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Productivity Commission

Analysis of members' needs

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The Productivity Commission

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The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

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Technical supplement 6: analysis of members' needs

This technical supplement provides documentation and further results from empirical analysis of some of the key aspects that determine whether members' needs are met by the superannuation system.

Section 6.1 outlines the simulation methods used to explore the distribution of outcomes from various investment strategies, recognising that asset returns are volatile and that average results conceal the variety of outcomes that can occur. Members do not get average results in the same way that lottery players do not get the average odds on a lottery ticket. Such modelling is also helpful in that it can indicate that intuition about the outcomes from different product designs may not be correct (as for life-cycle products).

Section 6.2 provides some simulation results concerning the degree of sequencing risks for superannuation balances as members approach retirement ages.

Life-cycle products have been developed to mitigate sequencing risks. Examining the degree to which they do so requires stochastic modelling, with the outcomes of various scenarios assessed in section 6.3.

As noted in chapter 4, some super funds offer thousands of options, with concerns that these are associated with higher fees and lower net returns. Section 6.4 examines some of the empirical evidence underpinning those concerns.

Finally, it is well established that members often have a limited understanding of their super funds or superannuation in general. While this can lead to poor decision-making, it also can magnify uncertainty, distrust and lack of satisfaction. The links between various aspects of financial literacy and trust/satisfaction is explored in section 6.5.

6.1 Simulation approaches to testing the impacts of superannuation products

Throughout the inquiry report, the Commission used two general assessment methods for considering the impacts of, among other factors, shifting to life-cycle products, high fees, low returns and the balance erosion that accompanies insurance:

- a deterministic cameo model based on a 'representative' member (described briefly in chapter 1 and in more detail below)

- a stochastic model drawing on the parameters of the above model, but with stochastic rates of return, since one of the major determinants of outcomes for members are the future distribution of returns. This is particularly valuable for assessment of products that deal with sequencing risk — a problem that only arises when returns are not known ex ante. The focus of the analysis in this technical paper is on the accumulation phase, but the model can also indicate the outcomes in the retirement period.

Wages and fees are in real terms over the period of the analysis.

The most important ages

The member enters the superannuation system in 2018 at age *StartAge* (with the default being 21 years), retires in 2064 at age *RetireAge* (with the default being age 67 years) and dies in 2085 at age *DeathAge* (with a default value of 88 years). While many people will have patterns of work, retirement and death that vary from the default values, they nevertheless will align with the expected experiences of many people.

- The default retirement age is higher than the current observed rate, but various factors are likely to increase the average retirement age over the period of the Commission's model.[1] Improving life expectancy, rising labour force participation rates for older people and policies that have increased the age when people are eligible for withdrawals from superannuation (the preservation age) and access to the Age Pension will all tend to defer retirement ages. In particular, the shift to an Age Pension eligibility age of 67 years by 2023 is likely to have a marked impact. Regardless, even now a significant share of men retire at or after age 67 years.
- The life expectancy estimate is also higher than current levels, but is also plausible. The most recent life tables (2014–2016) suggest that someone reaching age 67 years in 2015, will live another 18 years, which would take them up to age 85 years (ABS 2017d). However, this projection is a period (not cohort) life expectancy, which takes as given the *current* mortality rates for each year after age 67 years. The general trend is for declining age-specific mortality rates (Kontis et al. 2017). Moreover, a later retirement age (which the age of 67 years is) is protective of longevity, even after taking account of observed health status.
- While many people work before age 21 years, the share doing so is still only around 40 per cent for males aged 15–19 years (in 2018), and this will often entail work that does not meet the minimum required threshold for mandatory superannuation contributions (ABS 2018). In contrast, the employment rates for males aged 20–24 years is more than 70 per cent.

In the main report, an alternative scenario also considers someone who is *currently* 55 years old with an existing superannuation balance, and then estimates the outcomes for them at retirement, which only entails 12 years of further accumulation. This technical supplement

[1] In 2016-17, the average retirement age for men (the default gender in the PC model) aged 45 years and over was 58.8 years (ABS 2017e table 3). Around 30 per cent had retired after age 65 years or more.

does not model outcomes for that cohort. The impacts on the adoption of a life-cycle product in *absolute* dollar terms from that cameo will be less than shown here because the balance for a 55 year old today will reflect lower historical statutory contribution rates and wage rates. However, the proportional effect on retirement balances of adopting a life-cycle product will be similar to that shown below.

