Australian Government
Productivity Commission

# Investment performance methodology and analysis

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*Technical Supplement 4*

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### The Productivity Commission

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# 4 Technical supplement: investment performance methodology and analysis

This technical supplement expands on analysis presented in chapter 2 (investment performance). It covers three areas. First, it details the different data sources used, including their strengths and weaknesses (section 4.1). Second, it provides detail on the methods and assumptions adopted (the construction of benchmark portfolios (BPs) in particular) (section 4.2). And third, it presents supporting analysis (section 4.3). This includes sensitivity tests flagged in chapter 2, including:

- results over different time periods
- alternative assumptions about administration fees applied to BPs
- alternative assumptions about tax applied to BPs
- alternative assumptions about asset allocation (including hedging ratios).

The supporting analysis is structured in the same order as the analysis in chapter 2. The assumptions and data underlying all investment performance analyses relative to the benchmarks presented in the main report and this supplement are summarised in table 4.1. Broadly, the results were most sensitive to the time period analysed, somewhat sensitive to the hedging ratio used, and less sensitive to asset allocation and tax adjustments.

The data selected, and methods, assumptions and analysis employed by the Commission are the result of extensive consultation processes from stage 1 and stage 3. These processes included two technical workshops during the stage 1 study, submissions following the publication of the draft report and the subsequent supplementary paper, and much consultation with industry experts.

## 4.1 Data

The Commission's analysis of investment performance made use of data from regulators and private research firms. More information on all the data used by the Commission can be found in appendix B.

## Regulator data

Australian Prudential Regulation Authority (APRA) data offer the most comprehensive view of the system as large APRA-regulated funds (those with four or more members) — hereafter 'APRA-regulated funds' — make up a substantial portion of the superannuation system. System- and fund-level data are available back to 1997[1] (although the data are only in a usable form for the Commission's analyses from 2004 because different calculation and collection methods were used prior to 2004). Eligible rollover funds and insurance-only funds were excluded from the analysis as their investment objectives are different from those of most APRA-regulated funds.

The Commission received unpublished data from APRA that include more detail than publicly available datasets (appendix B). However, aspects of APRA's current reporting framework only commenced in 2013, and thus the Commission has had to work around a degree of discontinuity. For example, asset allocation reporting dramatically changed between 2013 and 2014.

Further, while all APRA-regulated funds are covered in APRA data, there were patches of poor reporting. For example, a large number of (typically retail) funds reported zero investment expenses in some years (tech. supp. 5).

APRA also publishes MySuper product-level data from 2013, in both a quarterly and annual form. The Commission has used both, depending on which is best suited to a given purpose. While these datasets are comprehensive (covering the entire default segment), the time period is too short for meaningful long-term analysis.

APRA fund-level and MySuper data are the only audited data with full APRA segment coverage available to the Commission. As such, despite the limitations, the Commission has drawn on APRA data as its primary source. Since the draft report, an additional year of data has been added to the analysis of system-, segment- and fund-level returns, which now covers a 13-year period (2005–2017).

Mostly, APRA data do not cover self-managed superannuation funds (SMSFs). To address this gap, the Commission drew on data provided by the Australian Taxation Office (ATO). However the Commission was only provided with aggregated data (across the SMSF segment, or by brackets, such as size brackets). This limited the scope of the Commission's analysis. Analysis was further limited by the fact that ATO data are not comparable to APRA data, as further outlined below. Since the draft report, an additional year of data has been added to the analysis, which now covers an 11-year period (2006–2016).

[1] Unless otherwise stated, all years referred to in this technical supplement indicate the financial year ending June of that year. In this case, 1997 represents financial year 1996-97.

Table 4.1 **Summary of investment performance analysis**[a,b,c]

