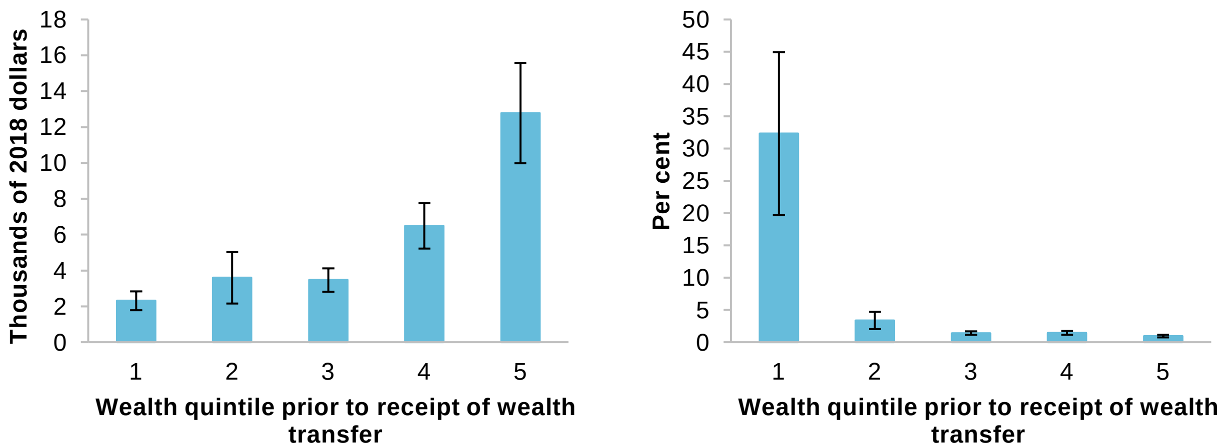
A less intuitive result, but one that is replicated in research for all other countries for which information was available (Britain, France, Germany, Italy, Spain and the United States), is that wealth transfers reduced *relative* wealth inequality, because wealthier people received less in wealth transfers *as a share of their existing wealth* than poorer people (figure 4, panel b). For example, as a share of their existing wealth, transfers boosted the wealth of the bottom 20 per cent (quintile 1) of the wealth distribution by about 30 times more than for those in the top 20 per cent (quintile 5).

That said, wealth transfers have less of an equalising effect on relative wealth inequality in Australia than in all countries studied, except for the United States. This is primarily because Australian wealth transfers are smaller as a share of the total stock of wealth.

Figure 4 – Wealth transfers increased absolute wealth inequality, but reduced relative wealth inequality

a. Average equivalised wealth transfer received among all people in a three-year period, by initial equivalised wealth quintile

b. Average equivalised wealth transfer received among all people in a three-year period as a share of average initial equivalised wealth, by initial equivalised wealth quintile



Box 2 – Absolute or relative inequality?

Wealth inequality can be expressed in absolute or relative terms. While relative wealth inequality is the more commonly invoked concept, both are valid and useful.

Absolute wealth inequality is inequality in the dollar value of wealth held by each person in society. If every person's wealth were to increase by a fixed amount, say $5, then absolute wealth inequality would be unchanged. If wealthier people's wealth increased by more than poorer people's wealth, say $10 compared to $5, then absolute wealth inequality would increase.

Relative wealth inequality is inequality in the share of wealth held by each person. If every person's wealth were to increase by the same fixed share, say 5 per cent, then relative wealth inequality would be unchanged. If wealthier people's wealth increased by a larger share than for poorer people, say 10 per cent compared to 5 per cent, then relative wealth inequality would increase.

If changes to wealth increase relative wealth inequality, they must also increase absolute wealth inequality. But changes to wealth that decrease relative wealth inequality do not necessarily decrease absolute wealth inequality.

The moderating effect of inheritances on relative wealth inequality persists

Studies of other countries have found that the effect of inheritances on relative inequality erodes over time because poorer recipients deplete their inheritances faster than wealthier recipients. Some studies have found that wealthier recipients earn larger returns to the invested component of their inheritances, while others have suggested that wealthier recipients consume smaller shares of their inheritances. (No studies exist for gifts.)

Our results suggest that the reduction in relative wealth inequality from inheritances persists in the longer term, because both wealthy and poor tend not to deplete their inheritances.

Inheritances impede social mobility among older Australians

As noted above, wealthier parents tend to have wealthier children, even in the absence of wealth transfers. Inheritances strengthen this relationship — which means inheritances impede social mobility — because they move children closer to their respective parent's position in the wealth distribution. This effect is conceptually different to the effect of inheritances on wealth inequality.

Among older Australians whose last surviving parent died in the past two decades, about one third of the association between their position in the wealth distribution (relative to their peers) and their parents' position in the wealth distribution (relative to their peers, and when still alive) was because of inheritances.

Future wealth transfers are projected to increase in size

Consistent with trends over the past two decades, older Australians are projected to hold a disproportionately larger share of wealth over time relative to their share of the population (figure 5, panel a). This finding is replicated across a number of reasonable scenarios for rates of return on different assets, home ownership, savings and wealth transfer behaviour, while holding current policy settings fixed (box 3).

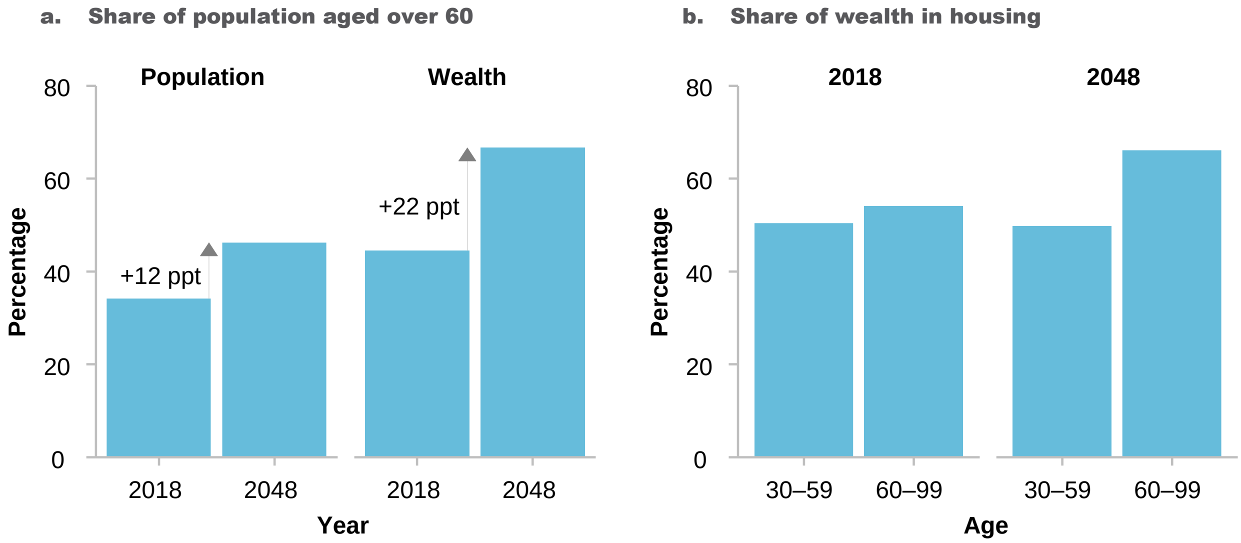
Housing wealth is a large driver of this result (figure 5, panel b) — older age groups own more housing wealth, they draw down on housing wealth slowly, and inherit large housing wealth from their partners in old age.

Box 3 – Modelling impacts of wealth transfers on future wealth inequality

Future wealth transfers and their impacts on wealth inequality were analysed using a simulation model calibrated to micro-level data on income, wealth, and wealth transfers while holding current policy settings, including for tax and the superannuation system, fixed.

Model outputs — the projections — depend heavily on assumptions and are not, and should not be, interpreted as predictions of the future. Although the projections do not provide an exact estimate of what will happen in the real world, they provide useful insights and forward-looking descriptive statistics about a range of potential outcomes for wealth transfers in the future.

Figure 5 – Older people are projected to hold a greater share of wealth



Inheritances passed onto the next generation are projected to grow in line with rising wealth among older age groups, with the total amount increasing nearly fourfold between 2020 and 2050. Falling fertility rates — a long term trend evident in Australia since the late 1950s — means that people who die will have fewer children to leave their wealth to, contributing to larger average inheritances received per person.

Projections of the value of gifts were based on existing gifting rates estimated from survey data (which may underreport gifts received). The size of gifts is projected to fall relative to the size of inheritances, because gifts tend to be made years before death from a relatively smaller stock of wealth than exists when people die.

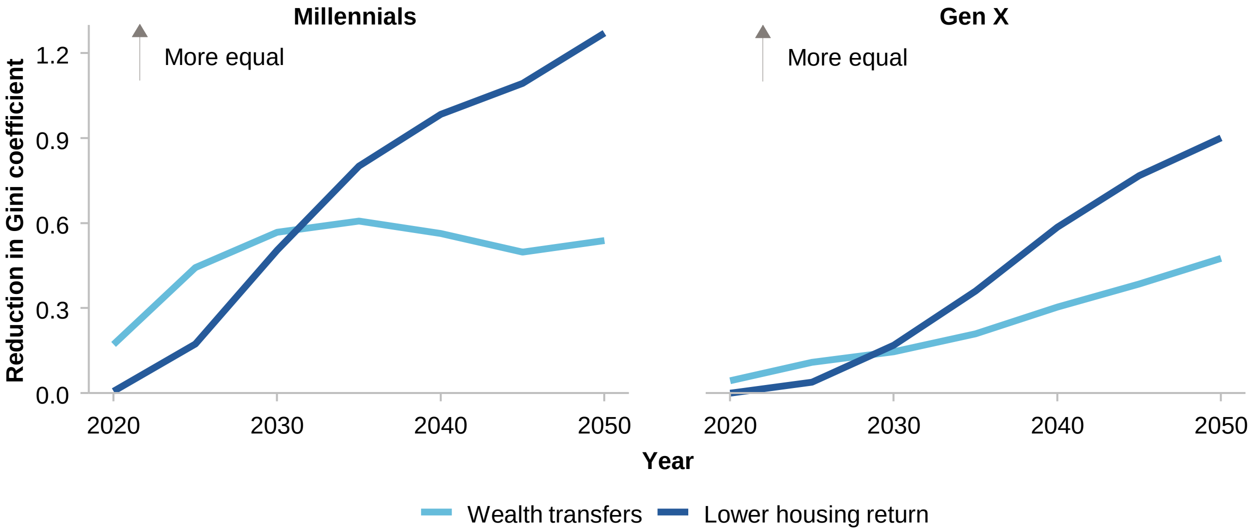
Wealth transfers are projected to reduce relative wealth inequality, although behavioural changes could increase it

In most of the scenarios that were modelled, wealth transfers are projected to increase *absolute* wealth inequality but reduce *relative* wealth inequality. The mechanics are the same as described above: even though wealthier people receive larger wealth transfers on average, less wealthy people receive wealth transfers that are a larger share of their existing wealth.

If wealthier people are assumed to benefit more from wealth transfers in the future — for example, because they receive a much larger share of total inheritances than observed in the past, or save a much larger share of their inheritances compared to less wealthy people — then there could be an increase in relative wealth inequality.

That said, the projected effects of wealth transfers on relative wealth inequality under all modelled scenarios are small. A one percentage point change in the rate of return to housing wealth — a fraction of the average annual historical return — is projected to have a much larger impact on wealth inequality than wealth transfers (illustrated with reference to the millennial and generation X birth cohorts in figure 6).

Figure 6 – As in the past, wealth transfers are projected to moderate wealth inequality but the effect is small relative to a lower housing return[a,b]



a. The ‘wealth transfers’ line shows the reduction in the Gini coefficient (100 point scale) due to wealth transfers, relative to no future wealth transfers. The ‘lower housing return’ line shows the effect due to a one percentage point lower rate of return on housing in the long run. **b.** See chapter 3 for further details.

1. How much wealth do people transfer?

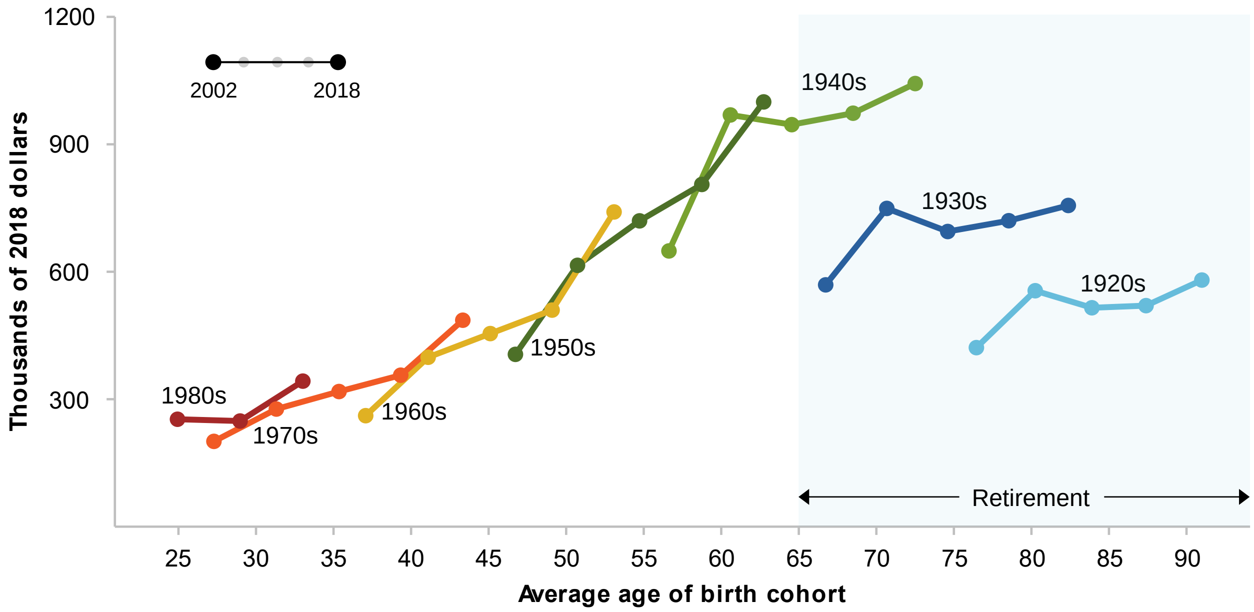
Key points

- **The total value of wealth transfers in 2018, including inheritances and inter vivos gifts (gifts), was slightly more than $120 billion.**
  - This was equivalent to about 6.5 per cent of gross national income, which was much lower than in a range of European countries where comparisons were possible.
- **Between 2002 and 2018 the total value of wealth transfers was approximately $1.5 trillion.**
- **Inheritances consistently account for the vast majority of wealth transfers. In 2018 approximately $107 billion (90 per cent) of total wealth transfers were inheritances, compared with less than $14 billion for gifts.**
- **The distribution of wealth transfers was highly skewed. There were a few very large wealth transfers, but most were much smaller than the average.**
  - The average reported value of an inheritance was $125 000 in 2018-19, compared with a median value of $45 000. The average reported value of a gift was $8000, compared with a median value of $1000.
- **Inheritance recipients were typically middle aged or older, with a median age a little over 50. Gift recipients were much younger, most commonly aged in their early twenties.**
- **The real value of intergenerational inheritances — that is, bequests that older Australians left to younger generations, typically their children — was $52 billion in 2018, up from about $24 billion in 2002. The increase was driven by increases in per-person wealth.**
- **The real value of intergenerational gifts from parents to their children was $12 billion in 2018-19, up from about $4 billion in 2001-02, driven by more, and higher value, gifting.**
- **Lack of high-quality data hampers accurate estimation of the size of wealth transfers, who they go to, and who gave them.**
  - Only 44 per cent of people in the Household, Income and Labour Dynamics in Australia (HILDA) survey reported receiving an inheritance after the death of their second parent, suggesting there is significant non-reporting of inheritances, particularly small inheritances.
- **Additional questions in the HILDA survey — the only dataset in Australia that facilitates household-level analysis of wealth transfers — could improve understanding of wealth transfers in Australia, as would potential linkage of administrative datasets with probate records as the latter are progressively digitised.**

Australians have experienced strong growth in household wealth over the past two decades. But growth in wealth has been uneven, which inevitably leads to changes in the distribution of wealth (PC 2018a, chap. 4). Retirees in particular have seen disproportionately strong growth in their wealth (and their population share, chapter 3) relative to younger people. Indeed at a time where one would expect retirees to be drawing down on their wealth to fund consumption, their wealth has actually increased (figure 1.1) (The Treasury 2020, p. 369).

Figure 1.1 – People build up wealth over their working lives

Average equivalised wealth by birth decade and age[a]



a. Data points are 2002, 2006, 2010, 2014 and 2018, following the same group of people over time.

Source: Productivity Commission estimates using HILDA Restricted Release 19.

A corollary of this strong growth in wealth is that older Australians in particular have significant amounts to give away while they are alive (inter vivos gifts — known henceforth as 'gifts'), and at death (inheritances) which, in turn, also changes the distribution of wealth. How gifts and inheritances (wealth transfers) affect the distribution of wealth, and whether they make it more or less equal, is the subject of this report.

This chapter lays the foundation for this study. It discusses data sources and estimates the annual flow of inheritances and gifts. The flow of inheritances is estimated directly (inheritances received by Australians from older generations), and indirectly (wealth held by Australians who die that is expected to pass to younger generations). The flow of gifts is estimated directly only. The analysis is confined to the transfer of financial (for example, cash) and non-financial assets (for example, houses and cars). In-kind transfers, such as childcare and rent-free living, are not considered in this study.

Later chapters look at how wealth transfers have affected the distribution of wealth over the past twenty years (chapter 2), as well as how they might affect the distribution of wealth in the future (chapter 3).

This chapter is in five parts. Section 1.1 describes the state of household and individual level data holdings available to inform analysis of wealth transfers in Australia. Section 1.2 reports the value of inheritances. The value of gifts are estimated in section 1.3. Section 1.4 presents some international comparisons of the size of wealth transfers. Finally, section 1.5 makes some suggestions to improve wealth transfer data collection.

1.1 State of data about wealth and wealth transfers

There is no definitive data source on wealth transfers in Australia (this is not unique to Australia — box 1.1). In fact, due to a lack of consistent and comprehensive public reporting, relatively little is known about the wealth holdings of individual Australians or Australian households throughout their lives, let alone with whom they share their wealth, and how much.

Broadly speaking there are two key sources of data for analysis of wealth and wealth transfers: administrative and survey data. Administrative data — data collected by courts or government agencies while performing their usual functions — covers broad swathes of the population but is difficult to access and does not provide all variables of interest for each person or household in question. Survey data — data collected by surveys designed for research purposes — provides a smaller sample but a richer picture of those who are surveyed.

Box 1.1 – Comprehensive wealth transfer data can facilitate detailed analysis

Very few countries collect comprehensive data on individual wealth, let alone make it available for public scrutiny. One country that did collect this data is Sweden, albeit indirectly, via its taxation of inheritances and gifts (since 1885) and wealth (since 1948) (Waldenström 2018). Both taxes were abolished between 2004 and 2006, nevertheless, the data remains available via the Swedish Inheritance and Estate Tax Register and the Wealth Register.

The Swedish databases facilitate highly detailed analysis of wealth accumulation and wealth transfer behaviour and the impact on the distribution of wealth. For example Nekoei and Seim (2019) (whose analysis is summarised in chapters 2 and 3) constructed a dataset consisting of almost 1.5 million likely inheritances for the period 2000 to 2012. In Australia, for the same period, analysis of the HILDA survey yielded fewer than 4300 reported inheritances.

Comprehensive administrative data about individual wealth does not exist in Australia

There is no high-quality, comprehensive administrative dataset that contains information about Australians' individual wealth holdings or wealth transfers. In Australia, inheritance taxes — which would otherwise provide a rich source of data for analysis — were abolished in 1979 at the Commonwealth level and the last state tax was abolished in 1982 (Pedrick 1981).[1]

The most detailed administrative datasets containing wealth data about individual Australians are the state and territory probate collections, which contain information about wealth at death and the beneficiaries of that wealth.[2]

[1] Katic and Leigh (2016) used tabulated inheritance tax data between 1953 and 1979 to analyse top wealth shares for Australia.

[2] Probate is the legal process to prove the validity of a person's will. A grant of probate is an Order passed by the relevant State or Territory's Supreme Court confirming that a will is the last valid will of the deceased and allowing an executor,

But probate data is difficult to access. There are no consolidated holdings of probate files nationally. Access to state and territory-based probate records is subject to different access arrangements in each jurisdiction. Further, as probate records are legal documents, it would be a time-consuming, on-site, paper-based task to collect, interpret and code the necessary information to create a dataset covering all jurisdictions that could be analysed using quantitative methods.

For this study, two existing probate datasets were analysed, based on a representative Australian sample from 2012 and for Victoria in 2016. Combined, these two datasets provide information on wealth at death relating to about 5000 deaths over the period 2003–2019, equivalent to about 0.2 per cent of the almost 2.3 million deaths in Australia over that period (ABS 2021). This study also references an analysis of a sample of Victorian probate records collected in 2006 (Baker and Gilding 2011).

The coverage of probate data is limited. In general, fewer than 50 per cent of deaths result in a grant of probate in any given year (Productivity Commission estimates based on analysis of probate data between 2013 and 2019 contained in the 2021 *Report on Government Services* (SCRGSP 2021a)). This is because probate is unnecessary in some circumstances — for example, when assets are owned jointly with a surviving spouse, or when estates are relatively low in value, such as those that do not contain real estate or financial assets worth more than $50 000. And probate is not comprehensive in terms of assets covered. Superannuation and other assets held in trusts are not usually captured.

The assets held in trusts are largely opaque. While certain types of trusts (discretionary and testamentary trusts) can enable the intergenerational transfer of wealth, there are few disclosure requirements for trustees of private trusts (Evans 2019). Moreover, as tax is levied on income rather than assets, data on asset transfers is not generally collected by the Australian Tax Office (ATO). That said, the ATO does facilitate access to superannuation data via the ATO Longitudinal Information Files (ALife). Alife contains information on superannuation assets for a large sample of Australian taxpayers and is used in this study to estimate the value of superannuation-derived inheritances (more commonly known as superannuation death benefits).[3]

Survey data contain the most comprehensive information about wealth holdings of individual Australians

There are two ongoing Australian surveys that report household wealth and wealth transfers — the HILDA survey and the Survey of Income and Housing (SIH) (box 1.2). These are the only household and individual level datasets — survey or administrative — that provide contemporary, ongoing, near-comprehensive information about the value of wealth and wealth transfers across a representative sample of the Australian population.

(The Youth in Focus dataset contains information about gifts from parents to children, but only in 2006 and 2008, and is discussed in section 1.3)

named in the will, to collect and distribute the estate in accordance with the will. Once probate is formally declared, probate records document the amount of assets held by the deceased persons and how they are distributed. These records may or may not include fees charged by lawyers who are nominated as executors, or funeral costs, paid by the estate.

[3] There are other administrative datasets that contain information about wealth holdings that were not used in this report because they were not representative of the population or timely access was not available including age pension asset test data, and aged care means test data.

Box 1.2 – Australian wealth surveys: an overview

Household, Income and Labour Dynamics in Australia (HILDA) survey

Commencing in 2001, the HILDA survey is a nationally representative household-based longitudinal study that collects information about economic and personal wellbeing, labour market dynamics and family life for a representative sample of Australians (Summerfield et al. 2020).

The survey is conducted annually and has been undertaken 19 times since 2001. It samples almost 10 000 households and just over 23 000 people.

Detailed information on wealth is collected every four years, starting in wave 2 in 2002 — the first large-scale survey of household wealth conducted in Australia since the 1915 Census (Headey, Warren and Wooden 2008, p. 2).

By wave 19, HILDA had collected detailed information about the wealth holdings of approximately 35 000 people.

Survey of Income and Housing (SIH)

The SIH is a household-based survey that collects information on sources of income, wealth, housing and household characteristics. It is representative of usual residents of private dwellings in urban and rural areas — covering about 97 per cent of people living in Australia (ABS 2019c).

The SIH was conducted irregularly between 1994-95 and 2002-03. Starting in 2003-04 the SIH has been conducted every two years. Detailed information on wealth has been collected for every iteration of the SIH since 2003-04, except for 2007-08. In 2017-18 just over 14 000 households were sampled (ABS 2019c).

Although the SIH is a larger survey than HILDA (for example in 2017-18 it included more than 14 000 households compared with fewer than 10 000 for HILDA), on balance, HILDA is the only viable option for this study.

- HILDA contains detailed annual information on wealth transfers including when they were received and the value of inheritances and gifts. By comparison, the SIH does not regularly include questions about inheritances (they are in fact only available in one year, 2011-12), the source of gifts — from parents or others — is impossible to isolate, and gifts for the purposes of purchasing property and vehicles or for paying off debt are excluded.
- HILDA is an annual, longitudinal panel (now 19 years old) that follows the same households through time, while the SIH uses a new cross section for each survey. The longitudinal nature of HILDA allows measurement of wealth — which is collected every 4 years — and other socio-demographic characteristics in the years before and after wealth transfers are received.
- The scope of HILDA more comprehensively covers the Australian population. The SIH does not survey people in non-private dwellings, most importantly people in aged care, which is where more than one third of Australians die (Productivity Commission estimates based on AIHW 2021b) (but also prisons, hospitals, boarding schools and university colleges).[4]

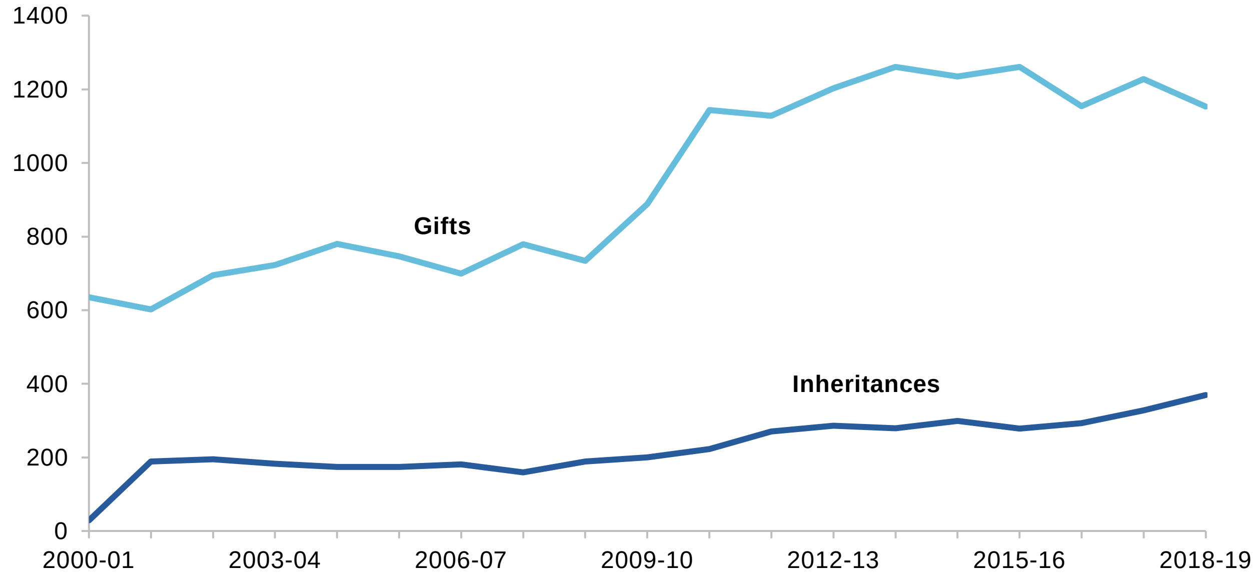
[4] The initial sample of HILDA respondents also did not include people living in non-private dwellings, but respondents who subsequently moved into non-private dwellings are surveyed.

HILDA underpins, most of the estimates in the rest of this report (refer to appendix A for a more detailed comparison of SIH and HILDA).

Shortcomings of survey data

HILDA, like all survey data, is subject to errors that can undermine the accuracy of subsequent inferences about the population. Most importantly for the purposes of this study, the number of reported wealth transfers is low — for example, in the 19 years of the HILDA survey a total of just 4300 inheritances are reported compared with nearly 2.8 million deaths over the same period (figure 1.2) — and the quality of the data, for the purposes of making statistical inferences, is unclear.

Figure 1.2 – Annual number of reported wealth transfers in HILDA



Source: Productivity Commission estimates using HILDA Restricted Release 19.

There is almost certainly underreporting and non-reporting that affect the wealth transfer data (some of which are discussed below and in chapter 2), and common solutions to these sampling and non-sampling errors are difficult, if not impossible to implement here because of the lack of a definitive administrative dataset with which to compare, and subsequently correct, the survey errors (Davies and Shorrocks (2000) provided a comprehensive summary of survey errors and potential corrections).

Because of these statistical issues and given the necessarily heavy reliance in this report on HILDA data, the rest of this chapter presents estimates of the value of wealth transfers using HILDA with a few different methodologies and in combination with other data sources to better understand the variability of the estimates. Statistical results in chapter 2 are reported wherever possible with confidence intervals and a range of scenarios are investigated in appendix C to transparently deal with the uncertainty in the data used in simulation modelling.

1.2 Inheritances

The value of inheritances can be estimated directly from the value of reported inheritances in HILDA and indirectly via the value of wealth at death. The direct approach is referred to in this report as the ‘inflow’ approach (wealth received by beneficiaries) and the indirect approach as the ‘outflow’ approach (wealth donated by those who die).

Analysis in the inflow section is based solely on reported inheritances data from HILDA. Analysis in the outflow section combines HILDA wealth estimates with information about deaths and the distribution of wealth from probate.

Inheritance inflows

Based on analysis of HILDA data, the total value of all reported inheritance inflows in the population increased from about $18 billion in 2001-02 to $50 billion in 2018-19 due to an increase in both the number and size of inheritances reported (figure 1.3, panels a and b).[5]

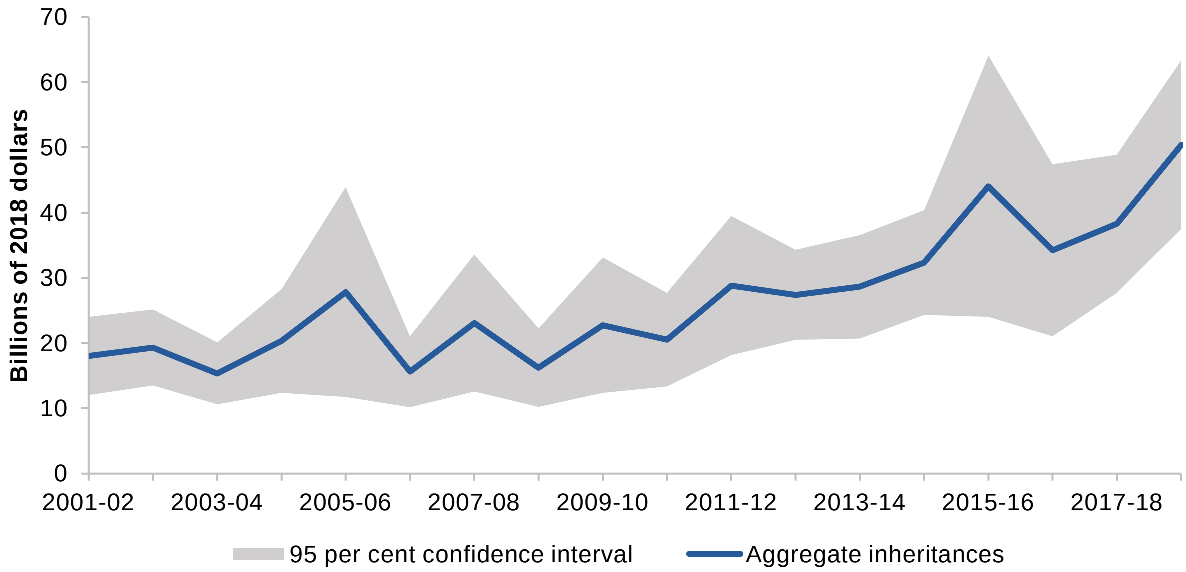
The average value of an inheritance increased from about $85 000 to $125 000 while the number of inheritances received doubled from about 200 000 to 400 000.

Inheritances tend to be highly skewed with many relatively small inheritances and very few large ones (figure 1.3, panel c). For example, in 2018-19 the median inheritance was only $45 000 while the average was about $125 000. The implications of the distribution of inheritances for wealth inequality are analysed in chapter 2.

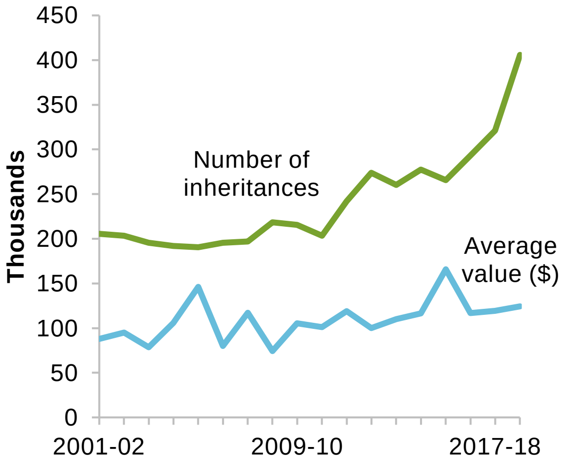
[5] Inheritances were not separately identified as a payment source in the 2001 HILDA Survey causing the number recorded to be unusually low (figure 1.2), and hence that year’s data is excluded from the analysis.

Figure 1.3 – The number and value of inheritances have grown but most are valued below $50 000[a]

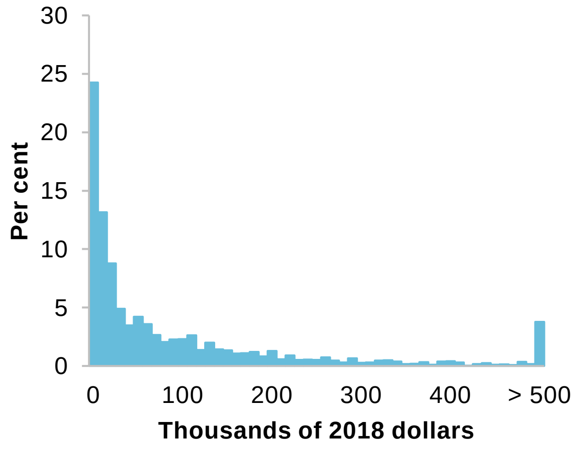
a. The aggregate value of inheritances received, by financial year



b. The average value and number of inheritances received, by financial year



c. The distribution of inheritances received, by value, 2001-02 to 2018-19



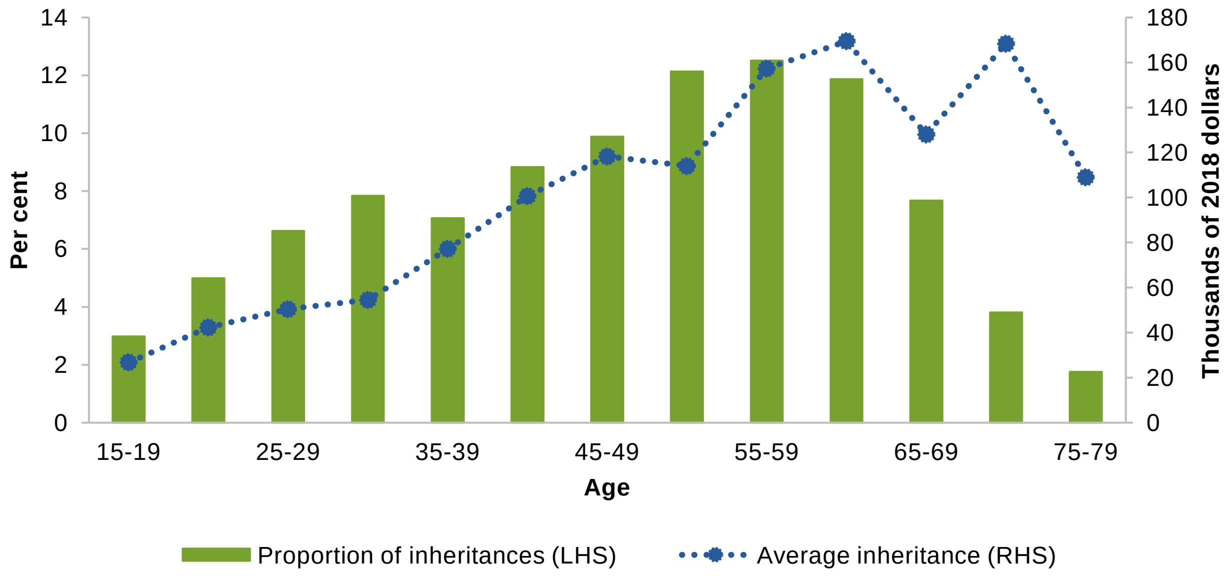
a. Based on an annual question in the HILDA survey that asks respondents '*How much did you receive from inheritances / bequests during the last financial year?*'.

Source: Productivity Commission estimates using HILDA Restricted Release 19.

The median age of an inheritance recipient in the HILDA dataset was about 50 (figure 1.4), compared to 58 in probate records. Productivity Commission analysis of probate records found that about 70 per cent of inheritances go to people in their fifties and sixties (Baker 2014; Wood, Griffiths and Emslie 2019).

The average value of inheritances received increased with age up until people in the 60–64 age bracket, who received an average inheritance of about $170 000.

Figure 1.4 – People in their fifties receive a larger share of inheritances than those in any other decade of life[a]



a. Inheritances for those aged over 79 years are negligible and not shown in the chart.

Source: Productivity Commission estimates using HILDA Restricted Release 19.

Comparison of inheritances reported in HILDA and the SIH in 2011-12

The SIH collected information about inheritances in 2011-12, which allows for a comparison with HILDA data for the period 2010–2012. This comparison finds that the implied value of inheritances is larger in HILDA — $49.0 billion compared with $38.5 billion — because both the value and likelihood of receiving an inheritance is higher in HILDA than in the SIH (table 1.1).

There are several possible reasons for the systematically higher estimate of inheritances in HILDA compared with the SIH.

- The SIH survey asked respondents to exclude inheritances received from family members living in the same household. When inheritances that were likely received from household members were excluded from the HILDA dataset, the gap between the aggregate value of inheritances received falls by about $4 billion.
- The HILDA survey requires respondents to recall inheritances received in the previous year, compared with the previous two years for SIH. Recall bias tends to worsen with time (box 1.3).

Table 1.1 – Reported inheritances are more common and larger in HILDA than SIH[a,b]

Reported inheritance	HILDA 2010–12	SIH 2011-12	HILDA estimate as a percentage of SIH estimate
Mean	$114 132	$101 365	113%
Median	$34 385	$32 985	104%
Total	$49.0 billion	$38.5 billion	127%
Proportion of population reporting an inheritance	2.21%	2.12%	104%

a. Constant 2018 prices. **b.** The two-year period covered by the SIH extends into the 2009-10 financial year for some respondents, whereas the HILDA data covers the 2010-11 and 2011-12 financial years exclusively.

Source: Productivity Commission estimates using ABS SIH Basic confidentialised unit record files for 2011-12; HILDA Restricted Release 19.

Box 1.3 – Recall bias: people forget …

Recall bias, or misreporting, is a type of non-sampling survey error. The other common type of non-sampling error is known as differential response, which refers to the refusal or inability of households to answer part or all of the survey (Davies and Shorrocks 2000, p. 30). In wave 2 of HILDA, 39 per cent of households could not provide information about at least one component of their wealth holdings. This meant that wealth could only be directly computed for 61 per cent of households with the rest having their values imputed (Headey, Warren and Wooden 2008, p. 5).

Although there is no direct analysis of recall bias in reporting of inheritances, there is evidence of recall bias for other variables in the HILDA dataset. For example, about five per cent of respondents incorrectly recalled their employment status at the time of their previous interview, one year earlier. Mistakes were more common if the respondent had changed employment status since their last interview (for example. someone who was employed a year ago but had subsequently lost their job). Of respondents who incorrectly recalled their employment status, 30 per cent made at least two mistakes answering questions about their previous employment status over the five-year period that was analysed (Goode 2007, pp. 9–13).

There are several other reasons for why misreporting may occur.

- Respondents may deliberately misreport their wealth holdings due to privacy concerns — data on wealth is typically considered more sensitive than information on other sensitive issues including income or sexual behaviour (OECD 2013, pp. 137–138). Similarly, respondents may deliberately misreport due to social desirability concerns.
- Respondents may report incomplete or out of date information (OECD 2013, pp. 137–138).
- Respondents may misreport because they are not sure of the true value of an asset, for example, in relation to collectibles (Davies and Shorrocks 2000, pp. 30–31).

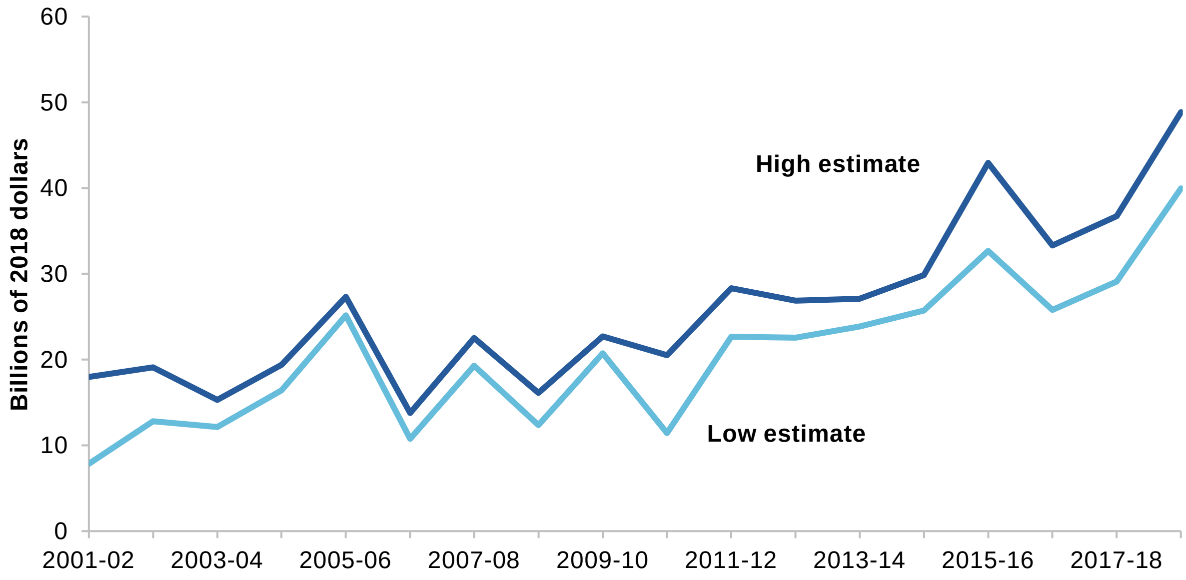
Intergenerational inflows of inheritances are hard to define

Compared with inheritance outflow estimates — analysed in the next section — disaggregating the total value of inheritance inflows into inter and intragenerational flows is not straightforward because HILDA respondents are not asked who they received their inheritance from. However, other aspects of the survey, such as the self-completion questionnaire, which includes information about the death of close relatives, enables the construction of approximate 'high' and 'low' estimates of the value of intergenerational inheritance inflows (figure 1.5).[6]

- The high estimate only excludes inheritances that are reported within three years of the death of a spouse. In this way, the high estimate could incorrectly include other intragenerational inheritances (for example, those from a sibling, cousin or friend).
- The low estimate attempts to isolate inheritances received from the death of the last surviving parent by including all reported inheritances within three years of the death of a 'close relative' and excluding other inheritances where the death of a spouse was reported, or no death was reported. In this way, the low estimate has a relatively lower probability of incorrectly including intragenerational inheritances.

In 2018-19, the low and high estimates for the value of inheritance inflows transferred between generations were $39.9 billion and $48.8 billion respectively, or between 79 and 97 per cent of the total.[7]

Figure 1.5 – The inflow value of intergenerational inheritances is uncertain



Source: Productivity Commission estimates using HILDA Restricted Release 19.

Inheritance outflows

The total value of inheritance outflows, and the share that is transferred across generations was estimated indirectly based on HILDA wealth estimates, as opposed to reported inheritances.

In brief, the calculation involves two steps.

- Calculating total inheritances: multiplying the value of wealth held by each person in HILDA in a given year by the probability that that person dies and then summing across all people in HILDA, produces an estimate of total wealth at death, or total inheritances. (The estimated value of refundable accommodation

[6] The survey asks about the death of a spouse as well as the death of 'other close relatives', but 'parent' is not specified.

[7] This suggests that people who received a wealth transfer from their spouse did not report it as an inheritance.

deposits, which people in aged care tend not to include in their reported wealth holdings, has been added to the outflow estimate — see Appendix A.)

- Calculating intergenerational inheritances: using information gleaned from probate data, the value of total inheritances can be disaggregated into intragenerational inheritances — typically those that go to a spouse — and intergenerational inheritances — typically those that go to children.

Appendix A contains a description of the methodology used to construct the outflow estimates as well as an additional estimate of the value of intergenerational transfers, which, for ease of exposition, is not presented in the chapter.[8]

The total outflow value of inheritances

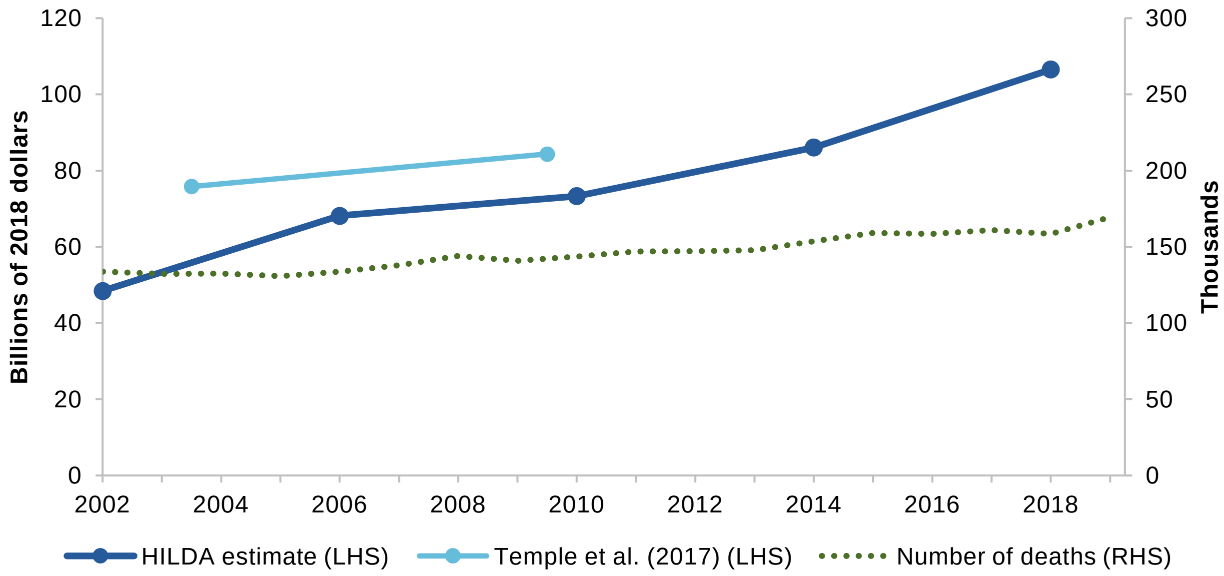
The total outflow value of inheritances — including inheritances that do not immediately go to younger generations — was $107 billion in 2018, up from $48 billion in 2002 (figure 1.6). This is equivalent to about six per cent of gross national income. The increase in value between 2002 and 2018 was driven by increases in per-person wealth more so than increases in deaths, which were relatively flat over the period (figure 1.6).

Only one other study appears to have estimated the outflow value of inheritances in Australia. Temple, McDonald and Rice (2017), whose estimate was based on the Australian Bureau of Statistics Household Expenditure Survey and SIH, found that the aggregate value of wealth held at death was about $76 billion in 2003-04 and $84 billion in 2009-10[9], slightly higher than the estimates in this study. The Temple, McDonald and Rice (2017) estimates were scaled against the aggregate value of household sector wealth reported in the National Accounts, which is larger than the aggregate value based on HILDA data (box 1.4).

[8] The key difference between the HILDA-based estimate presented here and the additional estimate in appendix A is how the probability of death is calculated. Put simply, the probability of death in the method used here is based on the number of deaths that occurred in Australia in that year, and in the method used in appendix A it is based on actual deaths observed in HILDA. Very few observations inform the 'actual deaths' calculation, which means the estimate in appendix A is subject to significant statistical noise.

[9] The values reported by Temple, McDonald and Rice (2017) have been converted to constant 2018 dollars using the CPI to enable comparison to other estimates reported in this paper.

Figure 1.6 – The outflow value of inheritances is driven by increasing per-person wealth



Source: Productivity Commission estimates using: ABS (*Deaths, Australia, 2019,* Cat. no. 3302.0); ACFA (2020b, 2021); AIHW (2021b); HILDA Restricted Release 19; Temple, McDonald and Rice (2017).

Box 1.4 – Explaining the gap

There is a sizeable gap — 15 per cent or $1.5 trillion — between the estimated aggregate wealth of the household sector based on HILDA data in 2018 and the aggregate wealth of the household sector measured by the National Accounts, which is considered to be a comprehensive measure of household sector wealth. (The National Accounts measures the wealth held by the household sector collectively, but it is not built up on, or apportioned to, the individual or the household level.)

This gap is a function of differences in scope and measurement as well as survey errors (sampling and non-sampling), which affect all survey datasets and can undermine the accuracy of subsequent inferences about the population. For example, inferences about the dispersion and aggregate value of wealth (Bloxham and Betts 2009; Davies and Shorrocks 2000; OECD 2013, pp. 137–138).

Some of the scope and measurement differences between HILDA and the National Accounts are quantifiable.

- Residents of aged care facilities can pay for their accommodation using a refundable accommodation deposit (RAD), which is returned to the estate of the resident when they leave aged care (usually due to death). RADs were worth $29 billion in 2018 and Commission analysis found that most aged care residents did not include the value of their RAD in the wealth holdings they reported to HILDA (appendix A).
- Other wealth held by aged care residents is surveyed by HILDA but not included in population aggregates because aged care residents are weighted to zero (appendix A contains more detail). The Commission estimates the non-RAD wealth of aged care residents to be worth $37 billion in 2018.

Box 1.4 – Explaining the gap

- The wealth of non-profit institutions serving households, such as charities, is included in the National Accounts but not HILDA. The bank deposits (other wealth is not quantifiable) of these institutions were worth $23 billion in 2018 (ABS 2019c).[a]
- Capitalised real estate transaction costs, such as stamp duty, are included in the National Accounts but not HILDA and were worth $243 billion in 2018 (ABS 2019c).[a]
- The extent to which HILDA captures unfunded superannuation claims and the technical reserves of general and life insurance corporations is not clear. Unfunded superannuation claims, that is, the liability of governments to pay superannuation to their employees, were worth about $452 billion in 2018 (ABS 2019c). The technical reserves of general and life insurance corporations, were worth about $174 billion in 2018 (ABS 2019c).[a]

Some of the remaining gap is likely due to under-sampling in survey data. Under-sampling at the top end of the wealth distribution (a common problem with wealth surveys due to the heavy skew in wealth data) can affect estimates of aggregate wealth. For example, the richest 200 Australians — who are very unlikely to have been surveyed — had wealth of $283 billion in 2018 (Stensholt 2018).

Appendix A contains a comprehensive comparison of the National Accounts, the SIH and HILDA.

a. Estimates have been converted into constant 2018 dollars using the CPI.

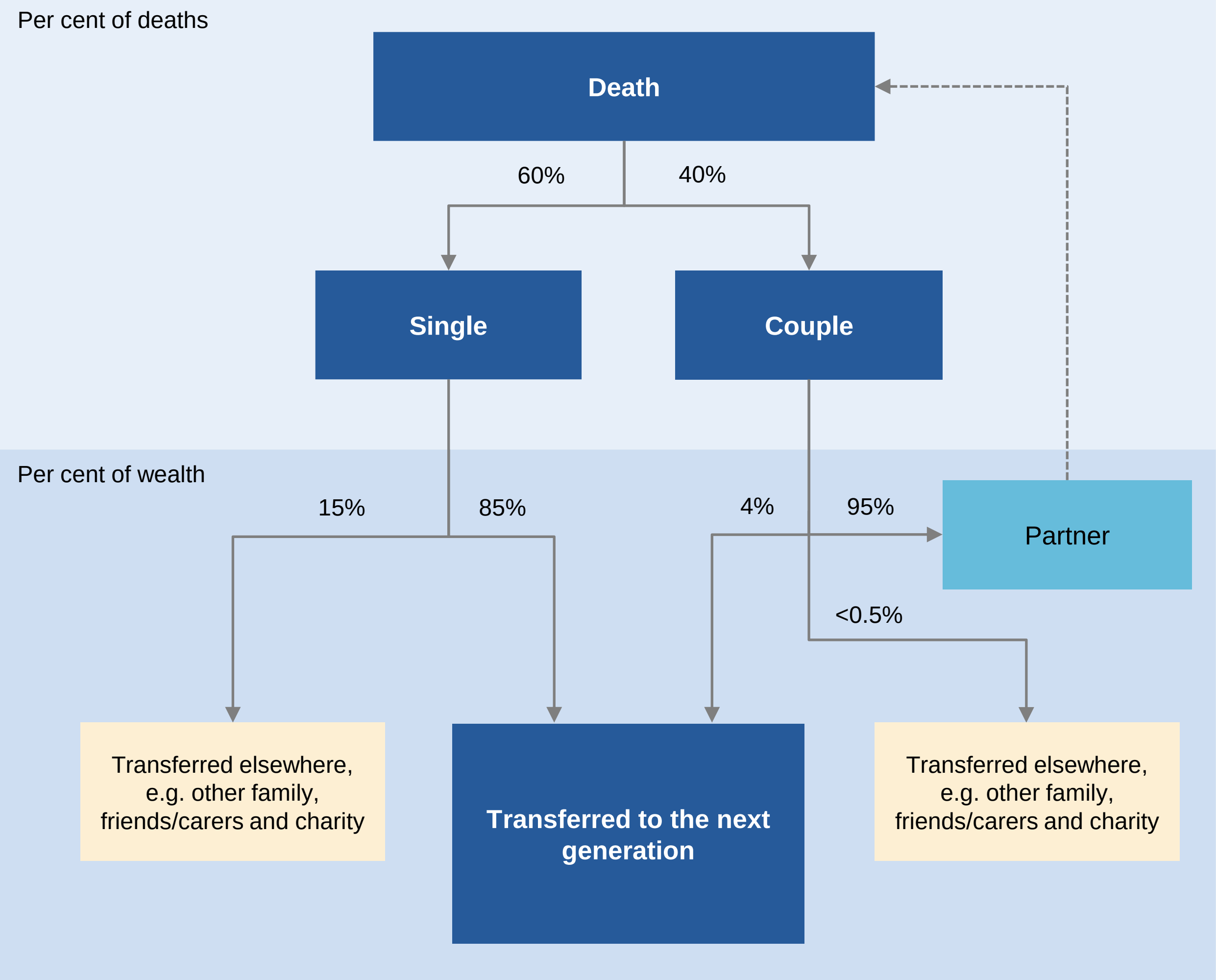
The value of intergenerational outflows

Calculating the share of inheritance outflows that was transferred between generations required information about who gives what to whom when they die. Analysis of ABS deaths data and probate data informed this calculation (box 1.5). Approximately 85 per cent of wealth owned by individuals who were single at their time of death (known as final estates) and about four per cent of wealth owned by individuals who were part of a couple at the time of their death (known as first estates) is bequeathed to the next generation, typically to their children. In the limited number of comparable studies in other countries, similar distributions are observed.[10]

[10] In the United States, 88 per cent of the value of final estates is distributed “approximately equally” among children (Wilhelm 1996, p. 880). Roughly 50 per cent of the value of all estates is immediately transferred to younger generations in Australia, compared to 49 per cent in the United Kingdom (Atkinson 2018, p. 143). Piketty (2011, p. 1098) studied the evolution of inheritances dating back to 1820 and found that 70 per cent went to children.

Box 1.5 – Who gives what to whom?[a]

The figure below combines ABS Deaths data with probate information. The top panel disaggregates the share of deaths by relationship status. The bottom panel shows the distribution of wealth at death into inter and intragenerational flows.



a. Detail on how the flows have been calculated is provided in appendix A.

Source: Productivity Commission estimates using ABS (*Deaths, Australia, 2019,* Cat. no. 3302.0); Wood, Griffiths and Emslie (2019); SCRGSP (2021b).

The outflow value of inheritances that was transferred intergenerationally was estimated to be about $52 billion in 2018, up from $24 billion in 2002.

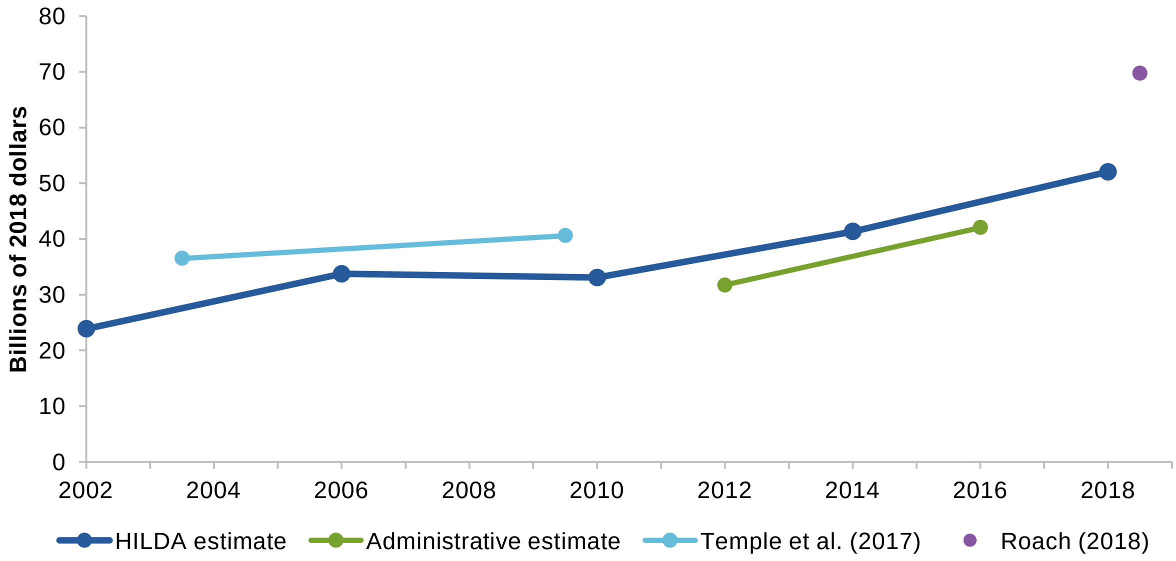
As a check on the accuracy of the HILDA outflow estimate, a comparable estimate was calculated using administrative data sources. This estimate was built up starting with an estimate of the value of final estates calculated using probate data. As discussed in section 1.1, because probate typically does not include superannuation assets or low-value estates generally, the ALife dataset was used to calculate the annual value of superannuation death benefits likely transferred between generations, and HILDA was used to calculate the expected value of low value estates (appendix A contains more detail on this methodology).

The outflow value of inheritances based on this estimate was only available for 2012 and 2016, and was approximately $32 billion and $42 billion respectively, similar to the HILDA-based estimate.

In addition to the Temple, McDonald and Rice (2017) study referenced above, one other study Roach (2018) has estimated annual wealth at death in Australia.[11] These estimates were adjusted based on the same process applied to this study's estimate (box 1.5) to produce comparable estimates of intergenerational inheritance outflows (figure 1.7).

The source of differences between the estimates used in this study and the Temple, McDonald and Rice (2017) estimate are discussed above. The Roach (2018) estimate was similarly scaled using the National Accounts, which will tend to inflate its value compared with the HILDA-based estimate.[12]

Figure 1.7 – Estimates of the outflow value of intergenerational inheritances based on survey and administrative data are similar[a,b]



a. The Temple, McDonald and Rice (2017) and Roach (2018) outflow estimates have been scaled in line with the flows in box 1.5.
b. There is a four-year interval between HILDA outflow estimates because wealth is only recorded every four years in the HILDA dataset.

Source: Productivity Commission estimates using: ABS (*Deaths, Australia, 2019,* Cat. no. 3302.0); ACFA (2020b, 2021); AIHW (2021b); Baker (2014); Wood, Griffiths and Emslie (2019); HILDA Restricted Release 19; ALife 2018 Release; SCRGSP (2021b); Temple, McDonald and Rice (2017); and Roach (2018).

Comparison of inheritance inflows and outflows

The HILDA estimate of inheritance outflows is consistently larger than the estimate of inflows, by an average of 29 per cent (figure 1.8). Three potential drivers of this gap include:

1. non-reporting of inheritances
2. inheritances sent abroad exceeding inheritances received from abroad
3. inheritance outflows being consumed by death-related expenses and taxes.[13]

[11] The Roach (2018) study is not presented in figure 1.6 because the estimate is based on final estates only.

[12] The HILDA based estimate has not been scaled to match the National Accounts estimate for household sector wealth because the distribution of the wealth not captured by the HILDA dataset is unknown.

[13] One additional driver that is difficult to quantify is the effect of superannuation-derived inheritances involving defined benefit funds being measured with error. It is not clear how this would affect the gap between inheritance inflows and outflows.

Non-reporting (and possibly underreporting) of inheritances in the inflow measures

Just 44 per cent of people in the HILDA survey reported receiving an inheritance when their second parent died. The true share is almost certainly much higher because about 80 per cent of single-person deaths involve an estate worth more than $20 000 — enough to cover death-related expenses such as a funeral — and, as discussed above, final estates are nearly always bequeathed to surviving children.[14]

Whether the value of inheritances is also underreported in HILDA is unclear. There is some evidence that inheritances are underreported in household surveys in other countries (Wolff and Gittleman 2014). A potential avenue for underreporting is by respondents forgetting to report or accidentally excluding non-monetary inheritances, in particular, housing — although evidence for this is weak (box 1.6).