Wage income and super contributions

Several factors are important in determining wage income over a lifetime:

- a starting wage, which is then subject to growth as the member ages (box 6.1)
- the effect of experience (years working in a job). While this is correlated with age, it is a distinct concept as people of the same ages can have quite different numbers of years of work experience. The experience effect on wage rates is modelled (for males) as:

  $$100\ Ln\ W_{age} = \boldsymbol{X\beta} + \propto Experience + \theta\ Experience^2$$

  where $\boldsymbol{X\beta}$ represents the vector of individual traits (and their corresponding estimated parameters from a Mincer equation) that determine the starting wage of any given person, and α and θ (respectively 1.556 and -0.019) are the estimated coefficients describing the impacts of experience on wages.[2] Accordingly, the impact of experience on the wages of a person who commences work at age 21 years and is employed for every year afterwards is:

  $E\_effect_{age} = exp^{0.01\ (\propto Experience + \theta\ Experience^2)}$ with experience = 0 for age 21 years, 1 for age 22 years and so on
- the impact of long-run productivity on wage growth, which is the major factor behind economywide wage rate trends. Estimated future labour productivity growth is 1.5 per cent per year, in line with the projections used in the 2015 *Intergenerational Report* (Treasury 2015)
- gender (with the base model reflecting male labour force experience over time)
- average working hours per week (assumed to be fixed at a full-time level in the base model)
- any interruptions to working, such as unemployment or exit from the labour force (which are not included in the base model described here, but can readily be included).

[2] The estimates are obtained from Forbes et al. (2010), whose model controls for many other aspects that determine wages. Similar results are obtained by Cai (2007) and Yu (2004), which have equally comprehensive models. Other models that have fewer control variables tend to find larger experience effects (Ganegoda and Evans 2015; Sinning 2014; Wei 2010), which may reflect omitted variable bias. Models with greater experience effects will lead to higher lifetime incomes and larger absolute impacts of any factors that erode member balances.

Box 6.1 Some variants on wages and experience effects

Case A: The default assumption is a full-time male non-managerial employee

There are multiple sources of wage data, but they do not provide contemporary wage estimates at the single year age level. Nevertheless, several indicators suggest that an annual wage rate of around $50 000 is a reasonable estimate for many full-time employees at age 21 years.

The average weekly total cash earnings of male permanent full-time non-managerial employees aged 21–24 years was $1113 in May 2016, with a corresponding value of $1003 for females (ABS 2017c, Data Cube 4, table 4). Since wages tend to grow with age, this suggest that 21 year olds would be receiving less than the rate for the entire age group. On the other hand, wage rates have increased (somewhat) over the ensuing years to 2018. Drawing on ABS data, the combination of these two factors are consistent with the assumed starting wage (ABS 2017a, 2017b).

Case B: The 'average' male non-managerial employee

Since many people work part time, especially at younger ages, the average wages of males (full-time and part-time) provides an alternative basis for estimating life-cycle income. The Commission estimates that a 21 year old non-managerial male employee earned around $36 500 in 2018, with this being used as an alternative starting wage (but with the same experience effects as in Case A).

Case C: A woman with two children

Women bearing children generally have interrupted careers, tend to more often work part time, and given the nature of jobs and reduced experience, earn less than their male counterparts of the same age.

Controlling for the effects of economywide wage increases over time, the earnings profile of women with two children were estimated using the relationship found by Breusch and Gray (2004). A starting wage equivalent to that of a female non-managerial employee aged 21 years in 2018 (around $30 000 per year) is used, based on the same ABS sources used in Case B.

Case D: Withdrawal from labour supply at older ages

Some older people commence working part time before retirement, which (to the extent that they do not adjust their working hours) means that they are more exposed to sequencing risks. The cameo in this instance is that the person works at 90 per cent of the full-time rate between ages 56 and 59 years exclusive, 80 per cent between the ages of 60 and 65 years exclusive, and 70 per cent from ages 66 to 67 years exclusive. All other variables follow those in Case A.

Case E: Higher payoff from experience in the labour market

While the experience parameters underpinning case A perform well in terms of predicting actual closing balances of a 21 year old who accumulates superannuation from 1996 to 2017, some studies find stronger experience effects. This case uses the results from Sinning (2014) to estimate the outcomes, but otherwise using the assumptions underpinning Case A.