| | | *Actual returns* | | | | *Benchmarks* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *Analysis* | *Figures/ tables* | *Unit of analysis* | *Data* | *Time periods* | *Bias* | *BPs used* | *Tax rate* | *Admin expenses* | *Asset allocation* | *Other sensitivity testing* |
| Time series of annual returns | Figure 2.2 | APRA funds | Regulator data | 1997–2017 | None | System BP1, BP2 (for 2005–2017) | System average (APRA funds) | (APRA-regulated) system median | BP asset allocation data: APRA<br>Unlisted/listed allocation: System<br>Domestic/ international property allocation: System<br>Domestic/ international private equity allocation: System | |
| Long-term annualised returns | Chapter 2 Table 4.28 | APRA funds | Regulator data | 2005–2017<br>2008–2017<br>2013–2017 | None | System BP1, BP2 | System average (APRA funds), 5% | | | Investment returns (gross of admin fees)<br>Member weighted returns<br>Static 2017 asset allocation<br>Only current funds<br>Hedging |
| Long-term performance decomposition | Figure 2.3 | APRA funds | Regulator data | 2005–2017 | None | Gross of everything system BP2 | | | | |
| Long-term standard deviation | | APRA funds | Regulator data | 2005–2017 | None | System average asset allocation & 70:30 system BP1, BP2 | System average (APRA funds) | | | |

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Table 4.1 (continued)

| | | *Actual returns* | | | | *Benchmarks* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *Analysis* | *Figures/ tables* | *Unit of analysis* | *Data* | *Time periods* | *Bias* | *BPs used* | *Tax rate* | *Admin expenses* | *Asset allocation* | *Other sensitivity testing* |
| Long-term returns of options by option type | Figures 2.4, 4.9<br>Table 4.29 | APRA fund option-type segments | SuperRatings data | 2005–2017 | Selection bias | Option-type BP1, BP2 | System average (APRA funds), 5% | APRA funds system median | BP asset allocation data: APRA<br>Unlisted/listed allocation: System<br>Domestic/ international property allocation: System<br>Domestic/ international private equity allocation: System | |
| Long-term returns by asset class | Figures 4.11, 4.12<br>Table 4.30 | Fund level | Funds survey | 2011–2017 | Selection bias, survivorship bias | Asset class indexes, BP2 | | | Domestic/ international property allocation: System<br>Domestic/ international private equity allocation: System | |
| | Figures 2.5, 2.6, 2.10 | System and segment level | | 2008–2017 | | | | | | |

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Table 4.1 (continued)

| | | *Actual returns* | | | | *Benchmarks* | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Analysis* | *Figures/tables* | *Unit of analysis* | *Data* | *Time periods* | *Bias* | *BPs used* | *Tax rate* | *Admin expenses* | *Asset allocation* | *Other sensitivity testing* |
| Long-term returns of Choice/MySuper | Figures 2.7, 4.13<br>Table 4.31 | APRA fund segments | SuperRatings data | 2005–2017<br>2008–2017<br>2013–2017 | Selection bias | Segment tailored BP1, BP2 | Accumulation tax rate, 7.5% | MySuper and Default investment options: Bottom quartile (APRA funds)<br>Choice: SuperRatings choice segment median | BP Asset allocation data: SuperRatings/Rainmaker<br>Unlisted/listed allocation: System<br>Domestic/international property allocation: System<br>Domestic/ international private equity allocation: System | Default investment options |
| Long-term returns of retirement/ accumulation | Figures 2.13, 4.17<br>Table 4.34 | | SuperRatings data, Rainmaker data | 2005–2017<br>2008–2017<br>2013–2017 | Selection bias | Segment tailored BP1, BP2 | Accumulation tax rate, imputed retirement tax rate, 7.5% | SuperRatings segment medians | | Rainmaker data |
| Long-term standard deviation of retirement/ accumulation | Figure 4.16 | | SuperRatings data | 2005–2017 | Selection bias | Segment tailored BP1, BP2 | Accumulation tax rate, imputed retirement tax rate, 7.5% | SuperRatings segment medians | | |

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Table 4.1 (continued)

| | | *Actual returns* | | | | *Benchmarks* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *Analysis* | *Figures/ tables* | *Unit of analysis* | *Data* | *Time periods* | *Bias* | *BPs used* | *Tax rate* | *Admin expenses* | *Asset allocation* | *Other sensitivity testing* |
| Long-term returns of retail and not-for-profit | Figures 2.8, 4.15, Table 4.32 | APRA fund segments | Regulator data | 2005–2017<br>2008–2017<br>2013–2017 | None | Segment tailored BP1,BP2 | System average (APRA funds), 5% | Segment median (APRA funds) | BP Asset allocation data: APRA<br>Unlisted/listed allocation: Fund type<br>Domestic/international property allocation: Fund type<br>Domestic/ international private equity allocation: Fund type | Investment returns (gross of admin fees)<br>Member weighted returns<br>Only current funds<br>With static 2017 asset allocation<br>Hedging |
| Long-term standard deviation of retail and not-for-profit | Figure 4.14 | APRA fund segments | Regulator data | 2005–2017 | None | Segment average asset allocation BP1, BP2 | System average (APRA funds) | Segment median (APRA funds) | | |
| Long-term returns of options by option type and fund type | Figure 2.9, Table 4.33 | APRA fund options by option type and fund type | SuperRatings data | 2005–2017 | Selection bias | Option-type BP1, BP2 | System average (APRA funds), 5% | System median (APRA funds) | BP asset allocation data: APRA<br>Unlisted/listed allocation: System<br>Domestic/ international property allocation: System<br>Domestic/ international private equity allocation: System | |