Box 1.6 – The majority of inherited housing is reported

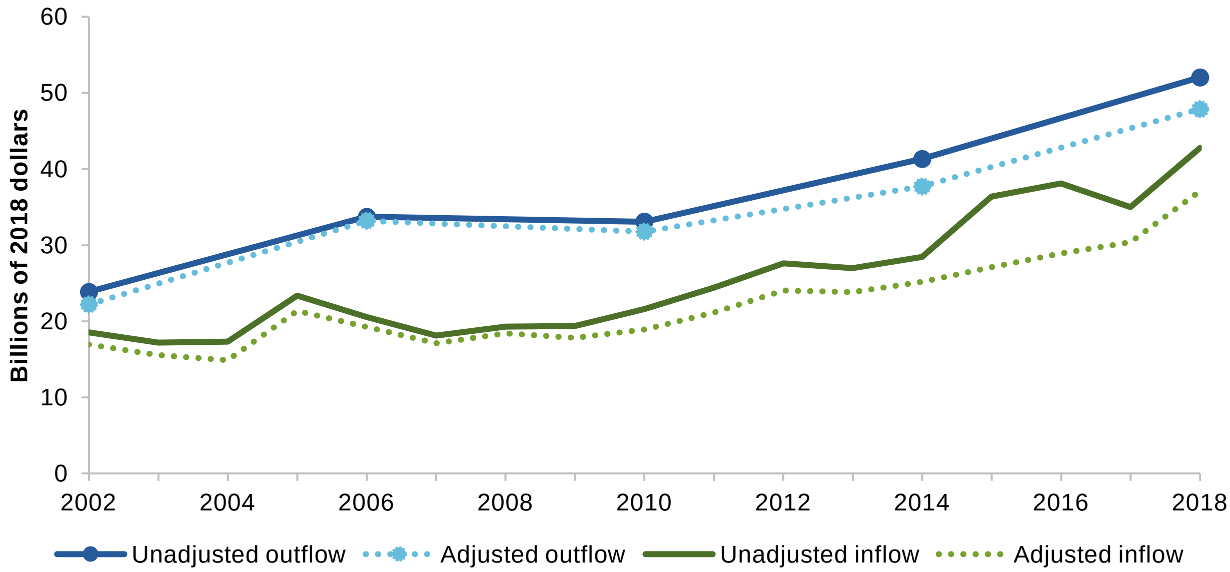
Most inherited housing is reported by inheritance recipients in HILDA. When housing wealth was excluded from the outflow estimates, the outflow estimates were much lower than the reported inflow. Specifically, even if all non-property inheritance outflows were accurately reported by recipients and the only source of misreporting pertained to inherited property, on average 55 per cent of inherited property was reported. This test does not distinguish between people who received property and people who received the monetary proceeds from the sale of that property. Children with no siblings seem more likely to have received property. People with siblings seem more likely to have received a monetary share of the proceeds from sale. Excluding children without siblings from the analysis did not narrow the systematic gap between outflows and inflows.

The effect of migration on inheritances given and received

The World Bank (2020) estimated that Australians paid out almost four times as much as they received in remittances (money sent, or received from, overseas) in 2020. To test the hypothesis that cross-border inheritance flows explain the gap between inflows and outflows, the HILDA sample was restricted to include only people whose immediate family lived in Australia. This adjustment slightly widened the gap between self-reported inheritance inflows and the inheritance outflow estimate based on expected deaths, indicating that cross-border inheritance flows did not explain the gap between inflows and outflows (figure 1.8).

[14] Nonreporting is likely non-random, which means simply scaling the estimates is not possible. Appendix B contains analysis of this issue and shows that nonreporting is more likely among those with poorer parents, who probably received smaller inheritances.

Figure 1.8 – Migration does not explain the difference between estimated inheritance inflows and outflows[a]



a. Calendar year averages have been calculated for the inflow estimates to make them more comparable to the outflow estimates.

Source: Productivity Commission estimates using: ABS (*Deaths, Australia, 2019,* Cat. no. 3302.0); (2020b, 2021); AIHW (2021b); Baker (2014); Wood, Griffiths and Emslie (2019); HILDA Restricted Release 19; ALife 2018 Release; SCRGSP (2021b).

Death-related expenses and taxes

Inheritance recipients tend to report the value of the inheritance they receive after death-related expenses have been paid (appendix B). Nevertheless, death-related expenses and taxes, which would lead to the value of self-reported inheritances being smaller than inheritance outflows, likely explain only a small part of the gap.

- Funeral expenses are usually paid out of the estate if the deceased does not have funeral insurance (and most people do not (Strategic Intelligence 2014)). Funeral costs range from about $4000 for a basic cremation, to $15 000 for a more elaborate burial (ASIC 2021). Even if every death had a $15 000 funeral, the reduction in the expected outflow of inheritances would have been only $1.1 billion in 2018 — enough to explain about 12 per cent of the gap between inflows and outflows.
- Probate applications entail a fee that may be paid out of the estate. About $0.5 billion was spent on probate fees in 2018,[15] which would explain about five per cent of the gap.
- Whilst most inheritances are not taxed, inheritances from superannuation are taxed in some circumstances. Even if all superannuation assets transferred following death were taxed at the maximum rate (32 per cent),[16] the reduction in the expected outflow of inheritances based on HILDA would have been only $1.6 billion in 2018 — enough to explain about 18 per cent of the gap.

In summary, the inflow estimates, which form the basis for the analysis in chapters 2 and 3, are likely significantly affected by nonreporting, especially by those who received smaller inheritances. As discussed in those chapters and each accompanying appendix, the most probable consequence is that inheritances reduce wealth inequality to a slightly greater degree than our estimates find. Outflow estimates are likely

[15] Based on an average estate size of $800 000 and using estimates of probate fees reported by National Probate and Estates Group (2021).

[16] Thirty-two per cent is the maximum rate payable on a death benefit received by a non-dependent as a lump sum (ATO 2020b).

more accurate than inflow estimates, although the outflow estimates themselves potentially over-estimate the true value of inheritances due to death-related expenses and taxes.

1.3 Gifts

Unlike inheritances, which allow estimates of both inflows and outflows to be calculated, only the inflow value of gifts can be estimated using HILDA data on the value of reported gifts received. This information is gathered via the following annual question: 'How much [money] did you receive in the last financial year?' The question is split into gifts received 'from your parents' and 'from others'. Unfortunately, who 'others' are is not further defined.

For completeness, the total value of gifts (figure 1.9, panel a) is reported in the first part of this section's summary statistics, but the remainder of the analysis focuses on gifts received by children, from their parents — intergenerational gifts.

The rest of the section analyses the accuracy of the HILDA gift data, which is used to inform chapters 2 and 3, using other survey datasets that contain information about gifts.

Note that this study does not explicitly seek to measure temporary and contingent wealth transfers, such as loans from parents to children, because they do not meet the definition of a wealth transfer in this report as outlined in section 1.1.[17] This is not to say that such contingent transfers, whilst hard to measure, are not important in, for example, assisting young people to enter the housing market (box 1.7). But our analysis suggests that in the case that the contingency is realised, such as in the case of a mortgage foreclosure, because these events are comparatively rare, they probably represent a very small wealth transfer (as defined in this report) at about $13 million per year.

Box 1.7 – Assistance for purchasing a home

In the context of strong housing price growth there has been persistent media interest in assistance provided by parents to enable their children to enter the housing market. Recent academic studies by Barrett et al. (2015) and Cigdem and Whelan (2017) found that receiving an intergenerational wealth transfer was correlated with subsequently higher rates of home ownership.

Assistance by parents goes beyond actual wealth transfers. For example, what has been dubbed the 'Bank of Mum and Dad' (BOMD) describes various ways, in addition to actual wealth transfers, that parents can help their children to enter the housing market in the form of loans and in-kind gifts: by acting as a formal guarantor on a mortgage application to avoid lenders mortgage insurance, lending money, or providing rent-free housing in the family home to indirectly enhance savings. There is no comprehensive data on the characteristics of BOMD, which makes it difficult to assess their size and prevalence, let alone identify genuine wealth transfers as opposed to loans and other in-kind assistance. For example, while HILDA identifies gift recipients, the use to which it is put (and the motivation of the giver) is unknown.

[17] The HILDA survey asks about 'payments' received. It is possible that respondents include loans and other contingent payments, which do not strictly meet the definition of wealth transfers used in this study.

Box 1.7 – Assistance for purchasing a home

Two sources of information on BOMD are private sector surveys (for example, Mozo, a financial advice aggregator, and Digital Finance Analytics (DFA), a consulting firm) and mortgage providers.

Based on relatively small samples, estimates of total lending by BOMD vary between $35 and $92 billion (Hughes 2021; Mozo 2020). When compared to the total book value of home mortgages provided by Australian mortgage providers, this would rank BOMD as somewhere between the fifth and ninth biggest home mortgage lender.

Information provided to the Commission by Commonwealth Bank and Westpac (combined 50 per cent of total mortgage market share) on mortgage assistance provided through parental guarantees showed that these types of loans account for a small share of total settled loans per year (on average, about 2.5 per cent at CBA since 2017 and 4.6 per cent at Westpac since 2016). Parental guarantees enable borrowers to avoid Lenders Mortgage Insurance, which is typically levied where a deposit is less than 20 per cent of the purchase price. If we (heroically) assume that 3.5 per cent (the weighted average of CBA and Westpac) of all loans in Australia are guaranteed, and the average guarantee is worth 20 per cent of the loan, then the total value of guarantees would be about $13 billion (based on aggregate housing and investor loans outstanding in September 2021). Guarantees are only transferred between generations if the borrower's loan is foreclosed, which is rare. Analysis by the RBA implies that about 0.1 per cent of residential mortgages are foreclosed (Bergmann 2020, p. 5). Hence, the actual wealth transfer between generations that arises from parental guarantees, at about $13 million, is very small.

Estimates based on gifts reported in the HILDA dataset

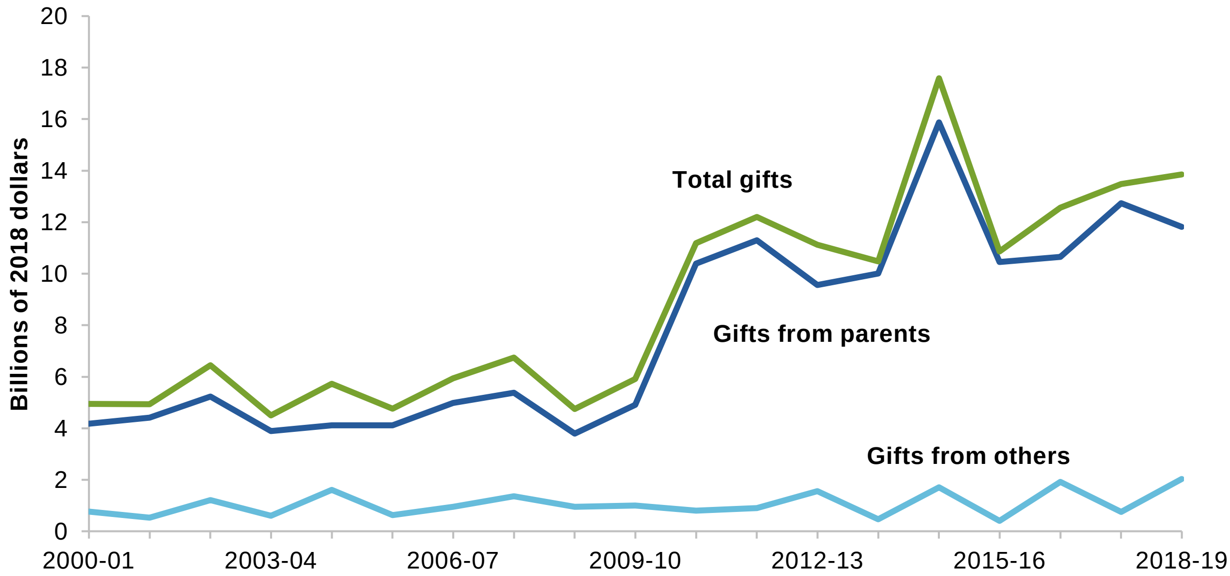
The implied total value of reported gifts in the population has increased since 2000-01. In 2018-19, the total value of gifts was approximately $14 billion (figure 1.9, panel a).

Focusing henceforth on gifts from parents to children, the implied total value of reported gifts in the population has almost tripled since 2000-01, due to an increase in both the number and value of gifts. In 2018-19, the total value of gifts was almost $12 billion (figure 1.9, panel a). The number of gift recipients increased from about 750 000 people in 2000-01 to 1.5 million in 2018-19 (figure 1.9, panel b).

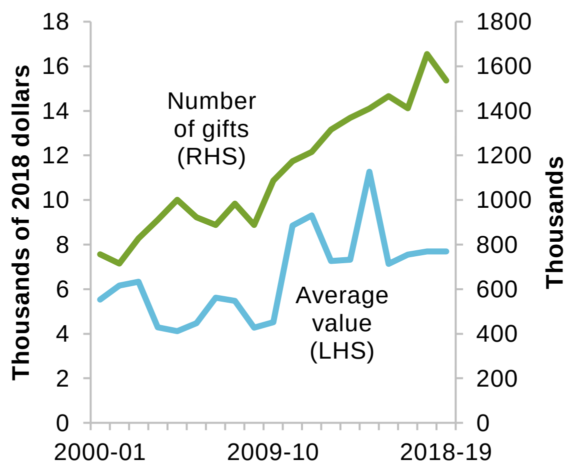
Similar to inheritances, there were many relatively small gifts and fewer very large ones. In 2018-19 the median gift was about $1000 while the average was about $8000 (figure 1.9, panel c).

Figure 1.9 – The number and value of gifts have grown but most are valued below $2000[a]

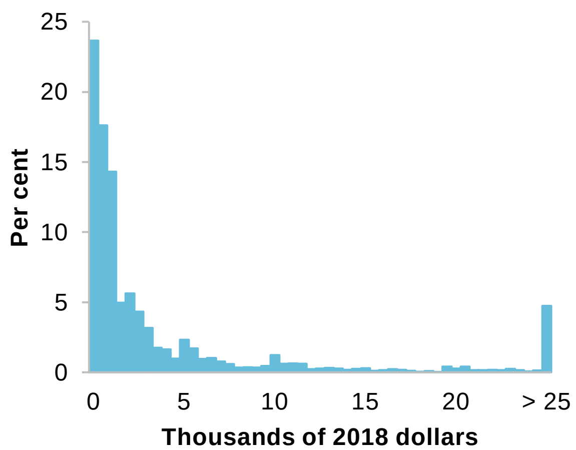
a. Aggregate value of gifts, by financial year



b. The average value and number of gifts from parents to their children, by financial year[a]



c. The distribution of gifts from parents to their children by value, 2000-01 to 2018-19

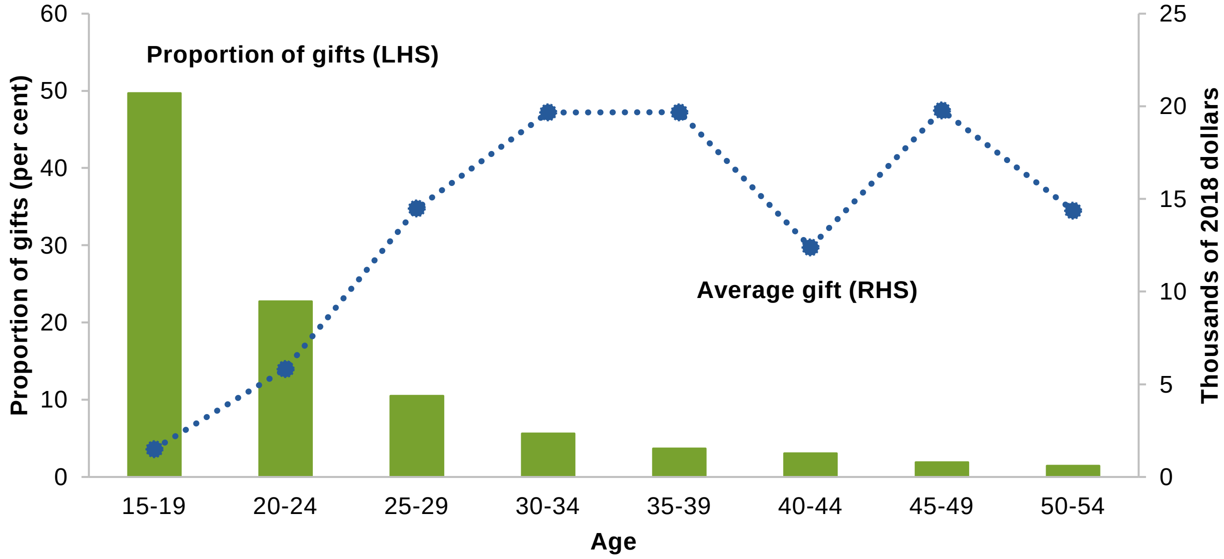


a. Commission analysis found that the large increase in the value of gifts in 2011 was not caused by the addition of the top-up sample in HILDA.

Source: Productivity Commission estimates using HILDA Restricted Release 19.

Younger people were more likely to receive gifts than older people, but they typically received smaller gifts (figure 1.10). The age profile of gift recipients is different to that of inheritances — most gifts accrue to people under 25, whereas most inheritances accrue to people over 50.

Figure 1.10 – Most gifts are received by young people[a]



a. Gifts for those aged over 54 years are negligible and are not shown in the chart.

Source: Productivity Commission estimates using HILDA Restricted Release 19.

Comparison of gifts reported in the HILDA dataset and other datasets

Direct comparisons between the value of gifts as reported in HILDA and in other survey datasets are difficult due to significant differences in scope and how gifts are reported.[18] This section uses the SIH and the Youth in Focus survey to indirectly investigate survey errors in the HILDA gift data. Gifts may be underreported in HILDA for much the same reasons as inheritances (underreporting could arise from respondents failing to recall the gifts they received or excluding non-financial gifts (such as cars) they received).

Survey of Income and Housing

The SIH provides a way to indirectly assess the scale of underreporting that might affect the HILDA estimates due to the way the gift-related question is asked. Specifically, the SIH asks respondents about the value of both gifts they have received — as per HILDA — as well as gifts they have given (figure 1.11, panel a).

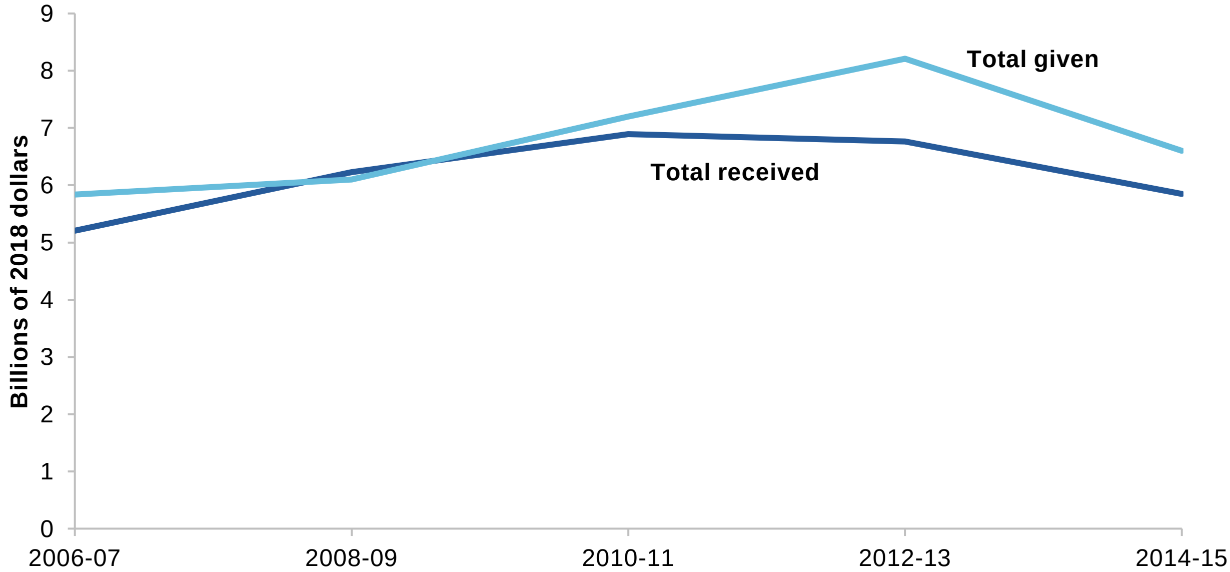
The total value of gifts given exceeded the total value of gifts received in four out of five surveys between 2006-07 and 2014-15 by about $600 million on average. The average gift received was larger than the average gift given (figure 1.11, panel b) but there were far more gifts given than received (figure 1.11, panel c).

Social desirability bias (Nederhof 1985) suggests that surveyed individuals are more likely to report gifts that they gave, regardless of size, and less likely to report small gifts they have received both because they may have forgotten them, but also because it could be viewed as socially undesirable. This may explain the reported differences and if present would tend to bias the value of HILDA gifts downwards.

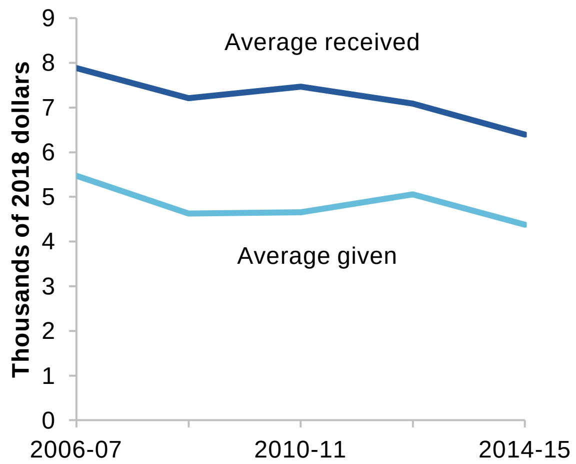
[18] In HILDA, the purpose of a gift (for example, to purchase a car or a house) is not specified. In the SIH, gifts can come from any family member, not just a parent, and they exclude those for the purpose of purchasing property or cars, to pay off debt, or for other living expenses.

Figure 1.11 – Reported gifts given exceeds reported gifts received

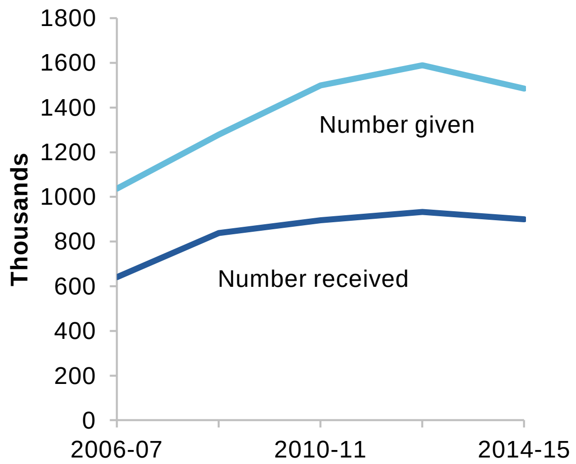
a. Total value of gifts to and from family members, by financial year



b. Average value of gifts to and from family members, by financial year



c. Number of gifts to and from family members, by financial year



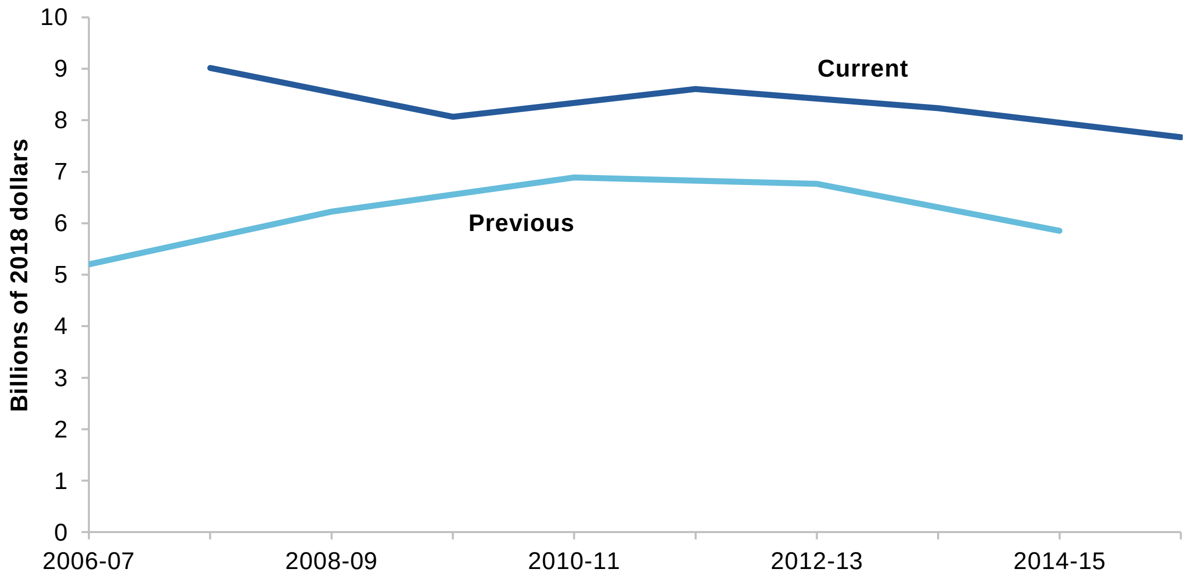
Source: Productivity Commission estimates using: ABS SIH Basic confidentialised unit record files for 2007-08 to 2017-18.

The SIH dataset also provides evidence that — as for inheritances — people forget about gifts they received, which would cause inflow estimates to underestimate the true figure. The SIH asks respondents about the value of gifts in the previous financial year as well as in the past three months. Interviews for the SIH are conducted throughout the financial year, meaning the value of gifts given and received in the current year can be estimated using the values reported for the past three months.

Gifts that respondents reported receiving in the previous financial year were, on average, 25 per cent lower than those reported for the current year (figure 1.12). Gifts given were, on average, 29 per cent lower. The HILDA survey asks respondents about gifts received in the past twelve months. Hence, it is likely that those reported values are lower than the true figures.

Figure 1.12 – There is some evidence that people forget receiving gifts over time

By the financial year the respondent reported receiving a gift



Source: Productivity Commission estimates using ABS SIH Basic confidentialised unit record files for 2007-08 to 2015-16.

Youth in Focus survey

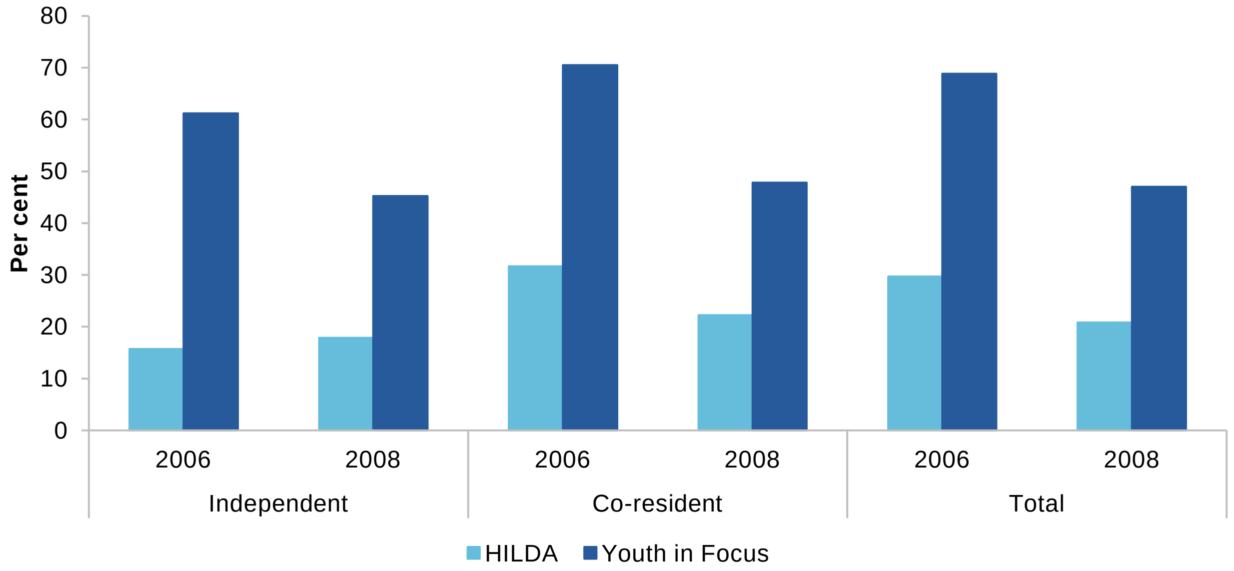
The Youth in Focus (YIF) survey, which asked children aged 18 in 2006 and 20 in 2008 about gifts they received from their parents, is directly comparable to the HILDA dataset for those age cohorts.[19] The proportion of children who reported receiving a gift from their parents in the YIF survey was higher than the proportion who reported receiving a gift in the corresponding waves of the HILDA survey (figure 1.13, panel a). Similarly, the median value of gifts reported in the YIF survey was higher than the median value of gifts reported in HILDA (figure 1.13, panel b). These two findings suggest that gifts might be underreported in the HILDA dataset. There are some possible explanations.

- The YIF survey asked the questions differently to the HILDA survey. Respondents were asked if parents had assisted them with any of a list of items, for example, a general living allowance, and if so, how much money their parents had given them. The HILDA survey asks respondents if their parents have given them any money, and if so, how much, without specifying the purpose of the gift. It is possible that the list of items effectively prompted children's memory.
- The list of items in the YIF survey also included non-financial forms of assistance, for example, a parent allowing their child to live in their investment property for low, or zero, rent. It is possible that the value of this type of transfer was captured in the YIF dataset but not in the HILDA dataset.

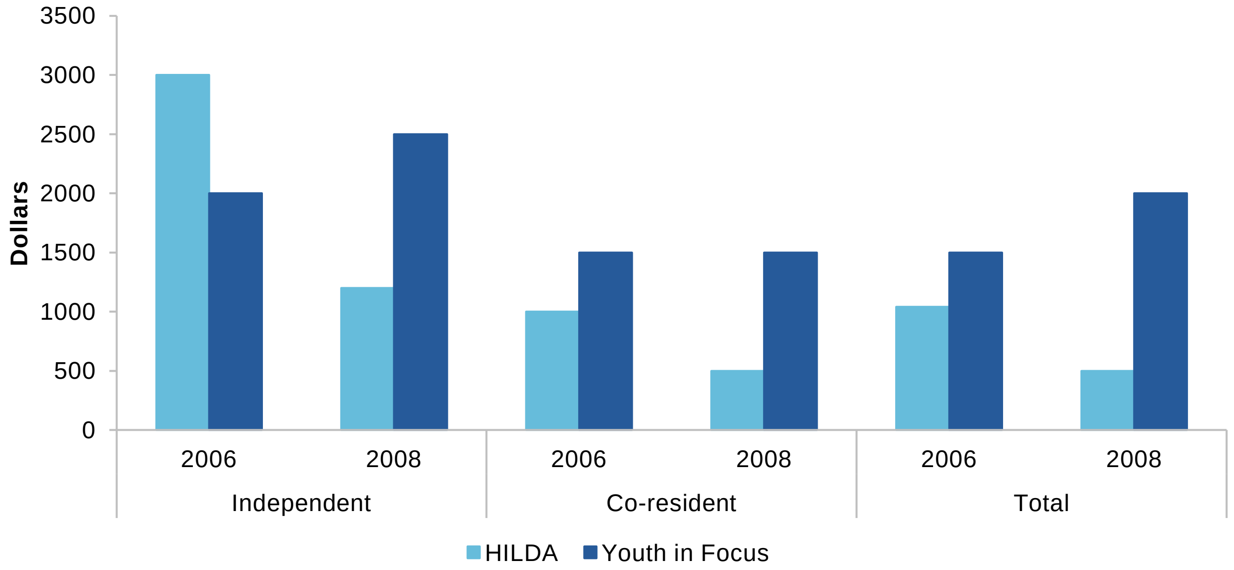
[19] The reference population for the YIF survey was any child who had direct (or indirect through a parent) contact with government support payments. The data covered 98 per cent of all youths born between October 1987 and March 1988 and the survey covered a stratified random sample of youths and a parent (Breunig et al. 2007, p. 13).

Figure 1.13 – Fewer and smaller gifts were reported in the HILDA Survey compared with the Youth in Focus Survey

a. Proportion of children who received a gift from their parents, by living circumstances and year



b. Median value of gifts children received from their parents, by living circumstances and year[a,b]



a. Current prices. **b.** Among those who received a gift.

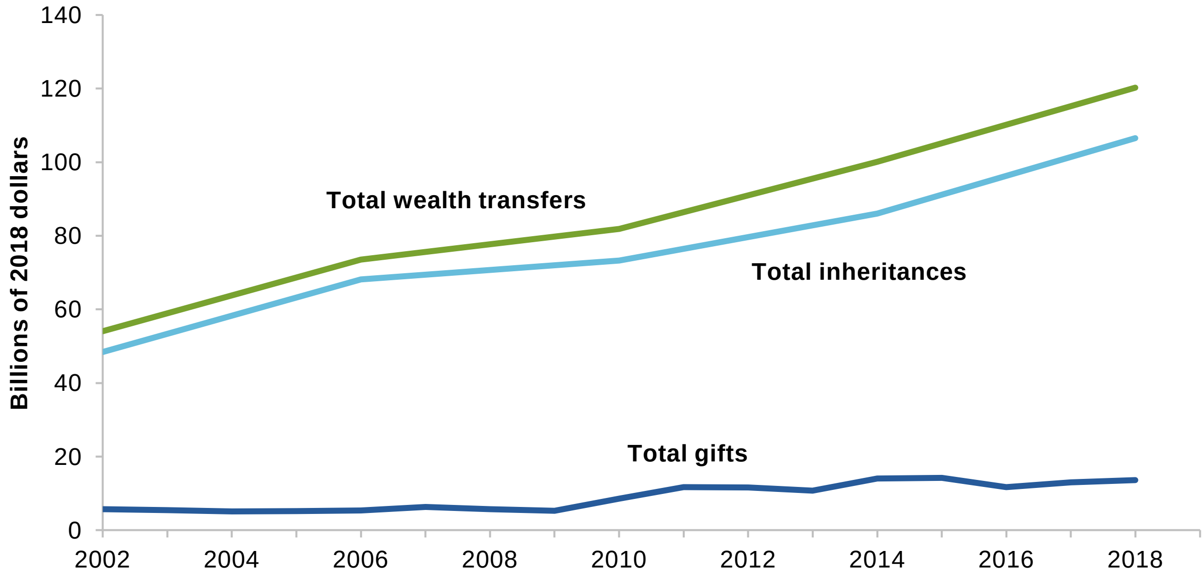
Source: Productivity Commission estimates using Cobb-Clark and Gørgens (2011); HILDA Restricted Release 19.

1.4 Total value of wealth transfers

The Commission’s best estimate of the total value of wealth transfers in Australia, including inheritances and gifts, was $120 billion in 2018 (figure 1.14).

Between 2002 and 2018 the aggregate value of wealth transfers was approximately $1.5 trillion, of which $1.3 trillion was inheritances and $155 billion was gifts.

Figure 1.14 – The value of wealth transfers is increasing[a]



a. Estimates of the total value of wealth transfers are based on the outflow measure of inheritances as described in section 1.2 and the reported value of gifts in HILDA as described in section 1.3.

Source: Productivity Commission estimates using: ABS (*Deaths, Australia, 2019,* Cat. no. 3302.0); ACFA (2020b, 2021); AIHW (2021b); HILDA Restricted Release 19.

International comparisons

The total value of wealth transfers in Australia in 2018 was equivalent to about 6.5 per cent of gross national income. This is lower than in other countries for which comparisons were available. The share in Italy, which has the largest wealth transfers as a share of national income, was more than twice as large (table 1.2).

Table 1.2 – Wealth transfers are larger as a share of gross national income in other countries

Country	Australia[a,b]	France	Germany	United Kingdom	United Kingdom[b]	Italy
Transfers as a share of national income	6.5%	14.5%	10.7%	8.2%	7.4%	15.1%
Year	2018	2010	2010	2010	2008	2016
Source	HILDA; ABS (2021)	Piketty (2014, p. 425)	Piketty (2014, p. 425)	Piketty (2014, p. 425)	Atkinson (2018, p. 160)	Acciari and Morelli (2020)

a. The estimate is calculated using the estimated sum of reported gifts and the estimated wealth at death based on expected deaths. **b.** The wealth transfer flow as a share of national income in Australia and the United Kingdom may be underestimated due to underreporting of gifts.

1.5 Improving wealth transfer data collection

There is scope to substantially improve wealth transfer data in Australia at low additional administrative cost, by making small changes to the HILDA survey and by systematically collecting data from probate files and linking that data with other administrative datasets.

Better collection of wealth transfer data in the HILDA survey

There are ambiguities about whether respondents report non-cash wealth transfers (especially in the case of inheritances) in the HILDA survey. Clarifying and expanding the scope of these questions for future waves would improve the quality of the data. The Melbourne Institute, which administers the HILDA survey, has flagged a willingness to make such improvements to these questions from the 2022 survey onwards.

As a further step, a special module on wealth transfers could be added to a future wave of the HILDA survey to provide clarity about wealth transfers given and received in the more distant past.[20] Such a module could ask about the monetary value of *all* past inheritances received and gifts given and received by the individual in question (at the time they occurred), the year in which the transfer took place, their relationship to the donor or recipient, and a breakdown by asset class. This would provide more clarity about wealth transfers reported in previous waves of the HILDA survey and allow for pre-2000 data to be collected. Historical information on wealth transfers has been collected in many other developed countries, such as Britain (via the Wealth and Assets Survey) the United States (via the US Survey of Consumer Finances), and France, Germany, Italy and Spain (via the multi-country Household Finance and Consumption Survey) (Nolan et al. 2021).

Digitising probate files and linking the data to other administrative records

Probate files are publicly available in many jurisdictions, yet so costly and time consuming to access that only small ad-hoc extracts have been used for research purposes (section 1.1). The Grattan Institute advised that it took approximately 3–4 weeks of a full time-equivalent staff member's time to compile their database of 534 probate files for analysis (pers. comm., 20 September 2021).

Extracting the relevant information from probate files *at the time the files are processed* would quickly generate a large dataset for analysis at much lower administrative cost. As courts move toward electronic lodgement of probate files — as has recently occurred in South Australia — the additional administrative burden will become negligible if systems are configured to automatically log the necessary data.

There would also be value in digitising and extracting the relevant information from historical probate files, although the per-file administrative cost would be greater. A more cost-effective approach would be to decide on a time period for analysis — say, the past 20–30 years — and then draw random samples from each year of the largest size that can be afforded with the available budget. That said, if all historical probate files were to be digitised for other reasons (better record keeping, perhaps), then it may be possible to collate the necessary data from these files using automated processes and compile a much larger historical dataset.

By itself, the information contained in probate files is of limited use for research purposes. Most importantly, the only information they contain about the *recipient* of the inheritance is their age, gender, and relationship

[20] Special modules are a standard component of the HILDA survey. Since the second wave, each wave has contained one or more 'major' or 'minor' special modules. There has never been a special module relating to wealth transfers.

to the deceased. Socio-economic information about the recipient — their income, for example — is the most useful for research into the effect of inheritances on inequality, but this is not found in probate files.

For probate files to be genuinely useful for the study of the effects of inheritances on inheritance recipients, their information would need to be linked to other administrative records about the deceased and recipients. For example, if probate files were linked to the Multi-Agency Data Integration Project (MADIP) dataset, information about the deceased and recipients' income, healthcare, education and social security usage would be available to researchers (in a confidentialised way).[21] If probate files were linked to the Alife dataset, information about the income of the deceased and the recipients would be available to researchers, and it would be possible to estimate the superannuation death benefits transferred alongside the probate-administered component of the inheritance.

[21] The MADIP dataset is a linked dataset that includes administrative data on healthcare, education and social security usage, income tax returns, and responses to Census questions.

2. How have wealth transfers affected wealth inequality and mobility?

Key points

- **Wealth transfers (inheritances and inter vivos gifts) affect both absolute and relative wealth inequality.**
  - Absolute wealth inequality measures how the *dollar value* increase to wealth due to wealth transfers differs between initially wealthier and initially poorer people.
  - Relative wealth inequality measures how the *proportional* increase to wealth due to wealth transfers differs between initially wealthier and initially poorer people.

- **Over the past two decades, wealthier people inherited more than poorer people. Hence, at the point at which inheritances were received (the immediate term), they increased absolute wealth inequality. But inheritances reduced relative wealth inequality in the immediate term, because wealthier people received less as a share of their initial wealth.**

- **Gifts were shared more evenly between wealthier and poorer people, so their immediate term effect on absolute wealth inequality is uncertain. Gifts reduced relative wealth inequality in the immediate term, because wealthier people received less as a share of their initial wealth.**
  - Because of data limitations, wealth transfers are considered an inflow of new wealth, rather than a redistribution of existing wealth. If gifts were considered as a redistribution of existing wealth they would likely have exerted a more equalising effect on absolute and relative wealth inequality.

- **The immediate-term effect of wealth transfers on relative wealth inequality has been small.**
  - Wealth transfers have, in the immediate term, reduced relative wealth inequality in every country studied — Britain, France, Germany, Italy, Spain and the United States. The magnitude of the effect was larger in Australia than in the United States, but smaller in Australia than in every other studied country.
  - The annual flow of welfare payments is three times the annual flow of wealth transfers. Yet welfare payments reduced immediate-term relative wealth inequality by 20 times more than wealth transfers, and also reduced immediate-term absolute wealth inequality.

- **On average, each $1 of inheritance increased wealth by about $1 in real terms, 4–7 years later. In other words, the returns to the invested component of inheritances roughly balanced the additional consumption that inheritances yielded. There is little evidence that this varied between wealthy and poor. This contrasts with studies from overseas, which have found that all except for the most wealthy tended to deplete their inheritances over time.**
  - In the longer term — although estimates are imprecise — the effect of inheritances on absolute and relative wealth inequality was most likely similar to the immediate term effect.

- **About one third (36 per cent is our best estimate) of the intergenerational persistence in wealth (the association between adult children's wealth and their parents' wealth) among those whose parents died in the past two decades was due to inheritances.**

This chapter discusses the effect of inheritances and inter vivos gifts (collectively referred to as 'wealth transfers') on wealth inequality in the immediate term (section 2.1) and the longer term (section 2.2) and the effect of inheritances on intergenerational wealth persistence (section 2.3). It draws international comparisons throughout.

The effect of wealth transfers on wealth inequality captures how wealth transfers affect the distribution of wealth, both in the immediate term and in the longer term. In the immediate term, the effect of transfers depends only on the initial wealth of the recipient and the size of the transfer that they receive. In the longer term, the subsequent behavioural response of their household also determines the effect on wealth inequality.

The effect of inheritances on intergenerational wealth persistence — the association between an adult child's position in society and their parents' — captures the extent to which inheritances reduce social mobility relative to other factors.

The analysis in this chapter uses data from annual Household Income and Labour Dynamics in Australia (HILDA) surveys (chapter 1). Using surveys to make inferences about the entire Australian population involves some uncertainty, but is common practice in research. For transparency, our estimates are presented with margins of error or 'confidence intervals'.[22]

Measures of wealth

An advantage of undertaking analysis with the HILDA dataset is that it permits a focus on the household, rather than just the individual. The household is a better unit than the individual for analysing wealth-related economic decisions and the consequences of wealth for peoples' welfare, as:

- people share some resources within households (OECD 2013). When using household wealth to analyse the consequence of wealth for peoples' welfare, it is implicitly assumed that wealth is shared equally among household members
- wealth invested in owner-occupied housing — which accounts for about 40 per cent of household wealth in Australia (PC 2018a, p. 78) — usually provides rent-free housing to all household members, regardless of which household member(s) own the house.[23]

To measure the consequences of wealth for peoples' welfare, 'equivalised' wealth is preferred over household wealth. Equivalised wealth is household wealth scaled to reflect differences in household size and composition.[24] For example, suppose that the people living in household A own the same amount of wealth in total as the people living in household B, but five adults live in household A and only one adult and one child live in household B. According to the household wealth measure, the two households are equally wealthy. This is a misleading indicator of the resources available to each household member and consequences of wealth for their wellbeing. Household A's wealth is shared between five people, whereas

[22] A 95 per cent confidence interval is a range that, if our assumptions are correct, contains the true value with a 95 per cent probability.

[23] In only about 8 per cent of owner-occupied households did at least one household member pay board to another household member (Commission estimate based on HILDA Restricted Release 19; average cross-sectional estimate over each wave).

[24] Consistent with previous Commission analysis (PC 2018a) and with the ABS' Distribution of Household Income, Consumption and Wealth publication (ABS 2021a), this chapter uses the 'OECD modified equivalisation scale' to equivalise household wealth. While the rationale for equivalising wealth is strong, there is no consensus about which scale is most suited to doing so (OECD 2013). For this reason, appendix B also presents figures 2.1–2.4 re-estimated using non-equivalised household wealth a robustness check. The same findings are apparent; hence the results presented here are not sensitive to the choice of whether or not to equivalise wealth.

household B's wealth is shared between only two people. Moreover, one member of household B is a child, and children require fewer resources to sustain a given level of wellbeing. Equivalised wealth 'corrects' for these factors to permit fairer comparison between such households. By the equivalised wealth measure, the members of household B are judged to be 2.3 times wealthier than the members of household A. A previous Commission study, *Rising Inequality? A stocktake of the evidence* explains the equivalisation process and its benefits in more detail (PC 2018a, pp. 27–28).

This chapter's analysis of the effects of wealth transfers on wealth inequality (sections 2.1 and 2.2) thus uses equivalised wealth when deriving wealth distributions, except when drawing comparisons with international studies that use other measures of wealth. Household wealth is used when analysing the effect of inheritances on intergenerational wealth persistence (section 2.3), as this is the approach that other studies take and the main intent is to draw international comparisons.[25]

Measures of wealth inequality

This chapter's analysis of the effects of wealth transfers on wealth inequality (sections 2.1 and 2.2) makes claims about both *absolute* and *relative* wealth inequality.

- Absolute wealth inequality is inequality in the level of wealth held by each person.[26] If every person's wealth were to increase by a given amount (say, $10), then absolute wealth inequality would be unchanged. If wealthier people's wealth were to increase by $15 and poorer people's wealth were to increase by $5, then absolute wealth inequality would increase.
- Relative wealth inequality is inequality in the share of wealth held by each person. If every person's wealth were to increase by a given proportion (say, 10 per cent), then relative wealth inequality would be unchanged. If wealthier people's wealth were to increase by 15 per cent and poorer people's wealth were to increase by 5 per cent, then relative wealth inequality would increase.

Both absolute and relative wealth inequality are relevant concepts, but it is important to understand their differences when interpreting claims about inequality. If the claim is used to advance a particular policy position or argue that a particular outcome is desirable, then one measure may be more appropriate than the other (box 2.1). As this chapter does not seek to do either, both measures are presented with no prioritisation intended.

[25] Throughout this chapter, results are presented at the individual level. Relative to household-level results — wherein each household is given equal weight — individual-level results for variables that are the same for all household members (such as equivalised wealth and household wealth) weight each household by its number of members. For example, five person households are given five times as much prominence as one person households. This is because the wellbeing of individuals is what ultimately matters.

[26] For the purposes of this chapter, the phrase 'wealth held by each person' refers to household wealth or equivalised wealth, as discussed previously.

Box 2.1 – Absolute versus relative measures of inequality

Inequality can be measured in both absolute and relative terms. Both measures are useful, but they will often present contrasting findings. A striking example is that of global income inequality over the very long term. Absolute global income inequality has increased continuously since 1850. Relative global income inequality, meanwhile, increased from 1820 to about 1970, but has since declined (Goda 2016). This recent decline coincided with a sharp increase in the rate of global poverty reduction — more than a billion people have lifted themselves out of poverty (Hasell and Roser 2019).

If a claim about inequality is used to advance a particular policy position or argue that a particular outcome is desirable or undesirable, then one measure may be more appropriate than the other. Returning to the global income inequality example above, some have argued that efforts to reduce absolute global income inequality would require a halting of the economic growth necessary to reduce poverty. Thus if the intention of policy is to reduce poverty, relative global income inequality is the better measure (Niño-Zarazúa, Roope and Tarp 2017).

2.1 Immediate-term effect of wealth transfers on wealth inequality

The immediate-term effect of transfers on wealth inequality is straightforward to compute. Wealth is measured once every four waves of the HILDA survey — in 2002, 2006, 2010, 2014, and 2018. Wealth as measured in the first four of these waves is used to construct initial wealth distributions, which are compared with wealth transfers (gifts and inheritances treated separately and together) received in the subsequent three financial years — 2003-04 – 2005-06, 2007-08 – 2009-10, 2011-12 – 2013-14 and 2015-16 – 2017-18 (no data is yet available for 2019-20 and onwards, so 2018 wealth data is not used). Hereafter, these are referred to as the '12 studied years'. As with wealth, wealth transfers are equivalised, meaning that that they are assumed to be shared equally among household members and scaled to reflect household size and composition.

The effect of wealth transfers on wealth inequality is measured relative to a counterfactual scenario where, hypothetically, wealth unexpectedly disappears after death and gifts are unexpectedly destroyed in transit (box 2.2).[27] This leads to the following limitations.

- Wealth transfers are considered an inflow of 'new' wealth, rather than a redistribution of existing wealth. If gifts were to be considered a redistribution of existing wealth — which is preferable, because donors' loss of wealth has consequences for their wellbeing — gifts would likely have had a more equalising effect on absolute and relative wealth inequality than that found here (box 2.2).
- It is not realistic to assume that no wealth is ever inherited. An interesting counterfactual that this study has not examined is the distributional consequences of taxing a share of wealth transfers but reducing other taxes such that the aggregate tax take is held constant.

[27] If recipients did not expect to receive wealth transfers, their prior behaviour might chage, which might change their position in the initial wealth distribution. Likewise, it might alter donors' wealth accumulation if they knew that they could not transfer their wealth.

- There is nonreporting of inheritances to the HILDA survey, particularly smaller inheritances (which are typically received by poorer recipients) (chapter 1). For this reason, inheritances probably reduce relative and absolute wealth inequality by more than this chapter suggests, but there is no way to be sure of this.

Box 2.2 – Wealth transfers are considered an inflow of 'new' wealth, rather than a redistribution of existing wealth

Our estimates of the immediate term effects of wealth transfers on wealth inequality consider the effects on the wealth of the household that receives the transfer, but disregard the effects on the wealth of the donor household. Hence, wealth transfers are considered to be an inflow of new wealth, rather than a redistribution of existing wealth.

This is because of data limitations. Information about donor households is very incomplete, and the instances where such information is available are not representative of the broader population.

This is not a shortcoming in the case of inheritances. The donor is deceased, so the loss of their wealth has no consequences for their wellbeing. But it is a shortcoming in the case of gifts, as the donor's wellbeing does matter. Under the assumption that gifts typically flow from wealthier households to poorer households, this means that our estimates likely understate the extent to which gifts reduce (absolute and relative) wealth inequality.

Wealthier people inherited more than poorer people, but inheritances reduced relative wealth inequality in the immediate term

Over the 12 studied years, more money was bequeathed to wealthier people than to poorer people. This was because:

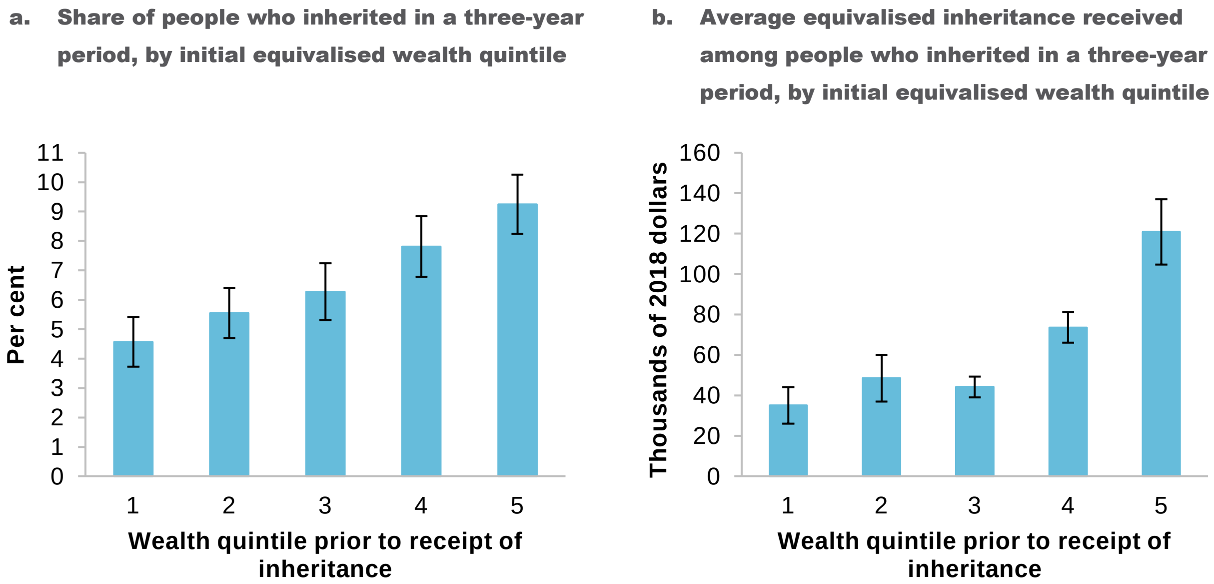
- larger shares of wealthier people received inheritances than poorer people (figure 2.1, panel a)
- among those who received inheritances, wealthier people usually received larger inheritances (figure 2.1, panel b). In equivalised terms, and averaging over the four three-year windows, the average inheritance received by the wealthiest 20 per cent of people was about $121 000, whereas the average inheritance received by the poorest 20 per cent of people was about $35 000.

Including those who did not inherit, the average inheritance received by the wealthiest 20 per cent of people was about $11 000 (still in equivalised terms and averaging over the four three-year windows), whereas the average inheritance received by the poorest 20 per cent of people was about $1600.

Hence, inheritances increased *absolute* wealth inequality — inequality in the *level* of wealth held by each person — in the immediate term. Appendix B shows that this conclusion is also reached when absolute wealth inequality is measured in other ways, and when wealth is adjusted for lifecycle effects (box 2.3).

Figure 2.1 – Wealthier people inherited more money[a,b]

Inheritances received in 2003-04 – 2005-06, 2007-08 – 2009-10, 2011-12 – 2013-14 and 2015-16 – 2017-18



a. Error bars represent 95 per cent confidence intervals. **b.** Wealth quintile prior to receipt of inheritance (initial wealth) is measured in 2002 for inheritances received in 2003-04 – 2005-06, 2006 for inheritances received in 2007-08 – 2009-10, and so on.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

Box 2.3 – When measuring wealth, lifecycle effects matter

The introduction to this chapter argued that equivalised wealth is the preferred measure of wealth for constructing wealth distributions, as it captures differences in the amount of wealth that each person can access better than individual or household wealth measures.

In the context of wealth transfers, an even better measure of wealth would capture differences in each person's access to wealth over their entire lifetime, rather than at just a point in time. For example: most direct gift recipients are aged under 30, and the individual wealth of people aged under 30 is typically below average (figure below, panel a). Hence, individual measures will tend to show that gifts flow to relatively poor people, as a consequence of the age profile of gift recipients. But many of these recipients might go on to be relatively wealthy later in life, even in the absence of the gifts they have received. It is likely that such individual measures overstate the extent to which gifts reduce inequality (or understate the extent to which gifts increase inequality).

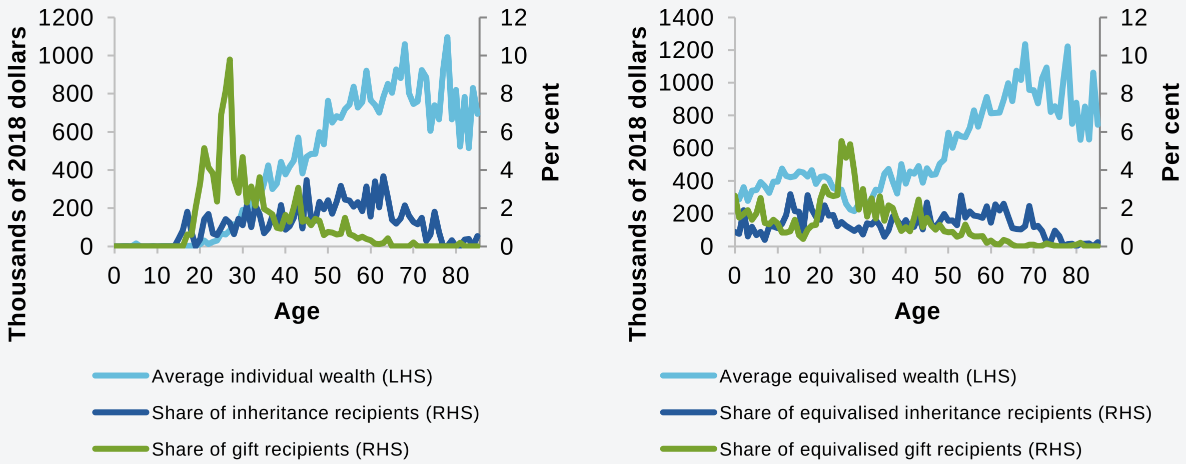
Equivalised measures are superior to individual measures on this front, yet still not ideal. Equivalisation assumes that wealth and wealth transfers are shared among household members, which smooths age of receipt over the lifecycle (figure below, panel b). But it is still the case that most equivalised gift recipients are aged under 30, and that people aged under 30 typically have below average equivalised wealth. Hence, equivalised measures might still overstate the extent to which gifts reduce inequality (or understate the extent to which gifts increase inequality).

Box 2.3 – When measuring wealth, lifecycle effects matter

For this reason, the Commission has developed 'lifecycle-adjusted' measures of the effects of wealth transfers on inequality that are robust to these distortions. Because they have other shortcomings, they are not presented in the main analysis, but are used as a check on the main analysis throughout this chapter and shown in more detail in appendix B.

Equivalisation only partially smooths age of transfer receipt over the lifecycle

a. Individual measures, 2018[a] **b. Equivalised measures, 2018**



a. Excludes gifts from resident parents, for consistency with the data in panel b.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

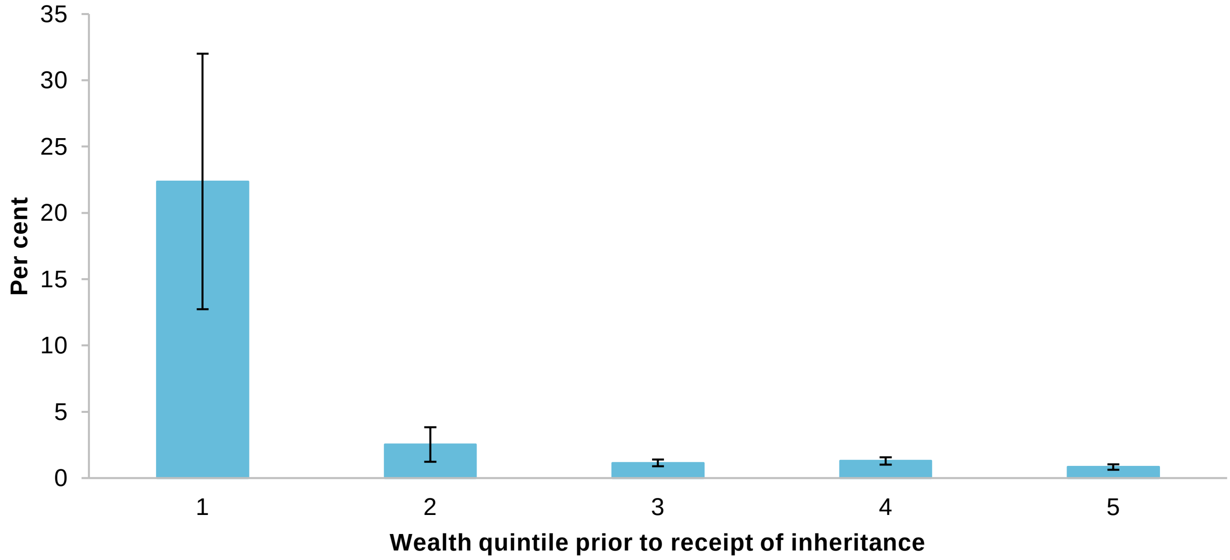
The story for *relative* wealth inequality — inequality in the *share* of the wealth held by each person — is different.

Inheritances reduced relative wealth inequality in the immediate term. While this may seem counterintuitive, it is not inconsistent with the previous finding that inheritances increased absolute wealth inequality. The reason is that, while wealthier people received, on average, larger inheritances, they received smaller inheritances *as a share of their initial wealth* (figure 2.2). Appendix B shows that this conclusion is also reached when relative wealth inequality is measured in other ways, and when wealth is adjusted for lifecycle effects.

In equivalised terms, and averaging over the four three-year windows, the average inheritance that the wealthiest 20 per cent of people (including those who received no inheritances) received increased their wealth by about 0.8 per cent, whereas the average inheritance that the poorest 20 per cent of people received increased their wealth by about 22 per cent. The difference between the poorest 20 per cent of people and the wealthiest 80 per cent is striking — inheritances boosted the wealth of the wealthiest 80 per cent of people by less than 3 per cent.

Figure 2.2 – In the immediate term, inheritances reduced relative wealth inequality[a,b]

Average equivalised inheritance received among all people in a three-year period as a share of average initial equivalised wealth, by initial equivalised wealth quintile; inheritances received in 2003-04 – 2005-06, 2007-08 – 2009-10, 2011-12 – 2013-14 and 2015-16 – 2017-18



a. Error bars represent 95 per cent confidence intervals. **b.** Wealth quintile prior to receipt of inheritance (initial wealth) is measured in 2002 for inheritances received in 2003-04 – 2005-06, 2006 for inheritances received in 2007-08 – 2009-10, and so on.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

Inter vivos gifts have been shared between wealthy and poor, which has reduced immediate-term relative wealth inequality

Over the 12 studied years, gifts were shared sufficiently evenly between wealthier and poorer people that whether wealthier or poorer people received more is unclear (figure 2.3, panel a). This is a consequence of two compensating effects.

- Larger shares of poorer people received gifts than wealthier people (figure 2.3, panel b). This reflects that gift recipients were typically aged under 30, and people aged under 30 were poorer on average (appendix B shows that when the estimates are adjusted for these lifecycle effects similar shares of poorer and wealthier people received gifts).
- Among those who received a gift in the year in question, wealthier people usually received larger gifts (figure 2.3, panel c).