Case F: Life-cycle product returns are 50/50 shares of the balanced portfolio and safe asset in the last 5 years

Given the above, wages as a member ages are given by the combined effect of the member's starting wage, the benefits of experience, and economywide productivity growth:

$$W_{age} = StartingWage \times (1 + 0.015) \times E\_effect_{age}$$

Additions to the members balance at each age are equal to:

$$Contributions_{age} = ContribRate \times (1 - ContribTax) \times W_{age}$$

ContribRate is the current 9.5 per cent contribution rate for the Superannuation Guarantee. The model does not pre-suppose that the contribution rate will be subsequently increased to 12 per cent (as proposed by Government) or that a member makes any voluntary contributions. Including these features in the model would exacerbate the adverse impacts on retirement balances of higher fees or lower returns. *ContribTax* is the 15 per cent contribution tax.

Financial returns to members

In the non-stochastic mode of the model, the gross rate of return on assets is 5 per cent, as in the cameo model presented in chapter 1 of the main report. Investment and administrative fees and charges for insurance are also as set out in chapter 1.

In the stochastic model, the gross real asset returns are estimated by bootstrapping from historical data on asset returns from 1988 to 2017 for a balanced portfolio. The advantage of this approach is that it mimics the underlying distribution of asset returns without needing to make assumptions about the distribution of the returns (such as normality).

For any given simulation, the estimated return for each of the years from 2018 to 2085 year is determined as a random sample (with replacement) for the historical series of returns. As there is some serial dependence between asset returns over successive years, the 'stationary block bootstrap' is used (as in Ganegoda and Evans 2015) with a block length of a maximum of five. This samples from blocks of returns in successive years with the block length varying randomly to ensure stationarity of the series, reflecting the time series nature of asset returns (Politis and Romano 1994).

The returns for the balanced portfolio are derived from data on nine asset classes (from Vanguard 2017 with conversion to real values through inflation-adjustment)[3] and assumed

[3] Asset shares for balanced/growth portfolios vary across super fund and time. Consequently, some judgment has been made in producing ranges for each asset class such that the midpoints of these ranges add to 100 per cent — with these midpoints being the basis for the (default) asset allocation used in the model. Vanguard's nine asset classes and their weights in the portfolio were Australian equities (27.5 per cent); global equities (17.5 per cent); global equities (hedged) (7.5 per cent); US equities (2.5 per cent); Australian bonds (15 per cent); global bonds (hedged) (5 per cent); cash (15 per cent); Australian property (7.5 per cent); and global property (2.5 per cent). Some funds construct portfolios that include other asset classes (for example, unlisted companies and infrastructure), but the Vanguard data has the advantage that

asset class shares consistent with a balanced portfolio. The mean (non-geometric) rate of return over the period from 1988 to 2017 is 5.3 per cent, and is close to the long-run rate assumed in the non-stochastic model. The standard error of the return is 8.2 per cent, signifying the considerable variation in returns. There is some skewness in the distribution of returns, although not so extreme that normality of the underlying distribution is statistically rejected.[4] While this means that the assumption of normality of rates of return may be a reasonable rule of thumb for simulations, this assumption may not apply for returns on a portfolio based on different weights for asset classes, and it does not capture any serial correlation in returns.

It is assumed that the funds undertake full annual auto-rebalancing to maintain fixed asset shares over time, an investment approach that is required to preserve the original risk strategy.

Determining the member's net balance for each year of age

Until members retire, the net balance at the end of each year (t from 2018 to 2064) is derived as:

$StartB_t = NetBalance_{t-1} + Contributions_t$, with $NetBalance_{t\text{-}1} = 0$ in the first year

$$NetBalance_t = StartB_t \times (1 + R_t - AdminFeeRate_t - InvestFeeRate_t) - AdminFeeFlat_t - Insurance_t$$

where *StartB* is the starting balance for each year after any new contributions, *AdminFeeFlat* is a fixed administration fee unrelated to the amount of investment funds, and *AdminFeeRate* and *InvestFeeRate* are fees that vary with the stock of investments in the member's fund. These fee rates vary between pre-retirement and post-retirement periods, but are otherwise fixed within those phases of a member's life. Insurance costs (chapter 1) depend on the age of the member and cease at retirement.