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Table 4.1 (continued)

| | | *Actual returns* | | | | *Benchmarks* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *Analysis* | *Figures/ tables* | *Unit of analysis* | *Data* | *Time periods* | *Bias* | *BPs used* | *Tax rate* | *Admin expenses* | *Asset allocation* | *Other sensitivity testing* |
| Long-term performance decomposition | Figure 2.11 | APRA fund segments | Regulator data | 2005–2017 | None | Gross of everything segment BP2 | System average (APRA funds) | Segment median (APRA funds) | BP Asset allocation data: APRA<br>Unlisted/listed allocation: Fund type | |
| Long-term relative outperformance decomposition | Figure 2.12 | APRA fund segments | Regulator data | 2005–2017 | None | Gross of everything segment BP2 | System average (APRA funds) | Segment median (APRA funds) | Domestic/international property allocation: Fund type<br>Domestic/ international private equity allocation: Fund type | |

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Table 4.1 (continued)

| | | *Actual returns* | | | | *Benchmarks* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *Analysis* | *Figures/ tables* | *Unit of analysis* | *Data* | *Time periods* | *Bias* | *BPs used* | *Tax rate* | *Admin expenses* | *Asset allocation* | *Other sensitivity testing* |
| Long-term fund-level returns | Figures 2.14, 4.18<br>Tables 4.35, 4.36 | Individual funds | Regulator data | 2005–2017 | Selection and survivor bias | Gross of tax fund BP2 | Gross of tax | Individual fund, system median (APRA funds) | BP Asset allocation data: APRA<br>Unlisted/listed allocation: Fund level<br>Domestic/international property allocation: Fund type<br>Domestic/ international private equity allocation: Fund type<br>(Asset allocation for the system benchmark is as per other system benchmarks) | With static 2017 asset allocation |
| Long-term performance decomposition (and exploratory residuals analysis) | Figure 2.15<br>Tables 4.37, 4.38, 4.39 | Individual funds | Regulator data | 2005–2017 | Selection and survivor bias | Gross of tax fund BP2 | Gross of tax | Individual fund | | |
| Long-term relative outperformance decomposition | Figure 4.19 | Individual funds | Regulator data | 2005–2017 | Selection and survivor bias | Gross of tax fund BP2, System BP2 | Funds, gross of tax, System average (APRA funds) | Individual fund, System median (APRA funds) | | |
| Long-term performance decomposition | Figure 2.18 | Individual MySuper products | SuperRatings | 2008–2018 | Selection and survivor bias | Tailored BP2 | Accumulation tax rate | Bottom quartile fee of sample | BP asset allocation data: SuperRatings | |

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Table 4.1 (continued)

| | | *Actual returns* | | | | *Benchmarks* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *Analysis* | *Figures/ tables* | *Unit of analysis* | *Data* | *Time periods* | *Bias* | *BPs used* | *Tax rate* | *Admin expenses* | *Asset allocation* | *Other sensitivity testing* |
| Short- and Long-term MySuper product returns | Figures 2.16, 2.17<br>Tables 4.40, 4.41, 4.42, 4.43 | Individual MySuper products | Regulator data (short term), SuperRatings data (long term) | 2015–2018<br>2008–2018 | Selection and survivor bias | MySuper segment BP2, tailored BP2 | Accumulation tax rate, 7.5% | Bottom-quartile fee of sample | BP asset allocation data: APRA (short term) and SuperRatings (long term) | Gross of admin fees (short term); net of fixed admin fees (long term) |
| Long-term choice option returns | Figures 2.21, 4.20<br>Tables 4.44 | Individual choice options | SuperRatings data | 2005–2017 | Selection and survivor bias | Option BP1 | Accumulation tax rate | SuperRatings Choice segment median, fund-type segment median (APRA funds) | BP Asset allocation data: SuperRatings<br>Unlisted/listed allocation: Fund level<br>Domestic/international property allocation: Fund type<br>Domestic/ international private equity allocation: Fund type | |

**a** Investment fee assumptions are not listed as they do not vary by analysis (table 4.25). **b** All APRA asset allocation data used in benchmarks are adjusted for the default investment asset allocation and use Rainmaker data for apportioning the 'other' assets category (section 4.2). **c** Only analysis using benchmarks is included in this table.