Hence, gifts had an inconclusive effect on *absolute* wealth inequality in the immediate term.[28] Appendix B shows that this conclusion is also reached when absolute wealth inequality is measured in other ways, and when wealth is adjusted for lifecycle effects.

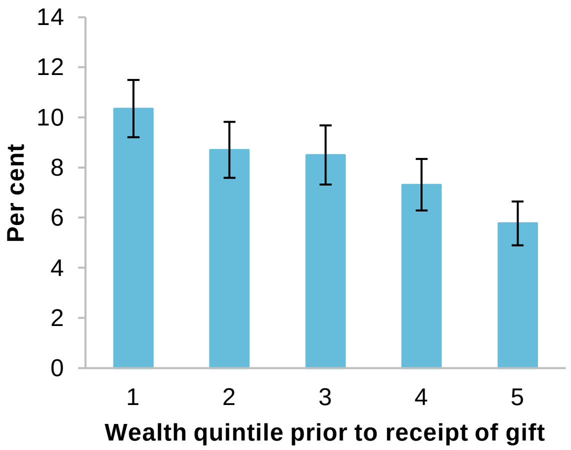
[28] The evidence in figure 2.3 and table B.2 of appendix B leans more toward the conclusion that gifts increased absolute wealth inequality than the conclusion that gifts decreased absolute wealth inequality, but the results are not statistically significant by any of the measures in table B.2. Moreover, as discussed above, a better analysis would also factor in donor households' loss of wealth, which would most likely push against the conclusion that gifts increased absolute wealth inequality.

Figure 2.3 – Gifts were shared between wealthy and poor[a,b]

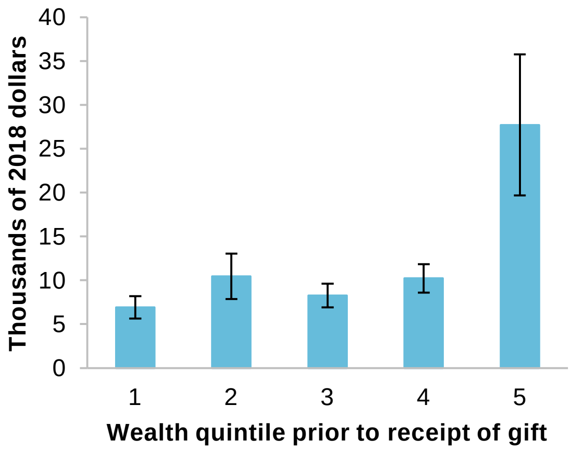
Gifts received in 2003-04 – 2005-06, 2007-08 – 2009-10, 2011-12 – 2013-14 and 2015-16 – 2017-18

a. Average equivalised gift received among all people in a three-year period, by initial equivalised wealth quintile

b. Share of people who received a gift in a three-year period, by initial equivalised wealth quintile



c. Average equivalised gift among people who received a gift in a three-year period, by initial equivalised wealth quintile



a. Error bars represent 95 per cent confidence intervals. **b.** Wealth quintile prior to receipt of gift (initial wealth) is measured in 2002 for gifts received in 2003-04 – 2005-06, 2006 for gifts received in 2007-08 – 2009-10, and so on.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

However, as was the case for inheritances, gifts reduced *relative* wealth inequality in the immediate term. Poorer people received more in gifts as a share of their existing wealth than wealthier people (figure 2.4). In equivalised terms, and averaging over the four three-year windows, the average gift that the wealthiest 20 per cent of people (including those who received no inheritances) received increased their wealth by about 0.1 per cent, whereas the average gift that the poorest 20 per cent of people received increased their wealth by about 10 per cent.

Appendix B shows that the conclusion that gifts reduced relative wealth inequality is also reached when relative wealth inequality is measured in other ways, and when wealth is adjusted for lifecycle effects. This latter point is particularly notable, as it suggests that the reduction to relative wealth inequality was not merely an artefact of the age profile of gift recipients. This point was discussed in box 2.3.

Figure 2.4 – In the immediate term, gifts reduced relative wealth inequality[a,b]

Average equivalised gift received among all people in a three-year period as a share of average initial equivalised wealth, by initial equivalised wealth quintile; gifts received in 2003-04 – 2005-06, 2007-08 – 2009-10, 2011-12 – 2013-14 and 2015-16 – 2017-18

a. Error bars represent 95 per cent confidence intervals. **b.** Wealth quintile prior to receipt of gift is measured in 2002 for gifts received in 2003-04 – 2005-06, 2006 for gifts received in 2007-08 – 2009-10, and so on.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

The effect is small — wealth transfers reduced wealth inequality by much less than welfare payments

A useful comparator for understanding the magnitude of the distributional effect of wealth transfers is provided by Australian Government transfers (the welfare system), through which about $970 billion was redistributed over the 12 studied years, compared to wealth transfers inflow data worth about $350 billion in the same years.[29]

Whereas wealth transfers increased absolute wealth inequality in the immediate term, income support payments and income supplement payments decreased it (figure 2.5, panel a). The combined effect of

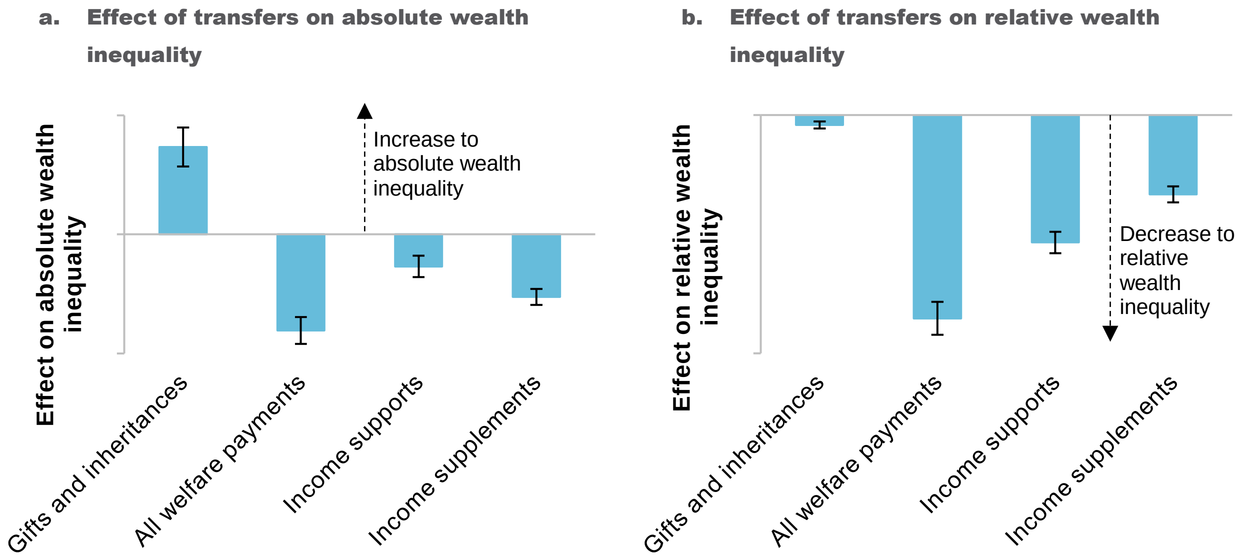
[29] This is slightly less than the inflow reported in chapter 3, because those figures included gifts from parents to their children who live in the same household and inheritances from people who lived in the same household at time of death. For analysis of the effects of wealth transfers on wealth inequality, these wealth transfers are disregarded because the wealth is assumed to be shared within a household.

income support and supplement payments on absolute wealth inequality was slightly larger in magnitude to the effect of wealth transfers, but in the opposite direction.

Both wealth transfers and the welfare system reduced relative wealth inequality in the immediate term (figure 2.5, panel b). But the reduction provided by the welfare system was far larger — the welfare system reduced relative wealth inequality by 20 times more than wealth transfers.

It is important to emphasise the 'immediate term' nature of this comparison (that is that it disregards behavioural responses). Inheritances are usually one-off lump-sum transfers, while welfare payments are usually regular payments. Welfare recipients likely consume larger shares of their welfare payments than wealth transfer recipients do of gifts and inheritances. Hence, in the longer term, wealth transfers likely have a larger effect on wealth inequality relative to welfare payments than that shown here.

Figure 2.5 – Welfare payments have had a more equalising effect on wealth inequality than wealth transfers[a,b,c]



a. The effect of transfers on absolute wealth inequality is the sum of the differences between the absolute Gini coefficient of the pre-transfer wealth distributions and the absolute Gini coefficient of the post-transfer wealth distributions — the difference between the absolute Gini coefficient of the 2002 wealth distribution and the absolute Gini coefficient of the 2002 wealth-plus-transfers-received-between-mid 2003-and-mid 2006 distribution, plus the absolute Gini coefficient of the 2006 wealth distribution and the absolute Gini coefficient of the 2006 wealth-plus-transfers-received-between-mid 2007-and-mid 2010 distribution, and so on. The effect of transfers on relative wealth inequality is the corresponding sum of the differences between the Gini coefficient of the pre-transfer wealth distributions and the Gini coefficient of the post-transfer wealth distributions. **b.** Error bars represent 95 per cent confidence intervals. **c.** Income supports comprises pensions (e.g. Age Pension, Disability Support Pension) and allowances (e.g. Newstart Allowance). Income supplements comprises, for example, Family Tax Benefits A and B and Carer Allowance.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

Wealth transfers have reduced relative wealth inequality in other countries too, and by more than in Australia

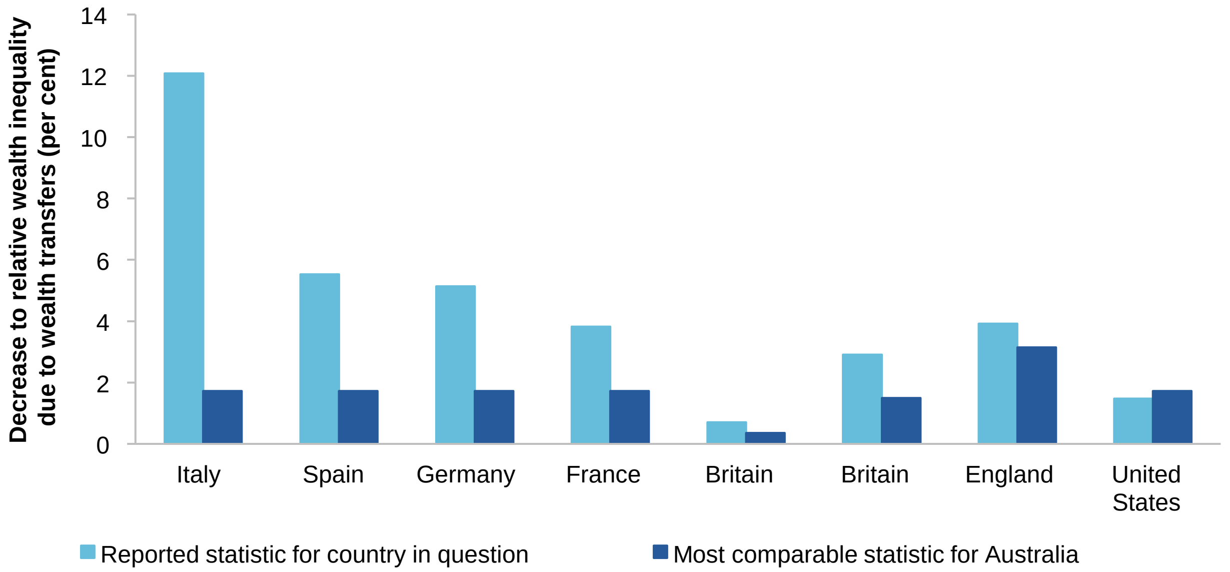
The finding that wealth transfers reduce relative wealth inequality is not unique to Australia.

However, the magnitude of the equalising effect is consistently smaller in Australia — that is, wealth transfers have only a small equalising effect on relative wealth inequality — than in all countries studied, except for the United States (where the effect is slightly smaller than in Australia) (figure 2.6).[30]

The primary reason that wealth transfers reduce relative wealth inequality by less in Australia than in other countries is that a lower share of the total stock of wealth is transferred in Australia than in other countries (appendix B). If less wealth is transferred, the impact on wealth inequality will be lower, other things equal.

Figure 2.6 – Wealth transfers reduced relative wealth inequality in other countries by more so than in Australia[a]

Published estimates of effect of transfers on relative wealth inequality in other countries and most comparable statistic for Australia



a. Other countries' reported statistics are based on several different methodologies, and hence the most comparable statistic for Australia varies between countries. See appendix B, table B.7 for more information about this figure.

Source: Crawford and Hood (2016); Karagiannaki (2017); Nolan et al. (2021); Productivity Commission estimates based on HILDA Restricted Release 19.

[30] Due to data limitations, most of the statistics reported for other countries in figure 2.6 slightly overstate the effect sizes relative to the most comparable statistic for Australia. However, as shown in appendix B, the overstatement is too small to substantively change the results.

2.2 Longer-term effect of inheritances on wealth inequality

In the longer term, the effect of wealth transfers on wealth inequality depends on recipients' initial wealth (the immediate-term effect) *and* how their household responds to the receipt of the transfer.[31] Members of the household might consume the transfer — or some share of it — either by purchasing goods and services (direct consumption) or by opting to earn less labour income (indirect consumption). The share that they do not consume is generally saved.[32] Those savings, or some share of them, might be invested, in which case the returns earned from that investment are also relevant.

For analysing the longer-term effect of wealth transfers on *wealth accumulation*, what matters is the net effect of the behavioural responses described above. Households that, on net, earn a return and grow their wealth transfer over time are 'net investors': each $1 of wealth transfers received in the past results in more than $1 of additional wealth today. Households that, on net, consume their inheritances over time are 'net consumers': each $1 of inheritances received in the past results in less than $1 of additional wealth today. And, because of inflation, a household must be a net investor for their wealth transfer to at least maintain its real (inflation-adjusted) value over time.

For analysing the longer-term effect of wealth transfers on *wealth inequality* (relative and absolute) how these behavioural responses vary with initial wealth also matters. For example, if otherwise wealthier people were typically net investors and otherwise poorer people typically net consumers, then the immediate-term increase to absolute wealth inequality from wealth transfers would increase over time, and the immediate-term decrease to relative wealth inequality would dissipate over time.

Unfortunately, it has not been possible to identify the longer-term effects of gifts on wealth inequality, in either our modelling or others' (appendix B). Hence, this section considers only inheritances.

The next subsection discusses the longer-term effects of inheritances on wealth accumulation, then the following two subsections discuss the longer-term effects of inheritances on wealth inequality.

Australians have typically been 'net investors' of their inheritances, but not by enough to overcome inflation

Australians have typically been 'net investors' of their inheritances. This does not mean that Australians did not spend their inheritances on goods or services, nor that Australians did not choose to work less after receiving an inheritance. It means that, on average, the returns to the invested component of inheritances roughly balanced the additional consumption that inheritances yielded.

Our best estimate is that, on average, each $1 of inheritance increased household wealth by $1.10 0–3 years later, and $1.20 4–7 years later (in nominal terms; figure 2.7), although there is significant uncertainty surrounding

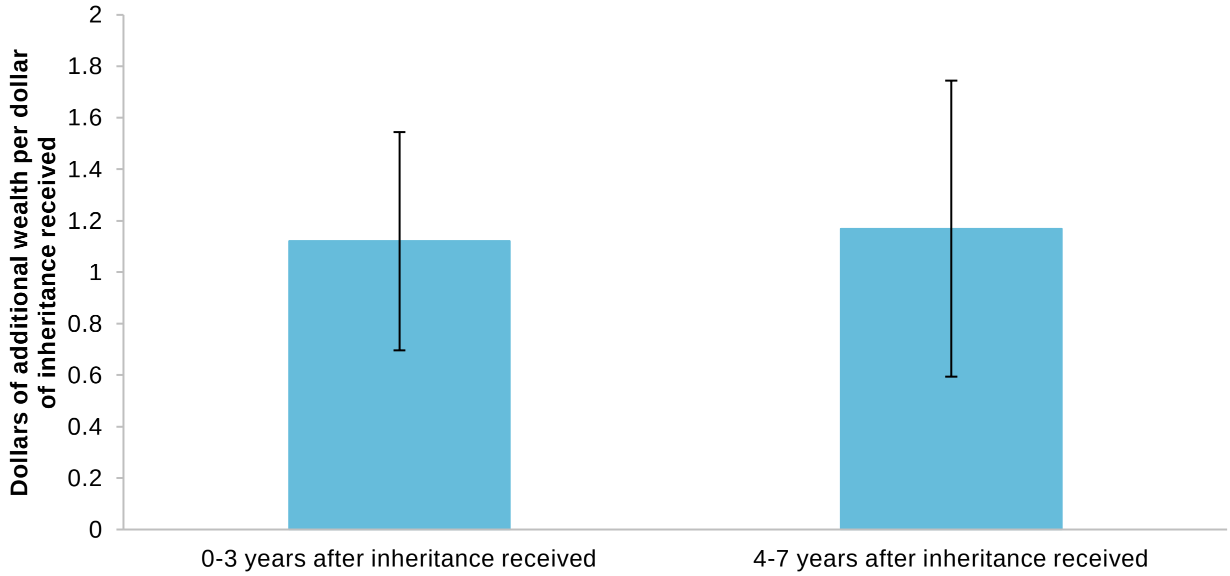
[31] Technically, non-inheritance wealth (wealth absent inheritances) is what matters for the longer-term effect, not initial wealth. There is a subtle difference between the two concepts. When studying the immediate-term effect of inheritances on wealth inequality, non-inheritance wealth and initial wealth are the same. But when studying the effect of inheritances received t years ago on current wealth inequality (the longer-term effect), they differ — non-inheritance wealth is equal to initial wealth plus wealth that would have been accumulated or decumulated in the absence of the inheritance over the past t years. For ease of exposition, and because non-inheritance wealth cannot be estimated without making strong assumptions, this section refers to initial wealth as a proxy for non-inheritance wealth throughout.

[32] Another possibility is that recipients transfer their inherited wealth to charities or people outside the household. Econometric tests suggests that it is not common for parents to transfer inheritances they have received to children who live in a different household.

this estimate (the statistical evidence is not sufficient to reject the possibility that Australians have typically been net consumers). Appendix B explores the modelling outlined in this section in more detail.

Figure 2.7 – Inheritances have a persistent effect on recipients' wealth[a]

Modelled average effect of $1 of inheritance on household wealth



a. Error bars represent 95 per cent confidence intervals.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

Decomposing the effect of past inheritances on current household wealth shows that inheritances primarily increased household wealth by increasing holdings of assets that typically yield investment returns, such as equities, property and superannuation (figure 2.8, panels a and b; in nominal terms). This suggests that Australians invested a substantial share of their inheritances.

However, Australians did not typically invest enough, and/or earn high enough returns from those investments, to overcome inflation. In real (inflation-adjusted) terms, each $1 of inheritance increased household wealth by $1 0–3 years later, but only $0.90 4–7 years later.

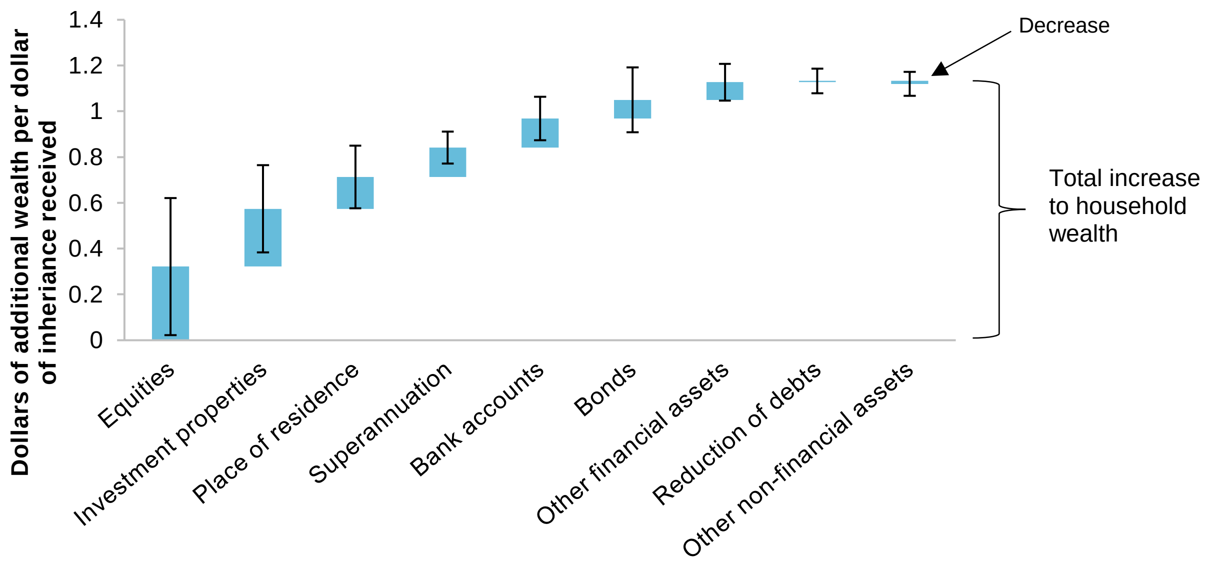
These results are at odds with studies of other countries, which suggest that the average inheritance recipient is a net consumer — specifically, that half to three quarters of the pool of inheritances are depleted within a decade of receipt (in nominal terms).

- Nekoei and Seim (2019, p. 20) found that the average Swedish recipient had depleted about half of their inheritance seven years after receipt.
- Druedahl and Martinello (2017, p. 1) found that the average Danish recipient had depleted about two thirds of their inheritance nine years after receipt.
- Karagiannaki (2017, p. 401) found that the average British recipient had depleted about three quarters of their inheritance a decade after receipt.
- Joulfaian (2006, p. 13) found that a typical recipient from the United States had depleted about 40 per cent of their inheritance about two years after receipt.

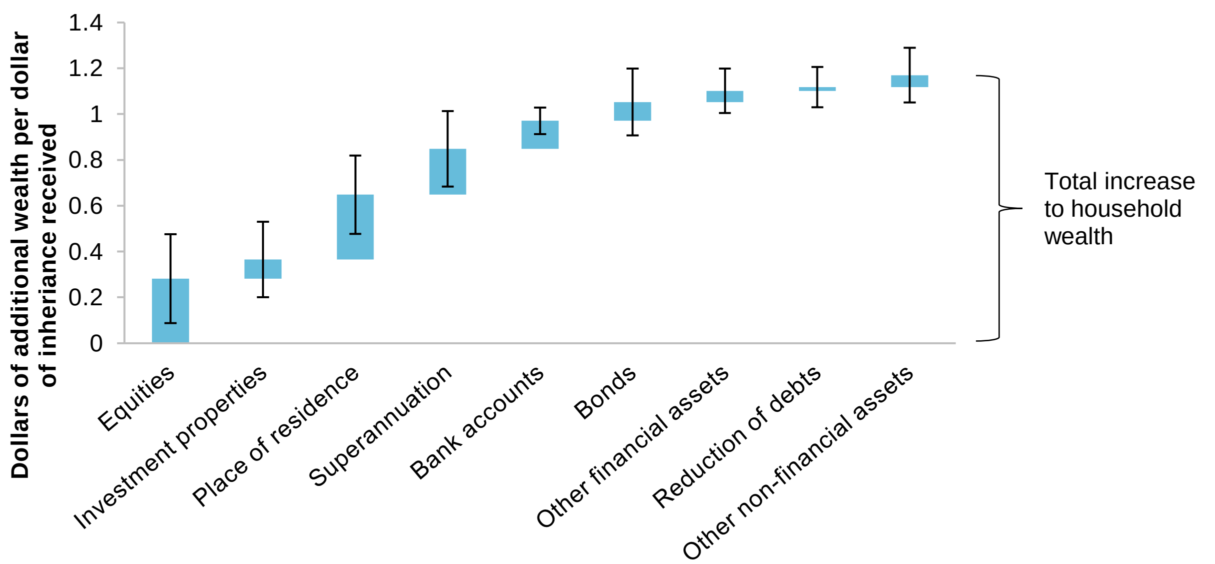
Figure 2.8 – Inheritances not consumed were mostly invested in equities, bonds and property[a]

Modelled average effect of $1 of inheritance on components of household wealth

a. 0-3 years after inheritance received



b. 4-7 years after inheritance received



a. Error bars represent 95 per cent confidence intervals.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

Why these results differ from those found in this study is not clear. It may be that Australians are less inclined to consume their inheritances, and/or that Australians earn higher returns from the component that they do not consume. It is notable that Australians tended to invest their inheritances in assets that have yielded substantial returns over the previous two decades (figure 2.8 above). Because of data limitations, this study has not directly examined what inheritances were spent on in Australia.

More generally, there is disagreement among studies from abroad on whether inheritances are mostly consumed directly (via increased spending on goods and services) or indirectly (via reduced labour income) (box 2.4).

Box 2.4 – Inheritances are consumed both directly and indirectly

Whether inheritances are mostly consumed directly (via increased spending on goods and services) or indirectly (via reduced income) is an open question.

The only study to fully address this issue is Nekoei and Seim (2019, p. 1), which found that increased consumption explained 70–90 per cent of inheritance depletion in Sweden, and labour supply reduction explained the remaining 10–30 per cent, with the relative contribution of increased consumption growing over time (and, consequently, the relative contribution of labour supply reduction declining over time). In the year following inheritance receipt, this was equivalent to a decrease in annual labour income of about $0.03 for each dollar of inheritance received.

However, Elinder, Erixson and Ohlsson (2012, p. 3) found that, on average, annual labour income following receipt of an inheritance in Sweden decreased by $0.04 to $0.09 for each dollar of inheritance received in the four years following inheritance receipt. At the upper end of these estimates, decreases to labour supply would be sufficient to explain the majority of the direct and indirect consumption of inheritances documented by Nekoei and Seim (2019).

Studies of income and wealth shocks unrelated to inheritances lend support to the view that inheritances are mostly consumed directly.

- Other studies of wealth shocks have typically found that annual labour income decreases by about $0.01–0.02 for each dollar of additional wealth (summarised by Elinder, Erixson and Ohlsson 2012, p. 3). These magnitudes are more consistent with the findings of Nekoei and Seim (2019) than those of Elinder, Erixson and Ohlsson (2012).
- The median estimate among 30 male labour supply studies surveyed by Pencavel (1986, pp. 69, 73, 80) is that each dollar of 'unearned income' (of which inheritances are a form) reduced earned income by $0.15, implying that the remaining $0.85 was consumed directly. Note that the models surveyed did not incorporate lifecycle dynamics, hence all unearned income was assumed to be consumed either directly or indirectly.

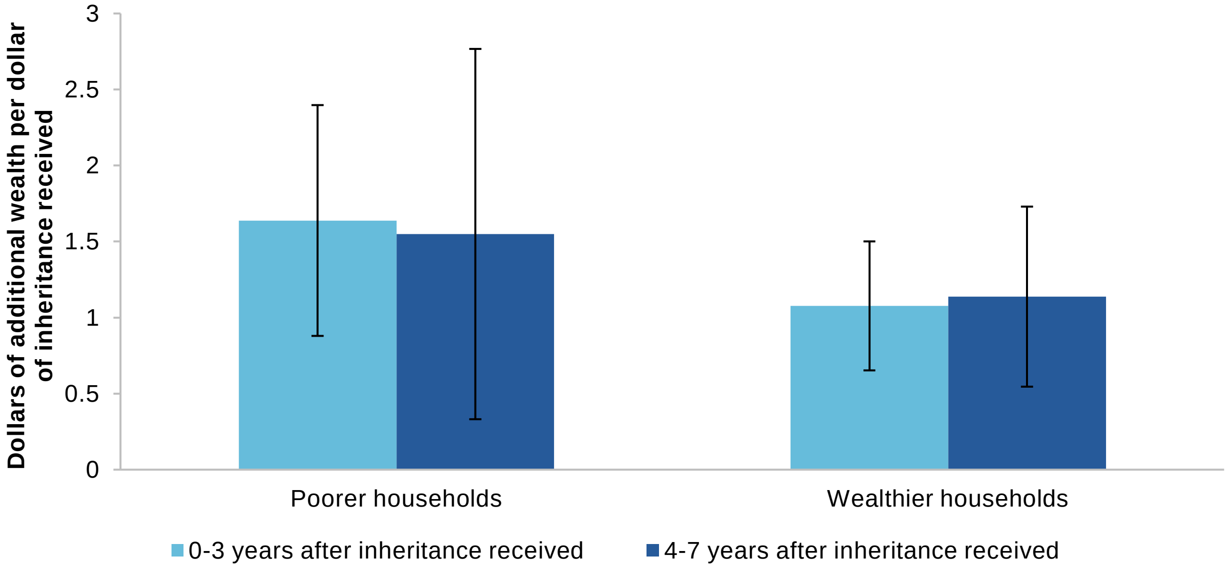
It is not clear how net inheritance consumption/investment varies across the initial wealth distribution

The longer-term effect of inheritances on wealth inequality depends on whether, and how, net inheritance consumption/investment varies across the initial wealth distribution.

Unfortunately, the nature of these differences is difficult to elicit with the available data. Our best estimate is that, on average, each $1 of inheritance increases household wealth by about $1.55 both 0–3 years later and 4–7 years later among the initially poorer 50 per cent of households and by about $1.10 both 0–3 years later and 4–7 years later among the initially wealthier 50 per cent of households (figure 2.9; nominal terms). But, as indicated by the confidence intervals, the uncertainty surrounding these estimates is substantial. The finding is not sufficiently robust to reject the possibility that each $1 of inheritance actually increases household wealth by more among wealthier households than among poorer households.

Figure 2.9 – Poorer households appear to be 'net investors' to a greater extent than wealthier households, but uncertainty abounds[a,b]

Modelled average effect of $1 of inheritance on household wealth, by halves of the initial wealth distribution



a. Error bars represent 95 per cent confidence intervals. **b.** 'Poorer' and 'wealthier' households are defined by halves of the initial wealth distribution.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

Appendix B shows that dividing the distribution of initial wealth into thirds or fifths and/or using 'lifecycle-adjusted' measures of initial wealth (recall box 2.3) does not clarify matters — the patterns that emerge are not robust.

Other studies suggest that, if there is a difference in inheritance consumption/investment among wealthier and poorer people, it is that each $1 of inheritance increases household wealth by more among wealthier households than among poorer households.

Two studies examined the issue directly.

- Nekoei and Seim (2019, pp. 21–23) found that recipients in the top 10 per cent of the wealth distribution prior to receiving their inheritances depleted their inheritances more slowly than those in the bottom 90 per cent of the distribution. This study drew on a large dataset (Swedish administrative records), which made it possible to examine differences at the extremes of the wealth distribution. This sort of analysis is not possible with the HILDA dataset.
- Karagiannaki (2017, p. 402) did not find sufficient evidence to conclude that there were systematic differences in inheritance depletion across the distribution of initial wealth in Britain. Like this study, her study drew on a smaller dataset drawn from household surveys.

Evidence from responses to lottery winnings suggests that initially wealthier inheritance recipients would directly consume (via increased spending on goods and services) their inheritances more slowly than poorer recipients. A Norwegian study found that, within a year, lottery winners with higher initial wealth directly consumed smaller shares of their winnings than lottery winners with lower initial wealth (Fagereng, Holm and Natvik 2018, p. 24). To the extent that inheritances lead to similar behavioural responses, this finding suggests that initially wealthier inheritance recipients ought to directly consume their inheritances more slowly than poorer recipients. A second finding about lottery winners strengthens the case further — Fagereng, Holm and Natvik (2018, p. 24) also found that larger lottery winnings were directly consumed more slowly than smaller lottery winnings (in proportional terms).[33] Recall that initially wealthier Australian inheritance recipients have tended to receive larger inheritances than poorer inheritance recipients (figure 2.1, panel b). Thus, it is probable that the findings of Fagereng, Holm and Natvik (2018) imply that each $1 of inheritance would have increased household wealth by more among wealthier households than among poorer households.[34]

The longer-term effects of inheritances on wealth inequality are most likely similar to the immediate-term effects

The longer-term effects of inheritances on absolute and relative wealth inequality in Australia are uncertain. It is most likely that the longer-term effects of inheritances on wealth inequality mirror the *direction* of the immediate-term effects (increase to absolute wealth inequality, decrease to relative wealth inequality), but their *magnitude* is unclear.

On average, the resultant increases to wealth from inheritance were mostly sustained, in real terms, 4–7 years after receipt. If it were the case that this average effect genuinely did not vary across the initial wealth distribution, then the longer-term effects would most likely mirror the immediate-term effects in both direction and magnitude.[35]

Our modelling did not find evidence that the effect systematically varied across the initial wealth distribution in either direction, although there is substantial uncertainty. In light of this, it would be unwise to make any claims about the magnitude of the longer-term effect, but the direction of the longer-term effect is less uncertain.

The findings for Australia contrast with findings from Sweden, the only other country for which longer-term effects of inheritances on wealth inequality have been investigated. Nekoei and Seim (2019, p. 1) found that the reduction in relative wealth inequality due to inheritances reversed within a decade of receipt, so that inheritances actually increased relative wealth inequality in the longer term (driven primarily by the ability of wealthier inheritors to obtain a higher return on their inherited wealth). Similarly, Elinder, Erixson and Waldenström (2018, pp. 25–26) found that the reduction to relative wealth inequality due to inheritances was smaller (although not reversed) five years after those inheritances were received than in the immediate term. We do not find evidence of this type of reversal in Australia.

[33] The size of the lottery winnings was unrelated to the recipients' initial wealth, so this was not a consequence of the initial wealth of the lottery winner.

[34] The 'probable' qualifier is important here, as additional assumptions are necessary to make this claim — namely that differences in the tendency of initially wealthier versus initially poorer lottery recipients to indirectly consume their lottery winnings (by earning less labour income) or differences in returns from invested lottery winnings did not compensate for the findings about direct consumption of lottery winnings. Fagereng, Holm and Natvik (2018) did not study these phenomena.

[35] This assumes that the difference between initial wealth and non-inheritance wealth (discussed at the start of section 2.2) is negligible. This is a discussed further in appendix B.

2.3 Effect of inheritances on the intergenerational persistence of wealth

Intergenerational persistence — the association between an adult child's position in society and their parents' — is a measure of social mobility. Lower intergenerational persistence indicates higher social mobility, as it suggests that parents' position in society has relatively little effect on their children's position in society.

Intergenerational persistence can be measured with respect to many variables, such as homeownership, employment, welfare dependency, and — most commonly — income. Intergenerational *wealth* persistence (IWP) is pertinent to this study because wealth transfers from parents to their children directly contribute to it. Inheritances or gifts from parents to their children typically increase IWP.

IWP is typically measured as the percentile increase to a child's household wealth associated with a 1 percentile increase to their parents' household wealth. The respective percentiles are usually calculated relative to the age cohort in question — that is, by comparing adults and children when they were broadly the same age.

A better variable with which to measure intergenerational persistence that is directly affected by wealth transfers would be 'lifetime resources' — the present value of all income and wealth transfers received over the lifetime (Boserup, Kopczuk and Kreiner 2017). Unfortunately, the data necessary to estimate the intergenerational persistence of lifetime resources in Australia do not exist, let alone to determine the share of it attributable to wealth transfers (Siminski and Yu 2021).

Intergenerational wealth persistence is lower in Australia than in the United States, and other comparisons are not yet possible

There has been only one study of IWP in Australia, which found that IWP was higher among older children — 0.09 among children aged 20–23 but 0.49 among children aged 40–65 (figure 2.10).

This pattern of IWP increasing with child age has been found in the United States and Denmark too, at least from about age 27 onwards (figure 2.10). It likely reflects that wealthier parents made larger investments in their children's education and broader human capital development, which yielded financial returns later in life. Consistent with this, Boserup, Kopczuk and Kreiner (2017) argue that larger investments in education delayed the children of wealthier parents' entry into the workforce, which is why IWP declined in Demark until children were aged about 27.

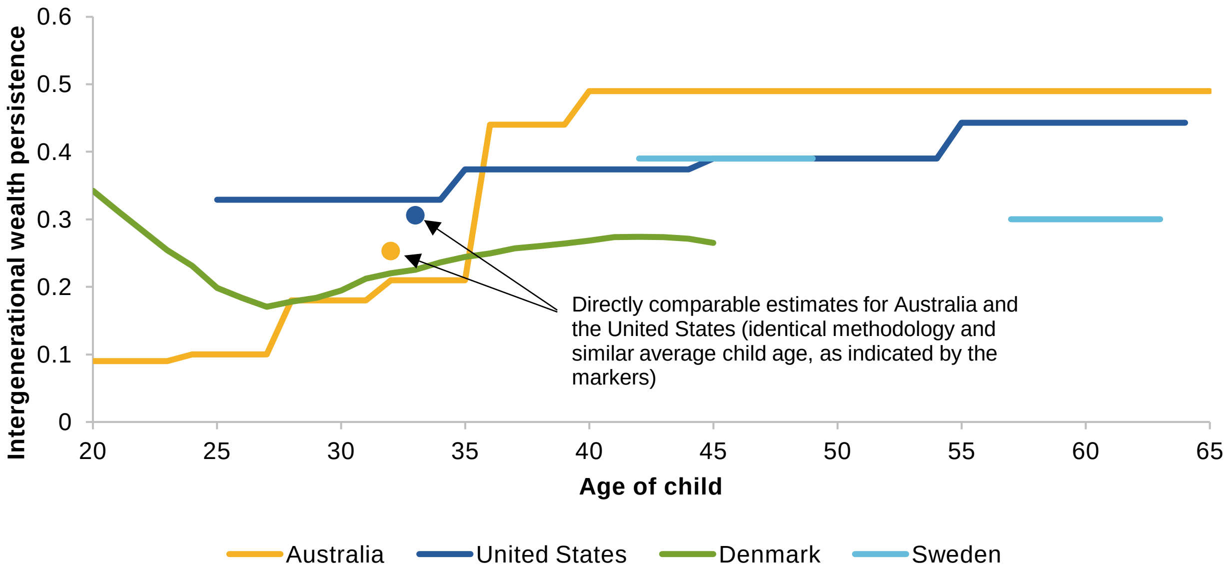
IWP also increases further in middle age, as inheritances are received. This is discussed in the next section.

Because of the difficulties in making cross-country comparisons among these few studies, the only conclusion that can be drawn is that IWP is lower in Australia than in the United States when averaged across children of different ages (figure 2.10). IWP appears lower in Australia than Denmark among children aged under 35 and higher thereafter, and higher in Australia than in Sweden among people aged over 42 (the only comparison available). But the Danish and Swedish studies draw on data from several decades ago, which makes such comparisons potentially misleading.

Studies of intergenerational *income* persistence align with the finding about Australia versus the United States for IWP. Intergenerational income persistence — the association between an adult child's position in the income distribution and that of their parents when they were a similar age — is much lower in Australia than in the United States. Intergenerational income persistence in Australia is also similar to that of Denmark and Sweden, and below the OECD average.[36] A corresponding result for IWP seems likely, since income is a critical input to wealth accumulation and Australians who earn higher incomes tend to be wealthier (PC 2018a, p. 81), but more research is needed to establish this.

Figure 2.10 – Intergenerational wealth persistence is lower in Australia than in the United States[a,b,c,d]

Estimates of intergenerational wealth persistence (percentile increase to a child's household wealth associated with a 1 percentile increase to their parents' household wealth) by age of child



a. Australian estimates are from Siminski and Yu (2021, p. 2), with the children's wealth measured in 2018. **b.** The United States estimate that is directly comparable to the Australian estimate is from Siminski and Yu (2021, p. 2) (children's wealth measured in 2018), while the other is from Pfeffer and Killewald (2018, p. 15) (children's wealth measured between 2013–2015). **c.** The estimate for Denmark is from Boserup, Kopczuk and Kreiner (2017, p. 23), and is derived from a single cohort of children who were aged 20 in 1985 and 45 in 2010. **d.** The estimate for Sweden is from Adermon, Lindahl and Waldenström (2018, p. 18). The wealth of the children aged 42–49 was measured between 1999 and 2006, and the wealth of the children aged 57–63 was measured between 1985 and 1991.

Inheritances accounted for one third of intergenerational wealth persistence in Australia among older people whose parents have died

Inheritances accounted for about one third (36 per cent is our best estimate, although considerable uncertainty surrounds it) of the IWP among Australians aged 64–74 in 2018 whose parents have both died. (The modelling underpinning this conclusion is shown in appendix B.) In other words, if all wealth had been unexpectedly destroyed at the time of death so that there were no inheritances, IWP would have been less by about one third.

There is no contradiction between this finding and the finding that inheritances reduced relative wealth inequality among the recipient (adult child) generation, as these are different concepts. Consider that some wealthy parents have poor children; the effect of inheritances is to substantially boost their wealth in

[36] In 2018, the Commission concluded that intergenerational income persistence in Australia is about average among OECD countries (PC 2018a, p. 93). However, subsequent research drawing on a much larger dataset (administrative records of individual tax returns, rather than the HILDA survey) has revealed intergenerational income persistence in Australia to be substantially lower than previously thought (Deutscher and Mazumder 2020).

proportional terms — reducing relative wealth inequality — and, in doing so pull them closer to their parents' position in the wealth distribution — increasing IWP. In general, the relationship between the share of IWP that is due to inheritances and the extent to which inheritances reduce relative wealth inequality may be positive or negative, depending on which exogenous factor is driving the variation in the two measures (box 2.5).

The finding that inheritances accounted for one third of IWP among this cohort implies that the majority of IWP in Australia was the result of factors such as education, attitudes and values, genetics, and gifts. As mentioned previously, wealthier parents might have invested more in their children's education by sending them to a private school or a better public school (by living near to it). They might have instilled their attitudes and values that promote wealth accumulation. And to the extent that there is a genetic predisposition to wealth accumulation, their children may have inherited it. There have been studies of how each of these channels influence IWP and intergenerational persistence with regard to other variables, but the results are often contradictory or not clear, which reflects the difficulties inherent to studying the subject matter (see, for example, Black et al. 2015; Fagereng, Mogstad and Ronning 2021; Pfeffer and Killewald 2015).

A recent study in Denmark found that a smaller share of IWP is attributable to inheritances than in Australia, while two studies of Sweden found larger shares of IWP were attributable to inheritances.

- The Danish study found that 35 per cent of IWP was attributable to inheritances (Boserup, Kopczuk and Kreiner 2017, p. 35). This is very similar to this study's estimate for Australia (36 per cent), but a fairer comparison suggests a wider gap: the Danish study measured child wealth immediately following inheritance receipt, whereas our estimate captures child wealth up to 17 years after some of the studied children received their inheritances, and by which point our estimates indicate that most of the inheritance will have been depleted in real terms (leading it to have a smaller effect on IWP) (appendix B).[37] If, for comparison with the Swedish study, it is assumed that inheritances were not depleted in Australia, then our modelling would suggest that 59 per cent of IWP in Australia was due to inheritances.
- Of the two Swedish studies, one found that 50–60 per cent of IWP was due to inheritances (Adermon, Lindahl and Waldenström 2018, p. 27),[38] while the other found that about 65 per cent of IWP was due to inheritances (Black et al. 2015, p. 19).

Two factors might explain why in Sweden the share of IWP attributable to inheritances is higher than in Australia.

- As a share of recipients' initial wealth, inheritances were larger in Sweden than in Australia. Larger inheritances (as a share of initial wealth) imply that the level of IWP attributable to inheritances ought to be larger, other things equal. Inheritances amounted to 9–13 per cent of recipients' initial wealth over in 2003-04, 2007-08, 2011-12 and 2015-16 in Australia. Yet, in Sweden, inheritances amounted to up to 30 per cent of recipients' initial wealth in 2000 (Commission estimate based on Nekoei and Seim 2019, p. 106).
- IWP appears to be lower in Sweden than in Australia (figure 2.10), so a given level of IWP due to inheritances would correspond with a larger share of IWP due to inheritances in Sweden than in Australia. Relatedly, the second study of Sweden (Black et al. 2015) was of adoptive children, amongst whom IWP is lower than amongst the general population for reasons other than inheritance, which exacerbates this effect.

[37] While section 2.2 found that inheritances were, on average, not depleted, inheritances were depleted among the subset of inheritance recipients considered here. The inheritance recipients considered here are older than the average recipient, and older recipients tended to deplete their inheritances.

[38] Adermon, Lindahl and Waldenström (2018, p. 30) also use another method to attribute IWP to inheritances which suggests that 70–90 per cent of IWP is attributable to inheritances. However, these estimates rely on an implied finding that Swedes are 'net investors', which is contradicted by the evidence presented in section 2.2.

Box 2.5 – The share of IWP attributable to inheritances versus the effect of inheritances on relative wealth inequality

The relationship between the share of intergenerational wealth persistence (IWP) attributable to inheritances and the extent to which inheritances reduce relative wealth inequality may be positive or negative, depending on which exogenous factor is driving the variation in the two measures.

For an example of a positive relationship between the two measures, suppose that IWP for reasons other than inheritance (pre-inheritance IWP) were to be higher, other things equal (this is the 'exogenous factor' driving the variation in this instance). This could occur if, say, public schools were to decline in quality relative to private schools, such that investment in private schooling (usually made by wealthier parents) boosted their children further up the wealth rankings. The share of IWP attributable to inheritances would then be lower, for two reasons:

- the *level* change to IWP attributable to inheritances would be lower, because the distribution of inheritances would more closely align with the existing child wealth distribution, so less re-ordering of the child wealth distribution would take place
- the *share* of IWP attributable to inheritances would be lower, both because the level change would be lower and because pre-inheritance IWP would be higher.

Meanwhile, inheritances would have a less equalising effect on relative wealth inequality, again because the distribution of inheritances would more closely align with the existing child wealth distribution.

For an example of a negative relationship between the two measures, suppose instead that wealth inequality among those who die were to be higher while wealth inequality among those receiving inheritances were to be unchanged, other things equal (this is the 'exogenous factor' driving the variation in this instance). This could occur if, say, the Age Pension were reduced in value or if aged care funding were reformed to a more 'user pays' basis. The share of IWP attributable to inheritances would then be higher, because the larger inequality in inheritance flows lead to more re-ordering of the child wealth distribution. Yet inheritances would again have a less equalising effect on relative wealth inequality, because poorer children would receive smaller inheritances, and vice versa.

3. How might future wealth transfers affect wealth inequality?

Key points

- **The total value of inheritances passed onto the next generation is projected to increase nearly fourfold between 2020 and 2050.**
- **Projected growth in inheritances is partly driven by rising wealth among older age groups, who hold a disproportionately large share of wealth in the future.**
- **Housing wealth is a significant factor driving these outcomes. Older age groups own more housing wealth, they draw down on that housing wealth slowly, and they inherit large housing wealth from their partners in old age.**
- **Demographic factors are also driving increases in the average value of inheritances, and the size of inheritances relative to recipients' existing wealth and income.**
  - The ageing population means that the number of deaths doubles by 2050, and older people make up a larger share of deaths.
  - The long term trend of falling fertility rates means that people who are expected to die have fewer children to leave their wealth to in the future.
- **Consistent with analysis of their historical impacts in Australia (and overseas), wealth transfers are projected to increase absolute wealth inequality (which is measured in dollar terms) but reduce relative wealth inequality (which is measured in proportional terms).**
  - This is because wealth transfers received by the less wealthy constitute a larger proportion of their existing wealth than wealth transfers received by wealthier people.
- **The projected sizes of total wealth and wealth transfers are highly sensitive to changes in rates of return on assets. However, the finding that wealth transfers moderate relative wealth inequality holds consistently, regardless of assumed rates of return.**
- **Scenario analysis demonstrates that wealth transfers would increase relative wealth inequality if, when compared to past outcomes, wealthier people receive much larger inheritances, or they save a much larger share of their inheritances compared with less wealthy recipients.**
- **The projected effects on relative wealth inequality under all scenarios were found to be relatively small, particularly in comparison to the impact of changes in rates of return on assets.**
  - A one percentage point change in the rate of return on housing led to relative wealth inequality effects that were more than triple the effect of wealth transfers by 2050.

Strong residential property price growth and increasing stores of wealth in the superannuation system have contributed to rising wealth (The Treasury 2020, p. 369). Retirees have also tended to draw down moderately on their savings (Wood, Griffiths and Emslie 2019, p. 43). If these trends continue and current policy settings remain broadly unchanged, generations reaching the end of their lives will potentially leave sizeable inheritances to younger generations.

While chapter 2 examined past impacts of wealth transfers, this chapter examines the potential future impacts of wealth transfers[39] on wealth inequality, given current policy settings and a range of scenarios about future wealth accumulation. There have been some past studies into how the size of inheritances might increase in the future, but little research on the implications of future wealth transfers on inequality in Australia (section 3.1). A simulation modelling exercise was used to examine the potential impacts of future wealth transfers in this study (section 3.2). Section 3.3 presents the results from the base scenario model projections and section 3.4 summarises the results from sensitivity testing of key assumptions in the base scenario. Section 3.5 concludes. Further details of the modelling are provided in appendix C.

3.1 Existing research and projections of future wealth transfers

Wealth transfers between generations are expected to grow

Chapter 1 found that intergenerational inheritances increased from $24 billion in 2002 to $52 billion in 2018, largely due to increases in per-person wealth. The Grattan Institute has suggested that in the future, inheritances may get bigger even faster given recent strong growth in wealth and evidence that older households tend to maintain or increase their wealth in retirement (Wood, Griffiths and Emslie 2019, p. 42).

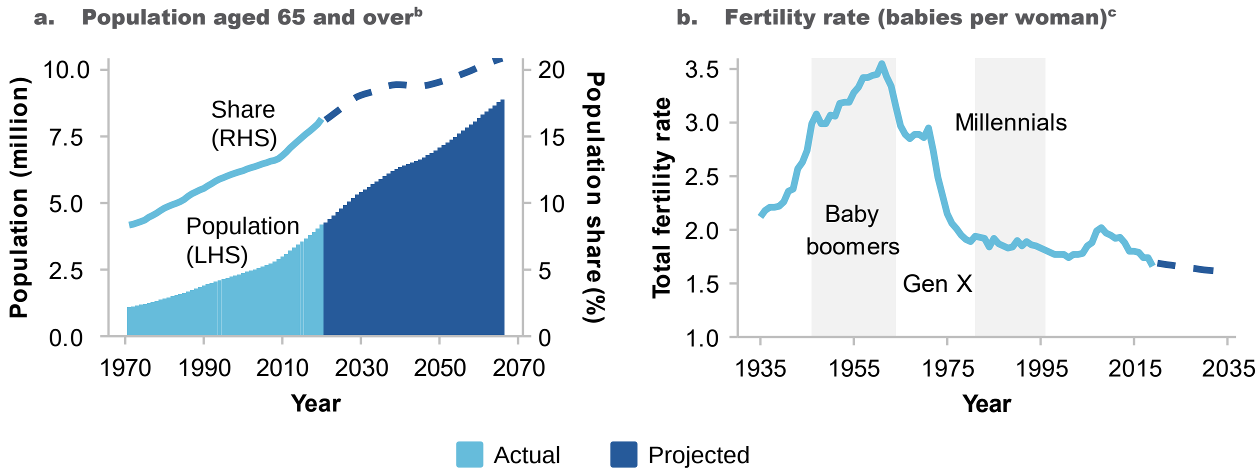
Research by Griffith University researchers (Brimble et al. 2017, pp. 5, 36) and McCrindle (2016, quoted in Brimble et al. 2017) estimated that Australians aged 60 and over would transfer $3.5 trillion or an average of about $175 billion per year in wealth in the next two decades. Inheritances are likely to increase across other OECD countries as well — both in value, if trends in asset prices continue, and in number, with the ageing of the baby boomer generation (OECD 2020, p. 27). In Australia, the share of the population aged 65 and over is projected to continue increasing in the coming decades (figure 3.1, panel a).

Fertility will continue to fall

Declining fertility rates are expected to result in larger inheritances per person, as parent wealth at death is shared between fewer heirs (Bourquin, Joyce and Sturrock 2020, p. 5; OECD 2020, p. 38). In Australia, fertility rates peaked at 3.55 babies per woman in 1961 during the baby boom. They then began to fall, to 1.89 by 1980 (corresponding to the last year of generation X births) and, albeit with a brief uptick in the 2000s, to a low of 1.66 in 2019 (figure 3.1, panel b). Projections in the 2021 Intergenerational Report assumed that the fertility rate would continue to decline to 1.62 by 2030-31 (McDonald 2020, p. 4; The Commonwealth of Australia 2021a, p. 25).

[39] 'Wealth transfers' in this report refer to intergenerational inheritances and inter vivos gifts (or simply 'gifts' henceforth).

Figure 3.1 – An ageing population and falling fertility[a]



a. Projections assuming no impact of COVID-19. **b.** Projections using medium ABS assumptions for fertility, life expectancy and net overseas migration. **c.** Actuals are by calendar year, projections are by financial year.

Source: ABS (2018, 2020b, 2021c); McDonald (2020); Productivity Commission estimates.

Housing wealth will continue to increase …

Housing is the largest source of wealth for most Australian retiree households (The Treasury 2020, p. 83). Despite this, retirees tend to be cautious about drawing down this wealth. Property was estimated to make up 72 per cent of net assets at death for those aged 65 and over, worth about $40 billion in total in 2009-10 (Temple, McDonald and Rice 2017, p. 89). The primary residence is also exempt from the Age Pension assets test (The Treasury 2020, p. 287) and can be exempt or only assessed up to a relatively low threshold in aged care fee calculations (DoH 2021; DSS 2020), meaning there is a strong incentive for retirees not to sell their residence.

Research projecting the future value of housing-based inheritances suggested that the total annual value of bequeathed housing from the existing stock of homes will reach about $100 billion (in 2019 dollars) in the year 2035, assuming that house prices grow at the same rate as the Consumer Price Index (CEPAR 2019, p. 36).

… as will superannuation

Superannuation represents the second largest share of net household wealth for Australians aged 55 to 74 (The Treasury 2020, p. 76). The Superannuation Guarantee was introduced in 1992 and is expected to be a more significant source of savings for people in the future, having been in place for 40 years — the average length of a working life — by the 2030s (The Treasury 2020, p. 116).

Well-off retirees tend to draw down on their superannuation slowly (Polidano et al. 2020, pp. 17–19; Rice Warner 2021). If low drawdown rates continue, future inheritances out of remaining superannuation balances ('death benefits') may be large. Projections suggest that average death benefits (in 2019 dollars) for people aged 65 and over could grow from $190 000 to more than $480 000 over 40 years from 2019, or from about $17 billion to $130 billion in aggregate terms (The Treasury 2020, pp. 369, 435).

Generally, retirees do not seem to consume very much

Slow decumulation of assets is a characteristic behaviour of retirees. Research using administrative data found that Age Pensioner households in Australia from 1999 to 2007 (who would not have had many working years under the Superannuation Guarantee) decumulated their financial assets at a 'remarkably slow' rate (Asher et al. 2017, p. 585). Pensioners tended to spend at rates below that required to maintain even a modest lifestyle such that the median pensioner passed away with 90 per cent of the initial value of their assessable assets (largely financial assets) still intact (Asher et al. 2017, pp. 598–599).

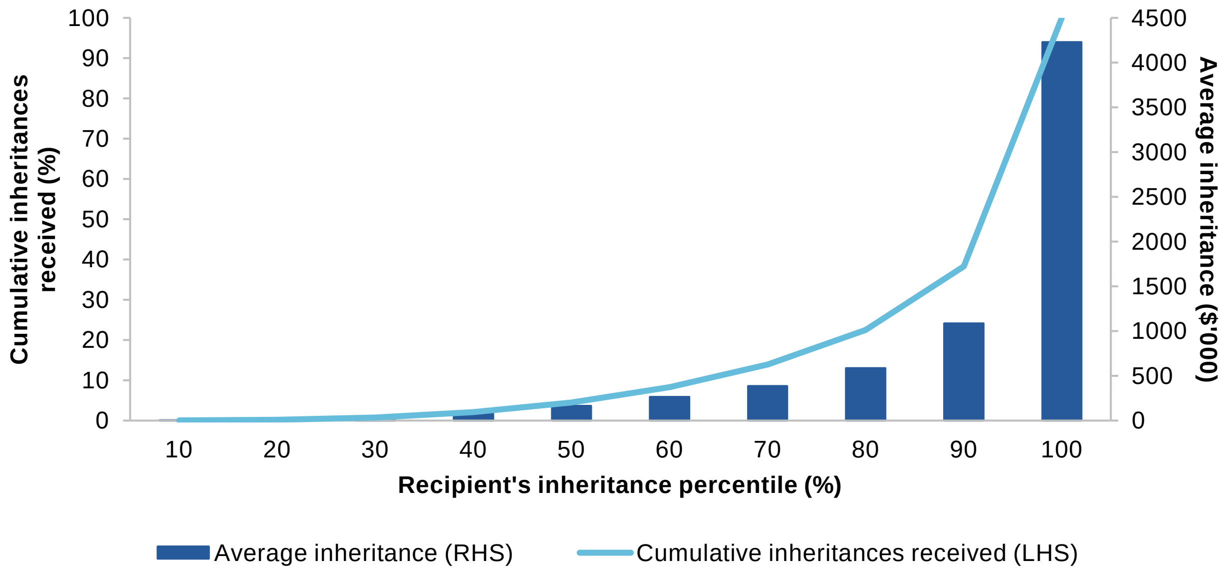
Limited research on effects on future wealth inequality in Australia

Other than the studies cited above, there has been little research on future wealth transfers in Australia, particularly those that examine the effects on future wealth inequality.

An Australian study (Brimble et al. 2017, pp. 38–40) examined potential distributions of inheritances received — that is, inheritance inequality — by projecting the future wealth of households aged 60 and over and then estimating the size of inheritances per surviving child or estate. The study's projected distribution of inheritances was in line with the current distribution of inheritances. Specifically, they projected that over three quarters of the total wealth transferred in the future would accrue to the top 20 per cent of inheritance recipients (figure 3.2) — broadly in line with the share of total inheritances that went to the top 20 per cent of inheritance recipients over the past 10 years (Productivity Commission estimates using HILDA Restricted Release 19). The study did not examine the subsequent effect on wealth inequality, which would have required projections for wealth of recipients at the time they received the inheritance.

Figure 3.2 – Projected inheritances by decile of inheritance received[a]

Inheritances received from households aged 60 and over



a. Inheritances on a per surviving child basis. Where there is no surviving child, the final estate value is used.

Source: Brimble et al. (2017, table 9).

As described in chapter 2, *absolute* wealth inequality is inequality in the level of wealth held by each person. *Relative* wealth inequality is inequality in the share of wealth held by each person, and can be quantified using measures such as the ratio of the wealth of the top 20 per cent to the bottom 20 per cent, or the Gini coefficient.[40]

[40] The Gini coefficient typically takes a value from 0 to 100 (on a 100-point scale). A value of 0 indicates perfect equality (all people have equal wealth) and a value of 100 indicates perfect inequality (one person has all the wealth). The smaller the value, the more equal the distribution.

Predicting the direction of the impact of wealth transfers on wealth inequality is straightforward with respect to absolute wealth inequality — in all practical circumstances, inheritances 'unambiguously increase absolute measures of wealth inequality' (Nekoei and Seim 2019, pp. 3, 8).[41]

However, the effect of wealth transfers on relative wealth inequality is less straightforward, and depends on the ratio of transfers to existing wealth as well as behavioural responses.

- In the immediate term, the impact can be explained by the size of wealth transfers received by the wealthy and the less wealthy, relative to their existing wealth (box 3.1).
- In the longer term, the impact also depends on differences in patterns of spending or saving associated with receiving an inheritance by people with different wealth levels.

Box 3.1 – How do inheritances affect wealth inequality? A framework

The immediate effect of wealth transfers on relative wealth inequality are driven by three factors (described here in terms of inheritances, but the same logic applies to inter vivos gifts) (Nekoei and Seim 2019, p. 8).

1. *Pre-inheritance wealth inequality among people receiving wealth transfers*. As a thought exercise, imagine the receiving generation all receive equal inheritances. If their pre-inheritance wealth was also equal, inheritances would have no effect on wealth inequality. If they had different levels of pre-inheritance wealth, then the wealthier someone is, the smaller their inheritance is relative to their pre-inheritance wealth (illustrated in example 1 below). This means that the more unequal the pre-inheritance wealth distribution is, the more likely wealth transfers are to reduce relative wealth inequality, keeping other factors unchanged.
2. *Wealth inequality among those who die, which determines the inequality in inheritances left by parents*. As described above, if the receiving generation all have equal pre-inheritance wealth and their parents also had equal wealth, then everyone would receive equal inheritances, and inheritances would have no effect on wealth inequality (disregarding parents with multiple heirs). However, if parents had unequal wealth, then those who receive larger inheritances would end up with greater wealth after receiving the inheritance, resulting in increased wealth inequality (as illustrated in example 2 below).
3. *Intergenerational wealth persistence between children and their parents*. Inheritances are more likely to reduce wealth inequality if intergenerational wealth persistence is low. The weaker the relationship between the wealth of children and of their parents before inheritances, the more likely it is for less wealthy children to receive larger inheritances and for wealthier children to receive smaller inheritances. This results in a wealth distribution that is more equal than if intergenerational wealth persistence was high (as illustrated below in comparing examples 2 and 3).

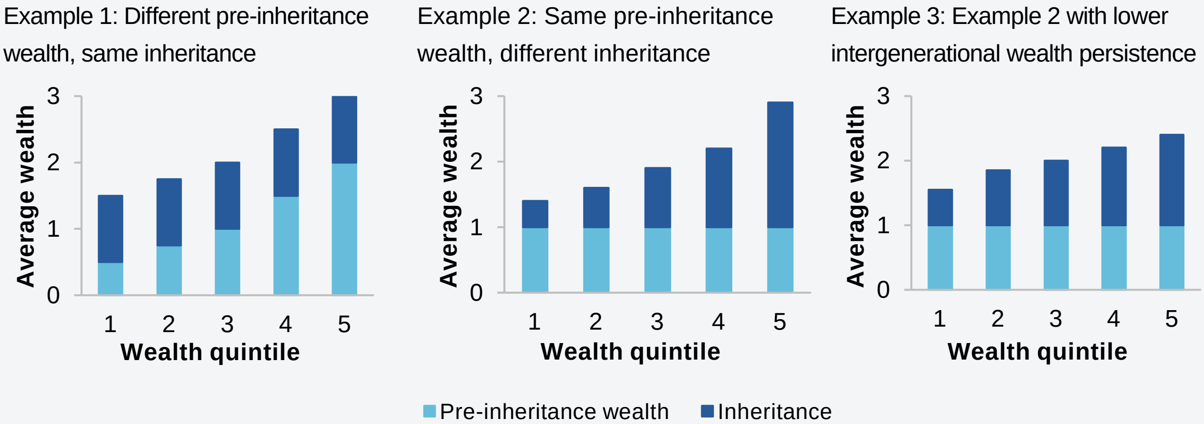
Together, wealth inequality among those who die (2) and intergenerational wealth persistence (3) determine the shares of total inheritances that children receive by wealth level (Nekoei and Seim 2019, p. 19).