At retirement, the member withdraws income, with no additional contributions to replenish the stock of funds (with t from 2065 to 2085):

$$Income_t = DrawR_t \times NetBalance_t$$

$$StartB_t = NetBalance_{t-1} - Income_{t-1}$$

it extends much further back than other asset return series. A simulation, using a Dirichlet distribution, randomly drew from asset share ranges that included the above asset allocations, revealed modest impacts on retirement balances, suggesting that balanced funds with generally similar asset choices produce similar results.

4 However, the log of the rate of returns is much less aptly described as normally distributed, though often this is how asset returns are characterised.

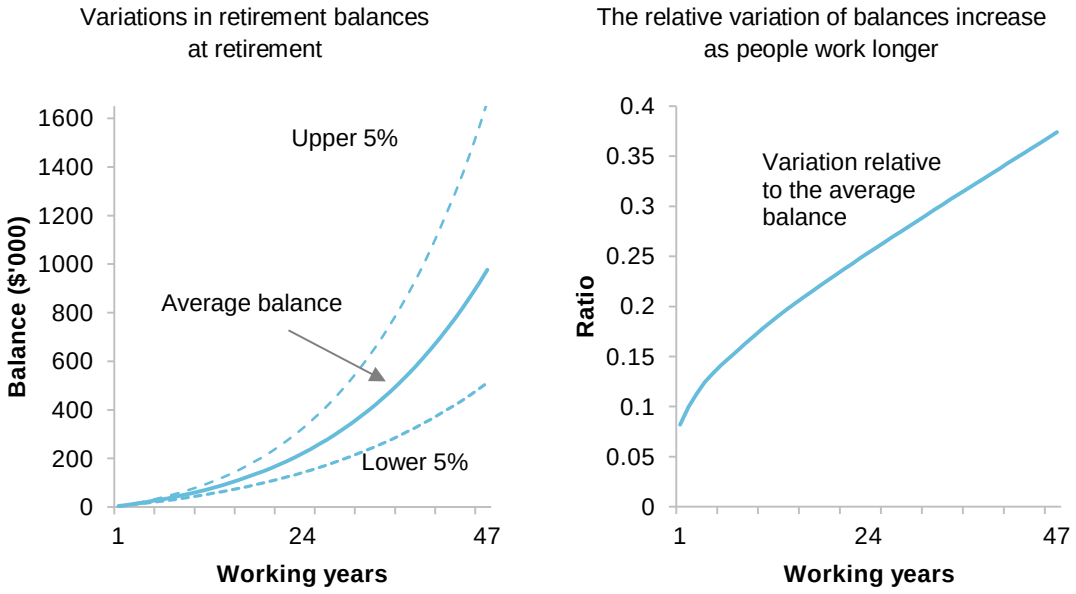
It is assumed that members withdraw at the minimum regulated rates.[5]

6.2 Sequencing risk

Downturns in asset returns close to retirement have much larger effects on retirement balances than downturns early in the working life of a member — a problem referred to as sequencing risk. Sequencing risk is particularly high for people in funds with high-risk exposure (say with a large weighting to equities).

While balances increase exponentially over time, so too do the extreme possibilities (the left hand panel of figure 6.1). For example, after working for 47 years, the average balance of an employee under the default case is close to $1 million, but there is a 5 per cent chance that their balance will be above $1.67 million and a 5 per cent chance it will be below $511 000 (case A). A single indicator of this pattern is the ratio of the standard deviation of the balance and the average balance, which more than quadruples from the first to last year of the employee's working life (the right hand panel of figure 6.1).

Figure 6.1 **Luck gets more important the longer people work[a]**



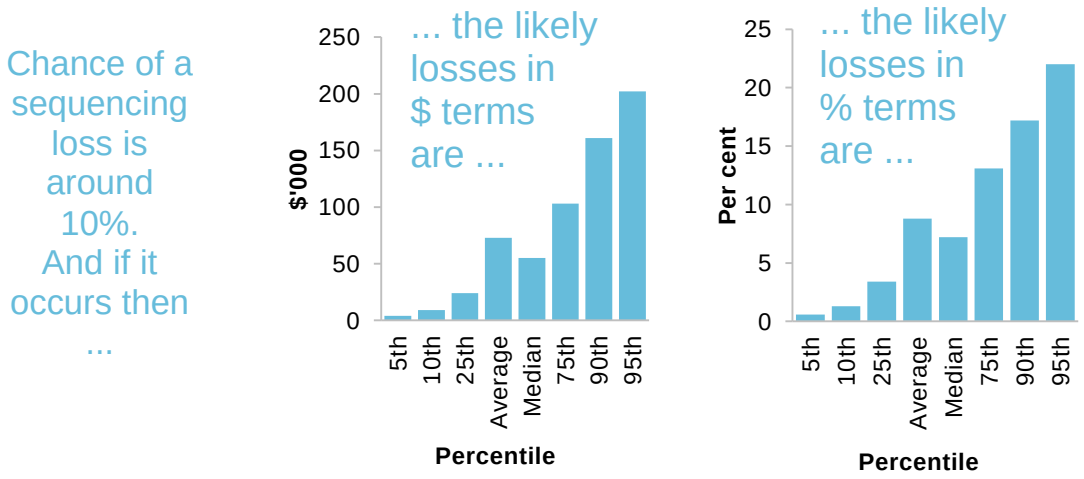
a Results are based on one million replications. The upper 5 per cent upper fractile is the value of the balance above which 5 per cent of outcomes occur, while the 5 per cent lower fractile is the value of the balance below which 5 per cent of outcomes occur. The variation relative to the average balance is the coefficient of variation (the standard deviation of the balances at any given age and the average balance for that age from the simulations). The results are based on bootstrapping asset returns with a block of 5 years.

5 In 2018, these were 4 per cent for age less than 65 years; 5 per cent for age 65 to <75 years; 6 per cent for age 75 to <80 years; 7 per cent for age 80 to <85 years, 9 per cent for age 85 to <90 years; 11 per cent for age 90 to <95 years; and 14 per cent for age 95 years or greater.

Life-cycle products do not seek to eliminate sequencing risks. Such a strategy would not be possible as no asset is free of risk — even 'safe' ones. Second, any strategy that involved investments in safer lower-returning assets over all of the years of a persons' working life would nearly always lead to lower balances at retirement than more risky strategies. Accordingly, most life-cycle products reduce risk exposure closer to retirement, though some products have a glide-path that commences early (figure 4.7 in the main report).

The likelihood that a balanced portfolio will deliver returns at retirement that are lower than even five years earlier is relatively low — around 10 per cent in the circumstances described in the default cameo (Case A). And if such an event occurs, the average losses are not that great compared to the balance five years before retirement (figure 6.2).

Figure 6.2 **The five year regret — what happens if balances go down in the last five years before retirement[a]**



[a] Based on simulating case A. See the note in figure 6.1 to interpret percentiles. The Commission also modelled a case where the bootstrap model did not have a block structure. In that instance, sequencing risk fell to 7.3 per cent and the average loss when sequencing risk occurred was around 15 per cent less.

6.3 What are the impacts of life-cycle strategies?

To address sequencing risks, life-cycle products shift members into lower-risk portfolios as they approach retirement. How well they do this is debatable and can only be assessed using stochastic modelling.

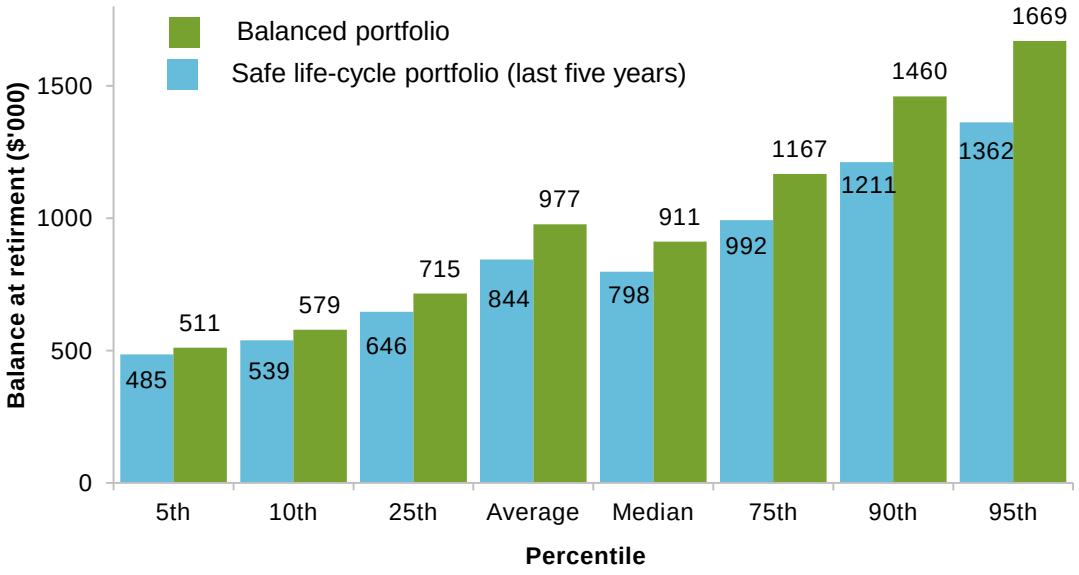
One illustration of the effects of life-cycle strategies is to compare outcomes of maintaining a balanced investment strategy until retirement and the outcomes of shifting from a balanced to a safe portfolio five years before retirement. In the example below, the safe portfolio produces a 2.5 per cent real return with zero variance. This gives the benefit of doubt to