[41] The only condition is that intergenerational wealth mobility is less than perfect (that is, the wealth of children is not perfectly correlated with the wealth of their parents).

Box 3.1 – How do inheritances affect wealth inequality? A framework

Illustrative effects of inheritances on relative wealth inequality

Average wealth of recipients before and after receiving an inheritance



Behavioural responses that have been analysed in the literature include changes in saving behaviour:

- in response to receiving a wealth transfer. The degree to which wealth transfers are saved by the wealthy and the less wealthy was shown by Nekoei and Seim (2019, pp. 20–22) to be the key driver of whether or not the immediate reduction in inequality from wealth transfers persisted in the long run (Nekoei and Seim 2019, pp. 20–22). De Nardi (2002, p. 22) found that a bequest motive could induce higher wealth households to choose a higher saving rate, and lead to the accumulation of large fortunes across generations over time.
- in anticipation of receiving a wealth transfer. International studies suggest that anticipation may lead to people reducing their savings (for example, Basiglio, Rossi and van Soest 2019; Lundberg 2020). In a lifecycle simulation of UK households, Bourquin, Joyce and Sturrock (2021, pp. 67, 71) found that inheritance anticipation resulted in higher wealth households saving less earlier in life compared with lower wealth households in *absolute* terms. This is because lower wealth households were less likely to spend uncertain amounts of money before they receive it and because they were more limited by borrowing constraints. However, inheritance anticipation led to lower wealth households building up less wealth in *percentage* terms early in life, which increased relative wealth inequality before inheritances were received.

As found in chapter 2, wealth transfers have reduced relative inequality across the wealth distribution and *within age groups* in Australia over the past twenty years. This is consistent with the international literature. In terms of inequality *across age groups* at future points in time, the OECD has suggested that as life expectancies rise, so will wealth concentration among older cohorts and the age at which people receive inheritances (OECD 2020, p. 27).

While this study focuses on the effects of wealth transfers on wealth accumulation and inequality, wealth transfers could have broader effects on wellbeing. Recent research on this topic from the United Kingdom suggests that receiving inheritances can reduce both wealth inequality and consumption inequality because the relatively large inheritances received by the less wealthy can lead to larger percentage increases in their wealth and consumption than inheritances received by the wealthy (Bourquin, Joyce and Sturrock 2021, pp. 72–73).

3.2 Simulation model of wealth transfers and inequality

This study models projections about the future for the primary purpose of understanding the impact of transferred wealth on wealth distributions within and across generations. That is, the interest is in identifying broad patterns and trends and understanding what drives them, rather than actual levels of wealth in the future, which are subject to greater uncertainty.

The study's projections are constructed using a dynamic cohort simulation model (box 3.2). This type of model provides a flexible framework for exploring the study's questions of interest, with fewer data requirements and less computational complexity than approaches such as microsimulation modelling. (Appendix C contains a brief exposition on alternative modelling approaches.)

Box 3.2 – The dynamic cohort simulation model of wealth transfers

A dynamic cohort simulation model was used to examine future wealth transfers and inequality effects. The initial population in the model was based on the surveyed population in the 2018 *Household, Income and Labour Dynamics in Australia* (HILDA) Survey. The population was split into cohorts based on five-year age groups (from ages 0–4 to 100+), five income quintiles, four initial wealth quartiles, initial homeowner status and an indicator for whether an inheritance has already been received.

Over the next 32 years to 2050, the model projects population, income and wealth for each cohort using assumptions about mortality rates, income growth, rates of return, saving rates and drawdown rates. Each year, wealth is transferred from older to younger generations via inheritances and inter vivos gifts. Changes in population due to births and migration were not included, meaning the model population declines over time as people pass away.

Major model components include:

- income — wages and other income were projected. Income transitions were incorporated based on age of entry into the workforce, career establishment and retirement to reflect lifecycle experiences. Income taxes and mandatory superannuation contributions were also simulated based on income.
- wealth — housing, superannuation and 'other assets' were projected, along with housing debt. Non-homeowners have a probability of entering home ownership based on their age, income and whether they have received an inheritance.
- inheritances — a proportion of wealth was assumed to be transferred to younger generations the year after death, in line with the probability of being single at death. The remaining wealth at death remains within the cohort. Cohorts that have not yet received an inheritance may receive one based on the ages of their living parents and the probability of those parents dying. A portion of inheritances received is saved in other assets.
- inter vivos gifts — cohorts gift a proportion of their assets, which younger cohorts receive based on the ages of their living parents. A portion of gifts is saved in other assets.

Model parameters were estimated from a range of sources. For example, wealth transfers, saving and drawdown behaviour were estimated largely using HILDA data. Various ABS datasets and other data and research findings were used to estimate parameters such as mortality and asset growth rates. Appendix C provides additional detail.

The model is used to analyse questions pertaining to wealth inequality *within* and *across* age cohorts under different scenarios relating to asset returns, home ownership, savings and wealth transfer behaviour, while holding current policy settings (such as the tax and superannuation systems) fixed. For instance, if people continue giving and receiving wealth transfers consistent with what is observed in existing survey data, does this result in the relatively wealthy accruing relatively more wealth? Similarly, how much more or less wealth might younger generations hold compared with older generations?

This model sheds light on these types of questions by projecting income, wealth and transfers for cohorts of the population, using 2018 *Household, Income and Labour Dynamics in Australia* (HILDA) Survey data as the initial model population (box 3.2). Outcomes were projected to 2050.

The future is uncertain and the model does not attempt to predict it

The model outputs depend heavily on assumptions. Actual future outcomes will certainly differ from the model projections for a number of reasons.

- The model structure, while useful for the purposes of this study, is not, and does not seek to be, a perfect or comprehensive representation of reality.
  - Actual wealth accumulation processes are more complex than represented in the cohort model with only three broad types of wealth.
  - The model does not account for population changes due to births or migration. Migration in particular has been a large source of population growth in Australia, and immigrants tend to be younger and higher skilled than the existing population (The Commonwealth of Australia 2021a, p. 7). This can affect comparisons of wealth by age group if higher skills translate to higher incomes and saving.
- The past is not understood perfectly.
  - There is very little data with which to model certain past economic behaviour (for example, that relating to drawdowns from wealth in retirement and housing investment). This means some model parameters were estimated with a high degree of uncertainty.
- The future is uncertain.
  - Future growth rates of asset prices — particularly housing, given its outsized influence on household wealth — and incomes, including relative differences between them, are especially important. They can drive large changes in relative wealth holdings through time and across the wealth distribution (box 3.3).
  - Future wealth accumulation and transfer behaviours may change as peoples' preferences change. For example, there is some evidence that older homeowners are becoming more likely to draw down on their housing wealth (Ong et al. 2013, pp. 16–17).

For these reasons, model outputs are not, and should not be, interpreted as predictions of the future. Rather, the model constructs projections, given varying assumptions, which are useful for producing the forward-looking descriptive statistics in this chapter.

> A projection is not making a prediction or forecast about what is going to happen, it is indicating what would happen if the assumptions which underpin the projection actually occur. (ABS nd)

Box 3.3 – Asset and income growth rates and inequality

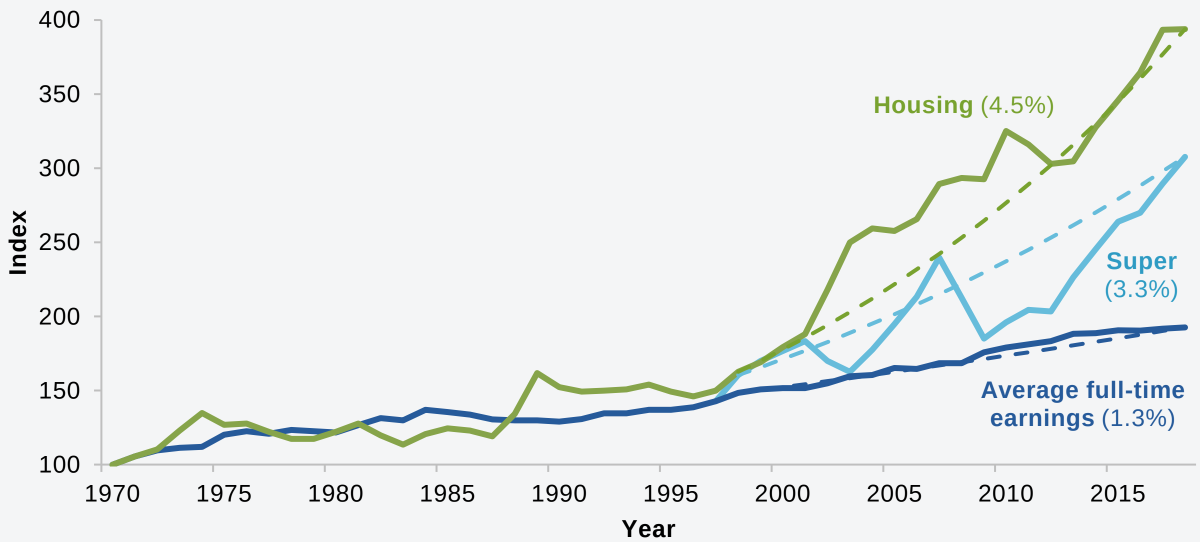
Piketty (2014, p. 258) found that the relative difference between asset and income growth rates — which measures how quickly capital income diverges from average income if capital gains are reinvested — was an important driver of historical patterns of wealth inequality. When capital grows significantly faster, the dynamics of wealth accumulation lead to highly concentrated wealth distributions.

Historically, house prices in Australia have grown faster than the value of other types of assets, and faster than labour income (illustrated in the figure below). Research published by the Reserve Bank of Australia showed that since the 1970s, there has been a gradual increase in the share of income paid to capital owners and a falling share paid to workers. An important contributor to this was increases in housing rents and prices (La Cava 2019). Low interest rates and high immigration appear to explain a large part of the rise in house prices in recent years (Saunders and Tulip 2019).

Whether the strong growth in housing prices will continue is uncertain. Changing interest rates, future immigration, and new dwelling construction — none of which are modelled in this study — have the potential to affect future rates of return.

Real house prices have risen faster than superannuation and income

1970 to 2018, indexed to 100 at 1970,[a] 20-year real growth rate in brackets



a. Superannuation index set equal to earnings index at 1997, because 1998 is the earliest date for which super returns were available in Grattan Institute analysis.

Source: Wood, Griffiths and Emslie (2019, figure 2.6); Productivity Commission estimates.

The base scenario

The base scenario results in this chapter largely reflect continuation of historical rates and distributions estimated from HILDA (including in relation to gifting rates, home ownership rates and the distributions of total inheritances to different cohorts by wealth group), with a number of other parameters informed by additional data sources and research (table 3.1). However, the base scenario assumes that rates of return on all assets converge over ten years from their historical rates to 4 per cent, equivalent to the assumed long-run rate of income growth. Wealth outcomes are projected in nominal dollars and discounted to 2018 values. Results from this projection are presented in section 3.3.

Scenario analysis was conducted to test how sensitive the outcomes in the base scenario were to the assumptions used (section 3.4).

Further assumptions and parameters in the base scenario are summarised in table 3.1. Appendix C contains further details of the model structure and limitations, and parameters in the base and alternate scenario models.

The counterfactual

The effect of wealth transfers was analysed by comparing results from the model relative to a counterfactual — a hypothetical world in which no future wealth transfers occur between generations. That is, parents are assumed not to gift any wealth to their children, and any wealth at death that is not inherited by partners is destroyed rather than passed on. This counterfactual was used to analyse the effects of wealth transfers in the base scenario and in alternate scenarios.

These effects can be analysed for specific generations by comparing outcomes for that generation in the scenario that includes wealth transfers relative to the counterfactual. Effects analysed over the projection period are cumulative across time. For example, outcomes ten years into the projection incorporate the cumulative effect of wealth transfers in each of those ten years.

While this counterfactual provides one way to examine the effect of wealth transfers, it is not realistic — wealth is not typically destroyed at death. An alternative counterfactual could be a non-inheritance based, distribution mechanism. Depending on the design of this distribution mechanism, it could result in either a more or less equal distribution of wealth.[42] This study does not examine alternate ways of distributing wealth transfers, so a relatively simple counterfactual of no wealth transfers was used.

[42] Nekoei and Seim (2019, pp. 22–23) considered the effect of inheritance taxation, and found that both proportional and progressive taxes tended to initially increase relative wealth inequality, but redistributing the tax revenue then reduced wealth inequality. The OECD (2020, p. 32) stated that the overall effect of inheritance taxes, including the redistribution of tax revenue, was more likely to be equalising. This was likely to be particularly so in the long term due to work, leisure and saving subsequently changing in ways that reduce wealth inequality.

Table 3.1 – Select model components and base scenario assumptions

Component	Base scenario model approach
Cohort size	
Starting cohorts	HILDA 2018 population split into 5-year age groups, five income quintiles, four starting wealth quartiles, inheritance received status, and homeowner status.
Mortality rate	Observed death rates calculated by age group (ABS 2020c).
Income transitions	Estimated probability of income group transitions in HILDA. Only cohorts aged 15–39 and 60–74 in the model assumed to be able to transition, at 5-year intervals.
Home ownership transitions	Estimated probability of purchasing a first home by age and income in HILDA, for cohorts aged 15–54. Cohorts that have received an inheritance have higher probabilities, informed by estimates in Cigdem and Whelan (2017).
Inheritance receipt	Based on ages of living parents in each cohort in HILDA and probabilities of those parents dying according to estimated mortality rates.
Income and asset growth (nominal growth rates)	
Income growth (and discount rate)	Converging from 2018 growth to 4 per cent over ten years. In line with 2.5 per cent inflation and 1.5 per cent labour productivity growth assumed in Intergenerational Report (The Commonwealth of Australia 2021a, p. 11) and Retirement Income Review (The Treasury 2020, p. 178).
Return on housing	Converging from historic average of 7 per cent to 4 per cent over ten years. Historic average informed by the average of property asset returns over 20 years from Vanguard (2021), and Reserve Bank of Australia reported average over 30 years to 2015 (Kohler and van der Merwe 2015).
Return on superannuation	Converging from initial rates (6.0 per cent for ages under 65, 5.35 per cent for ages 65 and over) to 4 per cent over ten years. Initial rates based on Retirement Income Review assumptions about returns on superannuation (The Treasury 2020, pp. 516–517).
Return on other assets	Converging from historic average (3.3–5.0 per cent depending on age group) to 4 per cent over ten years. Assumed historic return on cash assets of about 4 per cent, and equity of about 8 per cent based on 20-year average from Vanguard (2021). Rate of return on additional assets (such as vehicles, collectibles) assumed to be about 2 per cent (half of cash assets). Converted to age-dependent rates of return based on HILDA data on the composition of 'other assets' by age group.
Saving and drawdowns	
Housing	HILDA used to estimate: • individual value of housing assets on purchase of first home. This is assumed to grow with income growth over time • ratio of housing debt to assets after first home purchases • rate of housing debt reduction as a percentage of existing housing debt • changes in individual housing wealth via additional home purchases or sales.
Superannuation	Superannuation contributions projected by applying superannuation guarantee rates to projected wage income, including planned increase to 12 per cent by 2026, and 15 per cent contributions tax. Balances drawn down according to legislated minimum rates.
Other assets	Saving based on estimated shares of income not used in consumption, according to Household Expenditure Survey data (ABS 2017a). Inheritances and inter vivos gifts assumed to be saved in other assets at the same saving rate. Drawdown rates estimated using HILDA wealth data and assumed rates of return and saving.
Wealth transfers between generations	
Inheritances	'Pools' of intergenerational inheritances by age group are formed from wealth at death for single people using data on marriage status at death (ABS 2020d), with 2 per cent assumed to go to charity. Cohorts that had not yet received an inheritance receive a share of the pools based on the ages of parents who have died and the cohort's wealth ranking within their age group, informed by HILDA.
Inter vivos gifts	Estimated size of gifts given as a ratio of 'other assets' using HILDA. Younger cohorts receive a share of the gift 'pools' based on the ages of their living parents.

Generations and age groups in the model

Assumptions about the ages of generations of the population have been made to align with the five-year age groups in the model (table 3.2). During the 32-year projection period, pre-boomers and most baby boomers reach the end of their lives, with generation X beginning to reach old age as well. These definitions of generations have been used throughout the results presented in this chapter.

Table 3.2 – Generations in the dynamic cohort simulation model

Generation name	Years of birth[a]	Actual ages in 2018	Assumed five-year age groups in 2018
Pre-boomers	Pre-1946	73+	75+
Baby boomers	1946–1964	54–72	55–74
Generation X	1965–1980	38–53	40–54
Millennials	1981–1996	22–37	20–39
Post-millennials	Post-1996	0–21	0–19

a. There is no universally agreed definition of generations by year of birth. These years are consistent with commonly used year ranges (Beresford Research 2021; Dimock 2019).

In addition, the five-year age groups in the model age over time, such that they transition to the next five-year age group every five years. Comparisons of age groups between projection years are presented in multiples of five years to ensure that they are comparing the same age ranges over time. (For example, the 60–64 age group in 2018 is compared with the 60–64 age group in 2048.) Comparisons of the population over time are often presented using the 30–99 age range because the model does not include births and there are no cohorts under the age of 30 by the year 2048. The 100+ age group is also excluded due to the small sample size in the initial population, that can skew results.

3.3 Projected effects of transfers on wealth inequality

This section presents results for future wealth, wealth transfers and effects on wealth inequality between and within generations, as projected under the base scenario.

A number of factors shape projected wealth in the model. One is the initial wealth levels of population cohorts, which reflect past wealth accumulation behaviour and asset price growth. Wealth projections in the model build on these initial values. The model is not designed to change past returns or behaviour to align with assumed future rates of return or behaviour in the projection. Changes from initial wealth levels during the projection period are determined by assumptions about future incomes; rates of return, saving and drawdowns in each asset type; and wealth transfer behaviour for each cohort (section 3.2).

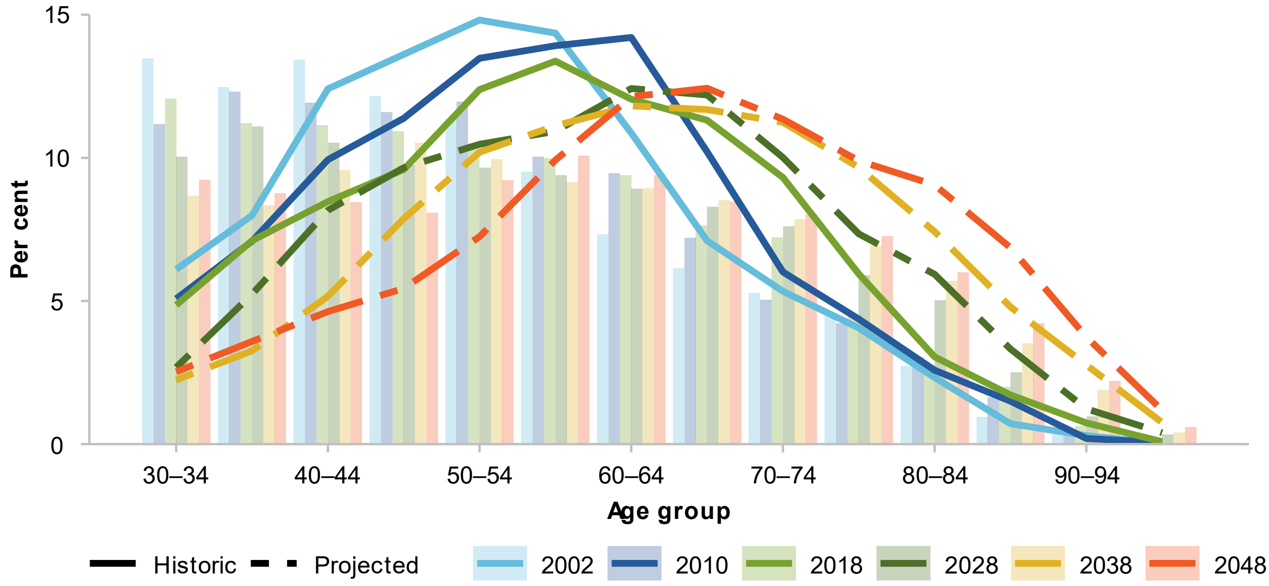
Consistent with the primary interest of this study — understanding the effects of wealth transfers on the wealth distribution across and within generations — the presentation of results in this section focuses on relative changes to wealth, rather than absolute changes. This section presents these results for the base scenario, and results from alternate scenarios that affect these findings are summarised in section 3.4. Additional results and discussions of projected wealth inequality over time are presented in appendix C.

Wealth is projected to become more concentrated towards older people

Wealth inequality between generations is projected to increase over time, driven by older age groups holding a disproportionately large share of wealth (figure 3.3). The base scenario projection suggests that among people aged 30–99, those aged 60 and over account for about a third of the population in 2018, rising by about 12 percentage points to 46 per cent in 2048. However, their share of wealth increases by about 22 percentage points to 67 per cent over the same period.

Figure 3.3 – Older people are projected to hold more wealth

Percentage of projected 30–99 year old population (column) and wealth (line)[a]



a. Historic data based on HILDA. Non-housing debt is excluded.

Source: Productivity Commission estimates from cohort simulation model and using HILDA Restricted Release 19.

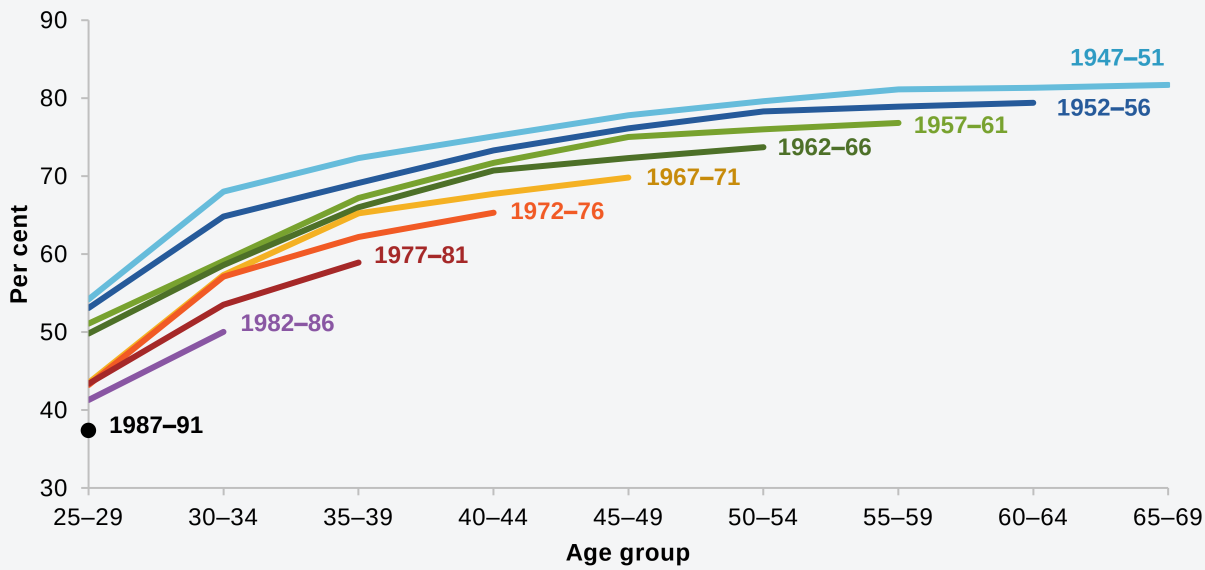
This increase is broadly consistent with trends in HILDA data, which shows that people aged 60 and over accounted for about 28 per cent of the 30–99 year old population and 31 per cent of their wealth in 2002, with shares of wealth rising faster in the decades since (figure 3.3). These historical trends are partly driven by falling home ownership rates among younger cohorts (box 3.4).

Box 3.4 – Falling home ownership rates

Home ownership rates by age group have fallen over time in Australia, as illustrated in the figure below (AIHW 2021a). For example, 68 per cent of people aged 30–34 owned a home in 1981 (born 1947–51). By 2016, the rate had fallen to 50 per cent in that age group (born 1982–86). The Grattan Institute estimated that home ownership rates for those aged 65 and over would fall by 19 percentage points from 2016 to 2056 if these trends continue (Coates and Chen 2019).

Cross-country research published by the OECD showed that countries with lower home ownership rates tended to have higher wealth inequality (Causa, Woloszko and Leite 2019). Preliminary research on wealth inequality over recent periods in the same study suggested that countries that experienced declining home ownership rates tended to have a decreasing share of wealth held by the bottom 40 per cent (indicating greater inequality). The relationship was less clear for countries that had also experienced rising house prices (such as Australia, the United States, Canada and the United Kingdom), where there was relatively little change in the share of wealth held by the bottom 40 per cent. This may be because rising house prices increase the share of wealth held by homeowners, including those in the bottom 40 per cent of the wealth distribution, offsetting falls in shares of wealth due to declines in home ownership.

Home ownership rates by birth cohort and age group[a]



a. Based on Census data. Rates reflect the year the household reference person was born.

Source: AIHW (2021a, figure 2).

Increasing housing wealth is a significant driver of rising total wealth among older age groups in the projection (figure 3.4). Housing wealth represents about half of the total wealth of those aged 30–59 in both

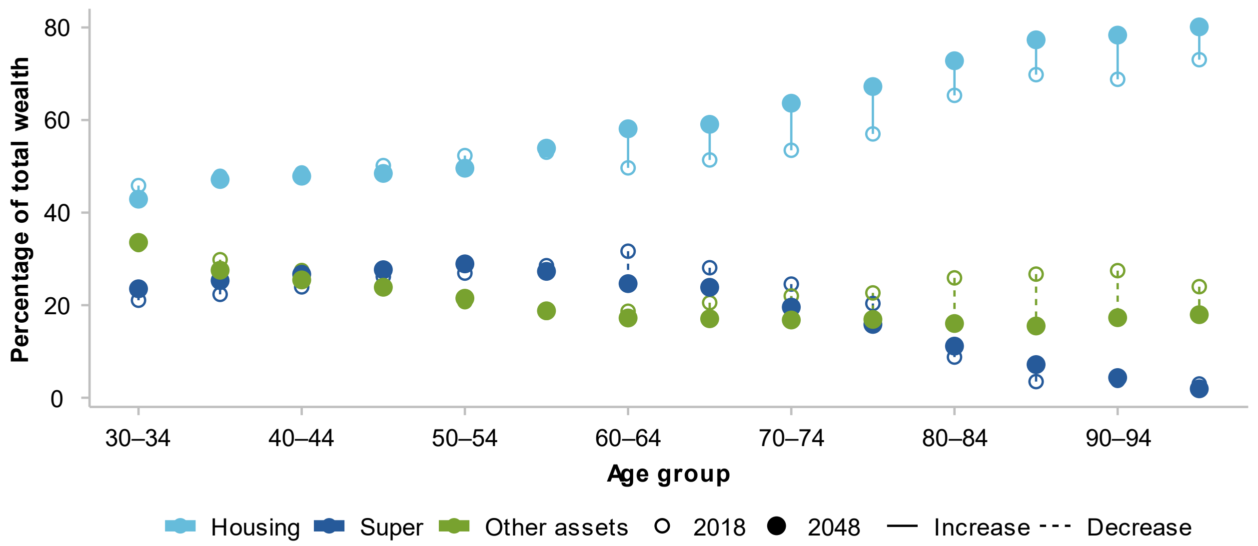
2018 and 2048. In comparison, housing wealth represents about 54 per cent of the total wealth of people aged 60–99 in 2018 and increases to 66 per cent by 2048. This is because older age groups:

- experience more years of higher returns on housing (including historical returns reflected in initial wealth values) before all asset returns converge to income growth in the model. If house prices had grown more slowly in the past, the initial housing wealth of these cohorts would also be lower
- draw down housing wealth slowly
- inherit large housing wealth from their partners in old age.

Probabilities of becoming a homeowner in the base scenario were estimated using HILDA, which produced home ownership rates by age group that were similar to those observed in HILDA in 2018 (appendix C). If alternatively, the model assumed that home ownership rates continue to decline as they have in recent decades (box 3.4), the share of wealth held by younger cohorts would reduce by a greater extent than under the base scenario, increasing wealth inequality across age groups.

Figure 3.4 – Housing is projected to drive growth in wealth among older age groups

Composition of projected total wealth held within each age group by year[a]



a. Discounted to 2018 values by projected income growth. Non-housing debt is not projected. As there are no births in the model, by 2048 there are no people aged under 30.

Source: Productivity Commission estimates from cohort simulation model.

Wealth accumulation is sensitive to the assumed rate of return on housing. For example, when housing was assumed to grow at its historical rate of 7 per cent in the long run, rather than 4 per cent, average wealth accumulated over the projection period by people aged 60–64 nearly doubled ($1.8 million by 2048 compared with $1 million in constant dollars).

Future wealth transfers are projected to increase in size

In the base scenario, wealth at death and inheritances passed onto the next generation are projected to grow in line with rising wealth among older age groups. Total wealth at death is projected to increase by a factor of 3.3 between 2020 and 2050, with the total amount passed onto the next generation increasing by a factor of 3.9. The larger factor increase in intergenerational inheritances in the model is because older age groups make up a larger share of total deaths projected in 2050 and are less likely to have a surviving spouse (who would otherwise receive the inheritance).

Decomposing the increase in total wealth at death into changes in the number of deaths and in average wealth shows that it is largely driven by an increase in the number of deaths, which is projected to double. (The decomposition of total wealth at death is highly sensitive to assumptions for returns on assets, which are explored in section 3.4).

The relative size of inheritances received is also projected to increase. For inheritance recipients aged 62–66 (the age group at which total received inheritances peaks) in 2020 and 2050:

- the ratio of received inheritances to existing wealth increases from 0.16 to 0.78
- the ratio of received inheritances to estimated cumulative income increases from 0.08 to 0.43.[43]

These outcomes are partially driven by the disproportionately strong growth in wealth for older people (including from historical returns, described above). This wealth is especially large relative to the incomes and lower returns on wealth for younger people during the projection period.

There is also a rise in the average size of received inheritances, driven by a 50 per cent fall in the ratio of inheritance recipients to deaths (from about 2:1 to 1:1) over the projection period. Even if there was no change in average wealth passed onto younger generations at death, the relative fall in recipients effectively doubles the size of inheritances received. As discussed in section 3.1, this is partly because of falling fertility rates observed in recent decades, reflected in the initial population. Analysis of 2018 HILDA data shows that about 55 per cent of people aged 80–84 had more than two children, whereas it was only 35 per cent for people aged 50–54 (Productivity Commission estimates using HILDA Restricted Release 19).

While inter vivos gifts are included in the model, gifting rates are assumed to remain constant over time in the base scenario and are estimated based on HILDA data, which, as noted in chapter 1, may underreport gifts received. The total value of gifts is projected to increase only slightly and fall relative to the value of inheritances (from about 23 per cent in the 2019 base scenario projections to only 6 per cent in 2050). This is because gifts are assumed to be given from other assets, which are projected to grow more slowly than wealth at death.

Benefits from wealth transfers change over the lifecycle

The degree to which people benefit from wealth transfers changes over the lifecycle (figure 3.5). In the simulation results:

- younger people under the age of about 40, who are millennials and post-millennials in the model, benefit from being net receivers of gifts from their parents. Those who receive an inheritance also benefit from an increased probability of home ownership.
- early middle aged people, aged around 45–54, tend to give more gifts, offsetting increases in wealth from saving received wealth transfers. Over the projection period, this age group initially covers generation X and then transitions to cover millennials and older post-millennials.

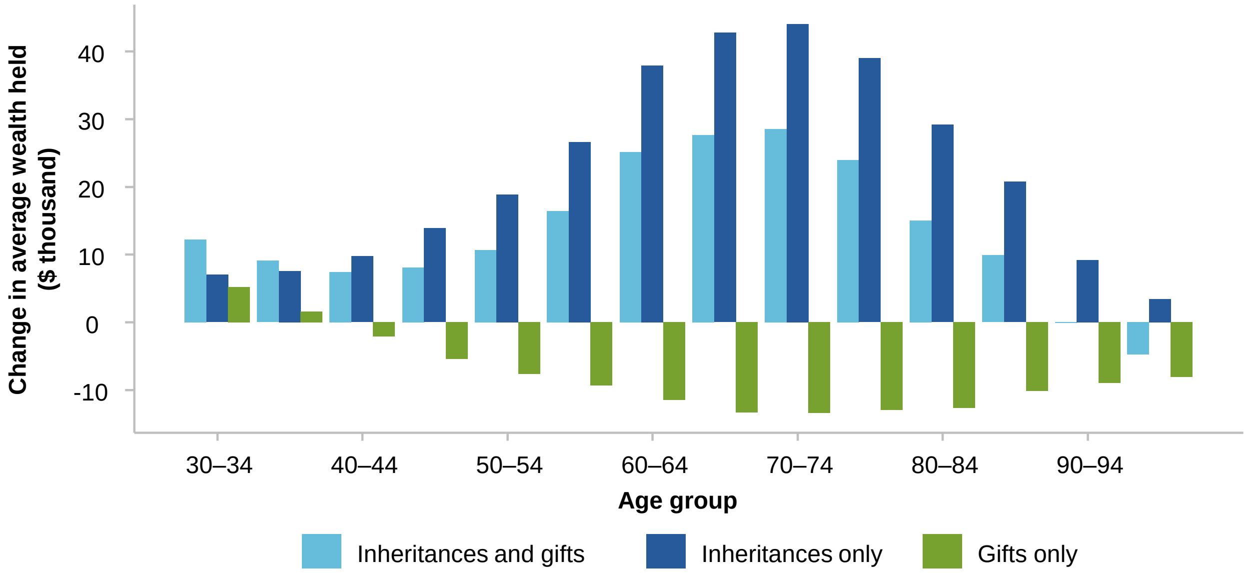
[43] Estimated cumulative income is net income earned in the 32 years of the model projection for the 2050 cohort, used as a proxy for lifetime income. The cumulative income of people aged 62–66 years in 2050, for example, is applied to people aged 62–66 in earlier years for comparing the relative size of inheritances. Cumulative income is limited to the 32 years of the projection as income is not projected in the model before or after this period. Average estimated cumulative income for the 62–66 year age group over the 32 years is $1.7 million, or about $54 000 per year.

- older middle aged people and retirees, aged around 55–74, are the biggest immediate beneficiaries of wealth transfers through the receipt of inheritances. For example, two thirds of the 60–64 age group had received an inheritance by 2048. The cohort of older middle aged people and retirees largely consists of baby boomers at the start of the projection, with generation X and older millennials transitioning into this age range during the projection period.
- older people, from the age of about 75 onwards, had mostly already received an inheritance, and are assumed to continue giving gifts to their children until age 79. This age group initially covers pre-boomers in the model, with the baby boomer generation and older members of generation X reaching this age range over time.

Figure 3.5 illustrates the cumulative effects of future wealth transfers during the projection period. For example, the difference in average wealth for people aged 60–64 in 2048 reflects the cumulative effect of increases in wealth due to gifts received while young, falls in wealth due to gifts given during early middle age, and increases in wealth from inheritances received in the latter parts of middle age. Average wealth is lower for people aged over 90 in 2048 because most had already received an inheritance before the start of the simulation, and they reduced their wealth by giving gifts in the earlier years of the projection.

Figure 3.5 – Wealth transfers increase wealth most when aged 55–74

Difference in average wealth in 2048 relative to a counterfactual in which no future wealth transfers occur, by age group (2018 dollars)[a,b]



a. Discounted to 2018 values by projected income growth. Non-housing debt is not projected. **b.** The sum of changes in average wealth with inheritances only and with gifts only do not add exactly to change with both inheritances and gifts because receiving an inheritance allows more wealth to be gifted.

Source: Productivity Commission estimates from cohort simulation model.

Inheritances do not appear to be a key driver of home ownership. In the base scenario projection, 81 per cent of people aged 55–59 are homeowners in 2048, marginally higher than the 79 per cent in a hypothetical world with no transfers. These projections are consistent with the fact that inheritances tend to be received in late middle age but about 95 per cent of first home buyers are under the age of 55 (ABS 2019a, table 9.5).

While wealth transfers do change the percentage of wealth held by each age group, the effect is projected to be small. In 2048, people within the 55–74 age range are projected to hold an additional 0.15 percentage points of the total wealth held by the 30–99 year old population, relative to a hypothetical world without future wealth transfers. This is because only a portion of wealth transfers received are assumed to be saved to generate more wealth, and in the long term it is small relative to wealth generated from other sources. Some of the additional wealth is also assumed to be given as gifts to younger generations, which balances the wealth across age groups.

Wealth transfers are projected to reduce relative wealth inequality

Wealth transfers increase *absolute* wealth inequality in the base scenario simulation. The range of wealth for people aged 30–99 at the 25th and 75th percentiles is projected to be \$673 000 (2018 dollars) in 2048. In a hypothetical world without future wealth transfers between generations, that range would be marginally lower in 2048, at about \$660 000.

Although wealth transfers lead to *absolute* wealth inequality increasing, as observed in chapter 2, they reduce *relative* wealth inequality across the population and within generations (illustrated with reference to the millennial and generation X birth cohorts in the light blue line in figure 3.6). This is because lower wealth cohorts tend to receive larger wealth transfers relative to their existing wealth. For example, in 2048, inheritance recipients aged 60–64 who are in the bottom third of the wealth distribution for their age group are projected to receive an average of \$230 000 in the base scenario model, which is about 70 per cent of their wealth before the inheritance. Those in the top third of the wealth distribution are projected to receive an average of \$929 000 — while this is larger in absolute terms, it is about 60 per cent of their existing wealth.

The reduction in relative wealth inequality is observed across a number of measures. The ratio of wealth held by people in the top 20th percentile to that held by the bottom 20th percentile — the 80:20 ratio — is marginally lower for people aged 30–99 in 2048 after accounting for wealth transfers (4.67 without transfers compared with 4.59 with transfers), indicating slightly better relative wealth equality. The Gini coefficient is also lower for the same population (43.6 without transfers compared with 43.1 with transfers).

In examining relative wealth inequality effects over time by generation, a slight timing effect of inheritances is observed for millennials, where the effect on the Gini coefficient falls between 2035 and 2045 (figure 3.6, light blue line). Not all millennials received an inheritance at the same time, which reduced the improvement in inequality from wealth transfers within that generation in the immediate term. Once all people within the generation receive an inheritance in the model, there is an equalising effect. This timing effect is present in all modelling results.

The reduction in relative wealth inequality due to wealth transfers is small

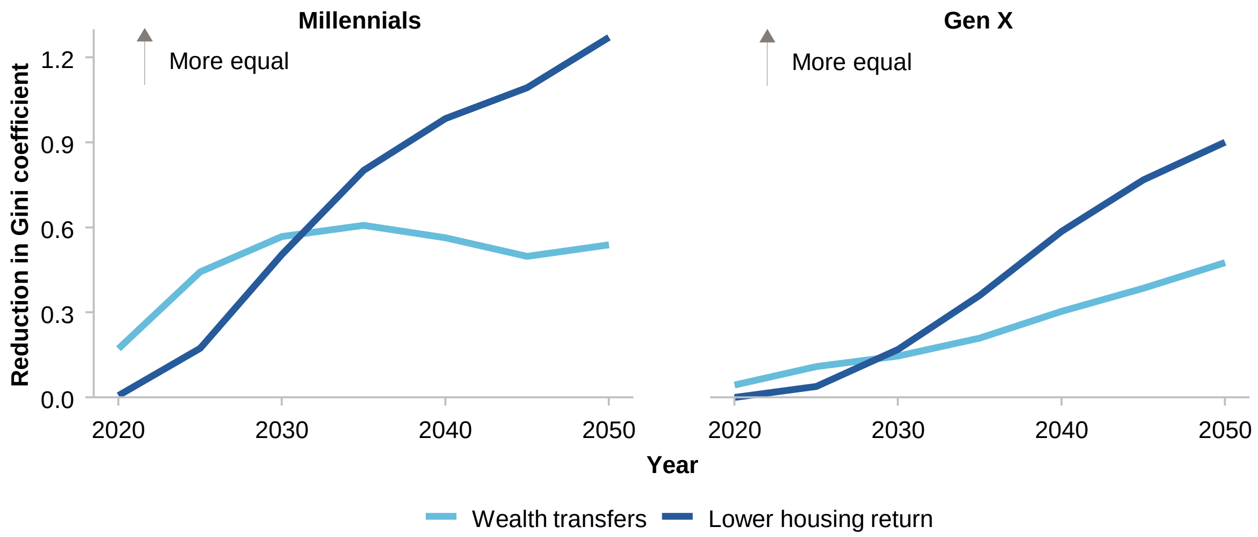
Wealth transfers reduce relative wealth inequality but the effect is small in the long run. To put its size in context, future wealth inequality was simulated based on a housing counterfactual scenario that was identical to the base scenario, except the long-run rate of return to housing was set to 5 per cent (1 percentage point higher than in the base scenario).

The wealth Gini coefficient in the housing counterfactual scenario is about 2 percentage points higher than in the base scenario for the 30–99 year old age range in 2048 — more than three times the size of the difference in the Gini coefficient attributed to future wealth transfers in the base scenario. In other words, a 1 percentage point change in the rate of return to housing wealth is projected to have a much larger impact on relative wealth inequality than wealth transfers.

The difference is largest among younger generations who are more likely to be moving into home ownership during the projection period. That is, when the rate of return to housing is lower (as it is in the base scenario compared to the housing counterfactual), the difference in wealth between those who own a home — and have higher wealth — and those who do not own a home — and have lower wealth — is smaller in absolute and relative terms (figure 3.6, dark blue line).

Figure 3.6 – Wealth transfers improve relative wealth equality

Projected improvement in equality (reduction in Gini, 100 point scale)[a,b]



a. The ‘wealth transfers’ line shows the reduction in the Gini coefficient due to wealth transfers, relative to no future wealth transfers. The ‘lower housing return’ line shows the reduction in the Gini in a world with wealth transfers when housing returns in the model are 4 rather than 5 per cent in the long run. Excludes non-housing debt. **b.** Post-millennials not shown due to the large scale of change in initial years, but wealth transfers are also found to be equalising for them. Baby boomers and pre-boomers not shown as changes in their composition due to deaths affects comparisons over time.

Source: Productivity Commission estimates from cohort simulation model.

3.4 Scenario analysis

There is uncertainty around the parameters in the simulation model (section 3.2). To test the sensitivity of the distributional effects of wealth transfers, a number of alternative projections were simulated based on different parameter assumptions for key variables.

The scenarios that are discussed in detail in this section involve changes to assumptions that, in theory, would alter the size and/or direction of the effect of wealth transfers on relative wealth inequality. This includes three pre-transfer factors (the pre-inheritance wealth distribution, inequality in inheritances left by parents and intergenerational wealth persistence) as well as behavioural responses to receiving and anticipating a wealth transfer (section 3.1).

More details of the scenario analyses and additional results are found in appendix C.

Rate of return assumptions affect projected wealth and transfers but not the equalising effect of wealth transfers

To assess the impact of different rates of return on the size of accumulated wealth across generations and the subsequent effects of wealth transfers on wealth inequality, four alternative scenarios are modelled (table 3.3). In each of these scenarios, the shares of inheritances distributed to different wealth groups are assumed to be the same as under the base scenario.

Table 3.3 – Alternative rate of return scenarios modelled

Scenario	Description
Base scenario	Rates of return on assets converge from historical rates to 4 per cent over 10 years.
1a: Historical rates	Historical rates of return across whole projection period (housing 7 per cent, superannuation 5.35–6.00 per cent, other assets 3.3–5.0 per cent depending on age group).
1b: High returns	All rates of return on assets converge to 5.6 per cent.
1c: Low returns	All rates of return on assets converge to 2.4 per cent.
1d: Zero returns	All rates of return on assets are zero.

Changing assumed rates of return can lead to substantial differences in the projected size of total wealth (figure 3.7, panel a), and hence the size of wealth transfers and wealth inequality.

The 'Historical rates' scenario (1a) assumes that asset values continue to grow at average historical rates, characterised by very high rates of growth in housing assets (box 3.3). This led to the largest difference in wealth accumulation relative to the base scenario. People aged 30–99 in this scenario hold 73 per cent of their total wealth in housing in 2048, compared with 61 per cent under the base scenario. Wealth held by people aged 65–69 (the age group at which total wealth peaks in 2048) is 88 per cent higher than in the base scenario.

Compared with the base scenario, estimates of wealth held by people aged 65–69 in 2048 are projected to be:

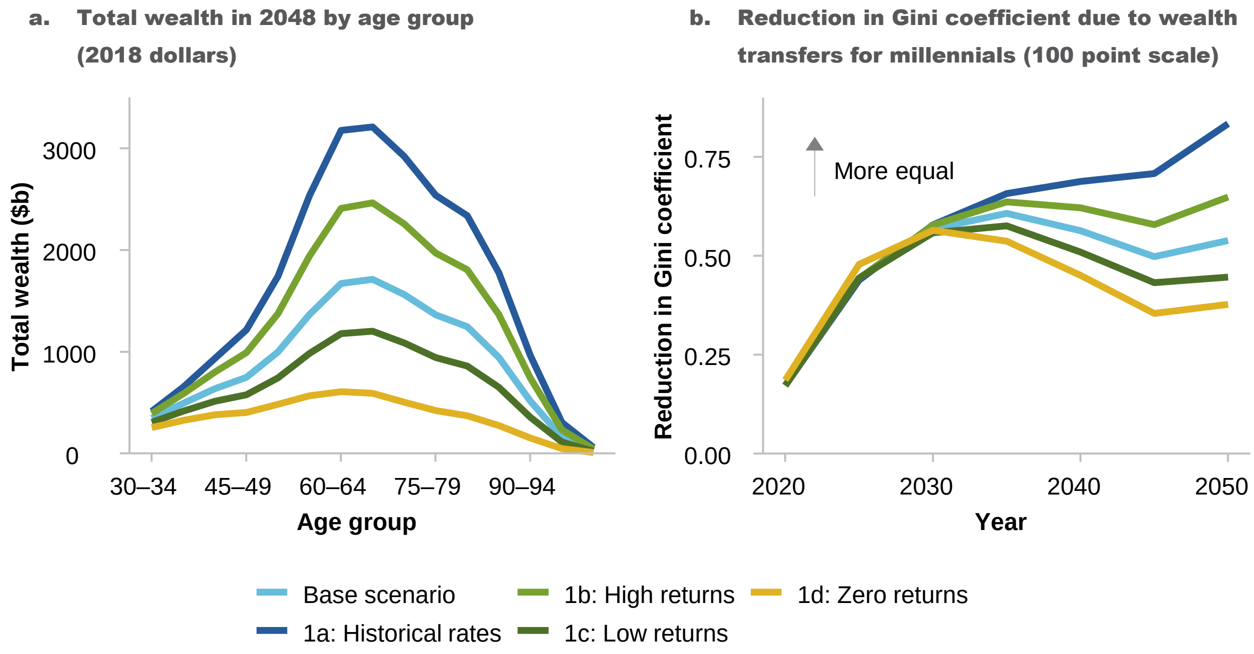
- 44 per cent higher in the high returns scenario (1b)
- 30 per cent lower in the low returns scenario (1c)
- 65 per cent lower in the zero returns scenario (1d).

As projected in the base scenario, wealth is also projected to become more concentrated among older age cohorts in each alternative rate of return scenario. There was a shift in wealth concentration towards older age groups even in the zero returns scenario, although this was in line with the change in the population shares, which reflected the ageing of the population.

Although rate of return assumptions can have large effects on the size of accumulated wealth and wealth transfers, the finding that wealth transfers improve relative wealth equality, when compared with a world without future wealth transfers, persists across all these scenarios (figure 3.7, panel b).

While relative wealth inequality, as measured by the Gini coefficient, is greatest in scenarios with higher rates of return, wealth transfers are found to moderate the increase in the Gini coefficient relatively more in these scenarios. This is consistent with the framework presented in box 3.1 (Nekoei and Seim (2019)), which suggests that the equalising effects of inheritances are greater when there is higher pre-inheritance wealth inequality. As an example of the intuition for this, consider pre-inheritance wealth held by homeowners and non-homeowners. Non-homeowners will tend to be among the lowest wealth groups, and when rates of return are high, homeowners will have even more wealth in relative terms, resulting in greater wealth inequality. Total inheritances are also larger when rates of return are high. Assuming that inheritances continue to be distributed to younger generations by wealth group in the same way as in the base scenario, they will be an even larger share of the pre-inheritance wealth for non-homeowners, which would reduce wealth inequality by a greater extent. However, if a larger portion of the increased inheritances was to be received by those who already have high wealth, the inequality effects could reverse — such a scenario is analysed below.

Figure 3.7 – Higher rates of return increase projected wealth and wealth inequality but wealth transfers are still equalising



Source: Productivity Commission estimates from cohort simulation model.

Wealth transfers increase relative wealth inequality in some scenarios

Three simple modifications were made to base scenario assumptions that increase the extent to which wealth transfers benefit the already-wealthy in accumulating wealth (table 3.4).

Table 3.4 – Alternative wealth transfer scenarios modelled

Scenario	Description
2a: Wealthy receive larger inheritances than in base scenario	Inheritance recipients aged 30–89 in the top third of the wealth distribution for their age group receive 65 per cent of the pool of inheritances for their age group, the middle third receives 30 per cent, and bottom third receives 5 per cent. (Base scenario distributions are about 54, 33 and 13 per cent respectively). It is also assumed that receiving an inheritance does not lead to an increased probability of home ownership.
2b: Wealthy save more of inheritance than in base scenario	Inheritance recipients aged 30–89 in the top third of the wealth distribution for their age group save 40 per cent of their received inheritance in other assets upon receipt, the middle third saves 20 per cent, and the bottom third saves 5 per cent. (Base scenario rates are about 15 per cent, differing depending on age group, income group and homeowner status.)
2c: Less wealthy save less than the wealthy before receiving inheritance	Cohorts aged 30–89 that have not yet received an inheritance and are in the top third of the wealth distribution for their age group have a rate of saving on income in other assets that is 10 per cent lower than under the base scenario, the middle third have a saving rate that is 20 per cent lower, and the bottom third have a saving rate that is 40 per cent lower. Saving rates on income in other assets revert to base scenario rates upon receiving an inheritance. (Base scenario rates are about 15 per cent, differing depending on age group, income group and homeowner status.)

Scenario 2a assumes that wealthy cohorts receive a larger share of total inheritances. This could be due to an increase in intergenerational wealth persistence before inheritances and/or an increase in inequality in inheritances left by parents (box 3.1). Scenarios 2b and 2c change the behavioural responses to inheritances via saving.

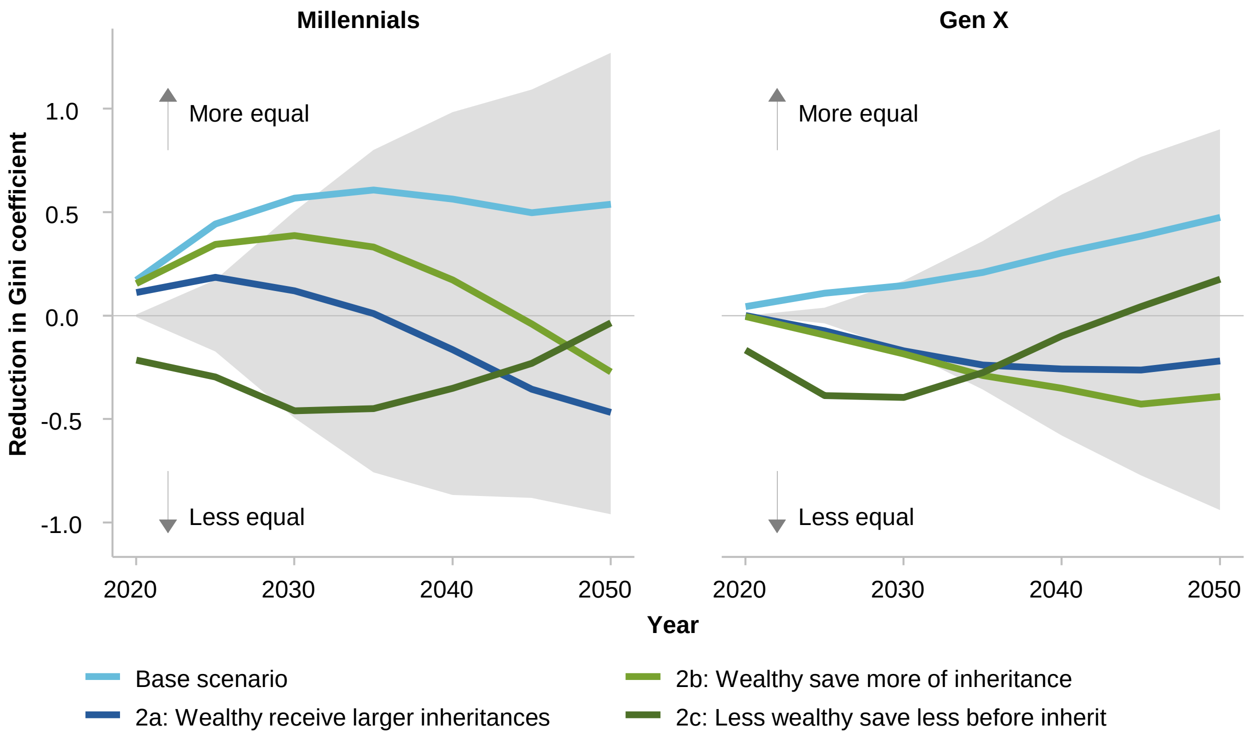
These scenarios have little effect on the size of total wealth and the distribution of wealth across age groups. However, instead of reducing wealth inequality as per the base scenario, in these scenarios wealth transfers tend to increase relative wealth inequality over the projection period (figure 3.8).

In scenario 2a, where the wealthy receive much larger inheritances than in the base scenario, wealth transfers are initially equalising for millennials, as they are of an age where they are largely receiving relatively small gifts. When they reach an age at which they are more likely to be receiving inheritances, wealth transfers begin to increase relative wealth inequality. A similar effect is seen in scenario 2b where the wealthy are assumed to save more of their inheritance than the less wealthy.

In contrast, in scenario 2c, where it is assumed that the less wealthy save less of their income before receiving an inheritance, the disequalising effects on the distribution of wealth for millennials are more obvious in the earlier years of the projection. When millennials reach an age at which they are more likely to receive inheritances, the effects on wealth inequality are reversed as they revert to the same assumptions under the base scenario (where their saving rates return to normal and where lower wealth people receive larger inheritances relative to their existing wealth than do higher wealth people).

Figure 3.8 – Wealth transfers increase wealth inequality when they benefit the wealthy by a greater extent than under the base scenario

Projected change in equality due to wealth transfers (reduction in Gini coefficient, 100 point scale)[a]



a. Shaded areas indicate the increase in relative wealth equality when the housing rate of return falls from 5 to 4 per cent, and the decrease in relative wealth equality when the housing rate of return increases from 3 to 4 per cent.

Source: Productivity Commission estimates from cohort simulation model.

These scenarios illustrate how, in contrast to the actual observed outcomes over the past 20 years, wealth transfers might increase relative wealth inequality in the future. While plausible, it is difficult to say how likely it is that the behaviour modelled in these scenarios, and the observed outcomes, will actually occur.

In addition to the fact that forecasting is inherently uncertain, there is a lack of data, particularly Australian data, with which to precisely define behaviour let alone to underpin accurate predictions. For example, as discussed in chapter 2, variation in saving behaviour associated with wealth transfers across people with different wealth holdings is highly uncertain. Similarly, there are no Australian studies, and few international ones, on how anticipation of an inheritance affects consumption and savings behaviour (section 3.1).

If intergenerational wealth persistence or wealth inequality among older generations increases in the future, there could be greater potential for the wealthy to receive a larger share of total inheritances. This would depend on a range of factors, such as future returns on assets, and future drivers of intergenerational wealth persistence (chapter 2).

But even if the situations illustrated by these scenarios were to eventuate, the projections suggest that the size of the wealth transfer effects will not be large. The scenario outcomes were of a similar magnitude to the change in relative wealth inequality in the base scenario, and smaller than a one percentage point change in the rate of return on housing (the average annual rate of return to housing was 7 per cent over the past 30 years).

The equalising effect of wealth transfers is robust to other reasonable changes in assumptions

A number of other changes to the assumptions in the base scenario were examined, including additional changes to wealth transfer behaviour, wealth drawdown behaviour and housing-related parameters. Some of these changes affect the projected size of wealth and transfers in the model, but typically to a much smaller extent than in the scenarios with changes to assumptions on rates of return discussed earlier. In all scenarios, older people are projected to hold a larger share of total wealth. Wealth transfers are also projected to reduce relative wealth inequality within generations in the long run, though immediate timing effects (section 3.3) were amplified in some scenarios.

The results of these scenarios are presented and discussed further in appendix C.

3.5 Modelling conclusions and discussion

The results of the base scenario projection suggest that while wealth transfers between generations are projected to grow over time, they are expected to have a moderating, but small, effect on relative wealth inequality when compared with a situation where there are no wealth transfers.

Consistent with theory, scenario analysis shows that wealth transfers increase relative wealth inequality when wealthier people are assumed to receive even larger inheritances, or when they save even more of their inheritances compared with less wealthy people. These assumptions directly increase the extent to which wealth transfers help the wealthy accumulate relatively more wealth. Nevertheless, the projected effects on the distribution of wealth remain small.

The equalising effect of wealth transfers is expected to hold when making comparisons between wealth transfer recipients based on socio-demographic cohorts of the population that were not considered in the model, unless there are vast differences in how much of a wealth transfer is saved between the different cohorts. For example, women historically have less retirement savings than men, and the size of inheritances received is unlikely to vary by gender. Hence in the model, women would receive inheritances that are a larger share of their existing wealth than men (the higher wealth group prior to receiving an inheritance). Assuming men and women use their inheritance to accumulate wealth at similar rates, inheritances would be found to moderate relative inequality.

The modelling also suggests that wealth will become more concentrated among older age groups. These effects are only slightly dampened by changes to assumptions that increase the rate at which older people draw down on their wealth, or that increase gifting rates (appendix C). Historically high returns on housing before the start of the model simulation, as well as wealth that is assumed to be inherited from partners in old age, are large drivers of this result.

While the ‘bank of mum and dad’ may be an increasing source of intergenerational wealth transfers (chapter 1), the model was not designed to examine their effects and there is a lack of data to inform this. Drawing on Nekoei and Seim’s (2019) framework (box 3.1), the short-run effect would depend on the degree of intergenerational wealth persistence (which is relatively low in Australia — chapter 2), the relative size of gifts given by wealthier parents and the existing wealth distribution among child generations. In the long run, because these types of transfers are used to accumulate wealth in housing, it may contribute to greater intergenerational wealth persistence if the wealthiest parents provide the largest ‘bank of mum and dad’ transfers. Such transfers could also have broader effects on future house prices and affordability that could affect wealth inequality.

Appendices

A. Australian wealth data and estimating inheritance outflows

Chapter 1 estimated the value of annual wealth transfers in the form of inheritances and inter vivos gifts (gifts). This appendix describes additional detail about the datasets and the assumptions underpinning the estimates presented in chapter 1. Section A.1 analyses the three main data sources that provide information about household wealth in Australia to understand why they report different estimates of total household wealth, including a description of how the wealth of aged care residents was estimated. Section A.2 provides additional detail about the probate system and how estates are distributed. Section A.3 describes the process used to apportion household wealth from the Household, Income and Labour Dynamics in Australia (HILDA) survey to individual members of the household. Section A.4 provides additional detail about how the estimates of the outflow value of inheritances were constructed.

A.1 Comparison of HILDA, SIH and National Accounts aggregate wealth estimates

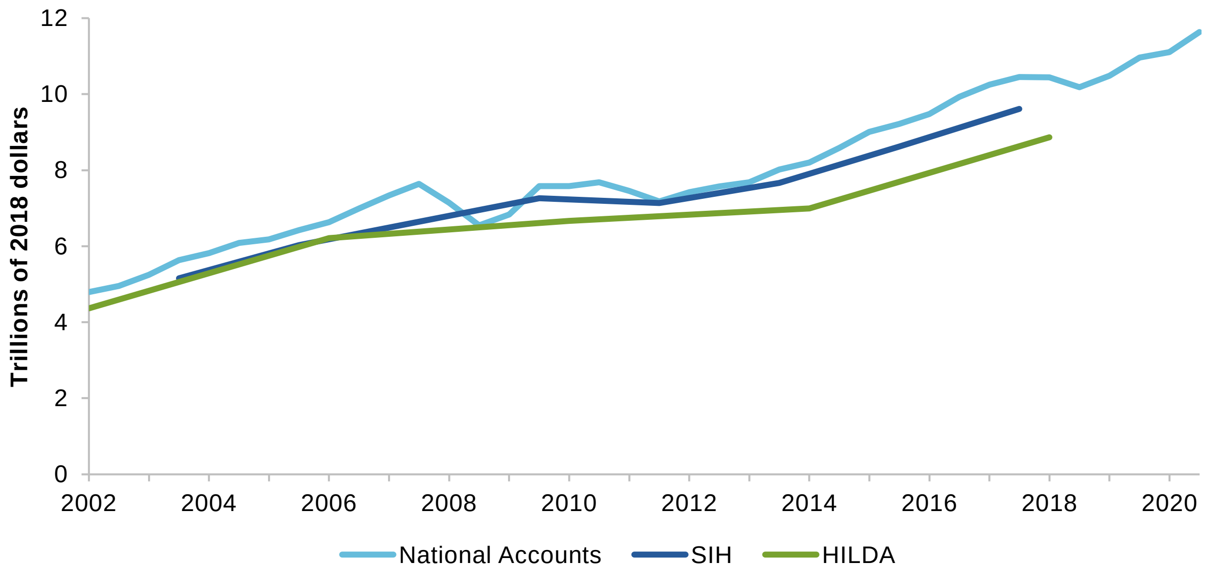
Household wealth is the sum of households' financial and non-financial assets minus their liabilities. There are three main sources that report aggregate household wealth data in Australia:

- the ABS quarterly National Accounts, which provides the most comprehensive information about aggregate household sector wealth (the National Accounts measure the wealth held by the household sector collectively, but it is not an aggregation of, and neither is it apportioned to, the individual or the household level, hence the need for survey data)
- the two-yearly cross-sectional Survey of Income and Housing (SIH)
- the annual longitudinal HILDA survey.