life-cycle products as it is in excess of the real rates of return on cash in recent years,[6] which have sometimes been negative, and because in fact, 'safe' rates have never had zero variance.

A shift to a life-cycle product will *typically* forego significant returns as shown by the relative distribution of retirement balances associated with life-cycle and balanced products (figure 6.3). Overall, the simulation model shows that the life-cycle product produces an expected retirement balance more than $130 000 lower than maintaining a balanced investment strategy. (If the safe portfolio returns a long-run real cash rate of 2 per cent consistent with lower cash rates in recent years, then the average loss is more than $150 000.)

Moreover, while the life-cycle product can sometimes produce better results than a balanced product, the worst outcome from a life-cycle product are very poor, involving losses of $500 000 or more, while the best positive outcomes are smaller in magnitude (figure 6.4).

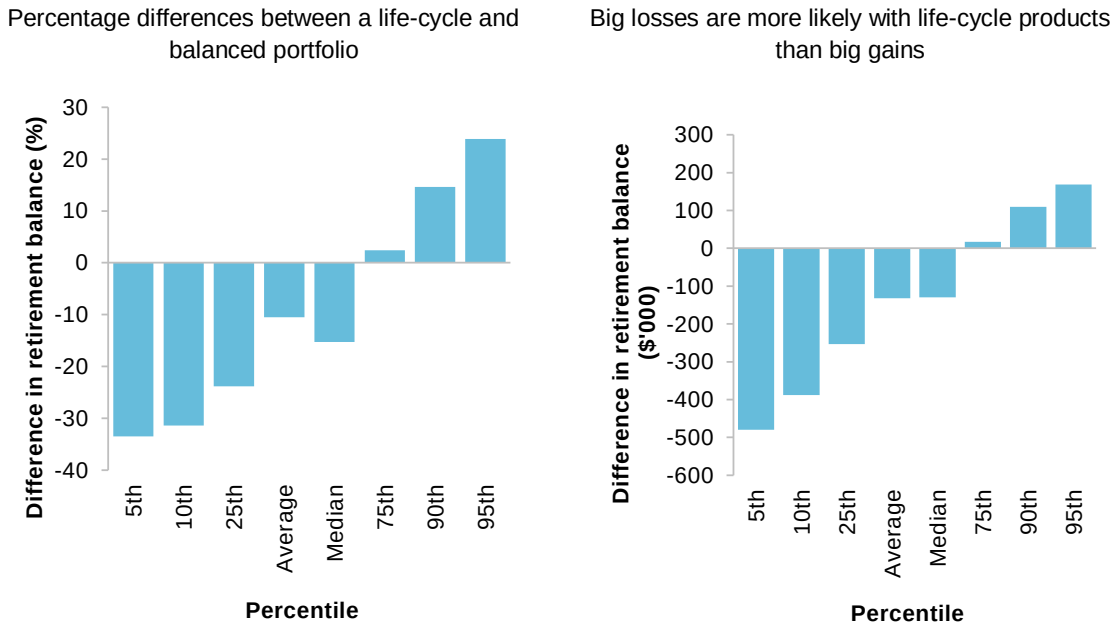
Figure 6.3 **The distribution of retirement balances under life-cycle versus balanced portfolios[a]**



a One million bootstrapped simulations based on case A parameters, with the life-cycle outcome based on a safe annual return of 2.5 per cent real over the last five years before retirement. Note that the *difference* between the two sets of outcome for any given percentile is not a valid indicator of the effects of life-cycle products at any given percentile (which is shown below in figure 6.4). This is because, for example, the simulation where the fund balance equals $511 000 for the balanced portfolio (the 5th percentile for that fund) is not the one where the fund balance equals $481 000 for the life-cycle product.

6 The implicit assumption is that real rates of return on cash (or other low risk assets) will rise over the longer run.

Figure 6.4 **Life-cycle products have large downsides[a]**



[a] The model is as specified in case A with the same simulations as in figure 6.3.

Other scenarios

All of the cases described in box 6.1 lead to significant expected losses from adoption of a life-cycle strategy. However, investments in balanced funds nevertheless involve higher sequencing risks for some members, most notably women who have had children, and people whose retirement from the labour force involves a shift to part-time work (table 6.1). This occurs because wages in the last few years before retirement provide an important contribution to previous super balances, and for these groups, wages are less in this period than at younger ages. For these people, life-cycle products are more attractive than for others to the extent that they are willing to forgo the likely higher returns from a balanced product.

The different outcomes between case A and case D in table 6.1 also reveal the benefits that a capacity to work provides for insuring people against sequencing risk.

Table 6.1 **Life-cycle products produce losses for many different types of member**

	Average retirement balance	*Sequencing risk*[a]	*Loss if risk occurs*[b]	*Sequencing risk in life-cycle product*[c]	*Average loss from life-cycle product*[d]	*Relative loss*[e]
	$'000	%	$'000	%	$'000	%
Case A (default model)	977	9.8	73	0	132	10.5
Case B (lower male wages)	697	9.7	52	0	95	10.5
Case C (woman with 2 children)	331	13.9	26	0	46	10.6
Case D (part-time work when older)	948	11.3	73	0	130	10.5
Case E (higher experience effect)	1 278	10.5	97	0	174	10.5
Case F (higher risk life-cycle product)	977	9.8	73	2.1	69	5.5

[a] Based on one million simulations. This is the risk that the value at retirement is less than the value five years earlier. [b] In the event of a sequencing risk, this is the average loss that occurs compared with a counterfactual in which the fund invests in a safe asset with a real return of 2.5 per cent per year. [c] While, by definition, there is zero sequencing risk where the life-cycle product involves an entirely safe asset, where the 'safe' asset includes some risky assets, this is no longer true. This is why sequencing risk remains for case F. [d] This is the average loss in the retirement balance from investing in a life-cycle product. [e] This is the average percentage reduction in the retirement balance of the life-cycle product relative to the balanced product.

6.4 The impact of more options

The Commission investigated the relationship between the number of investment options provided by a fund and its 10 year return rate using several approaches:

- a continuous measure of option numbers (in log form)
- categorising option numbers into six categories with roughly equal numbers of accounts in each group. This can capture any major non-linearities in the effects of option numbers (with the categories being 1–10 options, 11–15 options, 16–25 options, 26–100 options, 101–320 options and 321 or more options).

Several models were estimated using these measures of option numbers (and data from APRA). At the simplest, this involved a model with no controls for other factors that might affect 10 year returns. More complex models were estimated that took account of the effects of fund type, the portfolio share in cash and fixed income (since this would be expected to lower returns), and the benefit to account number ratio (a measure of the average size of each parcel of managed funds per member). The effects of options on return rates were similar across different models, were statistically significant, and had large impacts on retirement balances (table 6.2).

Table 6.2 **The impacts of option numbers on ten year rates of return**

Model[a]	*Impact on rate of return*	*Retirement balance*	*Impact on retirement balance*	*Change in option numbers modelled*
	Percentage points	*$'000*	*$'000*	*Description*
(1)	-1.35	607	-226	10 to 700 options
(2)	-0.72	693	-140	11–15 options to 321+ options
(3)	-1.02	663	-170	11–15 options to 321+ options
(4)	-1.06	637	-196	10 to 700 options
(5)	0	833	0	Not applicable

[a] The models are (1) ordinary least squares (OLS) of returns on six option number categories; (2) OLS of returns on log of options and controls for fund type, share in cash and fixed income, and the log of the benefit to account number ratio; (3) OLS on six option number categories, plus controls for retail fund status, the share of assets in cash and fixed income, and log of the benefit to account ratio; (4) OLS of returns on the log of option numbers; and (5) the result — as in the main cameo model used in this report — where returns are 5 per cent throughout the accumulation period. All coefficients were statistically significant. The non-stochastic model described above and in chapter 1 was used to provide the impacts on retirement balances.