Figure A.1 presents a time series of the value of household wealth for each of these data sources. The gap between HILDA and the National Accounts has expanded from about 9 per cent in 2002 to 15 per cent in 2018. In 2018, the National Accounts estimate of the value of household sector wealth was $10.4 trillion. The SIH estimate was $9.6 trillion (2017-18) and the HILDA estimate was $8.9 trillion.

Key identifiable causes of the differences between each of the estimates, including in the reference population and scope and measurement, are discussed below.

Figure A.1 – Household wealth has steadily increased



Source: Productivity Commission estimates using ABS (*Australian National Accounts: Finance and Wealth, June 2021,* Cat. no. 5232.0); ABS (*Consumer Price Index, Australia, June 2021,* Cat. no. 6401.0); ABS (*Microdata: Income and Housing, 2017-18,* Cat. no. 6523.0); ABS SIH Basic confidentialised unit record files for 2003-04 to 2017-18; HILDA Restricted Release 19.

Differences in the reference population

The measure of household wealth included in the National Accounts is the broadest of the three data sources, covering 'all resident households, defined as small groups of persons who share accommodation, pool some or all of their income and wealth and collectively consume goods and services, principally housing and food' (ABS 2015, p. 65).

The reference population of the SIH is 'usual residents of private dwellings in urban and rural areas of Australia (excluding Very Remote areas), covering about 97% of the people living in Australia' (ABS 2019c).

There are several groups excluded from this definition:

- residents of non-private dwellings, for example, boarding schools, aged care facilities, hospitals and hotels
- households that contain members of non-Australian defence forces
- households that contain diplomatic personnel of foreign governments
- households in areas defined as very remote.

The lack of coverage of aged care residents combined with a lack of data on inheritances received, meant that the SIH was not viable as the primary dataset for this report.

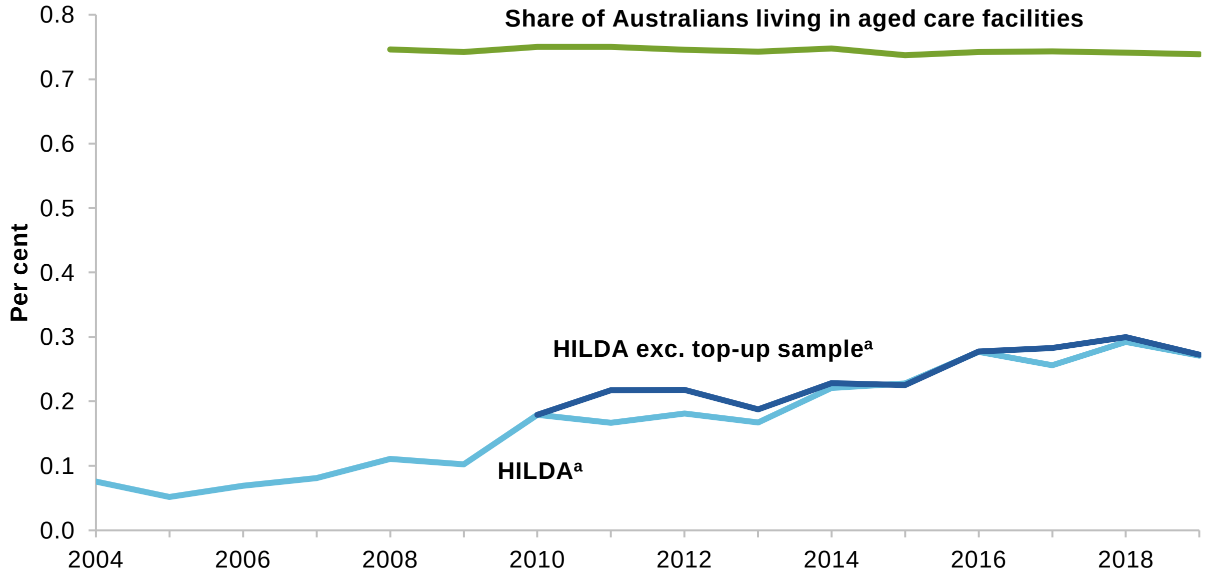
The wave one reference population of the HILDA survey covered all members of private dwellings in Australia. Similar to the SIH, households containing members of non-Australian defence forces and diplomatic personnel of overseas governments were excluded. Overseas residents, that is, those staying in Australia for less than one year, were also excluded. Residents of institutions, such as hospitals and prisons, and other non-private dwellings, such as hotels, were also excluded. In contrast to the SIH, residents of boarding schools and university colleges were considered part of the reference population in HILDA. In subsequent waves HILDA has followed respondents into institutions, for example, residential aged care.

Aged care residents are underrepresented in the HILDA dataset

Aged care residents are underrepresented in HILDA (figure A.2), and although interviews are sought with respondents in residential aged care, their responses are weighted to zero (Summerfield et al. 2020, p. 135).

Because more than one third of Australians die in aged care facilities (chapter 1), the HILDA survey weights were re-calculated to include these people in the estimates of the value of inheritances transferred between generations each year.

Figure A.2 – People living in residential aged care are underrepresented in HILDA[a]



a. Unweighted percentage of HILDA sample in residential aged care.

Source: Productivity Commission estimates using ABS (*Australian Demographic Statistics, March 2021,* Cat. no. 3101.0); AIHW (2021c); HILDA Restricted Release 19.

How the weights have been re-calculated to include aged care residents

The weight assigned to an individual in the year prior to them moving into a non-private dwelling was used as a proxy for their weight while they lived in a non-private dwelling.[44] This approach was applied to people living in a residential aged care facility and then their weight was scaled to match the proportion of people living in residential aged care facilities across Australia (figure A.1).

Some aged care residents' wealth is not properly recorded by the HILDA survey

Data from the Aged Care Financing Authority shows that about half of aged care residents fund their accommodation (either wholly or in part) using a refundable accommodation deposit (RAD), which is refunded (with any ongoing aged care fees deducted) when the resident leaves aged care (usually due to death, in which case the refund becomes part of the deceased person's estate) (ACFA 2021). The average value of a RAD in 2018-19 was $318 000 (ACFA 2020a, p. 137).

[44] For some younger sample members living in a university residential college or boarding school, the weight from the year when they left the non-private dwelling was used as a proxy.

However, there is no specific question in the HILDA survey that asks about RADs, and hence, in addition to being underrepresented, the wealth of aged care residents with RADs may also be under reported.

To test whether wealth is being under reported to the HILDA survey, the following model was used to estimate whether people who enter aged care have significantly less wealth than those who do not, other things equal.

$$Wealth_{i,t} = \beta_0 + \beta_1 AgedCare_{i,t} + \beta_2 Wealth_{i,t-4} + \boldsymbol{x}'_{i,t}\boldsymbol{\beta} + \varepsilon_i$$

Where:

- $Wealth_{i,t}$ is the wealth of person *i* at year t,in 2018 dollars.
- $AgedCare_{i,t}$ is an indicator variable equal to one if person i moved into a residential aged care facility between year t and year $t-4$, or zero otherwise.
- $\boldsymbol{x}_{i,t}$ is a vector of explanatory variables including income received since year $t-4$, the duration of a person's stay in residential aged care, their age, age squared, self-reported health status (from 1–5, coded as a continuous variable), and dummy variables for gender, relationship (couple) status, and the year.

Ordinary least squares estimation yielded $\widehat{\beta_1} = -200\,835$, which suggests that moving into an aged care facility was associated with a reduction to wealth of about $200 000 after controlling for income, time spent in aged care[45], age, health status, gender and marital status. The estimate was statistically significant at the 1 per cent level of significance. The coefficients on the other variables were also highly statistically significant, with the exception of the relationship status variable. Each of their signs was consistent with expectations, with the exception of the gender variable.

Including those who did not fund their care using a RAD, the average RAD per new aged care resident over 2002–2018 was about $110 000.[46] Therefore, even allowing for substantial bias in the estimate $\widehat{\beta_1}$ (perhaps due to an omitted variable that was positively correlated with moving into aged care and negatively correlated with wealth accumulation), these results are consistent with the HILDA survey not capturing residents' RADs and hence underestimating their wealth.

Consequently, the value of RADs that are returned to individuals' estates each year was estimated, using information from Aged Care Financing Authority and the Australian Institute of Health and Welfare, and added to the value of estimates for total wealth at death.

This involved a two-step process. First, the total stock of RADs in a given year was scaled by the proportion of residents who left residential aged care due to either death or hospitalisation that year. Of people who left aged care in 2018, 85 per cent of them did so due to either death or hospitalisation (Productivity Commission estimates using AIHW 2021b). Second, the scaled stock of RADs was divided by the average length of stay in residential aged care to produce an estimate of the value returned to the estates of residents who died that year. Among residents who left aged care due to either death or hospitalisation, the average stay length was two years and eight months. Hence, of the $28.9 billion stock of RADs, an estimated $9.2 billion was returned to the estates of residents who died in 2018 (Productivity Commission estimates using ACFA 2021; AIHW 2021b).

[45] This is a proxy for ongoing aged care fees, which apply to both those who do not fund their accommodation using a RAD and those who do (in which case it may be drawn from their RAD) (Cutler et al. 2021, p. 12). These may also reduce wealth, and so it is important to control for them.

[46] This statistic has been weighted to match the distribution of the year that people who moved into aged care in the sample used to estimate the model, to make it as comparable with the estimate $\widehat{\beta_1}$ as possible.

Scope and measurement differences

The exclusion of aged care residents from population aggregates and under reported refundable accommodation deposit wealth explain a small part of the gap (about $66 billion) between HILDA and the National Accounts.[47]

The remaining gap is likely a function of scope and measurement differences as summarised in box 1.4 and with additional information below about:

- property assets
- consumer durables
- financial assets
- superannuation
- other financial assets
- liabilities.

Property assets

Non-financial assets make up about 60 per cent of households' assets and real estate is the largest asset holding for most households (figure A.3). The National Accounts estimate of the value of residential property in 2018 was $6.6 trillion and the estimate of all property owned by households was $7.1 trillion. The 2017-18 SIH estimate was $6.1 trillion for residential property and $6.3 trillion for all property owned by households. The HILDA estimate for all property owned by households was $6.4 trillion in 2018.

The National Accounts household wealth measure includes residential property and commercial and rural land owned by the household sector. The value is calculated as the number of dwellings owned multiplied by the mean sales price. The sales price measure is the seasonally adjusted mean sale price of properties transferred each quarter and is weighted according to state or territory and whether the household is in a capital city.

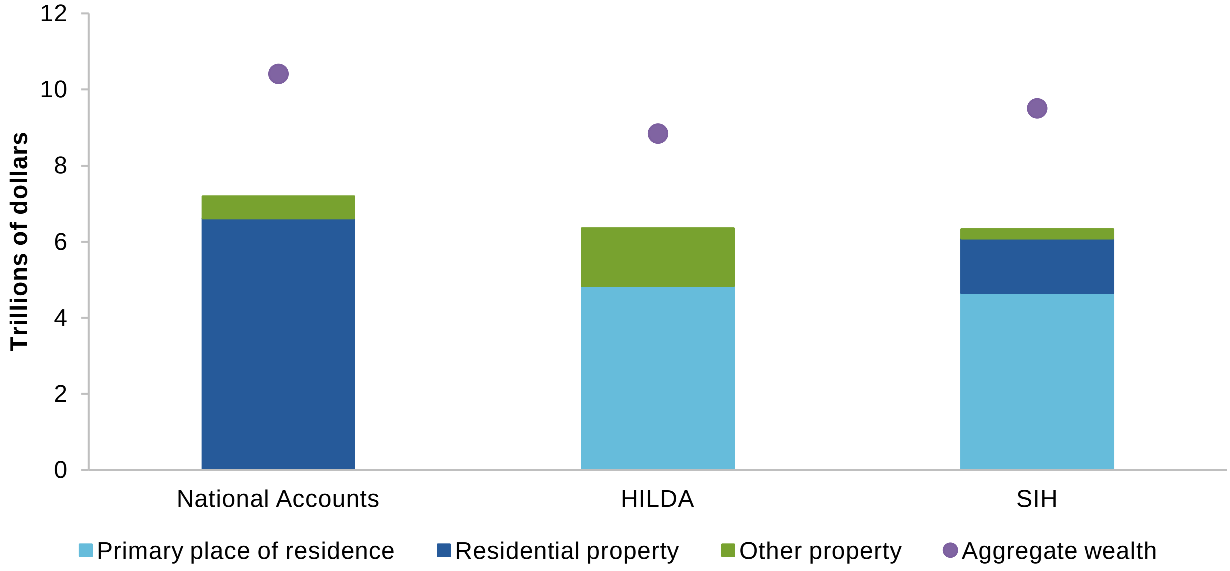
The SIH asks respondents what they would expect to receive if they were to sell their property at the time of interview.

The HILDA measure is the subjective judgement of households about their property assets (Bloxham and Betts 2009).

Capitalised real estate transaction costs, such as stamp duty, legal fees and real estate commissions, are included in the National Accounts but not in HILDA or the SIH. These costs were worth an estimated $241 billion in 2017-18 (ABS 2019c).

[47] The $66 billion consists of $29 billion worth of RADs and $37 billion of wealth held by aged care residents that was previously excluded from aggregate household wealth because aged residents were assigned a zero weight.

Figure A.3 – Value of property assets



Source: Productivity Commission estimates using ABS (*Australian National Accounts: Finance and Wealth, June 2021,* Cat. no. 5232.0); ABS SIH Basic confidentialised unit record files for 2017-18; HILDA Restricted Release 19.

Consumer durables

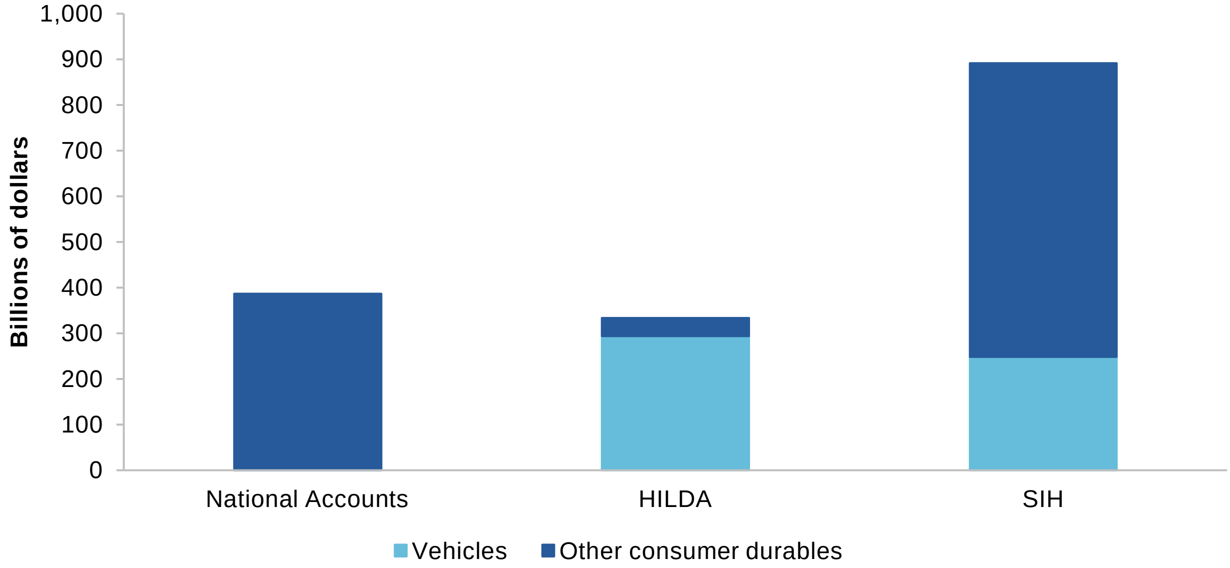
Each of the three measures of household wealth treat consumer durables very differently. In 2018 the National Accounts estimate of consumer durables was $387 billion. The value of vehicles in the SIH was $248 billion for 2017-18 and the value of other household contents was $643 billion. The largest component of consumer durables in the HILDA measure is vehicles, which were valued at $294 billion in 2018. The combined value for all consumer durables in HILDA was $333 billion (figure A.4).

Consumer durables are not included in the National Accounts measure of household wealth but are included as a memorandum item. Consumer durables include motor vehicles and household furnishings and equipment. The value of consumer durables in the National Accounts is based on actual value (depreciated from new).

In addition to the components considered by the National Accounts, the SIH measure of consumer durables also includes collectibles (Bloxham and Betts 2009). It also differs from the National Accounts measure because it is calculated using the insured value of the goods, which is typically a ‘new for old’ valuation (ABS 2019b).

The HILDA measure includes only vehicles and collectibles and is the subjective value reported by households.

Figure A.4 – Value of consumer durables



Source: Productivity Commission estimates using ABS (*Australian National Accounts: Finance and Wealth, June 2021,* Cat. no. 5232.0); ABS SIH Basic confidentialised unit record files for 2017-18; HILDA Restricted Release 19.

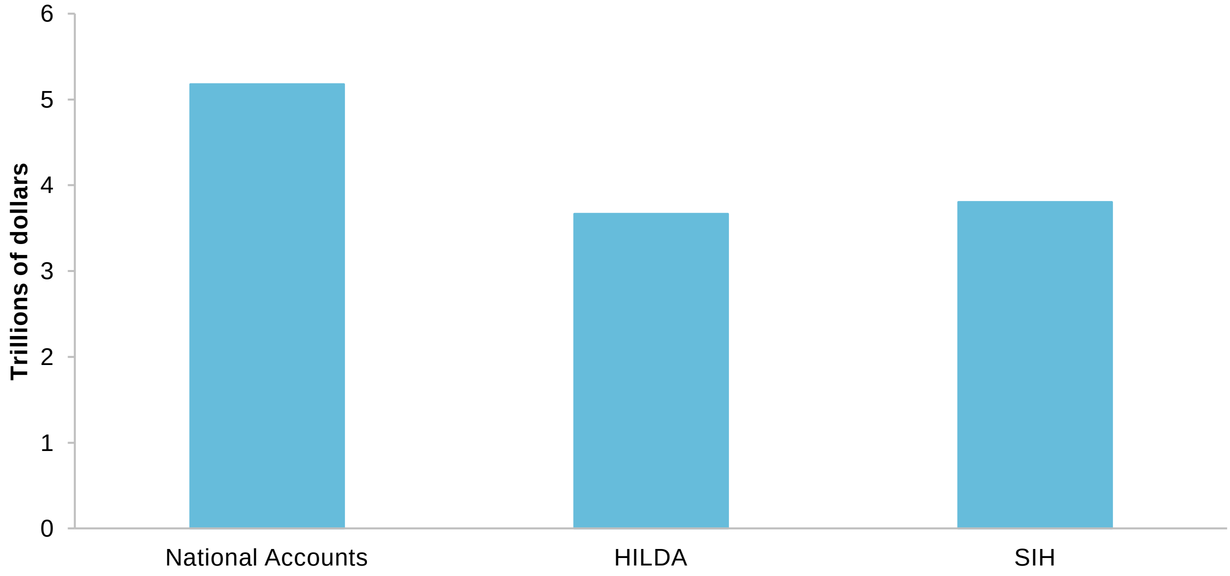
Financial assets

Financial assets make up about 40 per cent of household assets. The National Accounts valued financial assets at $5.2 trillion in 2018 while the SIH estimate was about $3.8 trillion (2017-18) and the HILDA estimate was about $3.7 trillion (figure A.5).

The National Accounts measure of financial assets relies upon the *Survey of Financial Information* and the *Survey of International Investment*. The data from the two surveys is combined with RBA and Australian Prudential Regularity Authority data (Bloxham and Betts 2009). The estimates of financial assets in the SIH and HILDA are self-reported.

One difference in scope relates to unincorporated enterprises and not-for-profit institutions serving households (NPISHs), such as charities. The National Accounts measure includes both unincorporated enterprises and NPISHs in household wealth. The SIH and HILDA both exclude the asset holdings of unincorporated enterprises and NPISHs from their measures of household wealth (Bloxham and Betts 2009). Only the bank deposits of NPISHs are quantifiable and were worth $23 billion in 2017-18 (ABS 2019c).

Figure A.5 – Value of financial assets



Source: Productivity Commission estimates using ABS (*Australian National Accounts: Finance and Wealth, June 2021,* Cat. no. 5232.0); ABS SIH Basic confidentialised unit record files for 2017-18; HILDA Restricted Release 19.

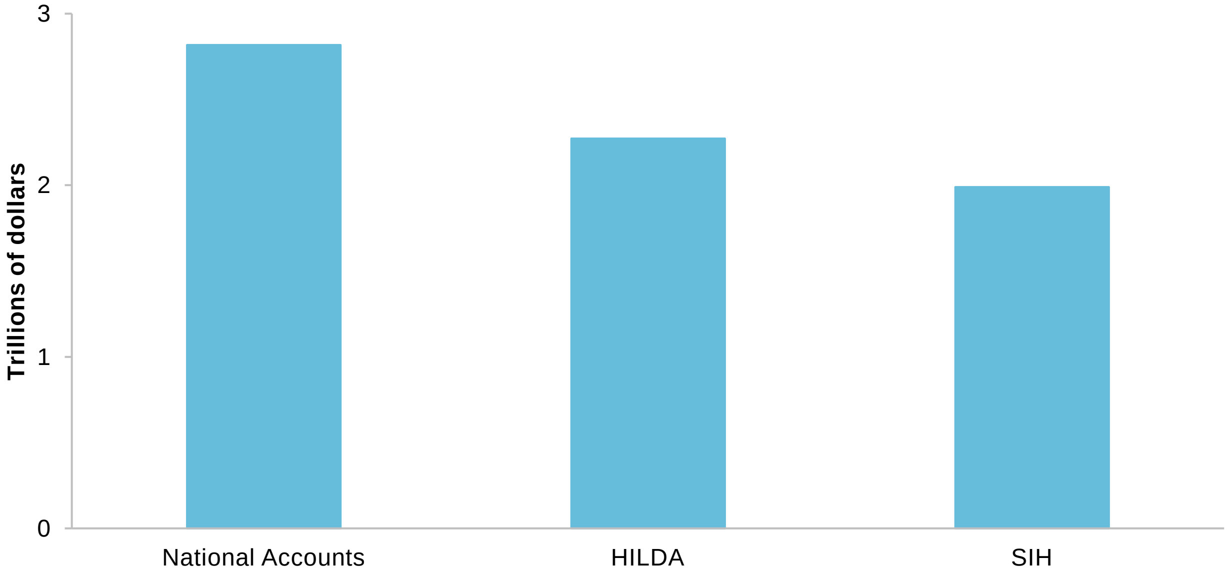
Superannuation

The National Accounts estimate of superannuation was $2.8 trillion in 2018. The SIH estimate was about $2 trillion (2017-18) and the HILDA estimate was $2.3 trillion (figure A.6). Unfunded superannuation claims — as measured by the National Accounts — were worth $448 billion in 2017-18 (ABS 2019c).

The National Accounts measure is the only one that explicitly captures the value of unfunded superannuation assets tied to defined benefit schemes. It is not clear to what extent defined benefit schemes are captured in HILDA or the SIH. Respondents are asked to self-report their superannuation balances, but those on a defined benefit scheme may receive an annuity or a lump-sum payment. It is not clear how defined benefit scheme recipients are answering this question. For example, respondents may report the net present value of the annuity they expect to receive or the total value they would receive if they were to retire today.

The SIH treats self-managed super funds as equities, whereas HILDA and the National Accounts consider the holdings of self-managed super funds as part of superannuation assets (Bloxham and Betts 2009).

Figure A.6 – Value of superannuation



Source: Productivity Commission estimates using ABS (*Australian National Accounts: Finance and Wealth, June 2021,* Cat. no. 5232.0); ABS SIH Basic confidentialised unit record files for 2017-18; HILDA Restricted Release 19.

Other financial assets

The National Accounts estimate of households' holdings of currency and deposits was $1.1 trillion in 2018, while the SIH estimate was $643 billion (2017-18) and the HILDA estimate was $662 billion. It is likely that households under report their holdings of currency and deposits (Bloxham and Betts 2009)

The National Accounts measure of household wealth allocate assets held in private trusts according to the underlying asset class. The SIH and HILDA measures have a separate trust asset class. Assets held in cash management trusts would likely be included in the separate trust asset class for the survey measures. The SIH estimate of trusts in 2017-18 ($450 billion) was more than twice the size of the HILDA estimate ($186 billion).

The three data sources differ in their treatment of equity in unlisted companies. The HILDA measure is the only one to include that type of equity as part of household wealth (Bloxham and Betts 2009). It is also unclear the extent to which HILDA captures the technical reserves of insurance and general life insurance companies, which are included in the National Accounts. In 2017-18 these reserves were worth $172 billion (ABS 2019c). These reserves are not explicitly captured by the SIH.

Liabilities

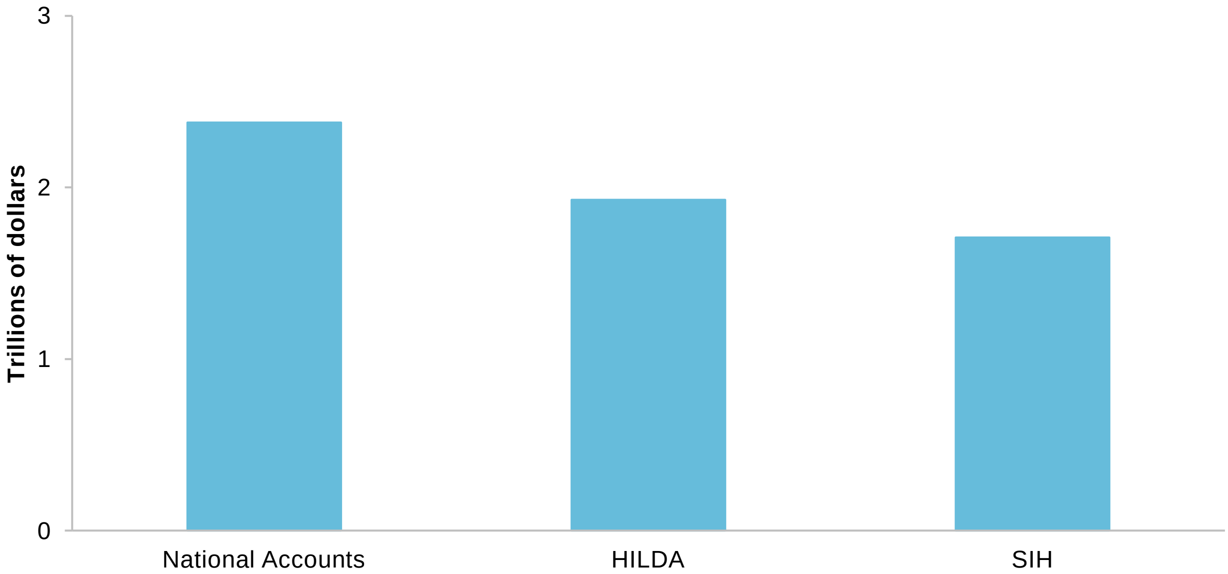
The National Accounts estimate of the value of liabilities was $2.4 trillion in 2018. The SIH estimate was $1.7 trillion (2017-18) and the HILDA estimate was $1.9 trillion (figure A.7).

The National Accounts measure of household debt includes loans to unincorporated enterprises and NPISHs. It also includes Higher Education Contribution Scheme and Higher Education Loan Program debt, tax payable and bills of exchange.

The SIH and HILDA measures include property loans, Higher Education Contribution Scheme and Higher Education Loan Program debt, credit card debt, loans for vehicles, investment loans, and other loans. Debts of unincorporated businesses owned by households are excluded.

The National Accounts measure returns the highest value for household debt due to the inclusion of loans to unincorporated enterprises and NPISHs, households under reporting their property debt in surveys and differences in the way that credit card debt is measured. The survey measures rely on self-reported values and respondents who regularly pay off their credit card debt each month tend to report zero credit card debt whereas the National Accounts record credit card liabilities owed on a given day (Headey, Warren and Wooden 2008).

Figure A.7 – Value of liabilities



Source: Productivity Commission estimates using ABS (*Australian National Accounts: Finance and Wealth, June 2021,* Cat. no. 5232.0); ABS SIH Basic confidentialised unit record files for 2017-18; HILDA Restricted Release 19.

A.2 Analysis of probate records

Who does and does not go through probate?

A grant of probate certifies a will and allows the executor to administer the estate.

Not all estates require a grant of probate. When a person dies, and all their assets are held as 'joint tenants', the assets are automatically transferred to the joint owner if they are living. However, if the assets are held as 'tenants in common' — where each owner owns a specified proportion of the asset — then they may require a grant of probate. Probate is also not required when individuals have transferred assets prior to their death into a trust or when the deceased person's assets are of low value (Baker 2014). The Commission understands that while the amounts vary, a grant of probate tends not to be required when the estate does not contain real estate and the value of each bank account and equity investment is less than about $50 000.

How estates are distributed

Probate records contain information about how the estate was distributed. This information can be used to estimate the value that is immediately transferred to younger generations.

Wood, Griffiths and Emslie (2019) analysed a sample of 526 probate files that were processed in Victoria in 2016. The sample contained 109 first estates (estates of the first spouse to die) and 417 final estates (estates for which there is no surviving spouse).

About 25 per cent of first estates required probate. First estates that consist only of jointly owned assets do not require probate because the assets are automatically transferred to the surviving owner(s). About 18 per cent of the value of first estates that required a grant of probate was distributed to younger generations.

About 65 per cent of final estates required probate. Final estates that do not require probate tend to be low-value. About 85 per cent of the value of final estates that required a grant of probate was distributed to younger generations.

In constructing the estimates of inheritance outflows, two assumptions were made about the distribution of estates that did not require a grant of probate. It was assumed that first estates that did not require probate were transferred in their entirety to the surviving spouse. It was assumed that final estates that did not require probate were distributed in the same way as those that did require probate. Overall, across the five HILDA wealth modules, roughly 51 per cent of the value of wealth at death was immediately transferred to younger generations.[48]

A.3 Apportioning household wealth to individuals

Most forms of wealth are reported to the HILDA survey at the household level, but some of the analysis in this study has required estimates of individual wealth holdings — for example, estimating the value of total wealth at death, which was used to estimate the outflow value of inheritances that are transferred intergenerationally (chapter 1). To permit this analysis, household wealth items were apportioned to individuals. This section explains how the wealth was apportioned for each asset class. It is a different process to estimating equivalised wealth.

- *Children's bank accounts* were apportioned equally among the children living in the household (those less than 15 years of age).
- *Cash investments* were allocated in proportion to each household member's share of income (sources of income are collected at the individual level) from interest earned (only interest exceeding $100 per annum is reported) from banks and other financial institutions, bonds, debentures, cash management trusts, family or private trusts, or loans. For households that do not report any such income, cash investments were allocated equally among household members who are not children under 15, dependent students, or non-dependent children.
- *Equity investments* were allocated in proportion to each household member's share of income from dividends earned from company shares, managed funds or property trusts. For households that do not report any such income, equity investments were allocated according to each household member's share of total dividends and royalties (a broader category that may include income from other investments, but one that is more widely available as missing values are imputed). For households for which neither of these variables are available, equity investments were allocated equally among household members who are not children under 15, dependent students or non-dependent children.
- *Place of residence-related assets and debts* were allocated among household members who were flagged as owning a share of the place of residence according to weights constructed using a variation on the regression method proposed by the United Nations National Transfer Accounts project (UN 2013, p. 98). A 'correction' was then made such that in cases where both members of a couple were flagged as owning a share of the place of residence, their shares were equal.
- *Other property-related assets and debts* were allocated among household members who were flagged as owning a share of an investment property in proportion to their share of income from rent. For households

[48] Baker (2014) found that about 2 per cent of estates are left to charity.

that did not report any income from rent, other property-related assets and debts were allocated equally among household members that were flagged as owning a share of an investment property.
- *Business assets and debts* were allocated in proportion to the average of each household member's share of income from dividends from incorporated businesses (that is, dividends from non-listed businesses) and share of income from unincorporated businesses.[49] For households for which neither of these variables were available, business assets and debts were allocated in proportion to each household member's share of income from owned incorporated businesses (for example, wage/salary income from working for an incorporated business that they owned). For households for which none of these variables were available, business assets and debts were allocated equally among household members who were not children under 15, dependent students or non-dependent children.
- *Trust funds, life insurance, collectibles, vehicles and overdue household bills* were allocated equally among household members who were not children under 15, dependent students, or non-dependent children.

A.4 Further detail on construction of outflow measures

This section details the construction of the outflow estimate of inheritances based on the HILDA dataset as presented in chapter 1. It also presents an additional estimate derived from the HILDA dataset. The key difference between the two estimates is the way that the probability of death is calculated. The first survey method uses expected deaths in the population (the number of deaths that would occur in the HILDA sample each year based on the total number of deaths that occurred in Australia that year) and the second method uses the actual deaths that have been recorded in the HILDA dataset. This section also details the construction of the outflow estimate of inheritances based primarily on administrative datasets.

Outflow estimate based on expected deaths

Two steps were required to derive an estimate of inheritance outflows each year based on expected deaths.

First, the wealth held by each person in the HILDA dataset was multiplied by the probability that they died in that year and then scaled to match the total number of deaths reported in Australia. This calculation produced an estimate of total wealth at death. A person's probability of death was allowed to vary by their gender, single year of age and marital status — the most refined data available from the ABS. The HILDA wealth data was adjusted to include aged care residents' refundable accommodation deposits, which are a large source of wealth that is not adequately captured by the HILDA survey (section A.1).

Second, total wealth at death was adjusted in line with the flows in box 1.5 in chapter 1 (apportioning wealth to the next generation based on past outcomes observed in probate data) to leave only an estimate of the share expected to be immediately transferred to younger generations.

Outflow estimate based on actual deaths

The outflow estimate based on actual deaths recorded in HILDA also required two steps.

First, the wealth held by people in the HILDA dataset who are known to have died in the year after their wealth was recorded was scaled to reflect the number of deaths in Australia in the year that they died. This calculation

[49] For unincorporated businesses, there is no distinction made by the HILDA survey between dividends from owning the business and wage/salary income earned by working for the business.

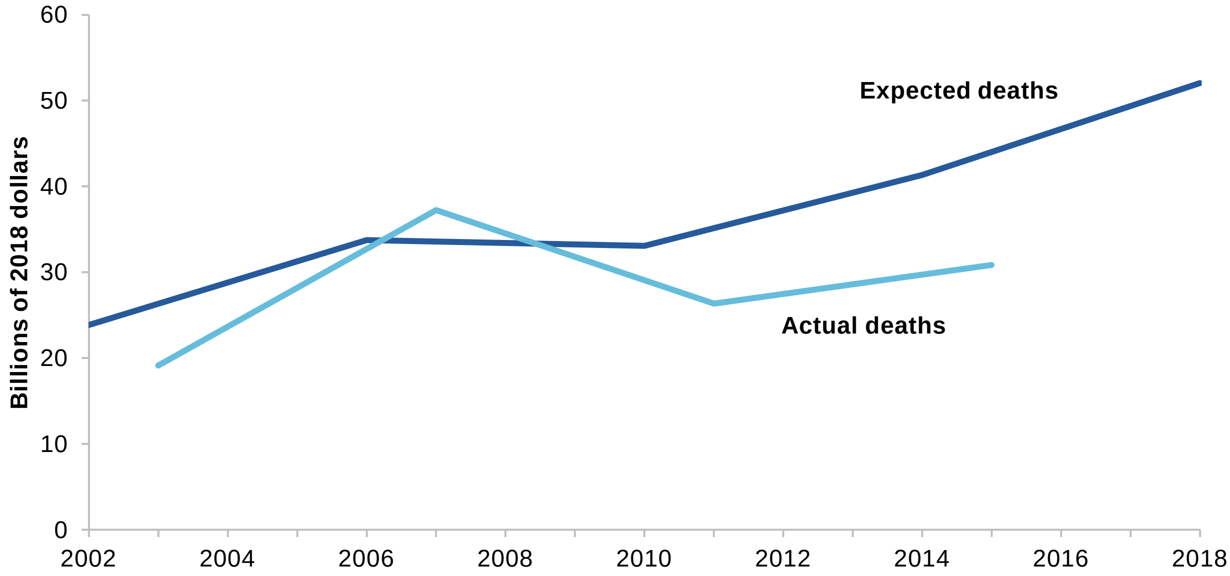
produced an estimate of total wealth at death. Like the estimate based on expected deaths, the HILDA wealth data was adjusted to include aged care residents' refundable accommodation deposits (section A.1).

Consistent with the estimate based on expected deaths, total wealth at death was then adjusted in line with the flows in box 1.5 in chapter 1 to produce an estimate of the share expected to be immediately transferred to younger generations.

Expected and actual deaths comparison

The 'expected deaths' estimate is the more precise, as it draws on information from the entire HILDA sample (because anyone might die in the following year). By contrast, the 'actual deaths' estimate draws on only information about surveyed respondents who die in the following year — about 100 respondents each year. For this reason, there is greater variation over time in the actual deaths estimate than in the expected deaths estimate (figure A.8).

Figure A.8 – Inheritance outflows based on expected deaths are more precise



Source: Productivity Commission estimates based on HILDA Restricted Release 19.

Further, roughly 20 per cent of the deaths in HILDA were not captured during the survey — a type of survey error. When HILDA was matched to the National Death Index in 2014 a total of 1238 deaths had already been identified through survey fieldwork and the matching process uncovered a further 304 deaths, which represented a 25 per cent increase in the number of deaths recorded. A correlation between whether a death was uncovered by fieldwork or not and the wealth of that individual would cause a bias in the inheritance outflow estimate based on actual deaths for 2015 because the matching process only matched deaths up until 2013.

However, the expected deaths estimate is also subject to statistical bias. The expected deaths estimate would have an upward bias (the estimates are too high) if people typically decumulated their wealth in the few months prior to death (perhaps due to higher medical expenses), but the findings of Wu et al. (2015) suggest that this is not the case.

The expected deaths estimate relies on the assumption that, after controlling for age, gender and marital status, wealth is not correlated with forecasted probability of death. This assumption probably also leads to some upward bias in the expected deaths estimate, as our tests find that widowed or otherwise single people of the same age and gender who die are probably somewhat poorer than those who do not, although the evidence is not conclusive.

To test the hypothesis that wealth was correlated with forecast probability of death, the following equation was estimated.

$$Wealth_i = \alpha + Male_i \sum_{j=14}^{99} \beta_j Age_{i,j} + Female_i \sum_{j=14}^{99} \gamma_j Age_{i,j} + \delta Died_i + \mu_i$$

Where:

- $Wealth_i$ is the wealth of person i in the most recent wave that it was recorded.
- $Male_i$ and $Female_i$ are indicator variables for sex.
- $\sum_{j=14}^{99} Age_{i,j}$ is a collection of 86 indicator variables for every age between 14 and 99 — the youngest and oldest age recorded in the relevant sample.
- $Died_i$ is an indicator variable for whether person i died that year — using actual deaths recorded in the HILDA dataset.

The regression was restricted to single persons because they are responsible for most wealth that is transferred between generations.[50] The regression produced a large negative relationship between death and wealth. Someone who died had, on average, $72 000, or almost 40 per cent, less wealth than someone who did not. However, the result was not statistically significant (table A.1).

Table A.1 – People who die tend to have less wealth than their peers, but the relationship is not statistically significant[a,b]

Explanatory variable	Estimated coefficient
Constant	192 755***
	(75 054.8)
Died	-71 643.6
	(55 147.61)

a. Coefficients on age and gender interaction terms are not shown. **b** *** indicates significance at the 1 per cent level of significance.

Intergenerational outflow estimate based on administrative datasets

Three steps were required to produce an intergenerational outflow estimate based primarily on administrative datasets.

First, probate records from 2012 and 2016 were used to calculate the mean estate value. The mean estate was multiplied by the number of probate applications in that year to produce an estimate of the total value of wealth transferred through the probate system. The value that was immediately transferred to younger generations was calculated in line with box 1.5 in chapter 1.

Second, because superannuation assets are not usually distributed through the probate system, estimates of superannuation death benefits based on the ALife dataset were used to supplement the probate files. The ALife dataset contains a random sample of 10 per cent of annual longitudinally linked individual tax and superannuation records reported to the Australian Tax Office. For those records ALife provides information

[50] The regression that was limited to members of couples found a statistically significant effect. People who died had, on average, $216 000 less wealth.

about superannuation balance and contribution information from all Member Contribution Statements and Self Managed Superannuation Fund annual returns (Polidano et al. 2020).

Third, because not all deaths result in a probate application, an estimate of the value of estates that do not go through the probate system was required.

Further detail on calculation of superannuation death benefits based on the ALife dataset

Using the ALife dataset, the total value of death benefits each year ($6.9 billion in 2016) was calculated and then apportioned to single-persons and members of a couple. The ALife dataset contains a spouse flag that identifies whether a member of the sample has a partner, but it is not recorded for all members of the sample. For those with a missing spouse flag, death benefits were split using the distribution of superannuation assets between singles and couples found in the HILDA dataset.

The value of death benefits that are transferred between generations ($2.2 billion in 2016) was added to the estimate for the value of wealth transferred between generations based on probate files.

Estimating the value of estates that do not go through the probate system

As discussed above, first estates and low value estates tend not to require probate. It was assumed that first estates that did not go through probate were transferred completely to the surviving partner. Hence, their value did not need to be estimated to produce an estimate of the value that is immediately transferred to younger generations.

It was assumed that the distribution of final estates that did not go through probate followed the pattern of those that did (85 per cent transferred immediately to younger generations). The value of these estates was estimated using HILDA by identifying single persons who did not own real estate and did not have bank accounts or equity investments exceeding $50 000. The value of wealth at death was then estimated using the same approach as the outflow estimate based on expected deaths (by multiplying their wealth by the probability that they died in that year).

The value of wealth at death was then adjusted in line with the patterns observed in probate data (box 1.5 in chapter 1) to produce an estimate of the value transferred immediately to younger generations, which was about $590 million in 2012 and $550 million in 2016.

B. Estimating the effects of wealth transfers on wealth inequality and mobility

B.1 Estimating intergenerational wealth persistence and the contribution of inheritances

Chapter 2 states that 36 per cent of intergenerational wealth persistence (IWP) among Australians aged 64–74 in 2018 can be attributed to inheritances.

To produce that estimate, IWP between the child cohort in question and their parents is first estimated. The approach taken is novel, as the data needed for the standard approach are not available.[51] The standard approach is to identify a representative group of parent–child pairs in a dataset, measure the household wealth (referred to as 'wealth' throughout section B.1) of each parent and child when as close as possible in age, and estimate the percentile rank–percentile rank correlation. But with the Household Income and Labour Dynamics in Australia (HILDA) dataset, it is usually only possible to identify parent–child pairs if the children are too young to have received an inheritance.[52]

The approach used here is to identify a cohort of children in the HILDA dataset whose second parent to die (hereafter 'second parent') died between 2001 and 2017 and impute their parents' 2002 wealth according to the size of the inheritance that the children received. 2002 is chosen as it is the earliest year for which the wealth data used in this imputation are available. A percentile rank – percentile rank correlation between each child's household wealth and their parents' household wealth is then estimated.

This IWP estimate suffers too much attenuation bias (bias toward zero) from error in the measurement of parent wealth to be compared with estimates from other countries. For this reason, it is not presented in chapter 2. But it is used to construct an unbiased estimate of the share of IWP that is due to inheritances.

This section proceeds as follows.

- The next subsection outlines the process for imputing the parents' 2002 wealth in four steps.
  - Step 1: parents' wealth at death is estimated based on the inheritances they left to their children.

[51] It is not uncommon for studies of intergenerational persistence in variables other than wealth to use creative methods to overcome data shortfalls. Prior to 2018, the only published estimates of intergenerational income persistence for Australia relied on imputing fathers' income based on their occupation (Murray et al. 2018). And a recent study of intergenerational persistence in occupation status in Australia from 1870 to 2017 linked parents and children across generations by identifying families with rare surnames in Census records (Clark, Leigh and Pottenger 2020).

[52] Murray et al. (2018) and Siminski and Yu (2021) each use this approach to measure intergenerational income persistence and IWP, respectively.

  – Step 2: parents’ wealth at death is estimated based on their demographic characteristics.
  – Step 3: the estimated derived in step 2 is used to adjust and verify the estimate derived in step 1.
  – Step 4: the adjusted version of the step 1 estimate is used to estimate the parents’ 2002 wealth.

- The following subsection estimates IWP for the cohort in question.
- The following subsection the share of IWP for the cohort in question that is due to inheritances.

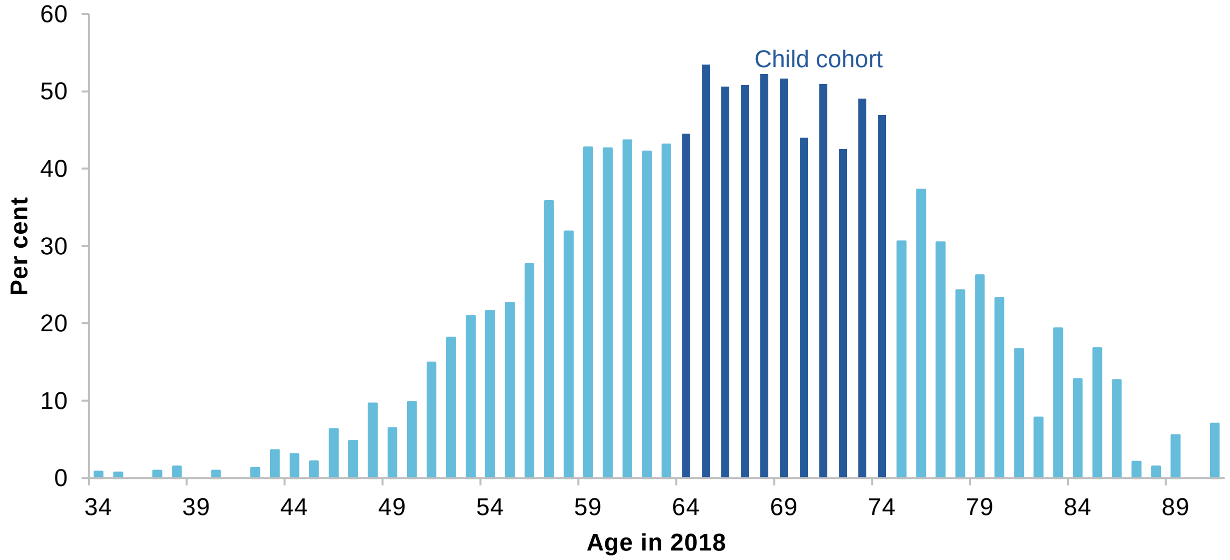
Imputation of parent wealth

Step 1: Inheritance-based estimate

The child cohort (hereafter ‘children’) is chosen to be children aged 64–74 in 2018, as children of this age were the most likely to have had their second parent die between 2001 and 2017 — this was the case for about 50 per cent of this cohort (figure B.1).[53] Children whose parents had separated (about 10 per cent) and children whose second parent to die had a new partner at time of death (about 2 per cent) were excluded, as imputation of parent wealth is particularly unreliable in these instances.

Figure B.1 – Choice of child cohort

Share of people whose second parent to die died between 2001 and 2017, by single year of age



Source: Productivity Commission estimates based on HILDA Restricted Release 19.

Next, the second parent’s wealth at death is imputed according to the following assumptions:

- The first parent to die bequeaths their entire estate to their partner, or, if any of the estate is bequeathed to the children it is bequeathed in equal shares. A study of Victorian probate records found that in 83 per cent of cases the first parent to die bequeathed their estate ‘primarily’ to their partner, in 7 per cent of cases the estimate was ‘primarily’ bequeathed to the children in equal shares, and in a further

[53] Widening the age cohort would increase the sample size for analysis, but at the cost of a less representative cohort. For example, if 40 year olds (in 2018) were to be included, the analysis would be almost completely unrepresentative of 40 year olds as such a low share had their second parent die between 2001 and 2017.

7 per cent of cases there were more complex distributions that usually involved a combination of spouse and children (Baker and Gilding 2011, p. 282).

- The second parent to die bequeaths their estate to their children in equal shares. The same Victorian study found that in 88 per cent of relevant cases over 90 per cent of the estate was bequeathed in this way, while a study of probate records from all around Australia found that in 71 per cent of relevant cases children were the 'primary' beneficiaries in equal share (Baker 2014, p. 50; Baker and Gilding 2011, p. 282). Moreover, in many of the remaining cases the distribution was still among children but on unequal terms — 5 per cent in the Victorian study described above and 16 per cent in the Australian study. These cases contribute noise but not necessarily bias to the imputation process.

Hereafter, this is referred to as the 'inheritance-based estimate' of the second parents' wealth at death.

A problem is that, even allowing three years after the second parents' death for the inheritance to be received, only 43 per cent of children reported receiving an inheritance. Were the above assumptions true, this would imply that the second parent of 57 per cent of the children died with negative or negligible wealth, but only about 1–2 per cent of people die with zero or negative wealth (chapter 1). And the issue cannot be fully explained by small inheritances being consumed by death-related expenses (funerals, cleaning, etc.) as only 15–20 per cent of people die with less than $10 000.

Therefore, it is almost certainly the case that there is substantial non-reporting of inheritances to the HILDA survey. This is problematic if the non-reporting is non-random.

Step 2: Demography-based estimate

To better understand the non-reporting, the wealth at death of the second parent to die is also estimated based on information reported by children about their parents — their year of birth, education, and country of birth — to generate an independent estimate of parent wealth that can be compared to the inheritance-based estimate. To do this, a group of HILDA survey respondents most similar to the parent cohort (single widows or widowers) is isolated, and data about them is used to estimate the following model (using least squares weighted by the appropriate survey weights):

$$Individual\ wealth_i = \beta_0 + \beta_1 Wave_i + \boldsymbol{x}_i'\boldsymbol{\beta} + \varepsilon_i$$

Where:

- $Individual\ wealth_i$ is the individual wealth of person i in the last wave at which it was recorded
- $Wave_i$ is the wave of the HILDA survey at which $Individual\ wealth_i$ was recorded. This is wave 18 (corresponding with 2018) in about three quarters of cases — the last year for which wealth data are available — meaning that about one quarter of the sample has died or ceased completing the survey.
- $\boldsymbol{x}_i$ is a vector the year of birth, level of education and country of birth of the person in question and their former spouse. These are coded to delineate between men and women, rather than the person in question and their former spouse, so that they correspond with information about the child's mother and father.

Hereafter, this group of HILDA survey respondents is referred to as the 'broad comparison group' ($n = 487$), and the subset of the group who have at least one child the same age as the child cohort is referred to as the 'narrow comparison group' ($n = 111$).

Table B.1 contains the results (reference category: widows/widowers who completed high school to grade 12, did not attend university and were born in Australia and whose former partner also had these characteristics). The sign of each variable is as expected, with the exception of $Mother's\ highest\ schooling - grade\ 10_i$. The R^2 equals 0.17, meaning that the model explains 17 per cent of the variation in $Individual\ wealth_i$.

Table B.1 – Effects of demography on parents' wealth[a,b,c]

Dependent variable: $Wealth_i$

Explanatory variable	Estimated coefficient
$Father's\ year\ of\ birth_i$	2 349 136.9***
	(705 763.6)
$Father's\ year\ of\ birth_i^2$	-604.7***
	(181.6)
$Wave\ of\ survey_i$	25 046.4**
	(10 370.6)
$Father's\ highest\ schooling\ is\ grade\ 10_i$ [b]	-131 386.1
	(193 016.8)
$Father's\ highest\ schooling\ is\ highschool, but\ grade\ 10\ or\ lower_i$ [b]	-327 890.4**
	(161 676.5)
$Father's\ highest\ schooling\ is\ primary\ school\ or\ special\ needs\ school_i$ [b]	-242 186.2
	(171 652.4)
$Mother's\ highest\ schooling\ is\ grade\ 10_i$ [b]	20 590.9
	(255 941.1)
$Mother's\ highest\ schooling\ is\ highschool, but\ grade\ 10\ or\ lower_i$ [b]	-136 557.8
	(110 830.0)
$Mother's\ highest\ schooling\ is\ primary\ school\ or\ special\ needs\ school_i$ [b]	-217 497.3*
	(129 451.9)
$Father\ attended\ university_i$ [b]	557 968.6***
	(185 565.7)
$Mother\ attended\ university_i$ [b]	406 534.4**
	(163 642.0)
$Father\ born\ overseas\ in\ an\ English\ speaking\ country_i$ [b]	-251 839.7*
	(129 207.6)
$Father\ born\ overseas\ in\ non\ English\ speaking\ country_i$ [b]	-347 141.4***
	(130 004.4)
$Has\ at\ least\ one\ child\ born\ between\ 1944\ and\ 1954_i$ [b]	33 452.1
	(111 782.1)
$Constant$	-2 280 790 000***
	(685 563 712.4)
Number of observations	487

a. * indicates statistical significance at the 10 per cent level of significance, ** indicates significance at the 5 per cent level of significance, and *** indicates significance at the 1 per cent level of significance. **b.** 1/0 dummy variables, where 1 indicates 'true'. **c** The following variables were excluded because they were found to be highly statistically insignificant: $Mother's\ year\ of\ birth_i$, $Mother's\ year\ of\ birth_i^2$, $Mother\ born\ overseas\ in\ an\ English\ speaking\ country_i$ $Mother\ born\ overseas\ in\ a\ non\ English\ speaking\ country_i$.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

Using this model, the wealth at death of each child's second parent to die is estimated by applying the coefficients from table B.1 to the corresponding data the children reported about their parents. Hence, a new estimate of parents' wealth at death independent of the inheritance the child reported receiving is generated.

Hereafter, this new estimate is referred to as the ‘demography-based estimate’ as opposed to the ‘inheritance-based estimate’ defined above.

Step 3: Derivation of representative samples

The demography-based and inheritance-based estimates of parents’ wealth at death are then compared to test possible explanations for the non-reporting. Probit regressions of the following form are estimated to test whether the non-reporting is correlated with the demography-based estimate of parent wealth at death:

$$\begin{aligned}\Pr(Inheritance\ reported_i = 1 | Parent\ wealth\ (demography\ estimate)_i) \\ = \Phi(\beta_0 + \beta_1 Parent\ wealth\ (demography\ estimate)_i + \varepsilon_i)\end{aligned}$$

Where:

- $Inheritance\ reported_i$ equals 1 if child i reports receiving an inheritance and 0 otherwise
- $Parent\ wealth\ (demography\ estimate)_i$ is the demography-based estimate of the wealth at death of child i’s second parent to die
- Φ is the cumulative distribution function of the standard normal distribution

The results are shown in table B.2. Model 1 (estimated using all observations) and suggest that children whose parents are estimated to be wealthier at death according to the demography-based estimate were more likely to report receiving an inheritance. Hence, when all observations are considered, the non-reporting of inheritances is non-random.

However, when the sample is split into those whose parents were expected (by the demography-based estimate) to have negative or zero wealth at death (model 2) and those whose parents were expected to have positive wealth at death (model 3) the results differ. Model 2 suggests that there was non-random non-reporting among those whose parents were expected to have negative or zero wealth at death according to the demography-based estimate, but model 3 suggests there is insufficient evidence to support this conclusion among those whose parents were expected to have positive wealth at death according to the demography-based estimate.[54] This is intuitive — some non-reporting may be because the inheritance was small and consumed entirely by death-related expenses. Of course, these tests are not especially high-powered since the demography-based estimate is imperfect.

Assuming that the non-random non-reporting of inheritances is confined to people who received little or no inheritance following the death of their second parent, an approximately representative sample of parent–child pairs about which there is sufficient information to estimate IWP can be derived. The sample comprises all children who reported receiving an inheritance, plus the group of children who did not report receiving an inheritance for whom it was most likely (based on the demography-based estimate) that their second parent to die had sufficiently little wealth at death to not leave an inheritance once death-related expenses were paid. With little guide to how large this ‘no inheritance’ group ought to be other than the 1–2 per cent and 15-20 per cent proportions outlined above, a central estimate of 10 per cent was adopted with 2 per cent and 20 per cent as robustness tests. Hereafter, the sample derived from the central estimate is referred to as the ‘main sample’, the sample derived from the 2 per cent assumption is referred to as the ‘small sample’, and the sample derived from the 20 per cent assumption is referred to as the ‘large sample’.

[54] The model shown in table B.1 predicts that nearly 30 per cent of parents died with negative wealth — far higher than reality (1–2 per cent). Hence, the cut-off points that delineate models 2 and 3 in table B.2 are somewhat arbitrary. This does not ultimately matter, as models 4–6 are used to verify the subsequent assumptions.

As a check that this approach isolated the source of the non-random non-reporting, model 1 from table B.2 is re-estimated with the 'no inheritance' groups removed (table B.2, models 4–6). The results suggest that some non-random non-reporting remains when only 2 per cent of the sample comprises people who likely did not actually receive an inheritance (model 4), but not if 10 per cent or 20 per cent of the sample comprises people who likely did not actually receive an inheritance (models 5 and 6). Thus, for the main and large samples, the hypothesis that the non-reporting is random is not rejected.

Table B.2 – Tests for whether non-reporting of inheritances is correlated with parents' estimated wealth[a,b,c,d]

Dependent variable: $\Pr(Inheritance\ reported_i = 1|Parent\ wealth\ (demography\ estimate)_i)$

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	All observations	$PWDE_i \leq 0$	$PWDE_i > 0$	Excluding lowest 5 observation-s of $PWDE_i$ for which an inheritance was reported	Excluding lowest 27 observation-s of $PWDE_i$ for which an inheritance was reported	Excluding lowest 61 observation-s of $PWDE_i$ for which an inheritance was reported
$Parent\ wealth\ (demography\ estimate)_i$	0.00043***	0.00122*	0.0001445	0.000375**	0.000131	-0.0002471
	(0.000148)	(0.000663)	(0.000219)	(0.000151)	(0.000161)	(.0001733)
Number of observations	485	133	352	480	458	424

a. $PWDE_i$ is $Parent\ wealth\ (demography\ estimate)_i$. **b.** * indicates statistical significance at the 10 per cent level of significance, ** indicates significance at the 5 per cent level of significance, and *** indicates significance at the 1 per cent level of significance. **c.** For models 4–6, the number of excluded observations is consistent with the 'no inheritance' group in the small, main and large samples, respectively. The small sample comprises 243 observations with a reported inheritance and 5 observations with no inheritance, the main sample 243 and 27, and the large sample 243 and 61. **d.** All results have been scaled by 1000 for ease of presentation.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

Table B.3 compares the inheritance-based estimate of parent wealth from these three prospective samples with the narrow comparison group. Each has been reweighted to balance the distribution over the years in which wealth was measured/imputed to allow for greater comparability. The inheritance-based estimate of the parents' wealth is 91–115 per cent of the wealth of the comparison group at the mean and 49–70 per cent at the median (table B.3). While an imperfect comparison, this likely suggests that there is substantial error in the inheritance-based estimate. However, as shown later, this does not necessarily lead to bias in the estimate of the share of IWP that is attributed to inheritances.

Table B.3 – Comparison of inheritance-based estimate of second parent wealth at death with observed value among narrow comparison group[a]

	Small sample		Main sample		Large sample	
	Inheritance-based estimate	Observed wealth for narrow comparison group	Inheritance-based estimate	Observed wealth for narrow comparison group	Inheritance-based estimate	Observed wealth for narrow comparison group
	$	$	$	$	$	$
Minimum	0	2 000	0	2 000	0	2 000
Quartile 1	120 000	216 000	80 000	216 000	6 000	216 000
Median	312 000	443 000	253 000	411 000	200 000	411 000
Quartile 3	600 000	636 000	598 000	636 000	525 000	636 000
Maximum	10 000 000	1 786 000	10 000 000	1 786 000	10 000 000	1 786 000
Mean	543 000	471 000	487 000	469 000	422 000	465 000
Number of observations	248	60[a]	270	60[a]	304	60[a]

a. Of the 113 available observations, 53 were from 2018. As all inheritance based estimates are from prior to 2018, these observation were excluded from the comparison.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

Step 4: Backdating of parent wealth to 2002

Finally, the inheritance-based estimate is backdated to 2002, so that the parents can be ranked by their wealth at death. To do so, the following random effects model is estimated on a panel derived from the narrow comparison group:[55] [56] [57]

$$\begin{aligned}\log(Couple\ wealth_{i,t}) &\\ = \beta_0 + \beta_1 Wave_{i,t} &+ \beta_2 Father\ born\ overseas\ (English\ speaking\ country)_i \\ &+ \beta_3 Father\ born\ overseas\ (other\ country)_i + \mu_i + \varepsilon_{i,t}\end{aligned}$$

Where:

- $\log(Couple\ wealth_{i,t})$ is the natural log of individual i's wealth plus the wealth of their partner when still alive
- μ_i is an individual-specific random effect that is assumed to be uncorrelated with all covariates.
- other variables are as previous defined.

$\widehat{\beta_1} = 0.019$ (statistically significant at the 10 per cent level of significance), implying that, other things equal, average growth in $Couple\ wealth_{i,t}$ was about 2 per cent per annum for the panel derived from the narrow comparison group. This parameter was used to deflate the inheritance-based estimates to their 2002 values.

[55] The panel comprises members of the narrow comparison group who were either interviewed in every wave where wealth was measured (waves 2, 6, 10, 14 and 18) or were not interviewed in one or more waves due to death or travel abroad ($n = 320$). Hence, there ought to be no issues of survivor bias.