The impacts of the number of options on fees were estimated using a similar approach. Fees were represented as the ratio of all fees (less any charges for insurance) to each fund's net assets (to normalise for fund size). A shift from a modest number of options (11–15) to 321 or more increases the ratio of fees to net assets by between 0.5 to 0.7 percentage points (table 6.3).

Table 6.3 **Impacts of option numbers on fee rates**

Model[a]	*Impact on fee rate*	*Change in option numbers modelled*
	Percentage points	Description
(1)	0.80	10 to 700 options
(2)	0.51	11–15 options to 321+ options
(3)	0.68	11–15 options to 321+ options
(4)	0.69	10 to 700 options

[a] The regression models were: (1) OLS of fee rate on six option number categories; (2) OLS of fee rate on log of options and controls for retail fund type and the log of the benefit to account number ratio; (3) OLS on six option number categories, plus controls for retail fund status, and the log of the benefit to account ratio; (4) OLS of returns on the log of option numbers. All coefficients were statistically significant.

6.5 Modelling satisfaction and trust

Members' superannuation and financial literacy are often seen as important for good decision-making (chapter 5). Such literacy can also affect the degree to which members are satisfied with the system and can trust their superfund, most likely because improved knowledge reduces uncertainty about the quality of the services provided by super funds.

To gain insight into how the various dimensions of literacy may affect members' perceptions about the performance of the system, three indices were constructed:

- KNOWLEDGE OF SUPER is an index of overall understanding of the system based on a series of questions about people's knowledge of superannuation and various aspects of their own superfund. The index is based on members' answers to Q1a,[7] Q1b, Q3a, Q3e and Q3f of the survey. For example, the questions covered whether employers were required to make super payments, whether superannuation was concessionally taxed and the age when members can access their balances. The index sums to a score anywhere from 0 to 17 for any given respondent (with 0 meaning no knowledge, and 17 meaning 'complete' knowledge). The index had good internal consistency as measured by Cronbach's alpha.
- LITERACY is an index of financial literacy, such as an understanding of compound interest rates (based on Q27 to Q29 of the survey). The index sums between 0 and 3 for any given respondent.
- UNDERSTAND STATEMENT is the extent to which a member can understand their statement (Q5b) (with 1 = fairly or very well, and 0 = not very well to can't say).

All three measures were statistically related to the measures of satisfaction and trust (figures 4.1 and 4.2, respectively, in the main report), with a particularly strong relationship between these and the UNDERSTAND STATEMENT index. While correlation need not imply causation, it seems plausible that improved knowledge leads to better satisfaction and trust (and not the other way around).

The effects are material. For example:

- an ordinary least squares (OLS) regression of satisfaction on the UNDERSTAND STATEMENT index provides an indication of the impact. The results showed that having some understanding of a member's superannuation statement increased satisfaction by about 1.6 points. Given that the average satisfaction level is 7 out of 10, this represents a significant increase. Much the same effect was apparent for a measure of trust, where the gain was about 1.5 points on a scale from 0 to 10, which again is a significant impact given that the average score for trust was 6.8 out of 10
- while more complex, an alternative, more rigorous approach is to undertake ordered logistic regression of measures of trust and confidence against the various indexes above. Unlike OLS, this approach takes account of the fact that satisfaction and trust measures are bounded and ordered count variables. There is no simple analogue to the impacts suggested by the OLS regression above, but an indicative result from an ordered regression is that the probability of getting a score of 10 out of 10 on satisfaction increases from 4 per cent (if there is a weak understanding) to 14 per cent (if there is a good understanding). Overall, the probability of getting a scale of 9 or 10 in the satisfaction measure is around 30 per cent if there is a good understanding and 10 per cent otherwise.

[7] The 5th sub-question in Q1a was excluded. It related to a question about insurance cover, and had poor consistency with measures of overall understanding of super.

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