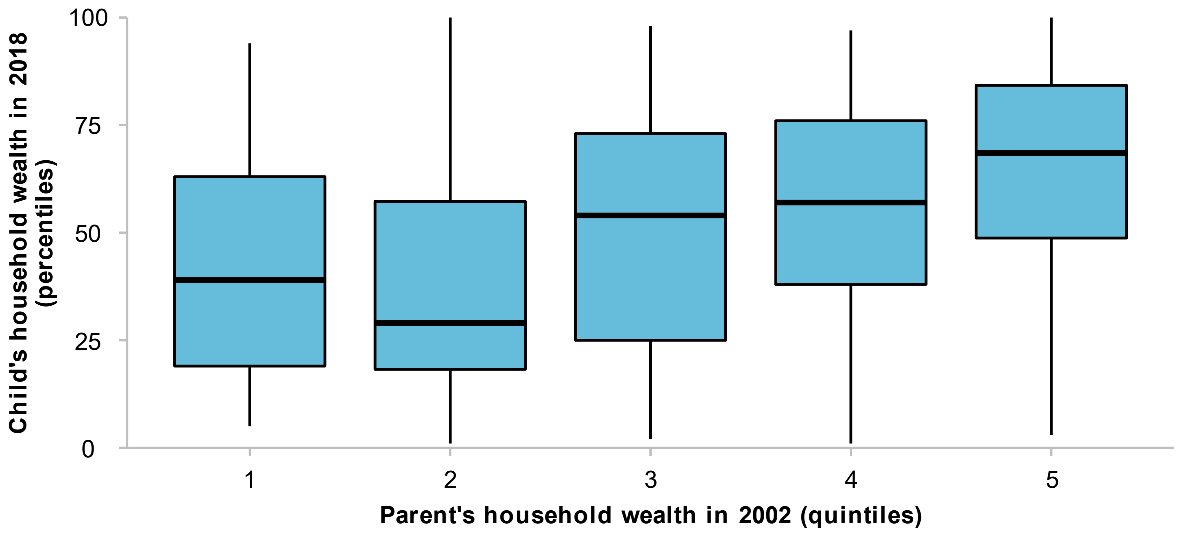
[56] Random effects was preferred to fixed effects because the null hypothesis that μ_i is uncorrelated with all covariates could not be rejected in a robust Hausman test.

[57] Each of the variables in table B.1 were tested for inclusion in the random effects model but all others were found to be highly statistically insignificant.

Estimation of intergenerational wealth persistence

Figure B.2 shows that there is a positive relationship between imputed 2002 parent wealth and 2018 child wealth, which implies that wealth is persistent to some extent.

Figure B.2 – Relationship between parent wealth and child wealth[a]



a. Based on the main sample.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

This relationship is captured by the following percentile rank – percentile rank regression, the standard measure of IWP, estimated using least squares weighted by the appropriate survey weights:[58]

$$Child\ wealth\ (rank)_{i,2018} = \beta_0 + \beta_1 Imputed\ parent\ wealth\ (rank)_{i,2002} + \boldsymbol{x}_i'\boldsymbol{\beta} + \varepsilon_i$$

Where $\boldsymbol{x}_i$ is a vector of age controls (age of child and each parent in linear and squared terms). (This is to control for within-cohort differences in parent and child age, and is a common approach in studies of IWP (see, for example, Siminski and Yu 2021).)

This yields $\widehat{\beta_1} = 0.26$ for the main sample, $\widehat{\beta_1} = 0.24$ for the small sample and $\widehat{\beta_1} = 0.30$ for the large sample.

Given the age of the child cohort, these estimates are low, both by international standards and when compared with the only other estimate for Australia of 0.49 among children aged 40–65 (chapter 2, figure 2.10). This is likely because of attenuation bias due to the substantial error in the measurement of parent wealth, rather than because IWP is genuinely low among this cohort. For this reason, these estimates are not included in the discussion of IWP in chapter 2.

[58] Because parent wealth is censored at zero (the imputation process cannot generate a negative wealth estimate), observations corresponding with zero parent wealth are dropped when the model is estimated. This is not expected to bias the results because the censoring is exogenous with respect to child wealth (Rigobon and Stoker 2007).

Attribution of intergenerational wealth persistence to inheritances

This estimate of IWP can be used, however, to construct an unbiased estimate of the share of IWP attributable to inheritances provided that the error in the measurement of parent wealth is not correlated with child wealth (other than via parent wealth).

To see why, note first that the share of IWP attributable to inheritances is defined to be $1 - \beta_3/\beta_1$ from the following models:[59]

$$Child\ wealth\ (rank)_{i,2018} = \beta_0 + \beta_1 Parent\ wealth\ (rank)_{i,2002} + \boldsymbol{x}_i'\boldsymbol{\beta_4} + \varepsilon_i$$

$$Child\ wealth\ excluding\ inheritances\ (rank)_{i,2018} = \beta_2 + \beta_3 Parent\ wealth\ (rank)_{i,2002} + \boldsymbol{x}_i'\boldsymbol{\beta_5} + \delta_i$$

Where $Child\ wealth\ excluding\ inheritances\ (rank)_{i,2018}$ is the counterfactual percentile ranking of child wealth in 2018 if inheritances had unexpectedly not been received.

With our data, however, $Parent\ wealth\ (rank)_{i,2002}$ has been imputed with error, such that $Imputed\ parent\ wealth\ (rank)_{i,2002} = Parent\ wealth\ (rank)_{i,2002} + \mu_i$.

As proven in box B.1, the only conditions necessary to ensure that least squares estimation of the above equations with $Imputed\ parent\ wealth\ (rank)_{i,2002}$ substituted for $Parent\ wealth\ (rank)_{i,2002}$ will produce an unbiased estimate of $1 - \beta_3/\beta_1$ are that μ_i is not correlated with ε_i or δ_i. In practice, this means that μ_i may be correlated with $Parent\ wealth\ (rank)_{i,2002}$ but correlated with $Child\ wealth\ (rank)_{i,2018}$ and $Child\ wealth\ excluding\ inheritances\ (rank)_{i,2018}$ *only* via $Parent\ wealth\ (rank)_{i,2002}$ (i.e. uncorrelated with $Child\ wealth\ (rank)_{i,2018}$ and $Child\ wealth\ excluding\ inheritances\ (rank)_{i,2018}$ conditional on $Parent\ wealth\ (rank)_{i,2002}$).

Unfortunately, it is not possible to rigorously test whether these conditions hold, but they are consistent with evidence presented earlier. The findings of table B.2 do not imply any violation of the conditions for the main and large samples, because the null hypothesis, that the observations excluded from the main and large samples because of non-reporting of inheritances are randomly excluded, is not rejected. Likewise, the statistics presented in table B.3 can be reconciled with a permissible μ_i, because μ_i may be correlated with $Parent\ wealth\ (rank)_{i,2002}$ and need not be mean zero.

[59] This approach to estimating the share of IWP attributable to inheritances is based on Adermon, Lindahl and Waldenström (2018).

Box B.1 – Proof that the share of IWP attributed to inheritances is unbiased if μ_i is not correlated with ε_i or δ_i

Claim

Suppose that the error in the measurement of parent wealth is of the form $Imputed\ parent\ wealth\ (rank)_{i,2002} =\ Parent\ wealth\ (rank)_{i,2002} + \mu_i$ where μ_i is not correlated with ε_i or δ_i (the error terms in the equations that estimate β_1 and β_3). Then the share of IWP attributed to inheritances $1 - \widehat{\beta_3}/\widehat{\beta_1}$ is unbiased.

Proof

Define the equations that estimate β_1 and β_3 as:

$$\boldsymbol{Child\ wealth\ (rank)_{2018} = X\beta_4 + \varepsilon}$$

$$\boldsymbol{Child\ wealth\ excluding\ inheritances\ (rank)_{2018} = X\beta_5 + \delta}$$

such that $\boldsymbol{\beta}_4$ absorbs β_0 and β_1, $\boldsymbol{\beta}_5$ absorbs β_2 and β_3, $\boldsymbol{X}$ absorbs $Parent\ wealth\ (rank)_{2002}$ and 1 (corresponding with the constant term), and each term is in vector or matrix form (hence the i subscripts are dropped and all terms are bolded). $\boldsymbol{\beta}_4$ and $\boldsymbol{\beta}_5$ are $x \times 1$ vectors, $\boldsymbol{Child\ wealth\ (rank)_{2018}}$, $\boldsymbol{Child\ wealth\ excluding\ inheritances\ (rank)_{2018}}$, $\boldsymbol{\varepsilon}$ and $\boldsymbol{\delta}$ are $n \times 1$ vectors, and $\boldsymbol{X}$ is an $n \times x$ matrix, where n is the number of observations and x is the number of explanatory variables. Order the vectors and matrices such that the first row of $\boldsymbol{\beta_4}$ and $\boldsymbol{\beta}_5$ correspond with β_1 and β_3 (respectively), and the first column of $\boldsymbol{X}$ corresponds with $\boldsymbol{Parent\ wealth\ (rank)_{2002}}$. With this setup, Bound et al. (1994, pp. 348–350) shows that, if the measurement error is of the assumed form, the biases to the least squares estimates $\widehat{\boldsymbol{\beta}_4}$ and $\widehat{\boldsymbol{\beta}_5}$ are:

$$\text{plim}\left(\widehat{\boldsymbol{\beta}_4} - \boldsymbol{\beta}_4\right) = \text{plim}\big((\boldsymbol{X}'\boldsymbol{X})^{-1}\boldsymbol{X}'(-\boldsymbol{M\beta_4})\big)$$

$$\text{plim}\left(\widehat{\boldsymbol{\beta}_5} - \boldsymbol{\beta}_5\right) = \text{plim}\big((\boldsymbol{X}'\boldsymbol{X})^{-1}\boldsymbol{X}'(-\boldsymbol{M\beta_5})\big)$$

where $\boldsymbol{M}$ (an $n \times x$ matrix) is the error in the measurement of $\boldsymbol{X}$. All but the first column of $\boldsymbol{M}$ contains zeros, as there is measurement error only in $\boldsymbol{Parent\ wealth\ (rank)_{2002}}$, so $-\boldsymbol{M\beta_4} = -\beta_1\boldsymbol{\mu}$ where $\boldsymbol{\mu}$ is an $n \times 1$ vector containing μ_i, and $-\boldsymbol{\mu\beta_5} = -\beta_3\boldsymbol{\mu}$. This means that:

$$\text{plim}\,\widehat{\boldsymbol{\beta}_4} = \boldsymbol{\beta_4} + \beta_1\text{plim}\big((\boldsymbol{X}'\boldsymbol{X})^{-1}\boldsymbol{X}'(-\boldsymbol{\mu})\big)$$

$$\text{plim}\,\widehat{\boldsymbol{\beta}_5} = \boldsymbol{\beta_5} + \beta_3\text{plim}\big((\boldsymbol{X}'\boldsymbol{X})^{-1}\boldsymbol{X}'(-\boldsymbol{\mu})\big)$$

Hence, $\text{plim}\,\widehat{\beta_1} = \beta_1\gamma$ and $\text{plim}\,\widehat{\beta_3} = \beta_3\gamma$ for some γ, because the first row of the right hand side of both equations differs only by the factor β_1/β_3.

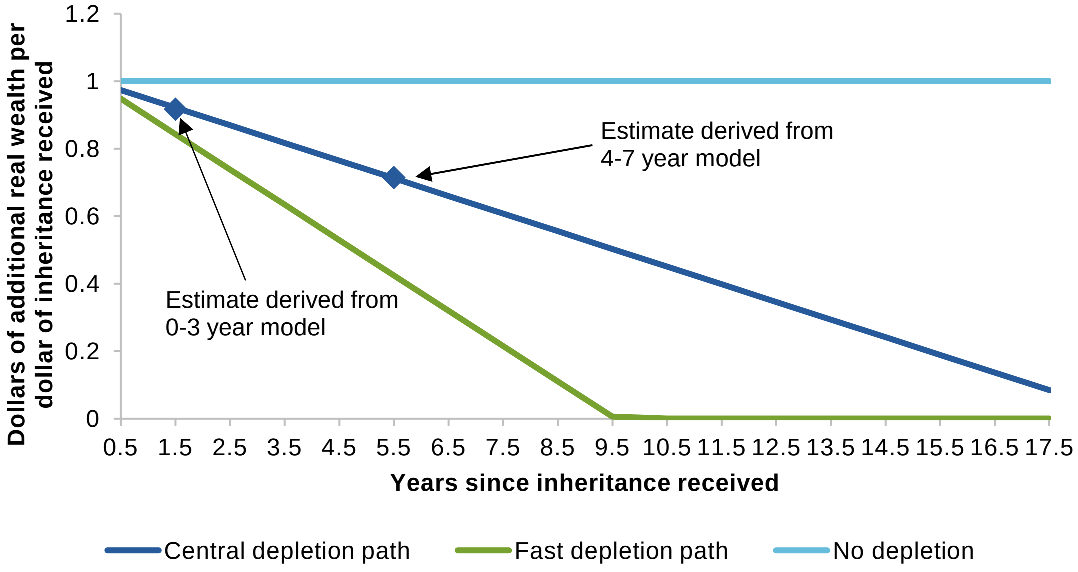
Therefore:

$$1 - \text{plim}\,\widehat{\beta_3}/\text{plim}\,\widehat{\beta_1} = 1 - \beta_3/\beta_1$$

What remains is the construction of $Child\ wealth\ excluding\ inheritances\ (rank)_{i,2018}$. This is estimated by deducting household i's estimated increase to wealth due to inheritances and then sorting the households into percentile ranks. The amount to deduct is calculated by estimating the 0–3 year and 4–7 year models outlined in section B.6 for the case $k = 1$ (the degenerate case of a single quantile) with the sample restricted to those aged 47–73 when they received an inheritance — the age range that corresponds with the child generation — and all variables converted to real terms to remove the effects of inflation. When the resulting estimates are taken to apply at their respective mid-points (1.5 years and 5.5 years) and the fact that each $1 of inheritance must increase wealth by $1 in the immediate term is recognised, a linear depletion path is clearly apparent (figure B.3).[60] This is taken to be the central depletion path, and a 'fast' depletion (twice the rate, to a maximum of full depletion) and the case of no depletion are taken as robustness checks.

Figure B.3 – Inheritance depletion path

Model-derived estimates and implied depletion path



Source: Productivity Commission estimates based on HILDA Restricted Release 19.

Table B.4 contains the results, in particular the estimate that 36 per cent of IWP is attributed to inheritances, which corresponds with the main sample and central depletion path. It is also notable that $1 - \widehat{\beta_3}/\widehat{\beta_1}$ is less sensitive to the choice of sample than the IWP estimate itself. This reflects the claim proven in box B.1.

[60] This contrasts with the result for the general population of minimal inheritance depletion in real terms (chapter 2), because older recipients deplete larger shares of their inheritances in a given period of time than younger recipients. This may be because older recipients expect to have fewer remaining years of life over which to spread the additional consumption that their inheritance affords them.

Table B.4 – Intergenerational wealth persistence and share attributable to inheritances

	Small sample	Main sample	Large sample
$Child\ wealth\ (rank)_{i,2018}$	0.24	0.26	0.30
Fast inheritance depletion path			
$Child\ wealth\ excluding\ inheritances\ (rank)_{i,2018}$	0.19	0.21	0.24
$1 - \widehat{\beta_3}/\widehat{\beta_1}$	20 per cent	20 per cent	20 per cent
Central inheritance depletion path			
$Child\ wealth\ excluding\ inheritances\ (rank)_{i,2018}$	0.16	0.17	0.19
$1 - \widehat{\beta_3}/\widehat{\beta_1}$	35 per cent	36 per cent	36 per cent
No inheritance depletion			
$Child\ wealth\ excluding\ inheritances\ (rank)_{i,2018}$	0.10	0.11	0.13
$1 - \widehat{\beta_3}/\widehat{\beta_1}$	59 per cent	59 per cent	58 per cent

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

B.2 Additional measures of the immediate-term effect of wealth transfers on wealth inequality

Chapter 2 presents evidence of the immediate-term effect of wealth transfers on wealth inequality. Tables B.5 (inheritances) and B.6 (gifts) present supplementary evidence of these effects, by examining the immediate-term effect that transfers had on the wealth distribution as summarised by four common measures of wealth inequality:

- the Gini coefficient of wealth inequality, the most commonly used measure of relative wealth inequality
- the generalised entropy class 2 coefficient of wealth inequality, a measure of relative wealth inequality. It is a one–to–one transformation of the coefficient of variation of the wealth distribution (another common measure of relative wealth inequality). Relative to the Gini coefficient, it is more sensitive to wealth transfers received by initially very wealthy people.
- the absolute Gini coefficient of wealth inequality, a measure of absolute wealth inequality. As its name implies, it is an absolute wealth inequality analogue of the Gini coefficient.
- the standard deviation of the wealth distribution, a measure of absolute wealth inequality. It is an absolute wealth inequality analogue of the generalised entropy class 2 coefficient.

Tables B.5 and B.6 also present 'p-values' to capture the uncertainty associated with the estimates. These are computed using the jackknife method commonly applied to HILDA data (see, for example, Hayes (2008)).

The results here concur with the conclusions of chapter 2 that — when pooled over the 12 studied years — inheritances increased absolute wealth inequality but decreased relative wealth inequality, and that gifts had an inconclusive effect on absolute wealth inequality but decreased relative wealth inequality. The results for each specific three-year block mostly concur with the chapter 2 conclusions too, and no result suggests the opposite conclusion to that reached in chapter 2.

Table B.5 – Effect of inheritances on wealth inequality[a,b,c]

Year	Measure	Estimate	p-value	Finding
	Change in…	$\hat{x}_{observed}$	$\Pr(\hat{x} \geq \hat{x}_{observed} \mid x = 0)$	This suggests that inheritances…
2003-04 – 2005-06	…Gini coefficient	0.000108	0.908	…had an inconclusive effect on relative wealth inequality
	…GE(2) coefficient	-0.00329	0.826	…had an inconclusive effect on relative wealth inequality
	…absolute Gini coefficient	2839.609	0.002	…increased absolute wealth inequality
	…standard deviation	7524.304	0.062	…had an inconclusive effect on absolute wealth inequality
2007-08 – 2009-10	…Gini coefficient	-0.00077	0.099	…had an inconclusive effect on relative wealth inequality
	…GE(2) coefficient	-0.00724	0.579	…had an inconclusive effect on relative wealth inequality
	…absolute Gini coefficient	1916.321	0.000	…increased absolute wealth inequality
	…standard deviation	5173.114	0.124	…had an inconclusive effect on absolute wealth inequality
2011-12 – 2013-14	…Gini coefficient	-0.00109	0.008	…decreased relative wealth inequality
	…GE(2) coefficient	-0.01870	0.000	…decreased relative wealth inequality
	…absolute Gini coefficient	2610.288	0.000	…increased absolute wealth inequality
	…standard deviation	3438.561	0.003	…increased absolute wealth inequality
2015-16 – 2017-18	…Gini coefficient	-0.00144	0.000	…decreased relative wealth inequality
	…GE(2) coefficient	-0.01701	0.003	…decreased relative wealth inequality
	…absolute Gini coefficient	2839.358	0.000	…increased absolute wealth inequality
	…standard deviation	4691.874	0.001	…increased absolute wealth inequality
Pooled across all years	**…sum of Gini coefficients**	**-0.00320**	**0.007**	**…decreased relative wealth inequality**
	…sum of GE(2) coefficients	**-0.04624**	**0.033**	**…decreased relative wealth inequality**
	…sum of absolute Gini coefficients	**10205.58**	**0.000**	**…increased absolute wealth inequality**
	…sum of standard deviations	**20827.85**	**0.000**	**…increased absolute wealth inequality**

a. 'GE(2) coefficient' is the generalised entropy class 2 coefficient. **b.** All measures are weighted by the appropriate survey weights. See the published script files for more information on the weights used throughout this study. **c.** Findings are based on whether the null hypothesis that inheritances had no effect on wealth inequality can be rejected at the 5 per cent level of significance.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

Table B.6 – Effect of gifts on wealth inequality[a,b,c]

Years	Measure	Estimate	p-value	Finding
	Change in…	$\hat{x}_{observed}$	$\Pr(\hat{x} \geq \hat{x}_{observed} \mid x = 0)$	This suggests that gifts…
2003-04 – 2005-06	…Gini coefficient	-.000951	0.000	…decreased relative wealth inequality
	…GE(2) coefficient	-.005547	0.000	…decreased relative wealth inequality
	…absolute Gini coefficient	40.75253	0.267	…had an inconclusive effect on absolute wealth inequality
	…standard deviation	2.308586	0.952	…had an inconclusive effect on absolute wealth inequality
2007-08 – 2009-10	…Gini coefficient	-.000791	0.000	…decreased relative wealth inequality
	…GE(2) coefficient	-.005197	0.000	…decreased relative wealth inequality
	…absolute Gini coefficient	52.27227	0.362	…had an inconclusive effect on absolute wealth inequality
	…standard deviation	-6.77162	0.863	…had an inconclusive effect on absolute wealth inequality
2011-12 – 2013-14	…Gini coefficient	-.000567	0.061	…had an inconclusive effect on relative wealth inequality
	…GE(2) coefficient	-.003554	0.001	…decreased relative wealth inequality
	…absolute Gini coefficient	383.8547	0.274	…had an inconclusive effect on absolute wealth inequality
	…standard deviation	807.4705	0.264	…had an inconclusive effect on absolute wealth inequality
2015-16 – 2017-18	…Gini coefficient	-.001165	0.001	…decreased relative wealth inequality
	…GE(2) coefficient	-.006397	0.001	…decreased relative wealth inequality
	…absolute Gini coefficient	288.075	0.028	…increased absolute wealth inequality
	…standard deviation	442.8433	0.131	…had an inconclusive effect on absolute wealth inequality
Pooled across all years	**…sum of Gini coefficients**	**-.003473**	**0.000**	**…decreased relative wealth inequality**
	… sum of GE(2) coefficients	**-.020694**	**0.000**	**…decreased relative wealth inequality**
	… sum of absolute Gini coefficients	**764.9545**	**0.065**	**…had an inconclusive effect on absolute wealth inequality**
	…sum of standard deviations	**1245.851**	**0.115**	**…had an inconclusive effect on absolute wealth inequality**

a. 'GE(2) coefficient' is the generalised entropy class 2 coefficient. **b.** All measures are weighted by the appropriate survey weights. **c.** Findings are based on whether the null hypothesis that gifts had no effect on wealth inequality can be rejected at the 5 per cent level of significance.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

B.3 Immediate-term effect of wealth transfers on unequivalised household wealth inequality

As chapter 2 notes, the rationale for equivalising household wealth when assessing the effect of wealth transfers on wealth inequality is strong, but there is no consensus about which equivalisation scale is most suited to doing so (OECD 2013). As a robustness check, the main results from section 2.1 are replicated below, but with unequivalised household wealth and unequivalised household wealth transfers used as the measures of wealth and wealth transfers.

None of the results differ from those presented in section 2.1 in directional terms (the numbers, of course, differ), which suggests that those results are not sensitive to the choice of whether or not to equivalise household wealth.

In the case of inheritances, when unequivalised measures are adopted, it remains the case that:

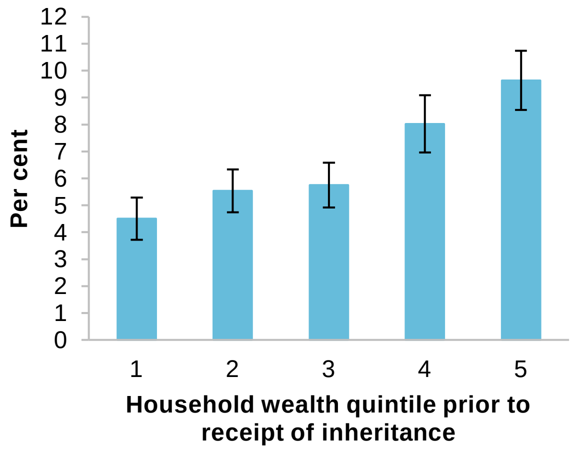
- larger shares of wealthier people received inheritances than poorer people (figure B.4, panel a)
- among those who received inheritances, wealthier people usually received larger inheritances (figure B.4, panel b)
- as a corollary of these findings, inheritances increased absolute wealth inequality in the immediate term (figure B.4, panel c)
- inheritances decreased relative wealth inequality in the immediate term (figure B.4, panel d).

In the case of gifts, when unequivalised measures are adopted, it remains the case that:

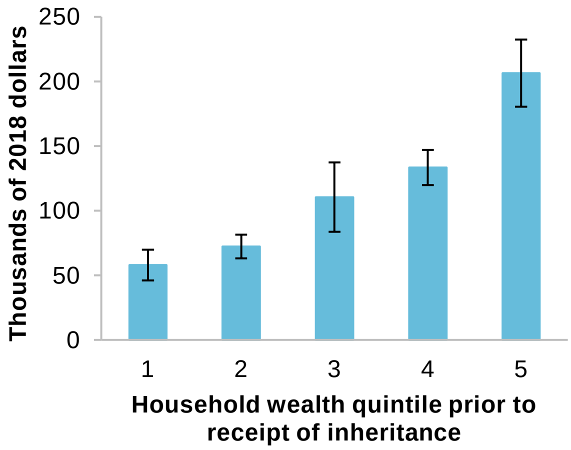
- larger shares of poorer people received gifts than wealthier people (figure B.5, panel a)
- among those who received gifts, wealthier people usually received larger gifts (figure B.5, panel b)
- as a corollary of these findings, gifts had an inconclusive effect on absolute wealth inequality in the immediate term (figure B.5, panel c)
- gifts decreased relative wealth inequality in the immediate term (figure B.5, panel d).

Figure B.4 – Effects of inheritances on unequivalised household wealth inequality[a,b]

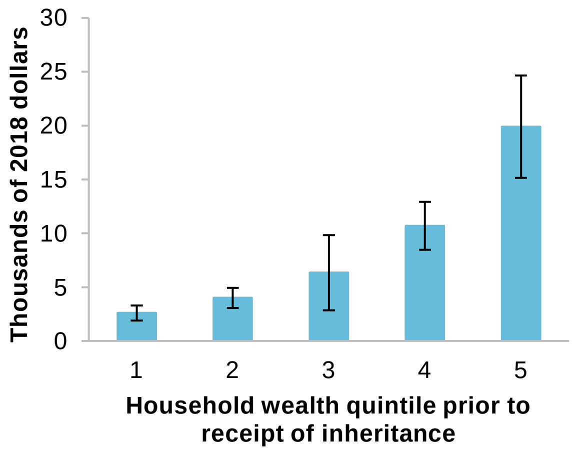
a. Share of people whose household inherited in a three-year period, by initial household wealth



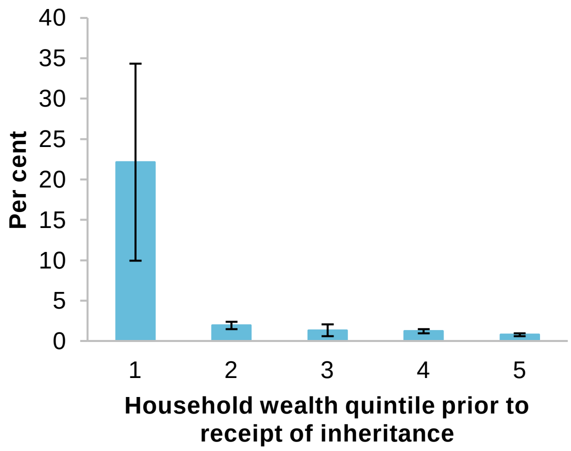
b. Average household inheritances received among people whose household inherited in a three-year period, by initial household wealth



c. Average household inheritances received among all people in a three-year period, by initial household wealth



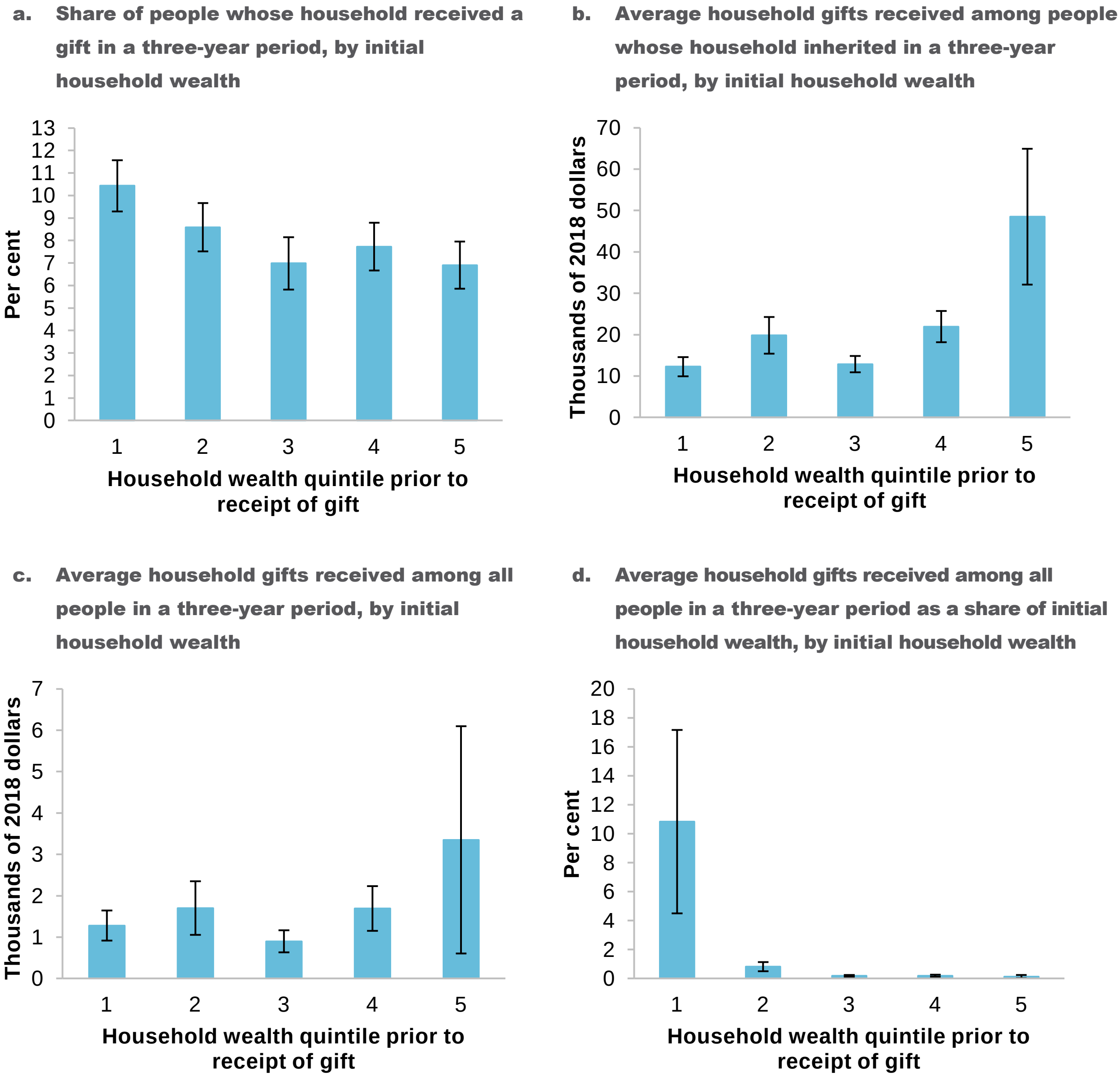
d. Average household inheritances received among all people in a three-year period as a share of initial household wealth, by initial household wealth



a. Error bars represent 95 per cent confidence intervals. **b.** Household wealth quintile prior to receipt of inheritance is measured in 2002 for inheritances received in 2003-04 – 2005-06, 2006 for inheritances received in 2007-08 – 2009-10, and so on.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

Figure B.5 – Effects of gifts on unequivalised household wealth inequality[a,b]



a. Error bars represent 95 per cent confidence intervals. **b.** Household wealth quintile prior to receipt of gift is measured in 2002 for gifts received in 2003-04 – 2005-06, 2006 for gifts received in 2007-08 – 2009-10, and so on.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

B.4 Immediate-term effect of wealth transfers on lifecycle-adjusted wealth inequality

As chapter 2, box 2.3 notes, it is possible that the findings about the immediate-term effect of wealth transfers on wealth inequality reflect only the age profile of wealth transfer recipients. This is more likely to be true in the case of gifts than inheritances, as gifts are typically received by people aged under 30 (who are poorer on average), even when considered in equivalised terms. If true, this somewhat invalidates the interpretation of the results.

If wealth is measured relative only to people of the same age, this concern is lessened. Hence, the Commission has developed a measure of 'lifecycle-adjusted wealth' along these lines, and used it to replicate the analysis in chapter 2. The measure is straightforward; quantiles of the initial (pre-wealth transfer) wealth distribution are calculated relative only to people of the same age (by single year of age) with equivalised wealth used as the measure of wealth. The assessment of the immediate-term effect of wealth transfers on wealth inequality then proceeds as in chapter 2.

Note that measuring inequality in this way has its own shortcomings.

- It disregards *genuine* inequality in wealth between different age cohorts which is not the result of distortionary lifecycle factors. Suppose, for example, that people born in 1960 had, on average, a lower trajectory through the (cross-sectional) wealth distribution over their lifetimes than people born in 1970. Perhaps the average wealth of people born in 1960 was similar to the average wealth among people of all ages in 1990, but the average wealth of people born in 1970 was far below the average wealth among people of all ages in 2000. That would have important implications for the effect of wealth transfers on wealth inequality, but these would not be reflected in the lifecycle-adjusted wealth measure.
- It disregards systematic movements within the age cohort-specific wealth distribution over the lifecycle. Of particular concern is the tendency of people who will be wealthy by comparison to their peers when in middle age to be poorer by comparison to their peers when in their 20s — typical gift-receiving age — because they spend more years in education (Boserup, Kopczuk and Kreiner 2017). Hence, this way of measuring inequality does not completely evade the major lifecycle distortion at play — the young age of gift recipients.

For these reasons, the lifecycle-adjusted measures are presented as a check on the chapter 2 findings rather than as the primary measure.

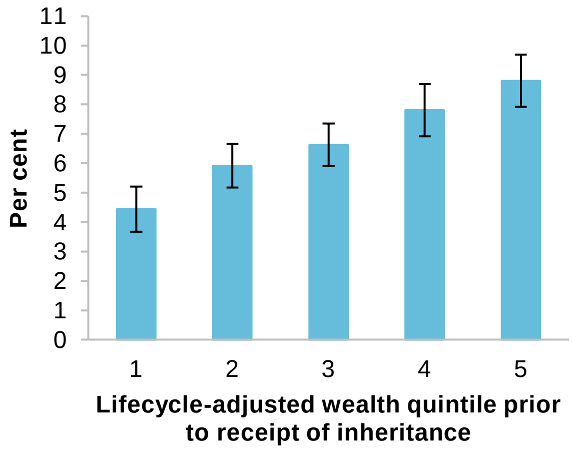
In the case of inheritances, none of the results differ from those shown in chapter 2 in directional terms. When the lifecycle-adjusted measures are adopted, it remains the case that:

- larger shares of wealthier people received inheritances than poorer people (figure B.6, panel a)
- among those who received inheritances, wealthier people usually received larger inheritances (figure B.6, panel b)
- as a corollary of these findings, inheritances increased absolute wealth inequality in the immediate term (figure B.6, panel c)
- inheritances decreased relative wealth inequality in the immediate term (figure B.6, panel d).

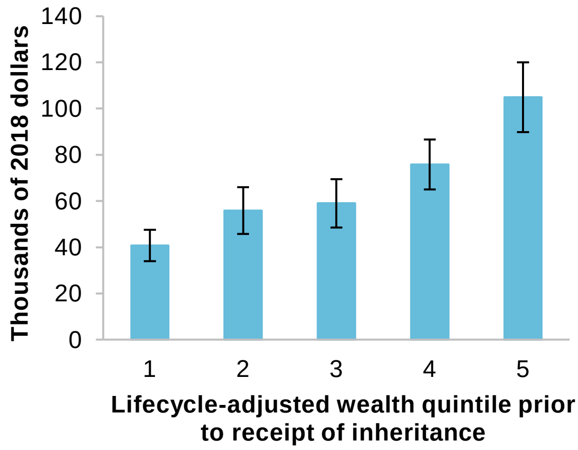
Hence, the corresponding results presented in chapter 2 are not a consequence of distortionary lifecycle effects.

Figure B.6 – Effects of inheritances on lifecycle-adjusted wealth inequality[a,b]

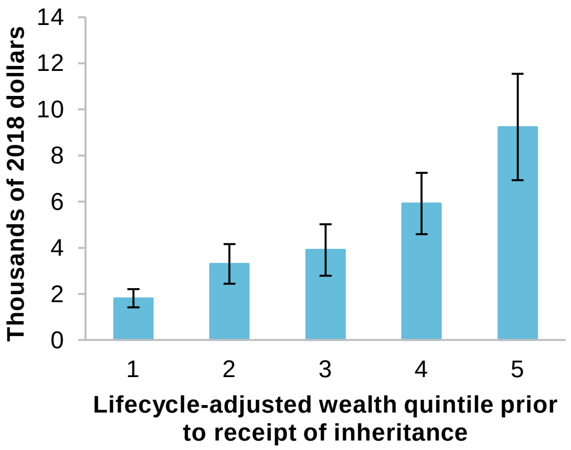
a. Share of people who inherited in a three-year period, by initial lifecycle-adjusted wealth



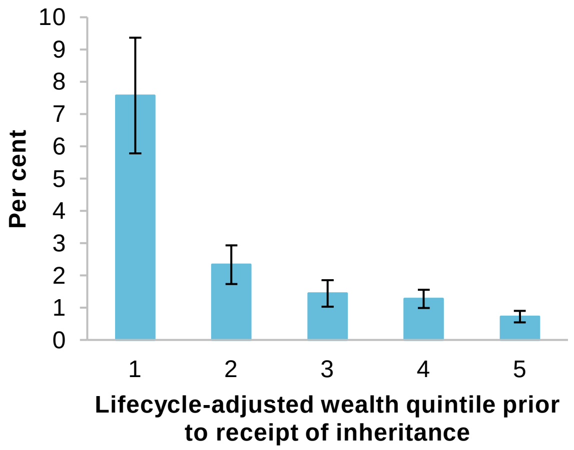
b. Average equivalised inheritance received among people who inherited in a three-year period, by initial lifecycle-adjusted wealth



c. Average equivalised inheritance received among all people in a three-year period, by initial lifecycle-adjusted wealth



d. Average equivalised inheritance received among all people in a three-year period as a share of initial wealth, by initial lifecycle-adjusted wealth



a. Error bars represent 95 per cent confidence intervals. **b.** Lifecycle-adjusted wealth quintile prior to receipt of inheritance is measured in 2002 for inheritances received in 2003-04 – 2005-06, 2006 for inheritances received in 2007-08 – 2009-10, and so on.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

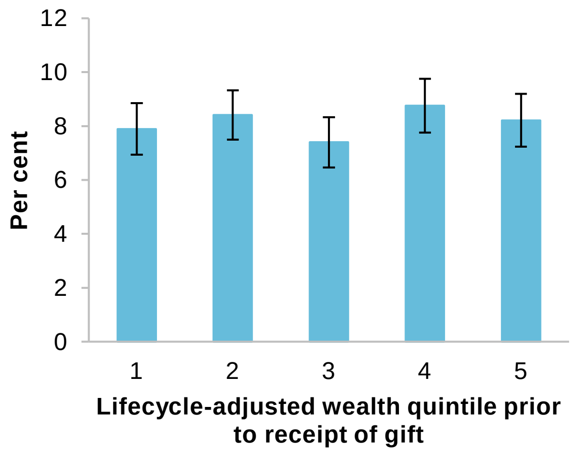
In the case of gifts, using lifecycle-adjusted measures does not change the overall conclusions about the immediate-term effect of gifts on wealth inequality, but some differences are apparent. When the lifecycle-adjusted measures are adopted:

- similar shares of wealthier and poorer people received gifts (figure B.7, panel a). This contrasts with the finding from chapter 2 that larger shares of poorer people received gifts than wealthier people. Hence, this aspect of the analysis in chapter 2 appears to be the result of distortionary lifecycle effects — gift recipients were typically aged under 30, and people aged under 30 were poorer on average.

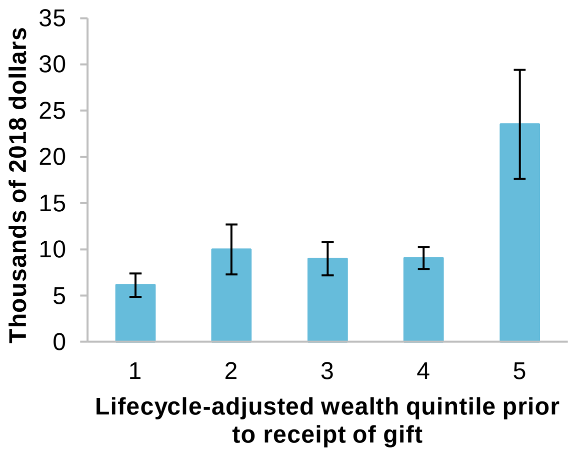
- among those who received gifts, wealthier people usually received larger gifts (figure B.7, panel b), which is consistent with the finding in chapter 2.
- as a corollary of these findings, gifts still had an inconclusive effect on absolute wealth inequality in the immediate term (figure B.7, panel c). That said, the effect is less inconclusive than that found in chapter 2, because the average gift received among the wealthiest quintile is highest, to a statistically significant threshold. There is suggestive evidence that gifts increased absolute wealth inequality in the immediate term when lifecycle-adjusted measures are used.
- gifts decreased relative wealth inequality in the immediate term (figure B.7, panel d), consistent with the corresponding finding in chapter 2.

Figure B.7 – Effects of gifts on lifecycle-adjusted wealth inequality[a,b]

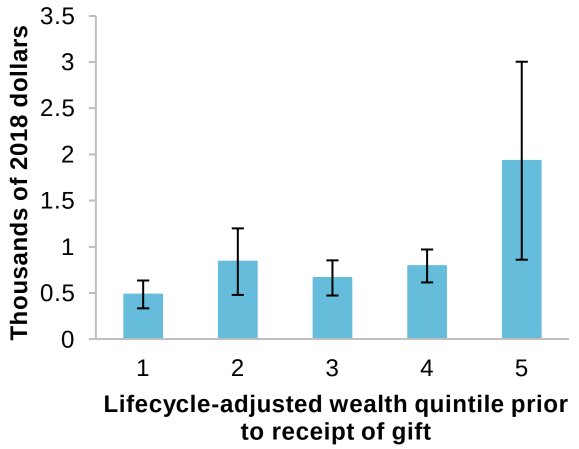
a. Share of people who received a gift in a three-year period, by initial lifecycle-adjusted wealth



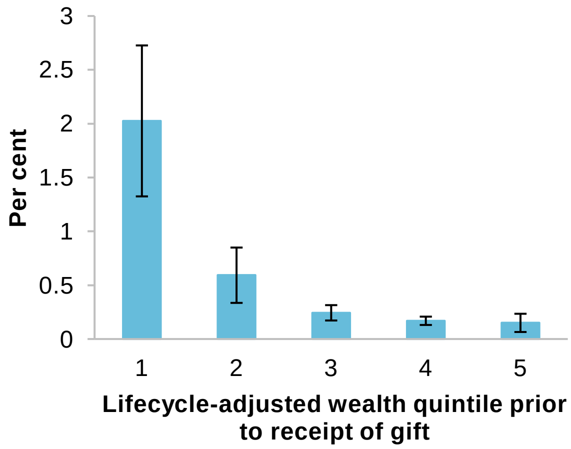
b. Average equivalised gift received among people who received a gift a three-year period, by initial lifecycle-adjusted wealth



c. Average equivalised gift received among all people in a three-year period, by initial lifecycle-adjusted wealth



d. Average equivalised gift received among all people in a three-year period as a share of initial wealth, by initial lifecycle-adjusted wealth



a. Error bars represent 95 per cent confidence intervals. **b.** Wealth quintile prior to receipt of gift is measured in 2002 for gifts received in 2003-04 – 2005-06, 2006 for gifts received in 2007-08 – 2009-10, and so on.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

B.5 International comparisons of the immediate-term effect of wealth transfers on wealth inequality

Chapter 2 compares the extent to which wealth transfers reduced relative wealth inequality in Australia to that in other countries. It finds that wealth transfers reduced relative wealth inequality in all studied countries in the immediate term, but the reduction was smaller in Australia than in all studied countries except for the United States, where it was slightly smaller than in Australia. Table B.7 provides more detailed information about these comparisons. Note that, while each estimate measures the effect on wealth inequality of previously received wealth transfers often stretching back many years, the estimates are more akin to 'immediate-term' than 'longer-term' effects as described in chapter 2, as they are based on an underlying assumption of no behavioural response to wealth transfer receipt.

Table B.7 – Estimates underpinning figure 2.6[a,b,c]

Comparison of studies of the effect of transfers on the wealth distribution in other countries and in Australia

Country	Study	Estimate about the effect of wealth transfers	Most comparable estimate for Australia
Britain	Karagiannaki (2017)	Inheritances received between 1995 and 2005 reduced the share of household wealth held by the wealthiest 20 per cent of households in 2005 by 0.71 per cent.	Inheritances received between 2001-02 and 2010-11 reduced the share of household wealth held by the wealthiest 20 per cent of households in mid-2010 by 0.36 per cent.
Britain[a]	Nolan et al. (2021)	Lifetime inheritances and gifts received between 2005 and 2011 reduced the 2011 Gini coefficient of household wealth inequality by 2.91 per cent	Gifts received between 2012-13 and 2017-18 and inheritances received between 2000-01 and 2017-18 reduced the mid-2018 Gini coefficient of household wealth inequality by 1.50 per cent
England[b,c]	Crawford and Hood (2016)	Lifetime gifts and inheritances prior to 2012-13 reduced the 2012-13 Gini coefficient of per-person household wealth inequality among people aged 65 to 79 by 3.92 per cent	Gifts and inheritances received between 2000-01 and 2017-18 reduced the mid-2018 Gini coefficient of per-person household wealth among people aged 65 to 79 by 3.14 per cent
France[a]	Nolan et al. (2021)	Lifetime gifts and inheritances received prior to 2011 reduced the 2011 Gini coefficient of household wealth inequality by 3.86 per cent	Gifts and inheritances received between 2000-01 and 2017-18 reduced the mid-2018 Gini coefficient of household wealth inequality by 1.73 per cent
Germany[a]	Nolan et al. (2021)	(as above) reduced the Gini coefficient by 5.13 per cent	
Italy[a]	Nolan et al. (2021)	(as above) reduced the Gini coefficient by 12.08 per cent	
Spain[a]	Nolan et al. (2021)	(as above) reduced the Gini coefficient by 5.53 per cent	
United States[a]	Nolan et al. (2021)	(as above) reduced the Gini coefficient by 1.48 per cent	

a. For consistency with the original study, the comparison estimate excludes superannuation and caps transfers at mid-2018 ex-superannuation wealth, or zero if mid-2018 ex-superannuation wealth is negative. **b.** Wealth measure from the original study is 'private wealth', which comprises non-pension wealth plus private pension wealth. **c.** For consistency with the original study, a 3 per cent annual real return to wealth transfers is assumed.
Source: Productivity Commission estimates based on HILDA Restricted Release 19.

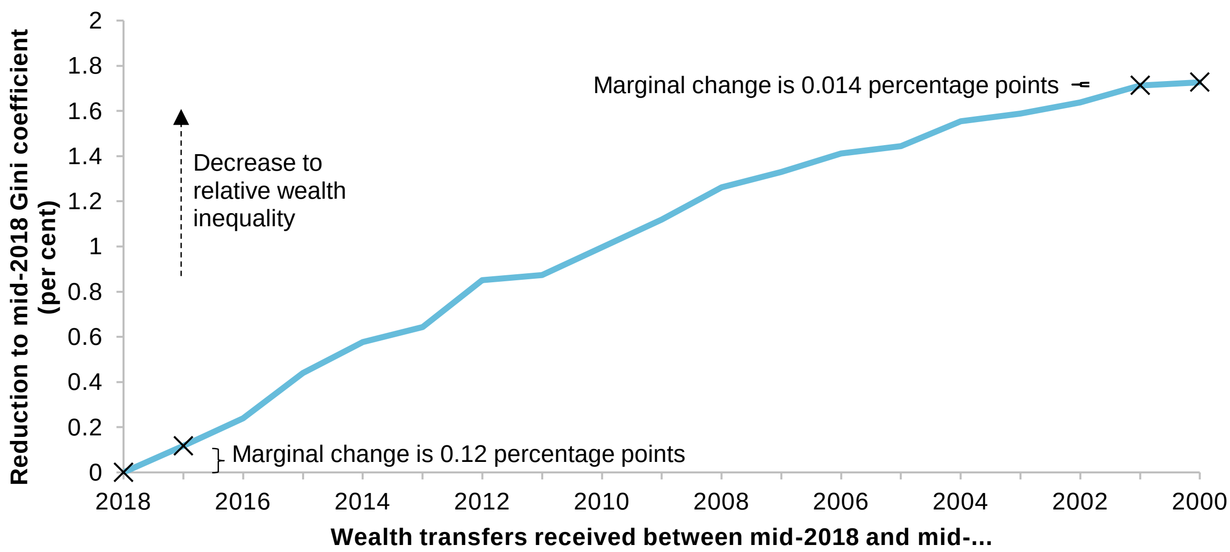
Adjusting the Australian estimate for a more like-for-like comparison

With the exception of the comparison with Karagiannaki (2017), each of these comparisons understates the extent to which wealth transfers reduced relative wealth inequality in Australia compared with other countries. This is because the studies of other countries rely on survey data about wealth transfers received at any time in the past. The HILDA survey asks only about wealth transfers received in the past financial year; hence no records of wealth transfers received in Australia prior to 2000-01 are available.

However, it is very likely that a like-for-like comparison would still suggest that wealth transfers reduced relative wealth inequality in all other studied countries by more than in Australia (except for the United States). To understand why, note first that the marginal effect of an additional year of wealth transfers on the mid-2018 Gini coefficient of wealth inequality in Australia declines as time stretches back further (figure B.8). Wealth transfers received in 2017-18 reduced the mid-2018 Gini coefficient of wealth inequality by 0.12 per cent, whereas wealth transfers received in 2000-01 reduced the mid-2018 Gini coefficient by only 0.014 per cent.

Figure B.8 – Effect of time since wealth transfers received on relative wealth inequality effect[a,b]

Cumulative effect of past wealth transfers on the mid-2018 Gini coefficient of household wealth inequality, assuming no behavioural responses to wealth transfer receipt



a. All variables are in real (inflation-adjusted) terms. **b.** Methodology is consistent with the estimates for Australia in table B.3 that are compared with Nolan et al. (2021).

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

Two effects explain this pattern.

- *Effect 1* — household wealth has grown over time in real terms. Other things equal, this means that wealth transfers from years past will be smaller than wealth transfers today. This effect is likely to be gradual, as the growth in wealth is gradual, and is thus consistent with the trend in figure B.8.
- *Effect 2* — As more time passes, those who received wealth transfers in the past die. This is likely to occur somewhat more suddenly than effect 1 but after more than the 18 year delay shown in figure B.8. Box B.2 outlines a simple model that explains why this is the case.

Box B.2 – Why effect 1 is gradual and effect 2 is more sudden

A simple model explains why effect 1 occurs gradually and effect 2 occurs more suddenly and after a delay of more than the 18 years shown in figure B.8. This model is not meant to be a realistic representation of the Australian economy; it has been designed to allow effects 1 and 2 to be contrasted in the simplest terms possible.

Suppose that an economy comprises 80 people aged 0, 1, 2 … 79, with time progressing in discrete years, indexed by t. Each person was/is given wealth $w(t)$ at birth, where $w(t)$ grows perpetually, in real terms, at rate $g > 1$ such that $\frac{w(t)}{w(t-1)} = g$. Each person lives for 80 years, has a child at age 30 (there is no partnering and reproduction is asexual), and bequeaths their wealth to their child immediately following their death. As one person is born and one person dies each year; the population is stable. Wealth is accumulated only by the growth of the initial endowment $w(t)$ and the inheritance (also $w(t)$) received at age 50. No wealth is consumed prior to age 50, but once the inheritance is received, 1/30th of the inheritance's present value is consumed each year, such that it is fully consumed by death. Thus, each person aged under 50 holds wealth $w(t)$, and each person aged 50 and older holds wealth $\left(w(t) + \frac{(30-n)w(t)}{30}\right)$, where n is the number of years older than 50 a person is. This means that total wealth in the economy at any point in time is $w(t)\left(80 + \sum_{i=1}^{30} \frac{i}{30}\right)$. Each of these quantities is non-stationary.

Noting that anyone who had received an inheritance 30 or more years ago is no longer alive, the share of the total stock of wealth at time t bequeathed x years ago to people still alive is:

$$\frac{Amount\ of\ wealth\ bequeathed\ in\ period\ (t-x)\ to\ people\ still\ alive\ at\ time\ t}{Total\ stock\ of\ wealth\ at\ time\ t}$$

$$= \begin{cases} \dfrac{1}{g^x\left(80 + \sum_{i=1}^{30} \frac{i}{30}\right)}, & x < 30 \\ 0, & x \geq 30 \end{cases}$$

In more intuitive terms, the marginal share of wealth that was transferred declines by a factor of $\frac{1}{g}$ each year going back 30 years. This is effect 1 in this economy — the gradual effect due to growth in household wealth. Then, from 30 years onwards, the marginal effect is suddenly zero. This is effect 2 in this economy — the people who inherited 30 or more years ago have now died.

In reality, effect 2 will not be quite this sudden, because:

- people have children and die at different ages
- not all wealth is inherited by children, and some inheritances are given early as gifts.

But it is still reasonable to expect effect 2 to be more sudden than effect 1, and delayed by more than 18 years.

Note also that — for simplicity — this model considers only the effect of past wealth transfers on the stock of wealth, not the effect of past wealth transfers on wealth inequality. The former is a major determinant of the latter, but not the sole determinant, as this appendix later demonstrates.

Applying effects 1 and 2, an Australian estimate more comparable to those estimated by Nolan et al. (2021) (other than for Britain) can be conservatively estimated by extrapolating the trend in figure B.8 forward by about

20 years. This suggests that lifetime wealth transfers reduced the mid-2018 Gini coefficient of wealth inequality by, at most, about 3 per cent. This remains comfortably below that of all countries except for the United States.

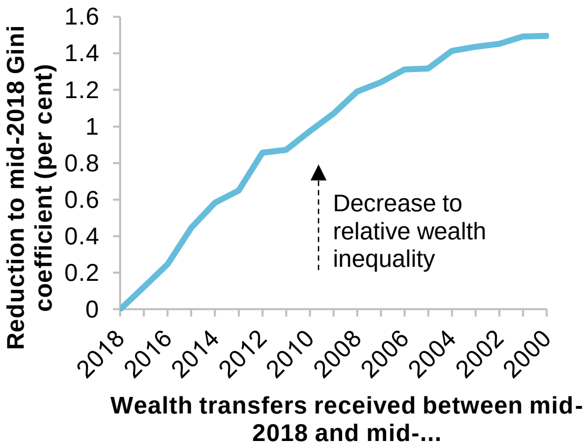
The estimates for Australia that are compared with Nolan et al. (2021)'s estimate for Britain and Crawford and Hood (2016)'s estimate for England can be adjusted similarly.

In the Nolan et al. (2021) case, extrapolating the trend in figure B.9, panel a forward by about 20 years will produce a more conservative comparison estimate than that which was compared with the non-Britain estimates. The only wealth transfers contributing to this comparison estimate prior to 2012-13 are inheritances, and so effect 2 will be more sudden. This remains comfortably below Nolan et al. (2021)'s estimate for Britain (2.91 per cent).

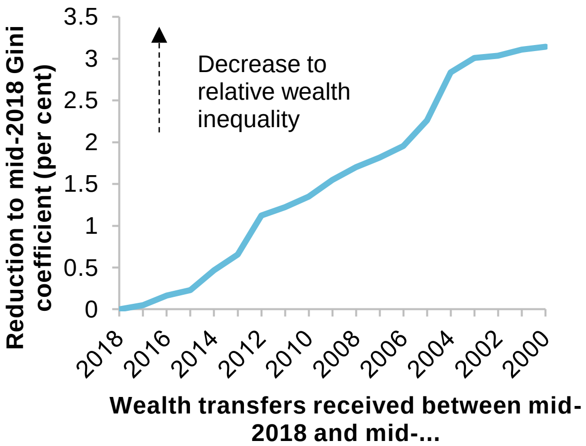
The Crawford and Hood (2016) case is slightly different. Wealth transfers are assumed to earn a 3 per cent annual real return, which mitigates effect 1. This is apparent as the trend in figure B.9, panel b is not as clearly concave as that in panel a or in figure B.8. But effect 2 is different here, as the comparison is restricted to people aged 65–79 in 2018. Effect 2 takes effect both in the period immediately prior to 2018 (as people aged 72 in 2018 — the mid-point — will typically have received their inheritances prior to 2018) and again in the more distant past (as people aged 72 in 2018 will typically not yet have received their inheritances prior to 1996, as the median age of inheritance receipt is 50). This may explain why the trend is flatter between mid-2018 and mid-2015 and prior to mid-2003. In light of this, it is not clear whether the comparison estimate would eventually exceed Crawford and Hood (2016)'s estimate for England (3.92 per cent). Even if it were to, this does not necessarily imply that wealth transfers reduced relative wealth inequality by more in Australia than in England, as Crawford and Hood (2016) focus on a subset of the population and the two studies of Britain suggest the opposite conclusion.

Figure B.9 – Effect of time since wealth transfers received on relative wealth inequality effect — additional comparisons[a]

a. Using the methodology of Nolan et al. (2021) (Britain only)



b. Using the methodology of Crawford and Hood (2016)[b]



a. All variables are in real (inflation-adjusted) terms. **b.** A 3 per cent annual real return to wealth transfers is assumed.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

Sources of the cross-country differences

Why is it that wealth transfers have reduced relative wealth inequality by less in Australia than in other countries? It is instructive to decompose the Gini coefficient of post-transfer wealth inequality as follows:[61]

$$Gini_{Post\,T} = Share_T \times Correlation_{T-Post\,T} \times Gini_T + (1 - Share_T) \times Correlation_{Pre\,T-Post\,T} \times Gini_{Pre\,T}$$

Where:

- $Gini_x$ is the Gini coefficient of wealth distribution x, for $x = Post\ T$ (wealth inclusive of wealth transfers), $x = T$ (wealth transfers only), and $x = Pre\ T$ (wealth exclusive of wealth transfers)
- $Share_T$ is the share of wealth T in wealth $Post\ T$
- $Correlation_{x-y}$ is the Gini correlation between wealth distribution x and wealth distribution y. The Gini correlation is the standard (Pearson) correlation between x and y, but with y in rank terms.

Applying this decomposition, the effect of transfers on the Gini coefficient of relative wealth inequality $\Delta Gini_{Pre\,T-Post\,T}$ is as follows:

$$\begin{aligned}\Delta Gini_{Pre\,T-Post\,T} = {} & Share_T \times Correlation_{T-Post\,T} \times Gini_T \\ & + [(1 - Share_T) \times Correlation_{Pre\,T-Post\,T} - 1] \times Gini_{Pre\,T}\end{aligned}$$

In more intuitive terms, this decomposition captures the same factors that underpin Nekoei and Seim (2019)'s model of the effect of inheritances on relative wealth inequality discussed in chapter 3 (box B.3).

Box B.3 – The Lerman–Yitzhaki Gini coefficient decomposition

The Gini coefficient decomposition shown above echoes Nekoei and Seim's (2019) simple model of the effect of inheritances on relative wealth inequality that is discussed in chapter 3. That model is specific to inheritances, but its findings and intuition can be generalised to all wealth transfers.

- Relative inequality in pre-transfer wealth $Gini_{Pre\,T}$ is roughly analogous to relative inequality in initial wealth among the generation receiving inheritances in Nekoei and Seim's model. Other things equal, the lower is $Gini_{Pre\,T}$, the smaller is the reduction in relative wealth inequality from wealth transfers. This is true since $\frac{d\Delta Gini_{Pre\,T-Post\,T}}{dGini_{Pre\,T}} = (1 - Share_T) \times Correlation_{Pre\,T-Post\,T} - 1$, which is strictly negative.
- Relative inequality in wealth transfers $Gini_T$ is roughly analogous to relative inequality in wealth among those who die in Nekoei and Seim's model. Other things equal, the lower is $Gini_T$, the larger is the reduction in relative wealth inequality from wealth transfers. This is true since $\frac{d\Delta Gini_{Pre\,T-Post\,T}}{dGini_T} = Share_T \times Correlation_{T-Post\,T}$, which is strictly positive.
- The third component of Nekoei and Seim's model is the intergenerational persistence in wealth. The most analogous measure here would be a correlation between wealth transfers and pre-transfer wealth. In effect, this is this captured in the decomposition by both $Correlation_{T-Post\,T}$ and $Correlation_{Pre\,T-Post\,T}$. Other things equal, the lower is $Correlation_{T-Post\,T}$ and $Correlation_{Pre\,T-Post\,T}$, the larger is the reduction in relative wealth inequality from wealth transfers. This is true since $\frac{d\Delta Gini_{Pre\,T-Post\,T}}{dCorrelation_{T-Post\,T}} = Share_T \times Gini_T$ and $\frac{d\Delta Gini_{Pre\,T-Post\,T}}{dCorrelation_{Pre\,T-Post\,T}} = (1 - Share_T) \times Gini_{Pre\,T}$, both of which are strictly positive.

[61] This Gini coefficient decomposition was discovered by Lerman and Yitzhaki (1985) and first applied to the context at hand by Nolan et al. (2021).

Table B.8 shows this decomposition for each of the countries investigated by Nolan et al. (2021) and the corresponding estimate for Australia reported in table B.7. $Share_T$ and $Gini_{Pre\ T}$ are lower in Australia than in most or all other countries, while $Gini_T$ and $Correlation_{Pre\ T-Post\ T}$ are higher. These factors are each consistent with the reduction in relative wealth inequality in Australia being lower than in other countries. Meanwhile, $Correlation_{T-Post\ T}$ is lower in Australia than in other countries, which has the opposite effect.

Table B.8 – Contributors to the immediate-term effect of transfers on wealth inequality[a]

	Australia	Britain	France	Germany	Italy	Spain	United States
$Gini_{Post\ T}$	**0.618**	0.668	0.678	0.776	0.604	0.581	0.868
$Gini_{Pre\ T}$	**0.629**	0.688	0.705	0.818	0.687	0.615	0.881
$Gini_T$	**0.906**	0.891	0.887	0.892	0.848	0.891	0.952
$Share_T$	**5.2%**	11.9%	16.6%	27.9%	29.2%	14.7%	8.6%
$Correlation_{T-Post\ T}$	**0.577**	0.731	0.779	0.865	0.716	0.658	0.848
$Correlation_{Pre\ T-Post\ T}$	**0.991**	0.974	0.969	0.951	0.878	0.943	0.992

a. Non-transfer wealth excludes superannuation for consistency with measures from other countries.

Source: Nolan et al. (2021); Productivity Commission estimates based on HILDA Restricted Release 19.

Measuring the individual contribution of each factor is difficult, because the factors are endogenous. For example, if $Share_T$ is increased while $Gini_{Pre\ T}$ and $Gini_T$ are held constant, $Correlation_{T-Post\ T}$ would automatically increase and $Correlation_{Pre\ T-Post\ T}$ would automatically decrease because of the increasing influence of transfers over post-transfer wealth.

Nevertheless, the results are consistent with Australia's low share of transfers in wealth ($Share_T$) being the driving factor behind the reduction in relative wealth inequality in Australia being lower than in other countries. Increasing $Share_T$ would increase $Correlation_{T-Post\ T}$ and decrease $Correlation_{Pre\ T-Post\ T}$ for the reasons discussed above. It would also decrease $Gini_T$, if the increase to $Share_T$ was because more people received wealth transfers. Each of these effects would push the relevant statistics for Australia closer to those observed in other countries.

Data quality issues are unlikely to be the sole reason that $Share_T$ is lower in Australia than in other countries. While there is strong evidence that some wealth transfers are not reported to the HILDA survey (chapter 1), Nolan et al. (2021) also draws on household surveys which may suffer from similar nonreporting issues. Moreover, as shown in chapter 1, the share of wealth transfers in gross national income is lower in Australia than in each other studied country (France, Germany, Italy and the United Kingdom) when a measure of inheritances that is not subject to nonreporting is used.

B.6 Estimating the effect of inheritances on future wealth

As an input to estimating the long term effects of inheritances on the distribution of wealth, chapter 2 presents estimates of the effect of receiving $1 of inheritance on household wealth ('wealth' throughout section B.6) up to 3 years into the future (hereafter '0–3' years into the future) and from 4 up to 7 years into the future (hereafter '4–7' years into the future). The chapter also presents estimates of how these effects vary with the initial wealth of the recipient and the size of the inheritance that they received.

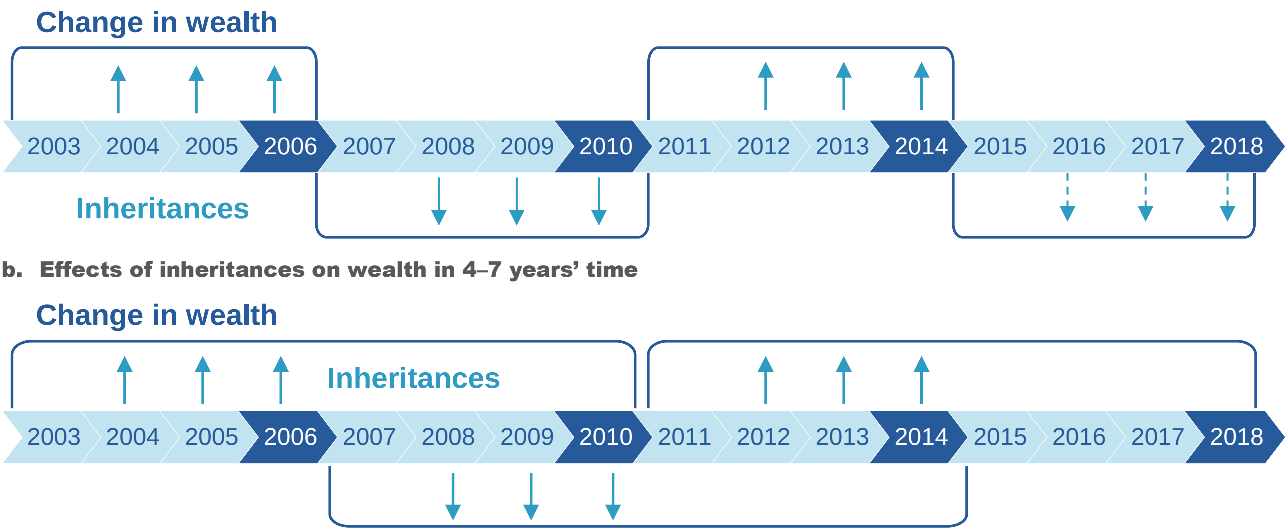
Method

Figure B.10 outlines the approach. To estimate the effect of $1 of inheritance on wealth in 0-3 years' time, the contribution of inheritances received in successive 3–year windows to the change in wealth in the corresponding 4–year window (wealth data are collected only once every 4 years) is estimated (figure B.10, panel a). The fourth year of inheritances are excluded because some may have been received outside the window in which wealth was measured. The approach to estimating the effect of $1 of inheritance on household wealth in 4–7 years' time is the same, except that the contribution of the 3 years of inheritances to an 8–year window comprising the corresponding 4–year window and an additional 4 years is used (figure B.10, panel b).[62]

Figure B.10 – Approach to estimating the effects of inheritances on future wealth[a,b]

a. Effects of inheritances on wealth in 0–3 years' time

b. Effects of inheritances on wealth in 4–7 years' time



a. Wealth data are available only for 2006, 2010, 2014, and 2018, as indicated by the dark blue boxes. **b.** Light blue arrows represent annual inheritance flows from the year in which the inheritance was received.

The 0–3 year model is:

$$\Delta_{t,t-4}Wealth_i = \beta_0 + \sum_{j=1}^{k}\left(\beta_j Inheritance_{i,[t,t-2]} \times Wealth\ k\ tile_{j,i,t-4}\right) + \boldsymbol{x}'_{i,t-4}\boldsymbol{\beta} + \varepsilon_{i,t}$$

The 4–7 year model is:

$$\Delta_{t,t-8}Wealth_i = \beta_0 + \sum_{j=1}^{k}\left(\beta_j Inheritance_{i,[t-4,t-6]} \times Wealth\ k\ tile_{j,i,t-8}\right) + \boldsymbol{x}'_{i,t-8}\boldsymbol{\beta} + \varepsilon_{i,t}$$

Where:

- $\Delta_{t,t-y}Wealth_i$ is the ith person's dollar change in wealth between period t and period $t-y$.
- $Inheritance_{i,[t-y+2,t-y+4]}$ is the sum of the inheritances that the ith person received between period $t-y+2$ and period $t-y+4$ (inclusive).

[62] To ensure consistency between the 0–3 year and the 4–7 year models, inheritances from 2016–2018 are not used to estimate the 0–3 year model, as they do not contribute to the 4–7 year model. Estimates including this additional tranche of inheritances are included in tables B.9–12 as robustness checks.

- $Wealth\ k\ tile_{j,i,t-y}$ takes the value 1 if the ith person's equivalised wealth in period $t-\ y$ was in k-tile j, and 0 otherwise. Chapter 2 presents the cases $k=1$ (the degenerate case for which this variable effectively vanishes from the model) and $k=2$ (halves of the wealth distribution). This appendix presents those cases, the $k=3$ (tertiles) and $k=5$ (quintiles) cases, and cases where the k-tiles parameterise the 'lifecycle-adjusted' wealth distribution (section B.4).
- $\boldsymbol{x_{i,t-y}}$ is a vector of controls for the ith person in period $t-y$. They are: year, age, gender, number of children, partner, education level, mother's and father's education level, country of birth, whether living with parents at age 14, number of siblings and household disposable income. These control variables are chosen because they are likely to correlate both with $Inheritance_{i,[t-y+2,t-y+4]}$ (usually via parents' wealth) and $\Delta_{t,t-y}Wealth_i$. With the exception of the time-invariant controls, no observations from after period $t-\ y$ are controlled for, as these changes might be caused by inheritance receipt.

The main identifying assumption is that, conditional on $\boldsymbol{x_{i,t-y}}$, $Inheritance_{i,[t-y+2,t-y+4]}$ is exogenous with respect to $\Delta_{t,t-y}Wealth_i$. Estimating the model on those who do and do not inherit might violate this, because differences in inheritance expectations are not controlled for. (Inheritance expectations can be thought of as a variable omitted from $\boldsymbol{x_{i,t-y}}$ that determines $\Delta_{t,t-y}Wealth_i$ via a channel other than $Inheritance_{i,[t-y+2,t-y+4]}$.) For this reason, the model is estimated on only people who inherited between year $t-y+2$ and year $t-y+4$ or in year $t+1$, as they ought to have similar inheritance expectations.[63] This is similar to the approaches taken by previous studies (Elinder, Erixson and Ohlsson 2012; Nekoei and Seim 2019). It also means that few repeated observations of the same individual are used to estimate the model, which reduces the risk of bias due to correlation between lags of $\Delta_{t,t-y}Wealth_i$ and $Wealth\ k\ tile_{j,i,t-y}$. The model is also estimated on the full sample as a robustness check.

Aside from this, there are three reasons that the identifying assumption is defensible, because $Inheritance_{i,[t-y+2,t-y+4]}$ is unlikely to respond to exogenous shocks to $\Delta_{t,t-y}Wealth_i$ (that is, there is no reverse causality).[64]

- Most people do not choose the timing of their death, which is a precondition for inheritance.
- The overwhelming majority of inheritances result from widows or other single people bequeathing their estate to their children in equal shares. It is rare for parents to consider the relative economic circumstances of each child when determining how their estate will be divided (chapter 1; section B.1).
- Surveys of retirees typically suggest that leaving an inheritance is among the lowest factors that motivate retirees' consumption decisions (The Treasury 2020).

The models are estimated using least squares weighted by the appropriate survey weights and with standard errors clustered at the individual level.

[63] Unfortunately, it is likely that some people anticipate not only that they will receive an inheritance, but that it will be of a certain size. This may lead to violations of the identifying assumption even with the restrictions we place on our dataset.

[64] Were $Inheritance_{i,[t-y+2,t-y+4]}$ to also include gifts, however, there would be a strong prospect of such reverse causality. This is why attention is restricted to inheritances. Whether the effects of gifts on wealth accumulation could be estimated by instrumenting gifts with parents' receipt of inheritances and/or parents reaching the superannuation preservation age was examined, but both instruments were found to be extremely weak (i.e. they induced extremely little variation in parents' propensity to gift to their children).

Results

Tables B.9 and B.10 present estimates of the $k = 1, 2, 3, 5$ models and robustness checks. Models 1a–d are the 0–3 year models (for $k = 1, 2, 3, 5$ respectively) and models 4a–d are the corresponding 4–7 year models. (Models 1a and 4a are presented in chapter 2, figure 2.7, and models 1b and 4b are presented in chapter 2, figure 2.9.) The other models are robustness checks. Models 2a–d are the 0–3 year models including the 2015–2018 tranche of inheritances, models 3a–d are the 0–3 year models estimated on the full sample (i.e. including those who did not inherit), although still excluding 2015–2018 data for comparability with the 4–7 year models, and models 5a–d are the 4–7 year models estimated on the full sample.

In addition to the points highlighted in chapter 2, these results suggest the following.

- The effect size does not appear to vary monotonically across the initial wealth distribution. The only consistent pattern is that the effect size is highest among the initially poorest, although substantial uncertainty surrounds all estimates.
- The estimates are similar when the full sample is used for estimation. This may suggest that inheritance expectations do not substantially influence wealth accumulation, and/or that the majority of the relevant variation driving the estimates is variation in the size of the inheritance received.
- Including the 2015–2018 tranche of inheritances when estimating the 0–3 year model appears to reduce the effect size near the middle of the initial wealth distribution, but does not substantially change the findings.

Table B.9 – Effect of inheritance on future wealth — all, halves and tertile models[a,b]

Dependent variable: $\Delta_{t,t-y}Wealth_i$

	$y = 4$	$y = 4$, includes 2015–2018 inheritances	$y = 4$, includes people who did not inherit	$y = 8$	$y = 8$, includes people who did not inherit
$k = 1$	Model 1a	Model 2a	Model 3a	Model 4a	Model 5a
β_1	1.120***	1.005***	1.085***	1.169***	1.205***
	(0.216)	(0.183)	(0.196)	(0.293)	(0.295)
$k = 2$	Model 1b	Model 2b	Model 3b	Model 4b	Model 5b
β_1	1.638***	0.754**	1.474***	1.550**	1.546***
	(0.387)	(0.364)	(0.370)	(0.620)	(0.564)
β_2	1.077***	1.065***	1.049***	1.138***	1.174***
	(0.216)	(0.195)	(0.202)	(0.301)	(0.309)
Test H_0: $\beta_1 = \beta_2$	$p = 0.1847$	$p = 0.4357$	$p = 0.3114$	$p = 0.5361$	$p = 0.5617$
$k = 3$	Model 1c	Model 2c	Model 3c	Model 4c	Model 5c
β_1	1.741***	1.647***	1.632***	1.836**	1.983***
	(0.470)	(0.429)	(0.451)	(0.725)	(0.607)
β_2	1.270***	0.525***	1.182***	0.453	0.549**
	(0.260)	(0.177)	(0.213)	(0.326)	(0.256)
β_3	1.071***	1.080***	1.041***	1.166***	1.207***
	(0.222)	(0.206)	(0.210)	(0.316)	(0.330)
Observations (all models)	1 424	2 240	27 678	1 430	24 269

a. Parentheses contain standard errors. **b.** * indicates statistical significance at the 10 per cent level of significance, ** indicates significance at the 5 per cent level of significance, and *** indicates significance at the 1 per cent level of significance.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

Table B.10 – Effect of inheritance on future wealth — quintile models[a,b]

Dependent variable: $\Delta_{t,t-y}Wealth_i$

	$y = 4$	$y = 4$, includes 2015–2018 inheritances	$y = 4$, includes people who did not inherit	$y = 8$	$y = 8$, includes people who did not inherit
$k = 5$	Model 1d	Model 2d	Model 3d	Model 4d	Model 5d
β_1	2.111***	1.988***	2.020***	2.273***	2.365***
	(0.379)	(0.380)	(0.356)	(0.685)	(0.576)
β_2	0.550**	0.327***	0.350*	0.333	0.428
	(0.268)	(0.0 742)	(0.201)	(0.409)	(0.329)
β_3	1.686***	1.180***	1.546***	1.066***	0.953***
	(0.392)	(0.248)	(0.331)	(0.372)	(0.289)
β_4	1.246***	1.017***	1.154***	1.457***	1.578***
	(0.248)	(0.175)	(0.208)	(0.478)	(0.433)
β_5	1.049***	1.071***	1.027***	1.096***	1.128***
	(0.231)	(0.223)	(0.223)	(0.322)	(0.336)
Observations	1 424	2 240	27 678	1 430	24 269

a. Parentheses contain standard errors. **b.** * indicates statistical significance at the 10 per cent level of significance, ** indicates significance at the 5 per cent level of significance, and *** indicates significance at the 1 per cent level of significance.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

Tables B.11 and B.12 present corresponding estimates from models for which the k-tiles parameterise the lifecycle-adjusted wealth distribution. Importantly, it is no longer consistently the case that the effect size is highest among the initially poorest (this is not apparent for any of the quintile models). This implies that, to the extent that the pattern in models 1–5 reflects the true parameter values (and not statistical noise), it is likely a consequence of lifecycle distortions. Thus the conclusion reached in chapter 2 is that there is no clear evidence that the effect varies across the initial wealth distribution.

Table B.11 – Effect of inheritance on future wealth — halves and tertile models with lifecycle-adjusted wealth

Dependent variable: $\Delta_{t,t-y}Wealth_i$

	$y = 4$	$y = 4$, includes 2015–2018 inheritances	$y = 4$, includes people who did not inherit	$y = 8$	$y = 8$, includes people who did not inherit
$k = 2$	Model 6a	Model 7a	Model 8a	Model 9a	Model 10a
β_1	1.478***	0.779**	1.354***	1.213**	1.213**
	(0.346)	(0.328)	(0.317)	(0.597)	(0.531)
β_2	1.081***	1.068***	1.050***	1.164***	1.204***
	(0.221)	(0.200)	(0.209)	(0.311)	(0.325)
Test H_0: $\beta_1 = \beta_2$	$p = 0.3019$	$p = 0.4293$	$p = 0.4208$	$p = 0.9395$	$p = 0.9891$
$k = 3$	Model 6b	Model 7b	Model 8b	Model 9b	Model 10b
β_1	1.683***	1.544***	1.593***	1.570**	1.604**
	(0.421)	(0.364)	(0.387)	(0.691)	(0.624)
β_2	1.146***	0.606***	1.067***	0.464*	0.577**
	(0.148)	(0.189)	(0.115)	(0.278)	(0.256)
β_3	1.072***	1.083***	1.041***	1.238***	1.278***
	(0.240)	(0.222)	(0.232)	(0.356)	(0.377)
Observations (all models)	1 424	2 240	27 678	1 430	24 269

a. Parentheses contain standard errors. **b.** * indicates statistical significance at the 10 per cent level of significance, ** indicates significance at the 5 per cent level of significance, and *** indicates significance at the 1 per cent level of significance.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

Table B.12 – Effect of inheritance on future wealth — quintile models with lifecycle-adjusted wealth

Dependent variable: $\Delta_{t,t-y}Wealth_i$

	$y = 4$	$y = 4$, includes 2015–2018 inheritances	$y = 4$, includes people who did not inherit	$y = 8$	$y = 8$, includes people who did not inherit
$k = 5$	Model 6c	Model 7c	Model 8c	Model 9c	Model 10c
β_1	0.876**	0.935***	0.822***	0.377	0.660**
	(0.348)	(0.271)	(0.269)	(0.428)	(0.326)
β_2	1.689***	1.627***	1.558***	1.398*	1.366*
	(0.443)	(0.399)	(0.441)	(0.785)	(0.747)
β_3	1.169***	0.538***	1.101***	0.402	0.454
	(0.196)	(0.187)	(0.163)	(0.339)	(0.328)
β_4	1.562***	1.463***	1.529***	1.933***	1.993***
	(0.115)	(0.123)	(0.114)	(0.146)	(0.144)
β_5	0.864***	0.895***	0.834***	0.963***	0.994***
	(0.213)	(0.225)	(0.211)	(0.309)	(0.339)
Observations	1 424	2 240	27 678	1 430	24 269

a. Parentheses contain standard errors. **b** * indicates statistical significance at the 10 per cent level of significance, ** indicates significance at the 5 per cent level of significance, and *** indicates significance at the 1 per cent level of significance.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

B.7 Estimating the longer-term effects of inheritances on wealth inequality

Drawing on the estimates of section B.6, chapter 2 concludes that it is most likely that the longer-term effects of inheritances on wealth inequality mirror the *direction* of the immediate-term effects (increase to absolute wealth inequality, decrease to relative wealth inequality), but their *magnitude* is unclear. A more technical discussion of this conclusion follows.

The longer-term effect of inheritances on wealth inequality can be estimated by making the following assumptions:

- The average effect of an additional $1 of inheritance on future wealth did not systematically vary across the initial wealth distribution. This is consistent with the estimates of section B.6.
- The initial wealth distribution is a good proxy for the 'non-inheritance' wealth distribution. When studying inheritances received t years ago, non-inheritance wealth is equal to initial wealth (wealth immediately prior to receipt of the inheritance) plus the wealth that would have been accumulated or decumulated in the absence of that inheritance. In other words, assume that there was negligible re-sorting of the wealth distribution over the t years for reasons other than inheritance.

If these two assumptions hold, it follows that the average effect of an additional $1 of inheritance on future wealth did not vary across the non-inheritance wealth distribution. This identifies the longer-term effect of inheritances on wealth inequality, as it allows non-inheritance wealth to be estimated both 0–3 years and 4–7 years after inheritance receipt.

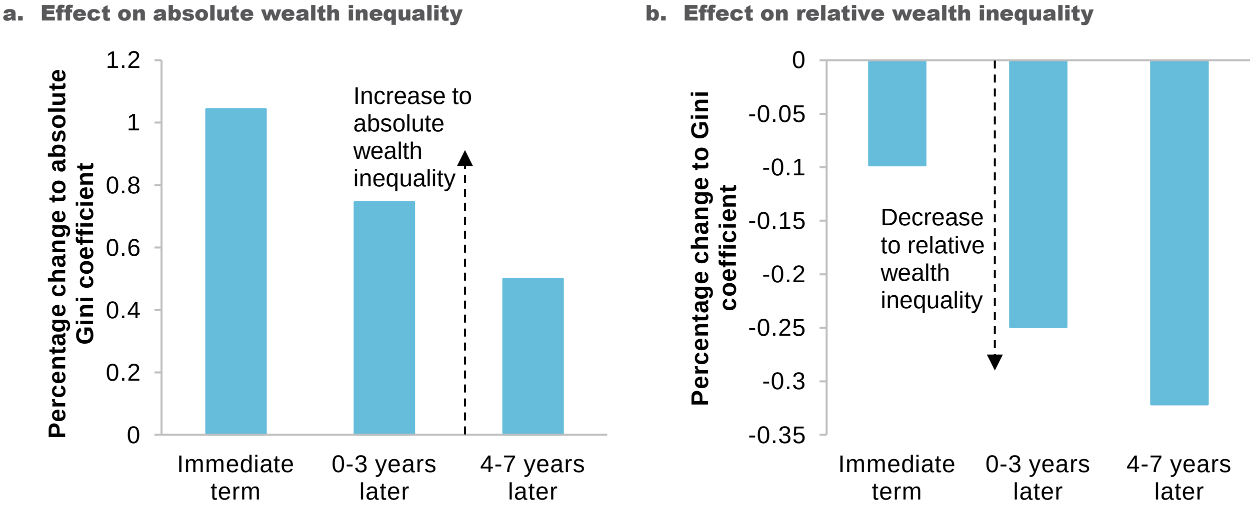
Figure B.11 shows the resulting estimates of the longer-term effect of inheritances on wealth inequality. The increase to absolute wealth inequality due to inheritances is found to decay over time (figure B.11, panel a), while the reduction in relative wealth inequality due to inheritances is found to grow over time (figure B.11, panel b).

However, these findings should be interpreted with caution. If the average effect of an additional $1 of inheritance on future wealth *did* vary across the non-inheritance wealth distribution, the error would directly flow through to the estimated non-inheritance wealth. For example, suppose that each $1 of inheritance boosted the wealth of people with higher non-inheritance wealth by more than for people with lower non-inheritance wealth (as has been found in Sweden; chapter 2). That would mean that absolute and relative non-inheritance wealth inequality would be lower than modelled 0–3 years and 4–7 years after inheritance receipt, and so the true longer-term effects would be closer to the true immediate-term effects.

Because of the sensitivity of these estimates to the underlying assumptions, it is not reasonable to make claims about the *magnitude* of the longer-term effect of inheritances on wealth inequality. However, chapter 2 makes a tentative claim about the *direction* of the effect, as it is inherently less sensitive to these assumptions.

Figure B.11 – Effects of inheritances on wealth inequality assuming no systematic variation in effect of inheritances on future wealth[a,b,c]

Modelled effect of inheritances on wealth inequality in the immediate and longer terms



a. The immediate-term effect is the sum of the differences between the Gini/absolute Gini coefficient of the initial wealth distributions and the Gini/absolute Gini coefficient of the post-inheritance wealth distributions — the difference between the Gini/absolute Gini coefficient of the 2002 wealth distribution and the Gini/absolute Gini coefficient of the 2002 wealth-plus-inheritances-received-between-mid-2003-and-mid-2006 distribution, plus the Gini/absolute Gini coefficient of the 2006 wealth distribution and the Gini/absolute Gini coefficient of the 2006 wealth-plus-inheritances-received-between-mid-2007-and-mid-2010 distribution, plus the Gini/absolute Gini coefficient of the 2010 wealth distribution and the absolute Gini coefficient of the 2010 wealth-plus-inheritances-received-between-mid-2011-and-mid-2014 distribution. **b.** The longer-term effects are sums of the differences between the Gini/absolute Gini coefficient of the non-inheritance wealth distributions and the Gini/absolute Gini coefficient of the post-inheritance wealth distributions — the 0–3 years later effect is the difference between the Gini/absolute Gini coefficient of the 2006 wealth-less-the-modelled-contribution-of-inheritances-received-between-mid-2003-and-mid-2006 distribution and the 2006 wealth distribution, and so on. The 4–7 years later effect is the difference between the Gini/absolute Gini coefficient of the 2010 wealth-less-the-modelled-contribution-of-inheritances-received-between-mid-2003-and-mid-2006 distribution and the 2010 wealth distribution, and so on. **c.** Assumes that each $1 of inheritance received 0–3 years ago increase real household wealth by $0.99, and that each $1 of inheritance received 4–7 years ago increase real household wealth by $0.91.

Source: Productivity Commission estimates based on HILDA Restricted Release 19.

C. Modelling effects of future wealth transfers on inequality

Chapter 3 examined the potential effects of wealth transfers[65] on future wealth inequality within generations and across age groups. This appendix describes in greater detail the dynamic cohort simulation model used to produce these results, including:

- model selection (section C.1)
- model structure (section C.2)
- the data and parameters used in the base scenario (section C.3)
- further details of results and scenario analyses that were not covered in chapter 3 (section C.4).

C.1 Model selection

Types of models for projecting wealth and wealth transfers

Past empirical research focusing on wealth accumulation in the future (such as analysing retirement incomes) and wealth transfers have used a range of modelling approaches (table C.1), including:

- basic projections
- dynamic cameo simulations
- dynamic cohort simulations (or group simulations)
- dynamic microsimulations
- overlapping generations (OLG) models with heterogeneous agents.

Basic projections and dynamic cameo simulations are not suited to investigating the effect of wealth transfers on wealth inequality across the population, which was the key aim of this study.

Cohort simulation, microsimulation and OLG models with heterogeneous agents can shed light on the future size of wealth transfers at an aggregate level and the potential effects on wealth inequality. Microsimulation and OLG models with heterogeneous agents are able to provide more detailed estimates but in order to achieve this are considerably more data and resource intensive than cohort simulations. Moreover, the granularity gained from added complexity is somewhat illusory, given the inherent uncertainty involved when projecting decades into the future. OLG models are also complicated by the additional challenges of calibrating behavioural parameters (described below).

[65] 'Wealth transfers' in this report refer to intergenerational inheritances and inter vivos gifts (or simply 'gifts' from hereon in).

Table C.1 – Select modelling approaches for projecting wealth

			Attributes	
Type of model	Description	Example	Analyses wealth inequality	Complexity
Basic projection	Projections of aggregate outcomes	The Centre of Excellence in Population and Ageing Research (2019, p. 36) projected data on house values, and estimated the timing of housing bequests based on life expectancies	No	Low — simple and stylised projection
Dynamic cameo simulation	Projections of outcomes for an individual with certain characteristics	The PC (2018b, technical supplement 6) analysed superannuation and bequests over the lifecycle of a representative individual	No	Low — requires assumptions about income and asset pathways of an individual
Dynamic cohort simulation	Projections of outcomes for cohorts of people in the population	Deloitte Access Economics (2020) used a cohort simulation of incomes and assets as part of analysis into the aged care system	Yes — analysis limited to structure of cohorts	Medium — requires assumptions about income and asset pathways for different cohorts of the population
Dynamic microsimulation	Projections of outcomes for individuals in the population	The Treasury (2020) used its Model of Australian Retirement Incomes and Assets model to project superannuation balances and costs of the retirement income system	Yes — ability to analyse detailed population groupings	High — requires adequate microdata, time and resources, and assumptions about income and asset pathways for individuals
Overlapping generations (OLG) model	Macroeconomic model with stylised representations of the household sector, that can be expanded to include production and government sectors, as a general equilibrium model	De Nardi (2002) developed an OLG model to examine how the bequest motive and inherited earnings ability can affect wealth inequality	Yes — analysis limited to structure of representative households	High — calibration of behavioural parameters can present challenges, and incorporating micro outcomes of interest (such as inequality) requires additional model complexity

A dynamic cohort simulation model was chosen for this study for several reasons. This type of model is relatively simple to construct and provides a flexible framework for exploring the study's questions of interest (including alternative scenarios and model settings), while demanding fewer resources, data and informational requirements.

Cohort simulations have been used widely in past Australian research.

- The Retirement Income Review drew on results produced from the Superannuation, Pension and other Retirement OUTcomes (SPROUT) model, which is jointly owned by Rice Warner and Industry Super Australia (The Treasury 2020, p. 544).
- Deloitte Access Economics (2020) produced a cohort simulation of incomes and assets as part of their analysis for the Royal Commission into Aged Care Quality and Safety.

- Treasury's RIMGROUP model (the precursor to the dynamic microsimulation model called MARIA (Model of Australian Retirement Incomes and Assets)) was used for projecting retirement incomes through four intergenerational reports (Bastian et al. 2017; The Treasury 2015).

Model design

The model was built to provide insights into the impact of future wealth transfers on wealth inequality — this purpose shaped decisions made about various aspects of model design. These decisions, including trade-offs and limitations, are discussed below.

Choice of population unit

The basic unit of analysis in this model is the individual, as opposed to the household. Key model components, such as age, mortality, income and accumulation of superannuation are inherently specific to individuals rather than households. While it would be possible to aggregate individuals into equivalised household units (as in chapter 2) based on additional assumptions in the model about future household formation rates, this would not change the overall conclusions. The broad findings about wealth transfers and inequality are not dependent on the unit of measurement. Rather, they depend on the distributions of wealth among the units and the relative size of transfers between them (chapter 3).

Choice of cohort structure

Cohorts in this study's model were based on age, income, starting wealth, homeowner status and inheritance-received status (section C.2) because these are the main factors of interest that influence wealth outcomes. This limits the scope of inequality analysis that can be undertaken, for example, with respect to gender, relationship status, household composition or geography.

As the model evolves (ages) it produces large numbers of irregular sized cohorts. This can make it difficult to construct equal-sized quantiles, which are a common building block for inequality analysis (for example, ratios that compare the top and bottom of the wealth distribution). As such, tertiles (which divide the population into equal groups of three, rather than into a greater number of groups) were typically used for age-based quantile analysis within the model.

Choice of projection period

Outcomes were projected to 2050. As discussed in chapter 3, wealth transfers over this period are expected to be significant given strong asset price growth in recent years and moderate drawdowns from wealth. Declining fertility rates since the baby boom are also expected to result in larger average inheritances received in the future. Projecting to 2050 covers a period over which most baby boomers (the next generation that is approaching end of life) are expected to die.

Choice of wealth types covered

Three forms of wealth were represented in the model: net assets held in housing, superannuation and 'other assets'. Housing and superannuation represent the largest sources of wealth among older Australians (chapter 3).

Other than housing debt, no other debt was modelled. Non-housing debt accounted for 14 per cent of total debt and was equivalent to about 2 per cent of total assets in 2018 (Productivity Commission estimates using HILDA Restricted Release 19). Non-housing debt tended to account for a larger proportion of total debt and assets held by those with lower wealth. Therefore, including non-housing debt would reduce the wealth of lower wealth groups to a larger extent, and increase the size of wealth transfers received relative to their existing wealth, all else equal.

Choice of wealth transfers covered

The model includes inheritances and gifts from parents to children. Inheritances were based on modelled wealth at death (section C.2). The modelling of gifts provides some insights into transfers over the lifecycle and wealth inequality effects, but due to data limitations, the extent of the effects is more uncertain than for inheritances (section C.3). As such, greater focus is placed on inheritances in discussion of the results and scenario analysis.

Wealth at death was assumed to be transferred either to others in the same cohort (if partnered) or to child generations as those parties account for the bulk of the value of wealth transfers (chapter 1). (A small share was also assumed to be donated to charities.) In actuality, some wealth is transferred to grandchildren, other family members, friends and carers (chapter 1), which means that the model slightly overestimates the size of wealth transfers to child and partner recipients.

Additionally, the study only considers transfers of financial (such as cash) and non-financial assets (such as houses) from parents to children. Transfers in the other direction, from children to parents, as well as in-kind transfers (such as childcare and rent-free accommodation) are out of scope of the project.

Considering population growth

The model does not incorporate population growth via births. This means that the model cannot produce outcomes for new generations and thus it restricts comparisons between age groups at later years of the projection. For example, by 2048 (30 years into the model projection), there are no people under the age of 30. As explained in chapter 3, comparisons of age groups between projection years are presented in multiples of five years to ensure that they are comparing the same age ranges over time.

Migration is also excluded from the model. Including migration would require additional assumptions about which model cohorts have migrants join or leave over time. As discussed in chapter 3, immigrants tend to be younger and higher skilled than the general population. The addition of immigrants in the model may increase the share of wealth held by younger cohorts and reduce average wealth transfers received because total wealth transfers would be distributed across a larger number of younger people.

Considering behavioural responses

Sensitivity analysis was conducted to test how widely outcomes differ with changes to assumptions relating to behaviour (such as saving rates and drawdown rates) rather than explicitly building behaviour into the model.

Endogenous behaviour could be incorporated in the model, for example, by allowing cohorts to make optimised consumption and investment decisions over time consistent with the lifecycle hypothesis (Modigliani and Brumberg 1954), rather than using fixed assumptions about saving rates. Behaviour affecting the value of wealth at death, such as the bequest motive or ‘accidental’ bequests due to precautionary saving, would also need to be modelled to generate inheritances. Incorporating endogenous behaviour in such ways would allow the model to examine behavioural responses to exogenous changes in policy. However, it would require additional calibration of parameters underlying behavioural equations in the model, and may require further simplifying assumptions in other areas to make solving the behavioural model tractable.[66]

It is worth noting that policy settings affect wealth accumulation and distort savings behaviour. For example, superannuation involves mandatory contributions and pension policy exempts certain asset classes from means testing. Allowing cohorts in the model to optimise their behaviour subject to these policy settings and constraints would require additional model complexity. Given policy analysis is not the aim of this report, the added model and computational complexity associated with incorporating endogenous behaviour is not considered worthwhile.

In addition, there is evidence that people do not behave in ways that are consistent with standard optimisation (lifecycle hypothesis) assumptions. For example, Australians tend to die holding most of the wealth that they had at the start of their retirement, but bequests do not appear to be a high priority for retirees (The Treasury 2020, p. 436). They also purchase very few products that insure against longevity risk (The Treasury 2020, p. 439) or instruments that facilitate access to equity in housing assets, even among people with low levels of income (The Treasury 2020, p. 436). Such observations may be a result of people's responses to system complexity (The Treasury 2020, pp. 443–445) and uncertainty about the permanency of policies in the future, which are both challenging to model.

C.2 Structure of the dynamic cohort simulation model

The model projects population, individual income and wealth for each cohort into the future, given assumptions about mortality, changes in income through time, wealth accumulation behaviour and rates of return. Each year, wealth is also transferred from older to younger generations via inheritances and gifts. Figure C.1 presents a simple summary of the model structure. More information is provided on the model components below. Data sources are described in section C.3.

Population and cohort transitions

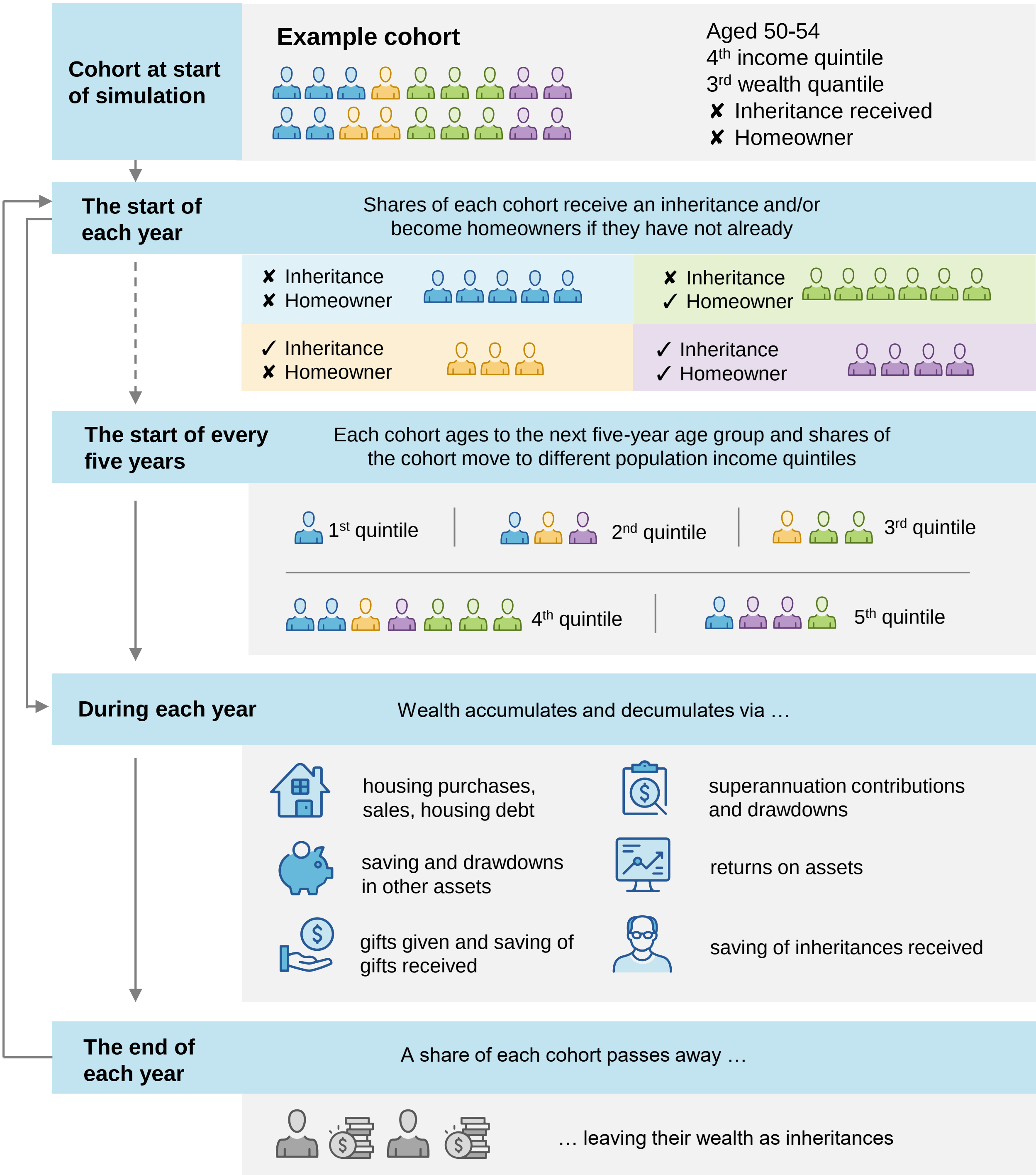
In the model, the initial population is split into five-year age groups (0–4 to 100+), five income quintiles, four starting wealth quartiles, initial homeowner status and an indicator for whether an inheritance has already been received.

The number of people in each subsequent cohort changes each year depending on:

- inheritance receipt — at the start of each year for cohorts that had not yet received an inheritance, a share of those cohorts' parents is assumed to have passed away in the previous year, leaving them an inheritance
- home ownership transitions — at the start of each year, for cohorts that had not yet purchased a home, a share of those cohorts is assumed to move into home ownership and remain homeowners for the rest of their lives
- income group transitions — at the start of each five-year interval, a share of each cohort is assumed to transition to a different income group, reflecting differences in how people experience entry into the workforce, career establishment and retirement
- mortality — at the end of each year, a share of each cohort passes away.

[66] Even in a static model, incorporating behaviour can be complex. For example, the Commission's static microsimulation model of childcare had a limited set of discrete choices for hours worked and childcare demanded in order to make the model tractable (PC 2014).

Figure C.1 – Simple representation of the cohort simulation model



Because demographic changes due to births and migration are not modelled (section C.1), the model population declines over time as people die.

Each cohort's previous sequence of income group transitions is recorded, thus producing an increasing number of cohorts over time as transitions occur, and a broad spread of wealth outcomes by the end of the simulation. The spreads of wealth across cohorts each year are used for analysing wealth inequality.

Income and wealth accumulation

Income is an important source of wealth accumulation as it affects how much an individual can save. In every year of the model, people in each cohort earn income (split into wages and income from other sources) based on their current age and income group, and assumed growth over time. All income is taxed based on assumptions about future tax rates (section C.3).

Wealth was grouped into three types in the model.

1. Housing wealth. Individuals within a cohort that transition into home ownership gain housing assets. This comes with an associated level of housing debt. Cohorts that already own a home are assumed to earn a rate of return on their housing assets, and they reduce some of their housing debt each year. They also gain additional housing assets by upsizing (which comes with additional housing debt at the same debt to asset ratio as new entrants into home ownership) or sell housing to downsize in old age. Investment housing is included in the wealth of the initial population, but it is treated the same as other housing wealth. Transaction costs were not modelled.
2. Superannuation. Contributions are modelled based on projected wage income and future superannuation guarantee rates, less contributions tax. Superannuation assets earn a rate of return each year, net of fees and taxes. Drawdowns are based on legislated minimum withdrawal rates after retirement, with low balances withdrawn as lump sums.
3. Other assets. These include assets other than housing and superannuation, such as cash, equities and vehicles. Cohorts are assumed to save a share of their income in other assets, and draw down a share of their other assets each year. A portion of wealth transfers are also assumed to be saved in other assets (described further below). The composition of other assets differs by age group, hence rates of return are also assumed to differ by age. (This assumption applies initially until all rates of return converge, as is assumed in the base scenario (section C.3).) All returns on other assets are assumed to be taxed at the cohort's marginal tax rate and reinvested back into other assets.

Box C.1 presents the equations describing the wealth accumulation process in the model.

Box C.1 – Equations representing the wealth accumulation process

The wealth accumulation process (excluding wealth received from the deaths of partners) can be broadly summarised by the following equations, where *c* represents a cohort and *t* represents the year.

$$HousingAssets_{c,t} = \begin{cases} HousingAssets_{c,t-1}\left(1 + RateReturnHousing_t + RateNetSavingHousing_{c,t}\right) & \text{if a homeowner in } t-1 \\ NewHousingValue_{c,t} & \text{if not a homeowner in } t-1 \text{ but became a homeowner in } t \\ 0 & \text{if not a homeowner in } t \end{cases}$$

$$HousingDebt_{c,t} = \begin{cases} HousingDebt_{c,t-1}\left(1 - RateDebtReduction_{c,t}\right) + \\ \left(HousingAssets_{c,t-1} RateNetSavingHousing_{c,t} DebtToAssetRatio_{c,t}\right) & \text{if a homeowner in } t-1 \text{ and } RateNetSavingHousing_{c,t} > 0 \\ HousingDebt_{c,t-1}\left(1 - RateDebtReduction_{c,t}\right) & \text{if a homeowner in } t-1 \text{ and } RateNetSavingHousing_{c,t} \leq 0 \\ NewHousingValue_{c,t} DebtToAssetRatio_{c,t} & \text{if not a homeowner in } t-1 \text{ but became a homeowner in } t \\ 0 & \text{if not a homeowner in } t \end{cases}$$

$$Superannuation_{c,t} = Superannuation_{c,t-1}\left(1 + RateReturnSuper_t\right)\left(1 - RateDrawdownSuper_{c,t}\right) + \left(WageIncome_{c,t} RateContribSuper_t\left(1 - RateTaxSuper_t\right)\right),$$

$$\text{where } RateDrawdownSuper_{c,t} = 1 \text{ if } \left(Superannuation_{c,t-1} + NetIncome_{c,t}\right) < LowSuperBalThreshold_t$$

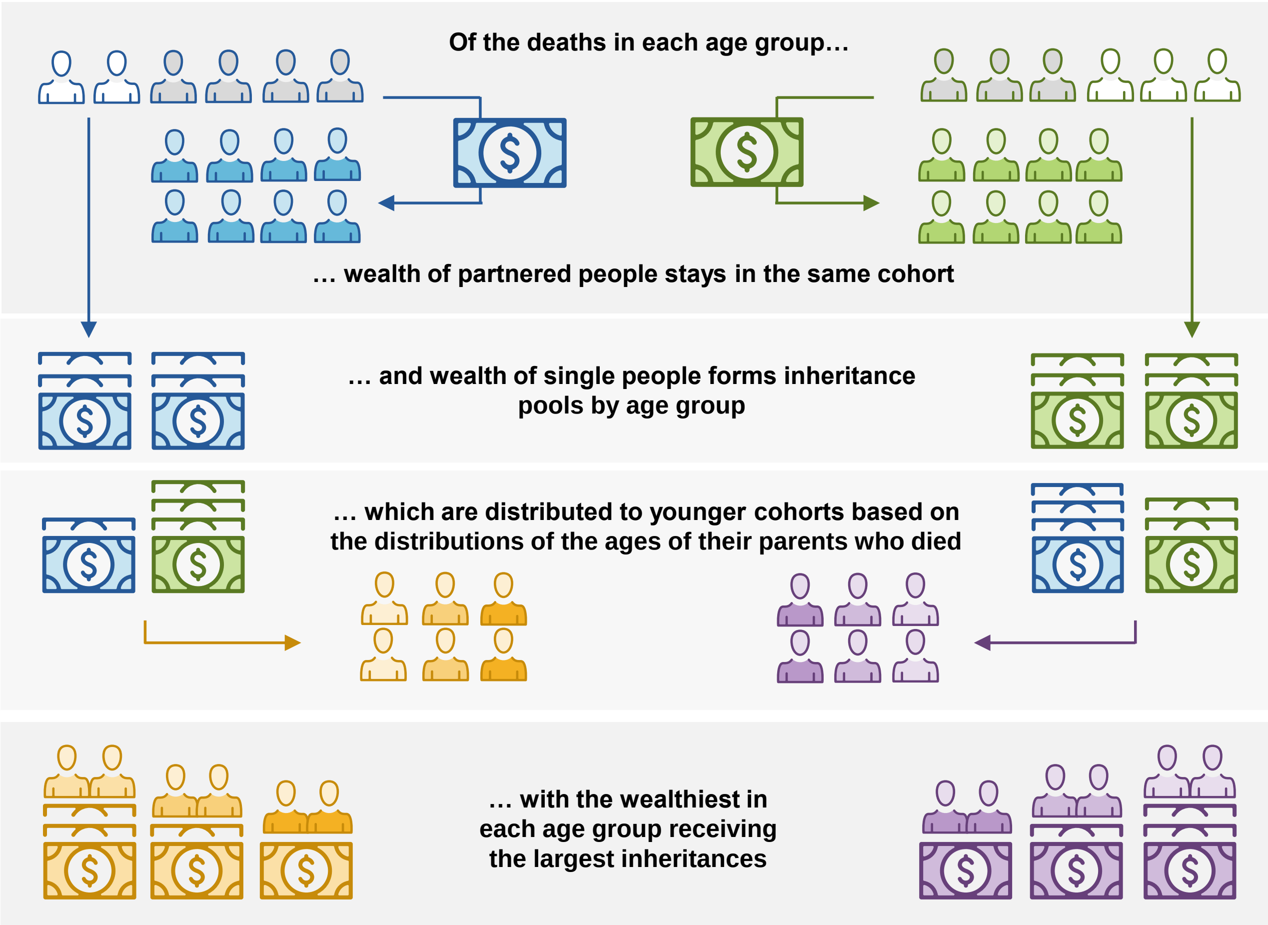
$$\begin{aligned} OtherAssets_{c,t} = {} & OtherAssets_{c,t-1}\left(1 - RateGiftGiving_{c,t}\right)\left(1 + RateReturnOther_t\left(1 - RateMarginalTax_{c,t}\right)\right)\left(1 - RateDrawdownOther_{c,t}\right) \\ & + \left(NetIncome_{c,t} RateSavingIncomeOther_{c,t}\right) + \left(InheritanceReceived_{c,t} RateSavingInheritanceOther_{c,t}\right) \\ & + \left(GiftReceived_{c,t} RateSavingGiftOther_{c,t}\right) \end{aligned}$$

$$TotalWealth_{c,t} = HousingAssets_{c,t} - HousingDebt_{c,t} + Superannuation_{c,t} + OtherAssets_{c,t}$$

Wealth transfers

Both inheritances and gifts are included in the model. A simple representation of how inheritances are modelled is displayed in figure C.2.

Figure C.2 – Simple representation of inheritances in the model



In modelling intergenerational inheritances, a share of deaths is assumed to be people who were in a relationship. The wealth at death of all those assumed to be in a relationship is distributed evenly among all people who are still alive in the same cohort, with housing wealth at death transferred as housing wealth but superannuation and other assets at death are combined into other assets only. Wealth at death for people who were not in a relationship is placed in an ‘inheritance pool’ by age group at the end of each year, less a small proportion that is assumed to be donated to charity.

For the cohorts of people who had not yet received an inheritance in the initial population data, the distribution of the age groups of their parents is recorded and follows the cohort through time (where both parents are alive, this is the age group of the youngest parent). This allows the inheritance pools by parent age group to be transformed into inheritance pools by receiving age group and distributed across cohorts in the following way.

1. As described above, at the start of each year for each cohort that had not yet received an inheritance, a share of their parents is assumed to have died in the previous year based on the mortality rates associated with their parents' ages.
2. The parent age group inheritance pools are then distributed in proportion to the share of assumed parent deaths (step 1), which determines the amount received by each child age group in the model. (Some adjustments are made to account for the fact that many people who die young are unlikely to have many children to bequest to in the model.)
3. The inheritance pools by receiving age group are then distributed among cohorts of that age group according to age-specific wealth rankings, assuming that wealthier cohorts tend to receive larger inheritances than less wealthy cohorts — this pattern is observed historically (chapter 2). Those in the bottom third of wealth in their age group are assumed to receive the smallest share of the inheritance pool specific to their age group, while those in the top third of wealth receive the largest share of the inheritance pool.

A share of received inheritances by each cohort is assumed to be saved into other assets. Cohorts that have received an inheritance are also assumed to have an increased probability of transitioning into home ownership in future years (section C.3).

Gifts are modelled in a similar but simpler way. Cohorts are assumed to give gifts from their other assets each year, which form 'gift pools' by parent age group. Cohorts that have a living parent (identified by those who have not yet received an inheritance) receive gifts based on the amounts gifted by the age groups of their living parents. Some adjustments are made to account for gifts assumed to be given to young people born during the projection period but are not included in the model. A share of gifts received by each cohort is assumed to be saved into other assets.

Model outputs

The model produces outputs for a number of variables each year including:

- population at start of year
- deaths at end of year
- average wealth of the living by wealth type
- average wealth at death by wealth type
- average inheritances received from parents
- average gifts given and received.

These results are produced for each starting cohort (defined by initial age group, income quintile, wealth quantile, homeowner status and inheritance received status) along with the income pathway the cohort has transitioned through during the model span (which includes current income quintile), current homeowner status and current inheritance received status.

From these model outputs, other results can be constructed, such as measures of wealth inequality each year.

C.3 Base scenario model data and parameters

This section covers the data and parameters used in the base scenario model. Key assumptions are described below, with full details provided in the R code published on the Commission's website. The sensitivity of results to some of these assumptions was examined in alternative scenario analysis, described in section C.4.

Initial population cohorts

The model's initial population uses data from the 2018 *Household, Income and Labour Dynamics in Australia* (HILDA) *Survey* (Restricted Release 19). The 2018 wave of HILDA is the latest wave that has detailed information about individual and household wealth (which has been included in the survey every four years since 2002).

Figure C.3 summarises the initial population by group (cohort splits are described in section C.2). The observed patterns across age groups are consistent with expected lifecycle experiences:

- incomes increase as people age and then decrease in retirement
- wealth accumulates through people's working lives and decumulates during retirement
- home ownership rates begin to spike when people are aged around their 30s
- inheritances tend to be received when people are aged around their 50s to 60s.

Each initial population cohort had initial values of wealth by wealth type, which differed by age group, wealth group and homeowner status. These initial values were determined according to the weighted averages of the sample data in those cohorts. Adjustments were made for outliers and values were smoothed across age groups.[67]

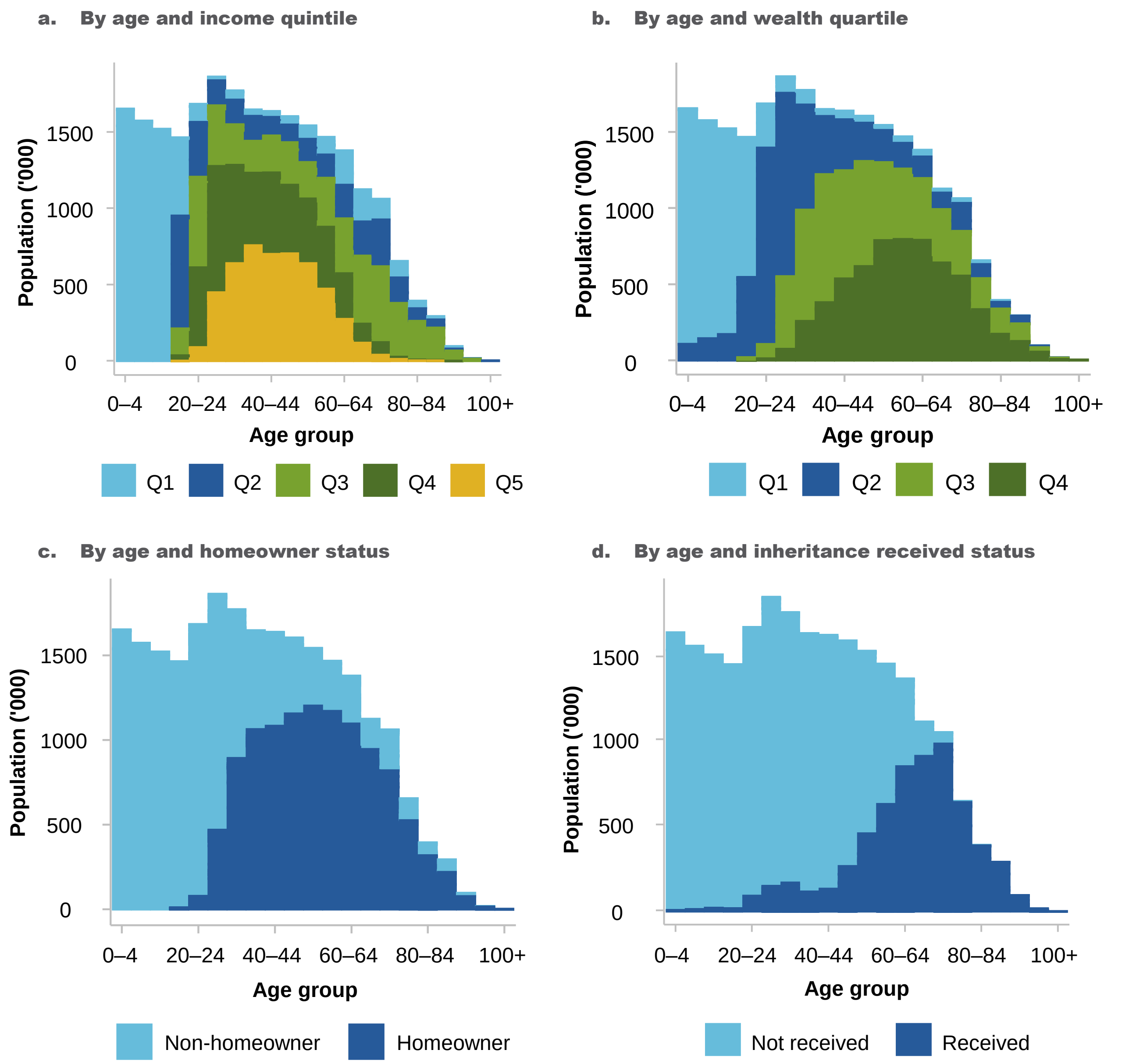
While grouping cohorts by age was straightforward, other groupings required additional assumptions.

- Income quintiles were based on total income, excluding income from sources of wealth that were separately modelled (income from superannuation, interest and dividends). This ensured consistency with income projections (described below), which excluded these sources to avoid double counting in the model.
- Wealth quartiles were based on estimated individual wealth. This involved attributing wealth items reported at the household level to individuals, with assumptions about how household wealth is shared (for example, couples were assumed to own equal shares of their home). Further details of this process are in appendix A. Non-housing debt was not modelled and was excluded in total wealth calculations (section C.1).
- Homeowner status was based on whether the individual owned any housing assets, using assumptions to apportion household housing assets to individuals.
- Individuals without data on the ages of their parents (mostly because their parents had already passed away, but some did not answer the question) were deemed to already have received an inheritance and were not able to receive one in the model simulation. About one quarter of the 2018 model population were deemed to have received an inheritance, with most aged over 50, which is broadly consistent with expected age profiles (figure C.3).

The initial population data used for the model also recorded the distribution of age groups of the youngest living parent, for each cohort that had not yet received an inheritance. This was used in modelling the probability of receiving an inheritance during the simulation.

[67] Housing wealth was set to zero for all children aged under 15 to control for large outliers. Values were smoothed based on a simple moving average over three age groups.

Figure C.3 – Initial model population in 2018



Source: Productivity Commission estimates using HILDA Restricted Release 19.

Mortality

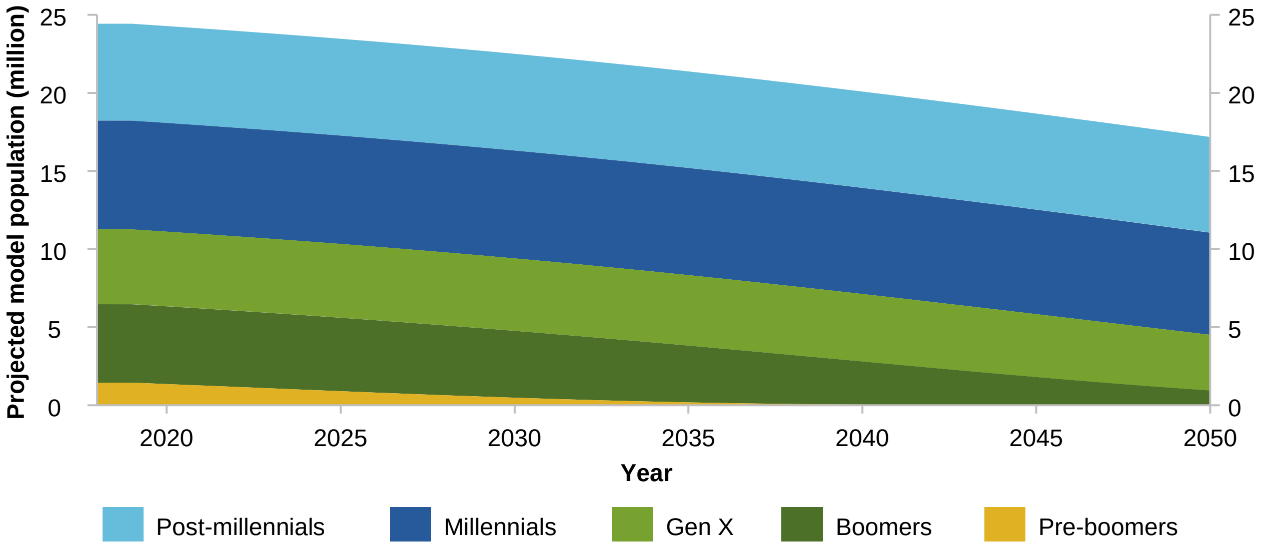
In the model, the cohorts effectively stay in the same age group for four years and then transition to the next five-year age group every fifth year. To prevent spikes in deaths upon reaching a new age group (which in turn affects inheritances), a ‘rolling’ mortality rate was estimated over age for each five-year age group. For example, the mortality rate used in the model for cohorts aged 60–64 in their first year at that age group was the average mortality rate at that age group, but in the second year it was the rate for people aged 61–65, in the third year it was the rate for people aged 62–66, and so on.

These mortality rates were also used to calculate the number of people whose parents die in each year of the simulation.

Data on observed deaths by age (ABS 2020c) was used to calculate the rolling mortality rates. These do not assume any improvements in life expectancy, but any improvements within the projection period are unlikely to be large.

Figure C.4 shows the change in population size in the model simulation with the assumed mortality rates.

Figure C.4 – Projected model population by generation[a]



a. Table 3.2 in chapter 3 describes the ages of generations in the model.

Source: Productivity Commission estimates from cohort simulation model.

Income

Income projections

Average incomes for the initial population cohorts in 2018 were estimated as weighted averages by age and income group. Similar to initial wealth values, some adjustments were made for outliers and values were smoothed across age groups.[68] Both wages and 'other income' were estimated. Other income excluded income from sources of wealth modelled separately (superannuation income, interest and dividends) to avoid double counting.

Growth in average incomes was then assumed to converge over 10 years to 4 per cent per year. This is significantly stronger than growth in average weekly earnings in recent years (Productivity Commission estimates using ABS 2021b, table 2) but is in line with the Intergenerational Report (The Commonwealth of Australia 2021a, p. 11), which assumed convergence to a long run inflation rate of 2.5 per cent and labour productivity growth of 1.5 per cent. Convergence assumptions are commonly used to transition from short-term estimates or forecasts to medium-term projections, such as in the Budget (The Commonwealth of Australia 2021b, p. 65).

Wage projections were used to project superannuation contributions (described below).

[68] One large negative 'other income' outlier was adjusted. Values were smoothed based on a simple moving average over three age groups.

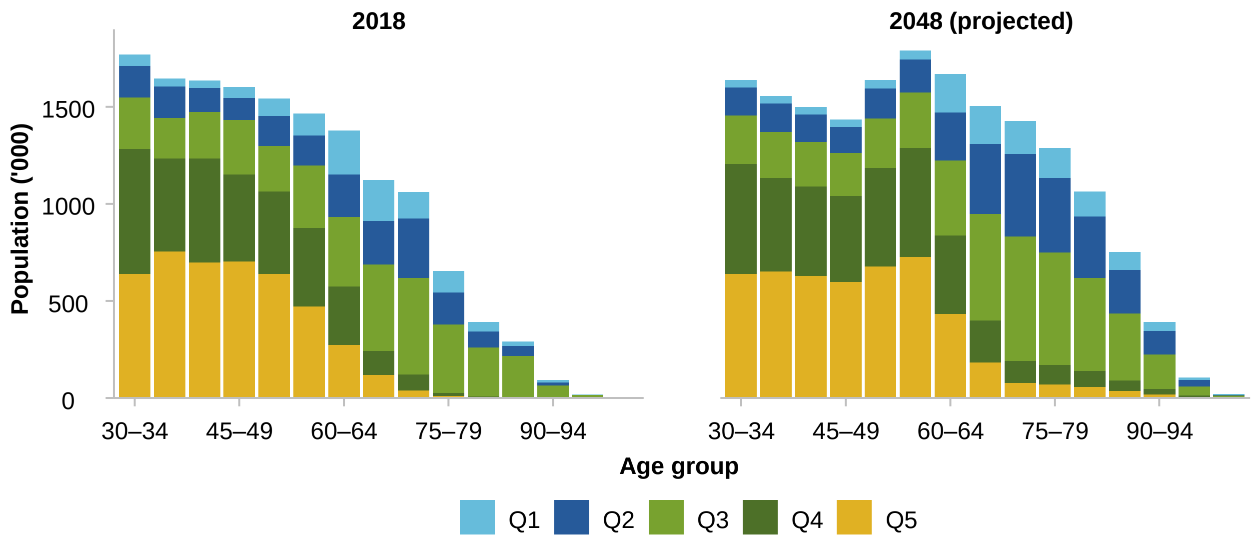
Income was also taxed in the model. Actual and expected tax rates and income tax thresholds were used up to 2026 (ATO 2021b, 2021a). From 2027 onwards, thresholds were assumed to increase with projected income growth. This indexation to income growth is consistent with assumptions used in the Retirement Income Review (The Treasury 2020, pp. 511, 541). A simple implementation of the Medicare levy of 2 per cent on gross income was also applied in all years. Actual Medicare levy thresholds were used up to 2021 (ATO 2019, 2020a, 2021d). Future thresholds were assumed to be indexed to inflation, using Budget forecasts to 2023 (The Commonwealth of Australia 2021b, table 2.1) and an assumption of 2.5 per cent thereafter.

Other details of the tax system, such as tax offsets and tax deductions, were not modelled. Tax deductions are regressive (providing a greater benefit to higher income earners compared with tax offsets of the same dollar amount) while tax offsets are progressive (providing a greater relative benefit to lower income earners) (TTPI 2019). The net impact of their exclusion from the model depends on their relative effects on wealth accumulation for cohorts of different wealth levels. If they enable higher wealth cohorts to accumulate relatively more wealth, then any wealth transfers they receive would tend to be a smaller proportion of their existing wealth, all else equal.

Transitions between income groups

As described in section C.2, shares of respective model cohorts transition to a different income quintile every five years. Assumptions about the probability of transitioning were based on analysis of historical rates in HILDA, by income quintile and age. This analysis showed relatively slow rates of transition — hence the use of five-year intervals between transitions. Based on similar analysis, income transitions were limited to cohorts aged 15–39 and 60–74. People at these age groups were more likely to have moved into a different income group from five years ago, reflecting ages at which people enter the workforce, establish their career and then retire. Applying these income transition probabilities to the model projections produced similar distributions of income groups within age groups over time (figure C.5).

Figure C.5 – Projected distribution of population by age and income group[a]



a. Age groups under 30 not shown. Changes in population sizes due to deaths only. Births and migration are not modelled (section C.1). The projected population patterns in 2048 for ages 30 to 60 reflect patterns in the initial 2018 population of people aged under 30 (figure C.3).

Source: Productivity Commission estimates from cohort simulation model.

Rates of return on assets

The base scenario model abstracts from differences in potential long-run growth rates between asset types. Rather, it assumes that rates of return on all assets converge from historical rates to the long run growth rate of income (4 per cent) over 10 years. Different rate of return assumptions were used in alternative scenarios (section C.4).

At the beginning of the projection period, nominal rates of return on assets were:

- seven per cent for housing assets based on analysis by Vanguard and the Reserve Bank of Australia of historical returns over the past two to three decades (Kohler and van der Merwe 2015; Vanguard 2021)
- six per cent for superannuation returns during the accumulation phase and 5.35 per cent during the retirement phase after accounting for fees and taxes, based on analysis in the Retirement Income Review (The Treasury 2020, pp. 516–517)
- between 3.3–5.0 per cent for 'other assets' depending on age group, based on data on the composition of other assets in HILDA and assumed rates of return by asset class.[69] All returns on other assets were assumed to be reinvested back into other assets.

Rates of return do not differ by asset by wealth group in the model. Because wealthier people are more likely to have a larger share of their wealth in types of 'other assets' earning higher rates of return (like equities) rather than non-appreciating assets (like vehicles), relative wealth inequality could be higher than projected (wealthier people accumulate wealth at a higher rate in other assets). Drawing on the Nekoei and Seim (2019) framework (chapter 3, box 3.1), this means that wealth transfers may be found to have a greater equalising effect because, for a given size of wealth transfer, they will be an even larger share of existing wealth for less wealthy people and a smaller share for wealthier people, all else equal. While this is not examined directly, such results are seen in an alternate modelled scenario that uses historical rates of return (section C.4), where those who have more wealth in housing and superannuation (who tend to be among the wealthier cohorts) benefit from higher rates of return than less wealthy cohorts (who rely more on other assets).

Housing wealth

As individuals are the unit of analysis in the model (section C.1), household-level housing wealth (available in HILDA) had to be attributed to individuals. These estimates of individual housing wealth were subsequently used in estimations of the housing-related parameters in the model, described below. The sensitivity of some of these parameter assumptions was explored in scenario analysis (section C.4).

Transitions into home ownership

The probability of non-homeowners transitioning into home ownership was estimated using HILDA data. First, individual home ownership rates for each age and income group were averaged over the HILDA waves containing wealth data (five waves from 2002 to 2018). These rates were smoothed across age.[70] Within each income group, an implied rate of entry into home ownership at each age was calculated such that it would produce the observed home ownership rates at the next age up. These estimates were used to calculate five-year rolling average rates of entry into home ownership (similar to the rolling mortality rate

[69] The assumed rate of return was about 4 per cent on cash assets, and 8 per cent on equity, based on the 20-year averages from Vanguard (2021) data. The rate of return on additional assets (which included vehicles and collectibles) was assumed to be about 2 per cent (half of cash assets).

[70] The values were smoothed to fit a monotonically increasing function (Pya 2021). This ensures that home ownership rates increase with age, and estimated probabilities of transitioning into home ownership are positive.

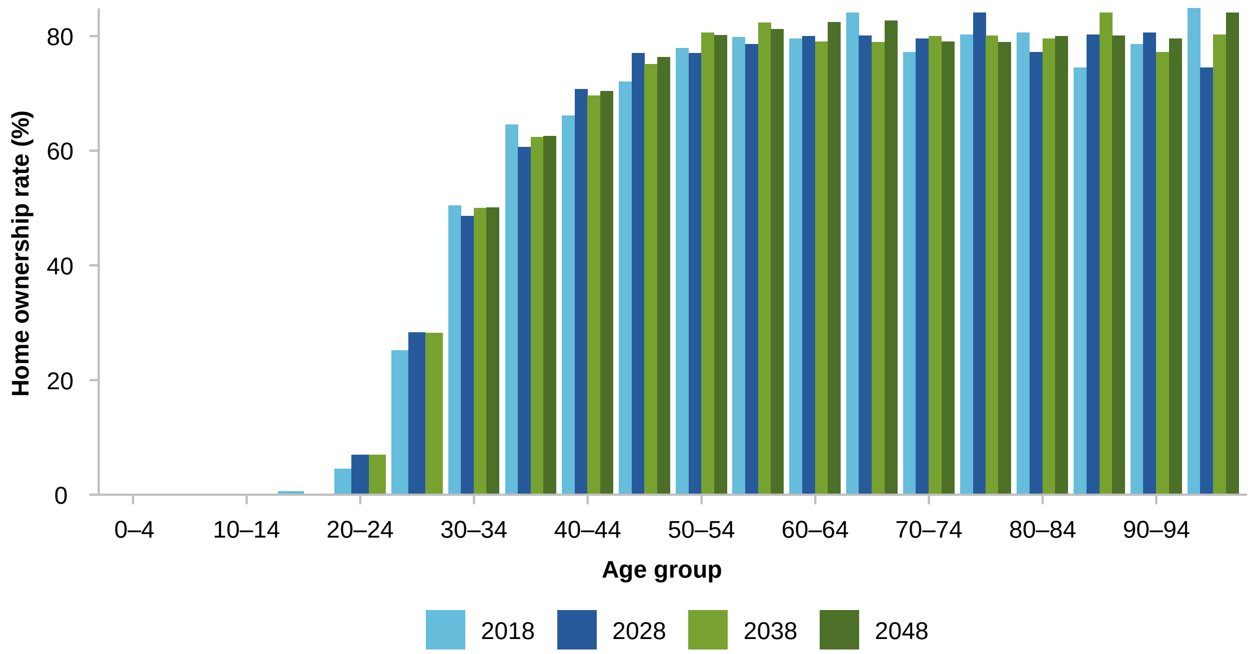
described above). It was further assumed that only cohorts aged 15–54 were able to transition into home ownership, which captures most transitions. ABS data suggests that about 95 per cent of first home buyers are under the age of 55 (ABS 2019a, table 9.5).

Transforming household wealth into individual wealth produces a potentially counterintuitive result. While one might expect to see an increasing relationship between income and the probability of transitioning into home ownership at the household level, this relationship is not clear at an individual level. This may be because decisions about home ownership, and wealth in general, are made at the household level but there is heterogeneity in income among members of households. Therefore a low-income member of a couple may have higher housing wealth than implied by their own income because they have a partner with a much higher income, who is able to afford a house. Furthermore, working age people in the lowest income quintile may seemingly be outliers in that they only have low or negative income temporarily due to poor business income or a break in employment, but were otherwise able to afford a home.

The model allows cohorts that have received an inheritance to have a higher probability of entry into home ownership. The estimates described above on home ownership transitions excluded people in the sample who did not have living parents and were assumed to have already received an inheritance. The increased probabilities of entry into home ownership in the model were based on estimates in an Australian study (using HILDA) that found that receiving an inheritance was associated with a 3.7 percentage point higher probability of being a homeowner for people aged 25–45, and a 2.1 percentage point higher probability for people aged 25–65 (Cigdem and Whelan 2017). These estimates informed the assumption in the model of a 3.7 percentage point higher rate of entry into home ownership for cohorts aged 25–44 and 1 percentage point higher rate for cohorts aged 45–54.

Applying these home ownership transition probabilities produced similar projected distributions of home ownership within age groups over time (figure C.6). However, home ownership rates have been falling among younger people in recent decades (chapter 3). Different assumptions about home ownership rates are examined through scenario analysis (section C.4).

Figure C.6 – Projected home ownership rates by age group



Source: Productivity Commission estimates from cohort simulation model.

Housing values, debt, upsizing and downsizing

Survey data on the value of housing at purchase in HILDA is not straightforward to use. Questions about the year housing was purchased and the price are only included in the survey every four years, and some survey participants report inconsistent values in different years. This information must also be apportioned to individuals in the model, and matched to available data on incomes and housing debts in previous waves of HILDA in order to calculate certain model parameters. This section provides an overview of parameter calculations, with specific details available in the R code published on the Commission's website.

The value of housing assets at entry into home ownership was estimated by income group using available data on home purchase prices by likely first home buyers. These estimates ranged from about $252 000 to $332 000 in 2018 dollars for individuals across the five income groups. Similar to the home ownership transition probabilities discussed above, estimating individual values meant that there was no longer a clear increasing relationship between income and these estimates. The estimated values appear broadly consistent with the reported median dwelling value for first home buyer households of $500 000 in 2017-18 (noting that most were couple households) (ABS 2019a, table 9.4). The estimated housing asset values were then assumed to increase with income growth rates in the model rather than the rate of return on housing in all scenarios unless explicitly stated. This reflects the fact that first home buyers typically buy cheaper than average housing — for example, the median dwelling value for first home buyers in 2017-18 was about 20 per cent lower than other buyers (ABS 2019a, table 9.4). It is also assumed that there is available stock of housing at this cheaper price level to meet demand from first home buyers, even in the alternative scenarios where housing rates of return are higher than income growth.

Housing debt to asset ratios at entry into home ownership were estimated by age and income group, using HILDA data on house values and debt for likely first home buyers immediately after their first home purchase. These estimates tended to be highest for younger age groups and were lower for older first home buyers. For example, in the third income quintile the estimated debt to asset ratio was about 75 per cent for the 20–24 age group, and about 40 per cent for the 50–54 age group. The rate of debt reduction was also estimated by age group, using HILDA data on mortgage payments and estimated complete repayments as a percentage of housing debt. These estimates were relatively low for younger age groups, at about 8 per cent of housing debt, and increased at age groups older than 60, to about a third of housing debt.

Rates of upsizing and downsizing as a proportion of existing housing assets were estimated by age group, using HILDA data on home purchases for people who were likely not first home buyers. People aged under 70 tended to be net upsizers, with homeowners in the 30–34 age group estimated to increase their housing assets by close to 5 per cent annually due to new home purchases, given historical rates of return. People aged 70 and over tended to be net downsizers, with rates of downsizing (as a proportion of existing housing assets) at less than 0.5 per cent. Recent high housing price growth likely affects the magnitude of change in housing wealth in HILDA when people purchase a new home. CoreLogic (2021) analysis found that properties in the upper quartile of the housing market increased in value by a higher percentage than those in the lower quartile over the past decade. This means that people may be paying more on average to upsize their home if prices grow quickly than if they grow slowly. Rates of upsizing in the model were adjusted in proportion to the difference in historical housing rates of return and the model's assumed rates of return. Upsizing was also assumed to come with additional debt, at the same housing debt to asset ratio as new entrants into home ownership. Transaction costs and additional investment housing were not modelled.

Superannuation

Superannuation contributions in the model were assumed to be equal to the superannuation guarantee rate as a percentage of projected wage income, less contributions tax of 15 per cent. The superannuation guarantee rate was 9.5 per cent until 2021, with a gradual planned increase to 12 per cent between 2022 and 2026 (ATO 2021c). It was assumed that the rate stays at 12 per cent for the rest of the projection period.

Superannuation balances were assumed to be drawn down for cohorts aged 65–69 and older at the legislated minimum rates, which range from 5 per cent for those aged 65–74 to 14 per cent for those aged 95 and over (ATO 2021e). Cohorts that had a combined net income and superannuation balance of less than $20 000 in 2018 dollars in a given year were assumed to draw down all their superannuation as a lump sum. This reflects research that shows that people who withdraw their superannuation as a lump sum tend to have low balances (PC 2015, p. 16).

Voluntary superannuation contributions and other drawdowns above minimum rates were not modelled. The temporary reduction in minimum drawdown rates due to COVID-19 was also not incorporated as the model has not been designed to capture the impacts of COVID-19.

Other assets

Saving rates from income into other assets were estimated using 2015-16 Household Expenditure Survey (HES) data (ABS 2017a) rather than HILDA because the HES contains more categories of expenditure (Coates and Nolan 2019). That said, the HES is not designed to comprehensively measure saving (ABS 2017b). The ABS stated that measures of income and expenditure in the HES are not classified consistently with the concept of wealth and saving, and there are timing differences between collected data on income and expenditure. Nevertheless, the HES remains the most comprehensive source of income and expenditure data at the micro level in Australia, and has also been used to measure saving in past research (for example, Finlay and Price 2014). Where possible, total income and expenditure data in the HES have been adjusted to be more consistent with the concepts in the model (for example by excluding superannuation contributions from expenditure, described below).

Individual saving in other assets as a percentage of post-tax income was calculated for each age group, income group and homeowner status. The steps involved are summarised as follows.

1. Using HES data, total household expenditure (excluding income tax and superannuation contributions) was apportioned to individuals in the household based on their shares of post-tax income (excluding superannuation income, interest and dividends for consistency with how income is captured in the model).
2. Saving rates — the shares of post-tax income that were not consumed — were calculated for each individual.
3. HILDA records incomes for people of all ages, and calculations of income quintiles for the model cohorts described above were based on the whole HILDA population. HES data alone cannot be used to construct income quintiles for the whole population because people aged under 15 are not included in the survey. To make the income quintiles from HES consistent with those constructed using HILDA, the income quintile shares by age group in the initial model population (estimated using HILDA and shown in figure C.3) were applied to the HES population. These income groups were used in the next step.
4. Weighted average shares of saved income were calculated by age group, income group and homeowner status. These were used as the saving rates into other assets in the model for cohorts aged 15 and over. Cohorts aged 0–14 that received an income were assumed to not consume any of it, saving all their income in other assets.

Estimated saving rates from income into other assets ranged from 0 to 38 per cent for those aged 15 years and over. They tended to be higher for higher income groups and lower for homeowners (who make mortgage repayments), all else equal. Across age groups, saving rates into other assets tended to be highest when young, fell during middle age, and then increased slightly again in old age.

There is limited data and research on how inheritances and gifts are saved in Australia (section C.4). In the base scenario projection, in addition to inheritances increasing the probability of home ownership, inheritances and gifts received were assumed to be saved in other assets at the same rates as was estimated from income into other assets. The rates of saving used in the model can be relatively low depending on age, income and homeowner status — for example, a 60–64 year old homeowner in the third income quintile was assumed to save about 12 per cent of their inheritance into other assets. The effect of changing these saving rates are investigated in scenario analysis (section C.4).

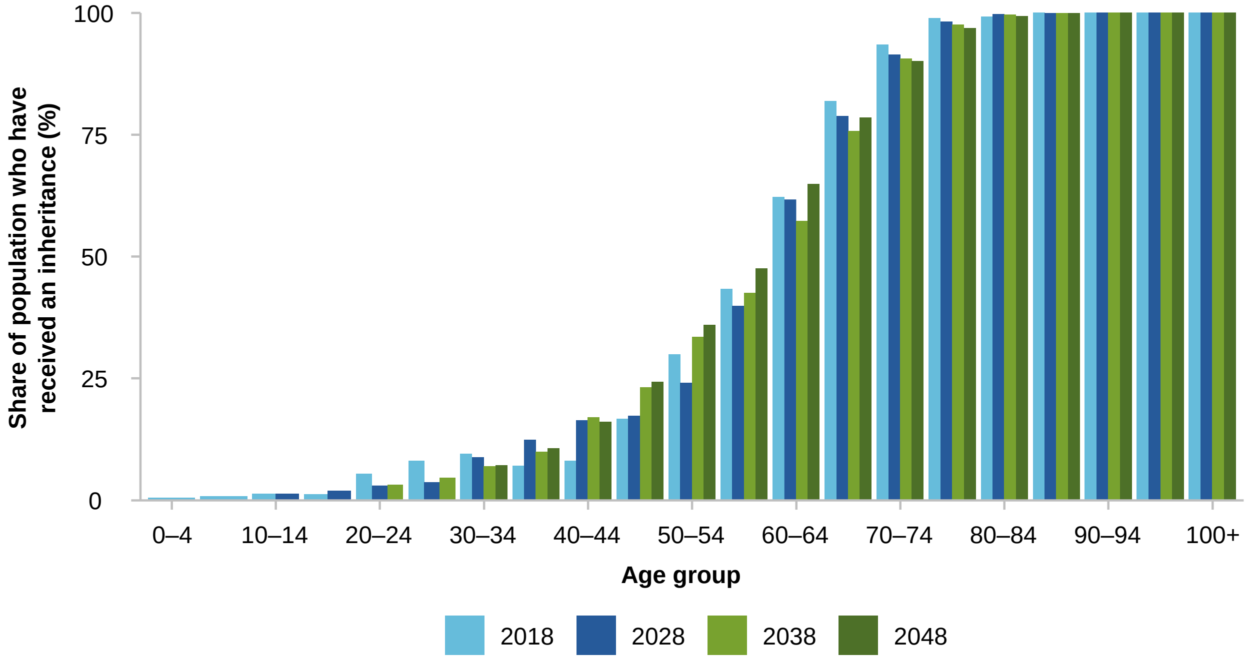
Drawdowns from other assets were estimated from HILDA using a deemed rate of return on other assets (estimates of historical rates by age group described above) and a deemed saving rate (estimated from the HES described above). Using balanced samples of HILDA between each wave containing wealth data (every four years), the differences between observed changes and expected changes in other assets (given deemed rates of return and saving) were assumed to be due to drawdowns. A weighted average annual rate of drawdowns was calculated by age group and homeowner status (no clear pattern was observed across income groups). These drawdown rates ranged from about 0 to 11 per cent per year. At younger age groups, drawdown rates were relatively high for non-homeowners (who also tended to have fewer other assets) and relatively low for homeowners, and then rates stabilised at older ages. Alternative drawdown assumptions are tested in section C.4.

Wealth transfers

Inheritances

The size of wealth at death in the model is driven by mortality rates and wealth accumulation over the projection period. The probability of being in a relationship at death by age group was estimated using ABS.Stat data on deaths (ABS 2020d). For people who had a living partner, wealth at death was assumed to stay within the same cohort. (The effect of adjusting this assumption is examined in section C.4.) Of the wealth at death of single people, 2 per cent was assumed to be distributed to charities (this wealth disappears from the model) based on estimates from other studies (appendix A). The remainder of wealth at death was assumed to be distributed to younger generations based on the distribution of parent age (section C.2). This resulted in fairly stable shares of the population by age group who have received an inheritance over the projection period, with most people having received an inheritance by the time they reach the 60–64 age group (figure C.7).

Figure C.7 – Projected share of population who have received an inheritance



Source: Productivity Commission estimates from cohort simulation model.

Within age groups receiving inheritances, the distributions of inheritances to the wealthy and the less wealthy were parametrised using HILDA data based on the pre-inheritance wealth of inheritance recipients. (Inheritance recipients excluded those who likely received inheritances due to the death of their partner.) Specifically, within the waves containing wealth data (every four years), each age group from 30–34 to 85–89 was split into age-specific wealth tertiles. An individual's last recorded wealth tertile prior to receiving an inheritance was assumed to be their pre-inheritance wealth tertile.

The share of total inheritances received by each pre-inheritance wealth tertile was calculated for each age group and wave, and then averaged. In the base scenario model, about 13 per cent of inheritances received by the 30–34 to 85–89 age groups was assumed to go to the bottom wealth tertile, 33 per cent to the middle tertile and 54 per cent to the top tertile. Inheritances received by age groups younger than 30–34 or older than 85–89 were assumed to be split evenly among tertiles — very few people in these age groups receive inheritances, and for those younger than 30, there tends to be much less disparity in wealth.

As discussed in chapter 1, inflow measures of inheritances may be affected by non-reporting, particularly small inheritances that tend to be received by less wealthy recipients. If this is in fact the case, then the share of inheritances projected to go to the lowest wealth groups may be underestimated, and inheritances may have a greater equalising effect on the distribution of wealth than estimated.

Conversely, if higher wealth groups actually receive a larger share of inheritances (for example, because the wealthiest people in the population are under sampled in survey data (appendix A)), then inheritances could have a less equalising (or even disequalising) effect on wealth distributions than estimated. Such a scenario is investigated in section C.4.

Inter vivos gifts

Modelling gifts is more complicated than inheritances because of the need to estimate parameters for both gift givers and gift receivers (whereas with inheritances, giving is informed by mortality rates and parameters relating to wealth accumulation).

There is some data on gift receiving in HILDA, though people likely underreport gifts (chapter 1). The estimates on gift giving have been inferred from gift receiving, but there is a lack of information on who is more likely to give larger gifts to their children. As stated in section C.1, the extent of the effects of gifts are uncertain and may be understated in the model.

Gifting rates from parents to children were estimated in the following way.

1. In the waves containing wealth data, the sample was split by the parent age groups recorded by survey respondents.
2. For each parent age group, based on the number and value of gifts reported as received by children within those groups, the probability of children receiving a gift and average gift size were calculated.
3. In those same waves, the share of the population having children and the size of 'other assets' held were calculated by age group. This information was combined with the information in step 2 to estimate total gifts given to children as a proportion of other assets, by age group. Cohorts aged 80–84 and over were assumed to not give gifts as raw estimated gifting rates tended to decline at these older age groups. Their children would typically be over the age at which significant gifts are given (such as for housing and education) and most of their wealth would soon be passed on as inheritances.
4. Gift sizes reported in HILDA have increased significantly over time (chapter 1). To ensure that the model's gifting rates reflected more recent gift sizes, gifting rates were scaled up to replicate the total size of gifts received in HILDA in 2018.

Estimated gifting rates were small. The 50–54 age group had the largest rate, gifting 0.9 per cent of their other assets each year. The sensitivity of assumptions about the size of gifts were investigated in additional model scenarios (section C.4).

Gifts given by each age group in the model were assumed to be received in equal amounts by people in cohorts who had parents of those ages. Unlike inheritances, the model does not redistribute gifts according to pre-gift wealth. Gifts received in HILDA appear to be more equally distributed across wealth than inheritances are, especially at younger age groups.

Discount rate

The model produced projections of wealth and wealth transfers in nominal dollars. These nominal values were adjusted to real 2018 values using projected income growth as the discount rate. The income growth rate provides a useful reference point for growth in wealth, especially in analysis of wealth inequality. Piketty (2014, p. 267) noted that when the rate of return on capital is higher than the growth rate of the economy and incomes:

> wealth originating in the past automatically grows more rapidly, even without labor, than wealth stemming from work, which can be saved. Almost inevitably, this tends to give lasting, disproportionate importance to inequalities created in the past, and therefore to inheritance.

The Retirement Income Review also discounted estimates of assets at retirement and superannuation balances by average weekly earnings (The Treasury 2020, p. 207).

C.4 Further details of results and scenario analyses

As discussed in chapter 3, the base scenario model projections to 2050 suggest that:

- wealth becomes more concentrated towards older cohorts
- wealth transfers reduce relative inequality (when compared with a world without future wealth transfers) but the effect is small.

In analysing the effect of wealth transfers on relative wealth inequality, chapter 3 largely focused on *differences* in projections of the Gini coefficient. The underlying values of the Gini coefficient were produced for this purpose, but are not designed to be used as predictions of future wealth inequality (box C.2).

There is uncertainty in the parameters used in this model, including around future rates of return and behaviour, and parameters that are estimated based on limited data. A number of changes to the base scenario assumptions were examined in alternate model scenarios to investigate their importance to the results. Chapter 3 provides a summary of these results, which found that wealth transfers only increase relative wealth inequality in scenarios that help the wealthy accumulate more wealth from wealth transfers than the less wealthy.

The remainder of this section presents further details from sensitivity analysis of the results to changes in assumptions. The scenarios analysed are grouped into four types:

- rate of return adjustments
- wealth transfer adjustments
- housing adjustments
- other adjustments.

Figures are presented for each of the scenarios relating to:

- total wealth by age group in 2048 (panel a in the figures)
- percentage of wealth held by age group in 2048 (panel b, and comparable to figure 3.3 in chapter 3)
- improvement in wealth inequality due to wealth transfers (panel c, and comparable to figures 3.6 and 3.8 in chapter 3).

Box C.2 – Projections of the Gini coefficient

The model was not optimised to predict wealth inequality outcomes for the future Australian population. The projections of wealth inequality from the model do not include factors that could affect wealth inequality in the future, and the wealth accumulation processes in the model are much simpler than what occurs in reality. Importantly, the model excludes some drivers of population demographics: there are no births (which restricts analysis to the population aged 30 and over by 2048) and no new immigrants (who tend to be younger and higher skilled, so their outcomes are likely to affect wealth inequality in the future) (section C.1).

Projections of the Gini coefficient for the 30–99 age group in the base scenario indicated a fall in inequality by about 5 percentage points between 2018 and 2048. These projections were sensitive to rate of return assumptions — for example, when historical rates of return on assets were assumed in the model, the Gini was projected to be little changed in 2048. The projected trend when historical returns are used is consistent with the relatively flat trend in the Gini coefficient of equivalised household wealth observed in

Box C.2 – Projections of the Gini coefficient

HILDA for the whole population since 2002. (Estimates of the Gini coefficient from the ABS Survey of Income and Housing (SIH) indicated increasing wealth inequality over the period (PC 2018a, p. 74). The Commission has not undertaken, and is not aware of, any analysis seeking to explain the differences between the estimates based on SIH and HILDA.)

The decreasing trend in the projected Gini in the base scenario is driven by a number of factors.

- An ageing population: Older people tend to have more wealth than younger people, so an ageing population increases the share of the population with relatively higher wealth. All else equal, this results in a reduction in measured wealth inequality.
- Continued maturation of the compulsory superannuation system: Lower income earners have low saving rates, but when superannuation was made compulsory in 1992, their saving rates rose to between 3–10 per cent of wages, with a continued increase to 12 per cent by 2025. This increases the relative wealth of the less wealthy, which reduces relative wealth inequality.
- The model's wealth accumulation processes and diversity of possible outcomes are much simpler than in reality: For example, in reality, wealthier people tended to have a larger share of their wealth in types of 'other assets' that earn higher rates of return than less wealthy people, but the model assumes that all people of the same age group earn the same rate of return on 'other assets' during the projection (section C.3). This reduces relative wealth inequality in the model, all else equal. Similar wealth-related variations exist for housing prices and voluntary superannuation contributions.

As the focus of the study was on analysing the effect of wealth transfers on relative wealth inequality, differences in the Gini coefficient were examined between simulations with wealth transfers and those without transfers. This approach abstracted away from the issues affecting the aggregate Gini.

Rate of return adjustments

There is substantial uncertainty around future rates of return on assets. A number of alternate rate of return scenarios were investigated (table C.2). As described in chapter 3, these can lead to large differences in projected wealth and hence wealth transfers (figure C.8, panel a). Scenarios that had higher rates of return also had greater levels of wealth inequality (as measured by the Gini coefficient) (box C.2).

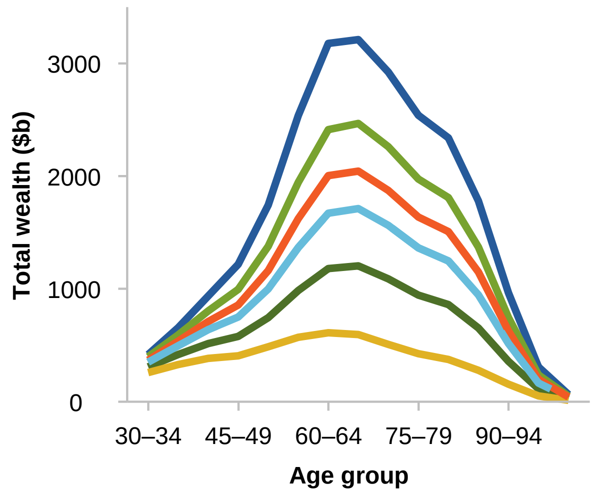
Table C.2 – Rate of return adjustments in scenario analyses

Scenario	Description
1a: Historical rates	Historical rates of return used (housing 7 per cent, superannuation 5.35–6.00 per cent, other assets 3.3–5.0 per cent).
1b: High returns	All rates of return on assets converge to 5.6 per cent.
1c: Low returns	All rates of return on assets converge to 2.4 per cent.
1d: Zero returns	All rates of return on assets are zero.
1e: Housing return 5%	Counterfactual housing return assumption — housing rate of return converges to 5 per cent instead of 4 per cent.

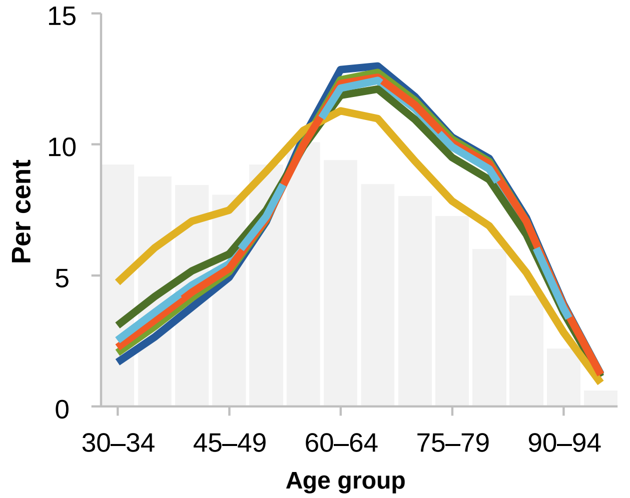
The finding that wealth becomes more concentrated towards older cohorts and that wealth transfers reduce relative inequality remained unchanged (figure C.8, panels b and c). As discussed in chapter 3, the underlying value of the Gini was higher in the scenarios that had higher rates of return, and wealth transfers led to greater reductions in the Gini from those higher levels.

Figure C.8 – Rate of return adjustment results

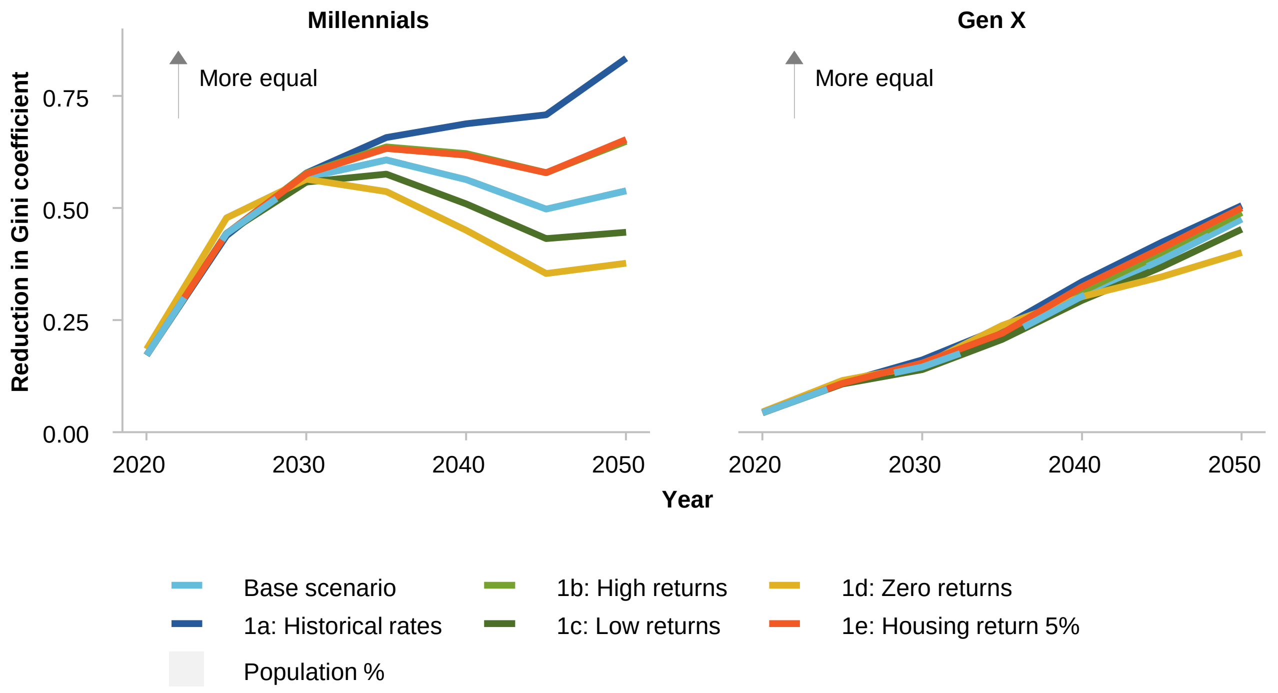
a. Total wealth by age group in 2048 (2018 dollars)



b. Percentage wealth held by age group in 2048 (percentage of projected 30–99 year old wealth)



c. Improvement in wealth inequality due to wealth transfers (reduction in Gini coefficient on a 100 point scale)



Source: Productivity Commission estimates from cohort simulation model.

Wealth transfer adjustments

Chapter 3 presented the results of three wealth transfer adjustment scenarios (table C.3, scenarios 2a to 2c), where:

- the wealthy receive larger inheritances
- the wealthy save more of their inheritance
- the less wealthy save less before receiving an inheritance (in anticipation of receipt).

The assumptions in these scenarios increased the extent to which the wealthy benefit from receiving inheritances, and led to wealth transfers worsening relative wealth inequality within generations for at least part of the projection period (chapter 3).

Three other wealth transfer adjustments were also examined (table C.3, scenarios 2d to 2f). In each of these scenarios, wealth transfers were found to reduce wealth inequality in the long run, as in the base scenario (figure C.9, panel c), but there were some other notable results.

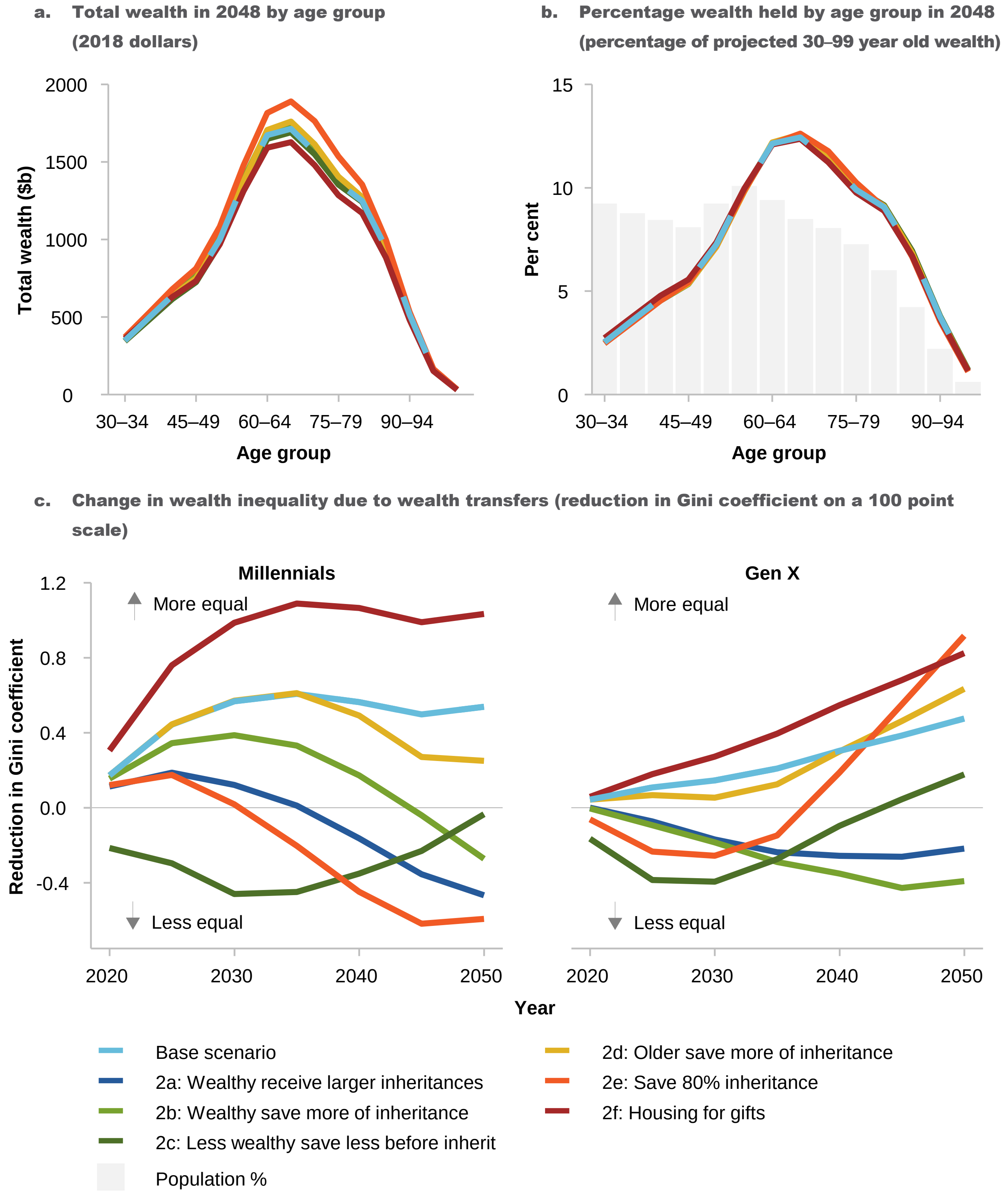
Table C.3 – Wealth transfer adjustments in scenario analysis

Scenario	Description
2a: Wealthy receive larger inheritances than in base scenario	Inheritance recipients aged 30–89 in the top third of the wealth distribution for their age group receive 65 per cent of the pool of inheritances for their age group, the middle third receive 30 per cent, and the bottom third receive 5 per cent. (Base scenario distributions are about 54, 33 and 13 per cent respectively.) It is also assumed that receiving an inheritance does not lead to an increased probability of home ownership.
2b: Wealthy save more of inheritance than in base scenario	Inheritance recipients aged 30–89 in the top third of the wealth distribution for their age group save 40 per cent of their received inheritance in other assets upon receipt, the middle third saves 20 per cent, and the bottom third saves 5 per cent.
2c: Less wealthy save less than the wealthy before receiving inheritance	Cohorts aged 30–89 that have not yet received an inheritance and are in the top third of the wealth distribution for their age group have a rate of saving on income in other assets that is 10 per cent lower than under the base scenario, the middle third have a saving rate that is 20 per cent lower, and the bottom third have a saving rate that is 40 per cent lower. Saving rates on income in other assets revert to base scenario rates upon receiving an inheritance.
2d: Older cohorts save more of inheritance	Cohorts aged 55 and over who receive an inheritance save their inheritance in other assets at double the saving rate of income in other assets.
2e: Save 80 per cent of inheritances	All cohorts save 80 per cent of their inheritance in other assets. Receiving an inheritance does not lead to an increased probability of home ownership.
2f: Housing for gifts	Cohorts aged 60–79 withdraw 0.3 per cent from housing assets each year to give as gifts (similar to assumed housing drawdowns for the age group). (No assumptions were made on the use of gifts to purchase housing.)

Assumptions about how cohorts save their received inheritances were changed in two of the scenarios (2d and 2e), due to the uncertainty and lack of data around this measure.

In scenario 2d, older people (aged 55 and over) were assumed to save more of their inheritance. This might happen because older people have a longer history of habit formation, leading to slower adjustments in consumption in response to changes to income (Carroll, Overland and Weil 2000). There was a larger ‘timing effect’ of inheritances on relative wealth inequality observed in this scenario. This can be seen most obviously in the later years of the projection for millennials — in scenario 2d, the equalising effect of transfers falls so it is lower than under the base scenario (figure C.9, panel c). Once all people within the generation have received an inheritance in the model, there is a greater equalising effect, as seen in the middle to later years of the projection period for generation X.

Figure C.9 – Wealth transfer adjustment results



Source: Productivity Commission estimates from cohort simulation model.

Scenario 2e assumed that all cohorts saved the same share of their inheritance in other assets, at a much higher rate than in the base scenario in order to reduce the implied depletion of inheritances.[71] This scenario is designed to reflect behaviour observed in this study (chapter 2), which found that Australians have typically been 'net investors' of their inheritances (but not by enough to overcome inflation). There was also insufficient evidence to reject the possibility that Australians were typically net consumers of inheritances. This result is at odds with international studies, which suggested that recipients typically depleted half to three quarters of their inheritance within a decade after receipt in nominal terms.

In scenario 2e the timing effect of inheritances was amplified, suggesting that there can be worse wealth inequality outcomes within generations earlier in life when only some receive large wealth transfers and use them to accumulate more wealth (observed among millennials during the projection period in this scenario), but the effect is reversed within the generation after a greater share of people have received an inheritance (observed among generation X) (figure C.9, panel c).

In scenario 2f, assumptions about gifting behaviour were adjusted. Older people were assumed to draw down on their housing wealth and gift it to younger generations, and the equalising effects were found to be stronger (figure C.9, panel c). This is partly because gifts given by parents of the same age were assumed to be distributed equally in the model so the less wealthy receive a gift that is a higher proportion of their existing wealth than wealthier people. In addition, homeowners tend to have higher wealth, so gifting it away reduces wealth inequality among the giving generation.

A separate scenario (not depicted) examined increases in gifting rates from other assets by 2 per cent each year. While this resulted in a slightly greater equalising effect for ages at which people *receive* gifts, there was a slightly greater disequalising effect at ages at which people *give* gifts. This is due to the assumption that both wealthy and less wealthy cohorts of the same age group gift at the same rates from their other assets — and other assets are a higher proportion of total wealth for the less wealthy. Noting that there is high uncertainty around these gifting parameters, if wealthier people do gift a larger proportion of their existing wealth than less wealthy people do (as seen in scenario 2f), then gift giving has the potential to be equalising as well.

Across all wealth transfer adjustment scenarios, the results of wealth held by age group were largely unchanged (figure C.9, panels a and b).

Housing adjustments

Housing makes up the largest share of wealth in the model. A number of adjustments were made to investigate the effects of housing parameters on the results (table C.4).

[71] A 'rate of inheritance depletion' parameter is not directly included in the model. Rather, inheritance depletion depends on a number of parameters including immediate saving of inheritances, rates of return, drawdowns and saving from income (as people could indirectly consume an inheritance by earning less labour income). The impact of inheritances on the probability of owning a home was also removed to prevent overstating the impact of inheritances in this scenario.

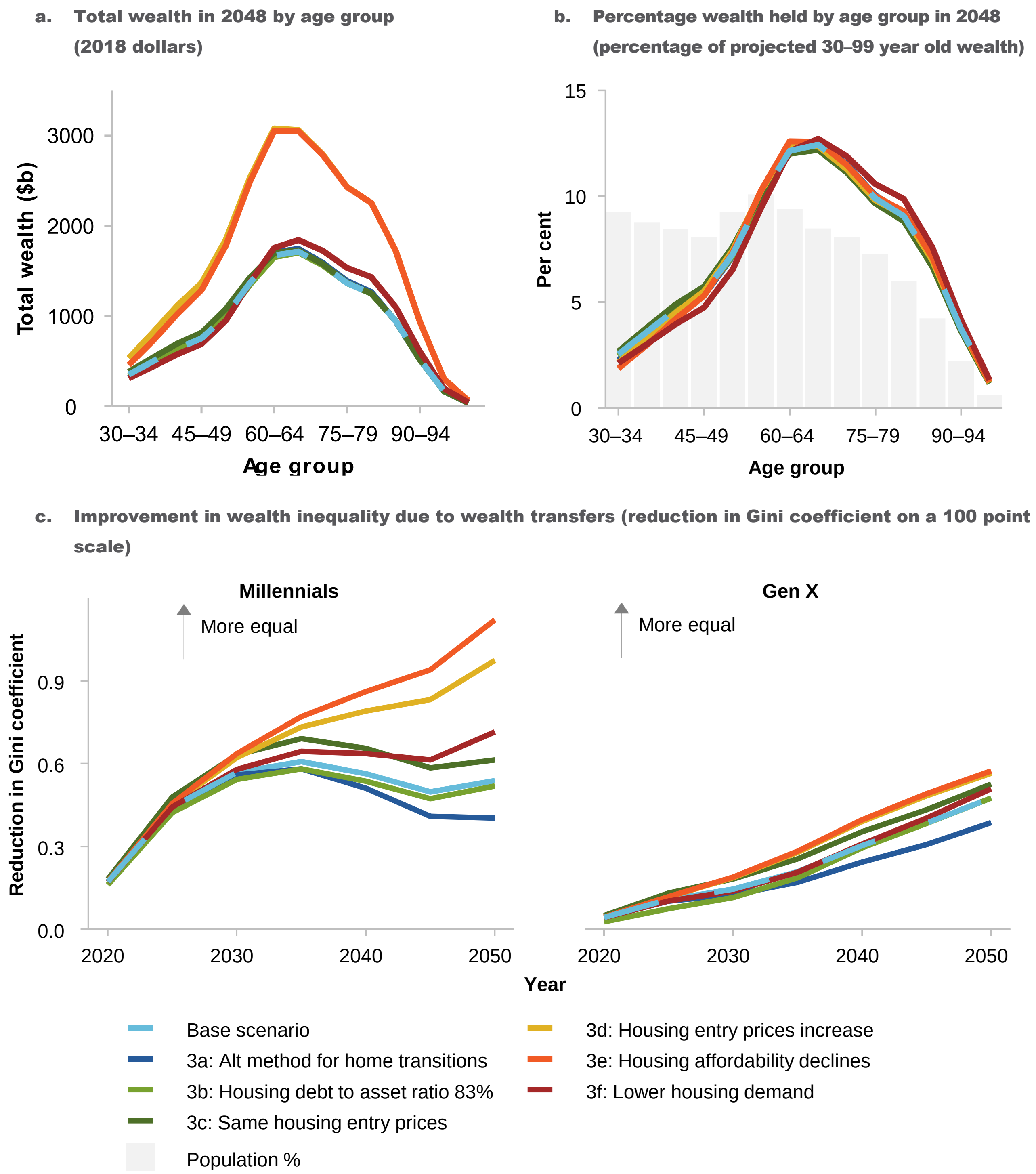
Table C.4 – Housing adjustments in scenario analyses

Scenario	Description
3a: Alternate method for estimating probability of home ownership	Longitudinal panel HILDA data (rather than cross-sectional data across age groups) used to estimate probability of home ownership. This resulted in younger cohorts taking longer to get into home ownership but overall higher home ownership rates by the time cohorts reach age 50.
3b: Housing debt to asset ratio on purchase is 83 per cent	Housing debt to asset ratio on housing purchases assumed to be 83 per cent across all cohorts (higher than base case), based on RBA estimate for indebted first home buyer households (which excluded those with no debt) (Simon and Stone 2017, p. 14).
3c: Same housing entry price across all income groups	All cohorts in the same income quintile enter property market with same housing entry price as top income quintile in the base scenario.
3d: Housing entry prices increase over time	Housing entry prices increase by 2 per cent more than base scenario housing entry price each year. Housing returns are at historical rates.
3e: Housing affordability declines over time	Probability of entry into home ownership falls by 2 per cent each year for everyone but the highest income quintile. Entry prices for housing increase 2 per cent faster each year. Housing returns are at historical rates.
3f: Lower housing demand	Probability of entry into home ownership falls by 5 per cent each year in first 5 years and then stays stable. Housing entry prices grow 2 per cent slower than base scenario each year in first 5 years and then 0.5 per cent slower each year thereafter. Housing returns fall from 7 to 5 per cent within 5 years.

The first three scenarios (3a to 3c) analysed alternate housing parameters due to uncertainty in their estimation for the base scenario. In particular, different estimates were used for the probability of entering home ownership, housing debt to asset ratios, and housing entry prices. These changes affected outcomes only slightly for younger people in the model, who were more likely to become homeowners during the projection period. The changes were not large enough to significantly affect patterns of wealth held across age groups (figure C.10, panels a and b). These changes also did not have a large effect on the size of inheritances in the model because young people were much less likely to have died during the projection. The overall equalising effect of wealth transfers remained (figure C.10, panel c).

The last three scenarios (3d to 3f) adjusted assumptions relating to the future of the housing market, including around growth rates, affordability and demand. Projected wealth and wealth inequality in these scenarios were higher than that projected under the base scenario because of the higher assumed rate of return on housing (figure C.10, panel a). However, wealth transfers were still projected to have an equalising effect (figure C.10, panel c). While the future of the housing market could affect the extent of wealth inequality more generally, it is not projected to change the equalising effect of wealth transfers, unless it also significantly increases the extent to which the wealthy benefit from wealth transfers.

Figure C.10 – Housing adjustment results



Source: Productivity Commission estimates from cohort simulation model.

Other adjustments

A number of other adjustments to model assumptions were investigated (table C.5).

Table C.5 – Other adjustments in scenario analyses

Scenario	Description
4a: Alternate method for estimating drawdowns in other assets	Cross-sectional HILDA data across age groups (rather than balanced longitudinal panel data) used to estimate difference between observed change in wealth and estimated change (given assumed rates of return and saving). Results in similar patterns of drawdowns but some higher rates, particularly for older homeowners.
4b: Older cohorts' drawdowns from wealth increase over time	Drawdown rates on other assets for cohorts aged 65+ increase by 5 per cent of base scenario rates each year for next 10 years and then stay stable (new rates range from 6–10 per cent). Drawdown rates on housing for cohorts aged 70+ increase by 15 per cent of base scenario rates each year for next 10 years and then stay stable (new rates range from 0.7–1.3 per cent).
4c: All wealth to younger generations at death	All wealth at death is passed onto younger generations, and no wealth is passed onto surviving spouses. This effectively assumes that nobody is partnered at death, or everyone who is partnered dies at the same time as their partner.

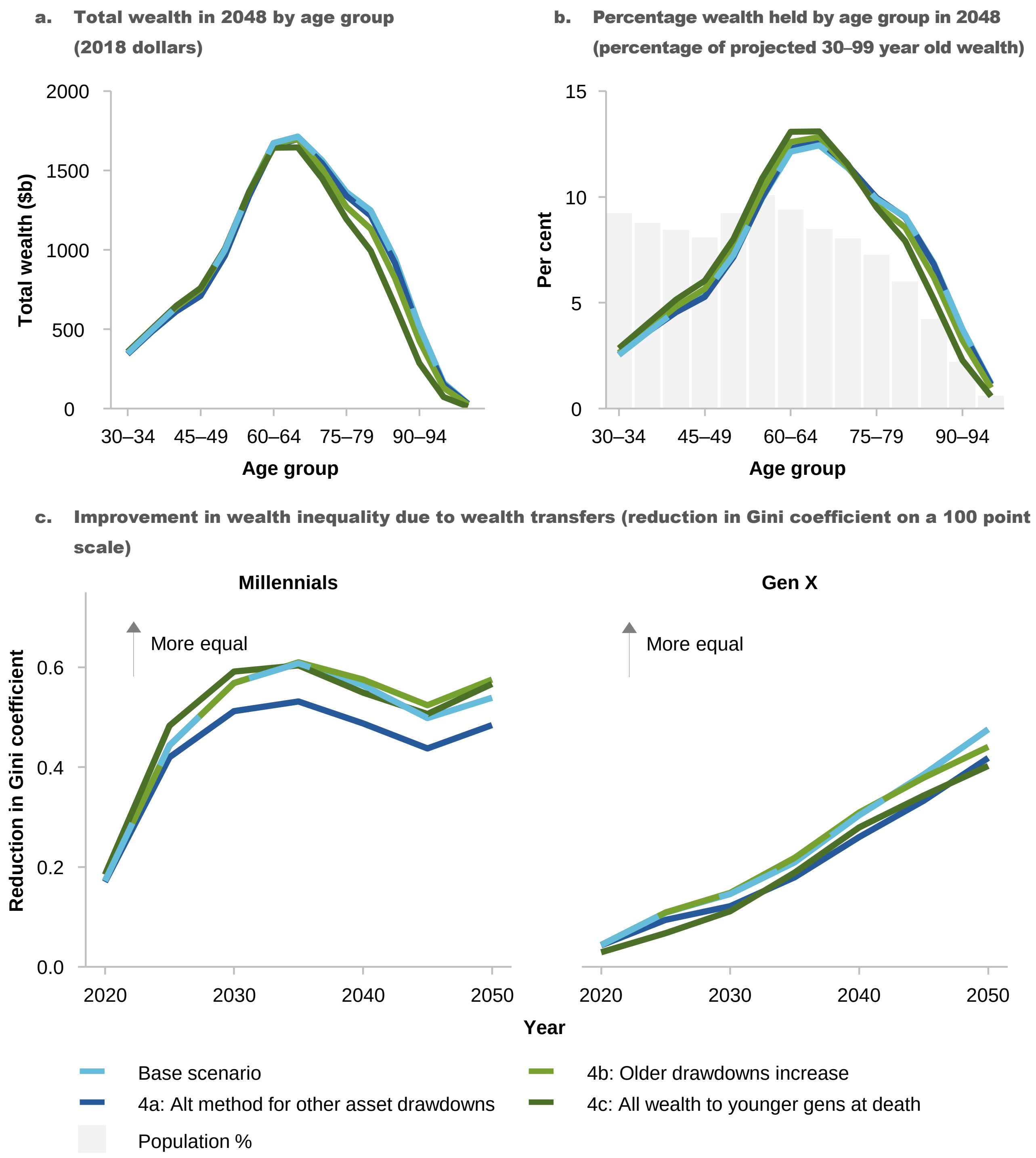
Scenarios 4a and 4b relate to drawdowns from wealth. As mentioned in section C.3, there is high uncertainty around drawdown parameters, especially for other assets. Drawdown behaviour may also change in the future — although past generations of retirees have tended to draw down on their wealth slowly, there is some evidence to suggest that newer generations of retirees might behave differently. For example, more recent generations of Australian homeowners are more likely to be carrying mortgage debt later in their working lives than generations before them (Wood, Ong and Cigdem 2014, pp. 5–6). Older homeowners were also found to be increasingly likely to draw down on their housing wealth (Ong et al. 2013, pp. 16–17). If baby boomers continue to have a higher propensity for taking on debt in retirement, then the inheritances they leave might be smaller in size than anticipated.

Scenario 4a used an alternate method for estimating drawdown rates, which led to higher drawdown rates, especially for older homeowners. The size of gifts and inheritances were therefore smaller in this scenario, and wealth transfers were found to have a smaller equalising effect compared with the base scenario (figure C.11, panel c). Scenario 4b assumed that drawdown rates on housing and other assets for older cohorts gradually increase over time. This largely reduced inheritances in the model, and hence reduced the equalising effect of wealth transfers when inheritances are received (figure C.11, panel c). In both scenarios, total wealth within age groups was similar to the base scenario (figure C.11, panels a and b).

Under the base scenario, a fixed age-based percentage of wealth at death was assumed to remain within the same cohort, as a simple and tractable way of accounting for the fact that not all wealth is passed on to younger generations at death when there is a surviving spouse. However, because the wealth is spread evenly among all surviving members of the cohort in the model, this assumption leads to higher wealth among older generations than if couples were explicitly modelled and had their wealth passed on when both members die. Scenario 4c examines the effect of undoing this assumption and instead assuming that no wealth stays in the same cohort at death and is passed entirely to younger generations.

As expected, older age groups hold a slightly lower share of wealth in scenario 4c than in the base scenario (figure C.11, panels a and b). However, as in the base scenario, older people were still projected to hold a disproportionately larger share of wealth over time (that is, as a percentage of the population aged 30–99, there was a 19 percentage point increase in the wealth share compared with a 12 percentage point increase in population share for people who were 60 and over). The finding that wealth transfers are equalising is also unchanged (figure C.11, panel c). However the magnitudes of effects are slightly altered — scenario 4c brings forward the size of inheritances received and increases the timing effect because inheritances are bigger among those who receive theirs earlier. Those who receive an inheritance later than their peers may receive smaller inheritances than under the base scenario because older people hold less wealth.

Figure C.11 – Other adjustment results



Source: Data source: Productivity Commission estimates from cohort simulation model.

Public consultations

In preparing this research paper, the Commission consulted with a range of organisations, individuals, industry bodies, government departments and agencies. The Commission is grateful for their assistance.

Individual/organisation
ACT Supreme Court
Aged Care Steps
Australia and New Zealand Banking Group
Australian Bureau of Statistics
Australian Institute of Health and Welfare
Australian Taxation Office
Centre of Excellence in Population Ageing Research
Cobb-Clark, Deborah (University of Sydney)
Commonwealth Bank of Australia
Courts Administration Authority of South Australia
Deloitte Access Economics
Department of Health
Department of Social Services
Department of Treasury
Finder
Grattan Institute
Gross, Isaac (Monash University)
Laurie, Mark
Melbourne Institute
Mozo
National Australia Bank
Reserve Bank of Australia
Rice Warner Actuaries
Roach, Joe
Services Australia
Siminski, Peter (University of Technology Sydney)
Supreme Court of Victoria
Tax and Transfer Policy Institute (Australian National University)
ViforJ, Rachel (Curtin University)
Westpac Banking Corporation

Abbreviations

ABS	Australian Bureau of Statistics
ATO	Australian Tax Office
ALife	ATO Longitudinal Information Files
BOMD	Bank of Mum and Dad
CBA	Commonwealth Bank of Australia
DFA	Digital Finance Analytics
HES	Household Expenditure Survey
HILDA	Household, Income and Labour Dynamics in Australia (Survey)
IWP	Intergenerational wealth persistence
MADIP	Multi-Agency Data Integration Project
OECD	Organisation for Economic Co-operation and Development
OLG	Overlapping generations
PC	Productivity Commission
RAD	Refundable accommodation deposit
RBA	Reserve Bank of Australia
SIH	Survey of Income and Housing
UK	United Kingdom
US	United States
YIF	Youth in Focus (Survey)

Glossary

Term	Description
Absolute inequality	See **inequality**.
Bequest	See **inheritance**.
Equivalisation	Adjusting household-level variables for differences in the number and age of people in each household. This enables comparison of the economic resources available to different households, by accounting for the fact that larger households need more income to achieve the same standard of living as a smaller household, and households generally have some 'economies of scale' due to sharing living costs.
Gift	See **inter vivos gift**.
Gini coefficient	A summary indicator of **relative inequality** that typically takes a value between 0 and 1 (or 0 to 100 on a 100-point scale). A value of 0 indicates perfect equality (all people have the same wealth) and a value of 1 indicates perfect inequality (one person has all the wealth). The smaller the value, the more equal the distribution. Other indicators of inequality, including the absolute Gini coefficient and the generalised entropy class 2 coefficient are defined in appendix B.
Inequality	**Absolute inequality** refers to the degree of variation in an outcome (such as wealth) based on the numeric differences in the value of that outcome between individuals or households. An example of an absolute measure of inequality is the dollar difference in wealth held by the most and least wealthy households. In contrast, **relative inequality** refers to the degree of variation in an outcome based on the proportional differences in the value of that outcome. An example of a relative measure of inequality is the ratio of wealth held by the most and least wealthy households. See **Gini coefficient**.
Inheritance	Wealth that is passed on upon the death of the donor.
Inter vivos gift	Wealth that is passed on during the life of the donor.
Intergenerational	Between generations (for example, between parents and children).
Intergenerational wealth persistence	The association between an adult child's rank in the wealth distribution among their peers and their parent's rank in the wealth distribution among their peers. The greater the association, the greater is intergenerational wealth persistence (or, conversely, the lower is intergenerational wealth mobility). The respective ranks are usually calculated by comparing adults and children when they were roughly the same age.
Intragenerational	Within the same generation.
Probate	The legal process to prove the validity of a person's will. A grant of probate is an order passed by the relevant State or Territory's supreme court confirming that a will is the last valid will of the deceased and allowing an executor, named in the will, to collect and distribute the estate in accordance with the will. Once probate is formally declared, probate records document the amount of assets held by the deceased persons and how they are distributed.
Quantile	Units of analysis formed by ranking all observations in a distribution (for example, incomes of people or households) from smallest to largest and then dividing these into a certain number of equal-sized groups. **Tertile**: Formed by dividing ranked observations into three groups. **Quartile**: Formed by dividing ranked observations into four groups. **Quintile**: Formed by dividing ranked observations into five groups. **Decile**: Formed by dividing ranked observations into 10 groups. **Percentile**: Formed by dividing ranked observations into 100 groups.
Quartile	See **quantile**.

Term	Description
Quintile	See **quantile**.
Relative inequality	See **inequality**.
Tertile	See **quantile**.
Wealth	The total value of assets less debts.
Wealth transfers	**Inheritances** and **inter vivos gifts**.

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