## Research firm data

The Commission purchased data from superannuation research firms SuperRatings and Rainmaker to undertake investment performance analysis. Research firm data offer more granular insights into individual products and investment options in the system, which is closer to the member experience.

The key limitation of these data sources is that they only cover a subset of investment options in the system, which gives rise to selection bias issues as detailed below. If many smaller (and potentially poorer performing) options are not covered, the dataset may present a more positive assessment of the overall system than is actually the case.

Further, datasets from these research firms are not primarily designed for a thorough historical investigation of the system. The Commission had to undertake its own matching and linking of investment options over time and across datasets. Further details are provided below.

Since the draft report, the Commission has added an additional year of data where possible. For example, the analysis of MySuper (and default predecessor) product returns now covers an 11-year period (2008–2018). The sample coverage has not materially changed.

### International comparisons

The Commission also purchased data from CEM Benchmarking of Canada on the net returns to individual asset classes achieved by pension funds in other countries. The data on net returns cover the United States (with pension funds separated into defined contribution and defined benefit), Canada, the Netherlands, the United Kingdom, other parts of Europe (aggregated into a single category) and the Asia–Pacific. The average total assets by funds across the dataset is US$19 billion (table 4.2). There are at least 20 funds covered in each region, except for other parts of Europe and the Asia–Pacific (10 and 4 funds respectively). As such, the data may not be entirely representative of the outcomes in these regions. The data on international returns by assets class is provided below (table 4.3).

## Table 4.2 **CEM Benchmarking data coverage**[a]

2016

| | | Assets (US$b) | | | | |
|---|---|---|---|---|---|---|
| *Country/region* | *Number of funds* | *Total* | *Average* | *Min* | *Median* | *Max* |
| United States (defined contribution) | 146 | 1 017 | 7 | 0.1 | 4 | 50 |
| United States (defined benefit) | 168 | 3 617 | 22 | 0.2 | 8 | 293 |
| Canada | 77 | 1 211 | 16 | 0.1 | 4 | 221 |
| Netherlands | 25 | 922 | 38 | 0.4 | 7 | 404 |
| United Kingdom | 36 | 391 | 11 | 0.7 | 5 | 71 |
| Rest of Europe | 10 | 1 115 | 112 | 17 | 35 | 818 |
| Asia–Pacific | 4 | 694 | 173 | 3 | 115 | 460 |
| **Total** | **466** | **8 967** | **19** | **na** | **na** | **na** |

**na** Not available.

*Source*: CEM Benchmarking.

## Table 4.3 **CEM Benchmarking: net investment returns**[a]

Asset-weighted average net investment returns by asset class, 2007–2016

| *Asset class* | *US DC* | *US DB* | *Canada* | *Nether-lands* | *United Kingdom* | *Rest of Europe* | *Asia–Pacific* | *Total* |
|---|---|---|---|---|---|---|---|---|
| Domestic equities | 7.1 | 7.0 | 5.1 | na | na | na | na | na |
| International equities | 5.2 | 2.1 | 5.3 | na | na | na | na | na |
| Domestic fixed income | 4.3 | 5.2 | 5.0 | na | na | na | na | na |
| All other fixed income | 4.4 | 6.3 | 5.7 | na | na | na | na | na |
| Cash | 1.7 | 1.2 | 1.7 | 2.3 | na | 1.3 | na | 2.0 |
| Listed property | 4.6 | 3.9 | 5.5 | na | na | na | na | na |
| Unlisted property | 5.0 | 0.6 | 0.3 | na | na | na | na | na |
| Private equity | na | 10.0 | 10.7 | 12.3 | na | 10.4 | 14.5 | 10.5 |
| Unlisted infrastructure | na | 6.0 | 7.5 | 6.4 | na | 5.9 | 5.8 | 7.7 |

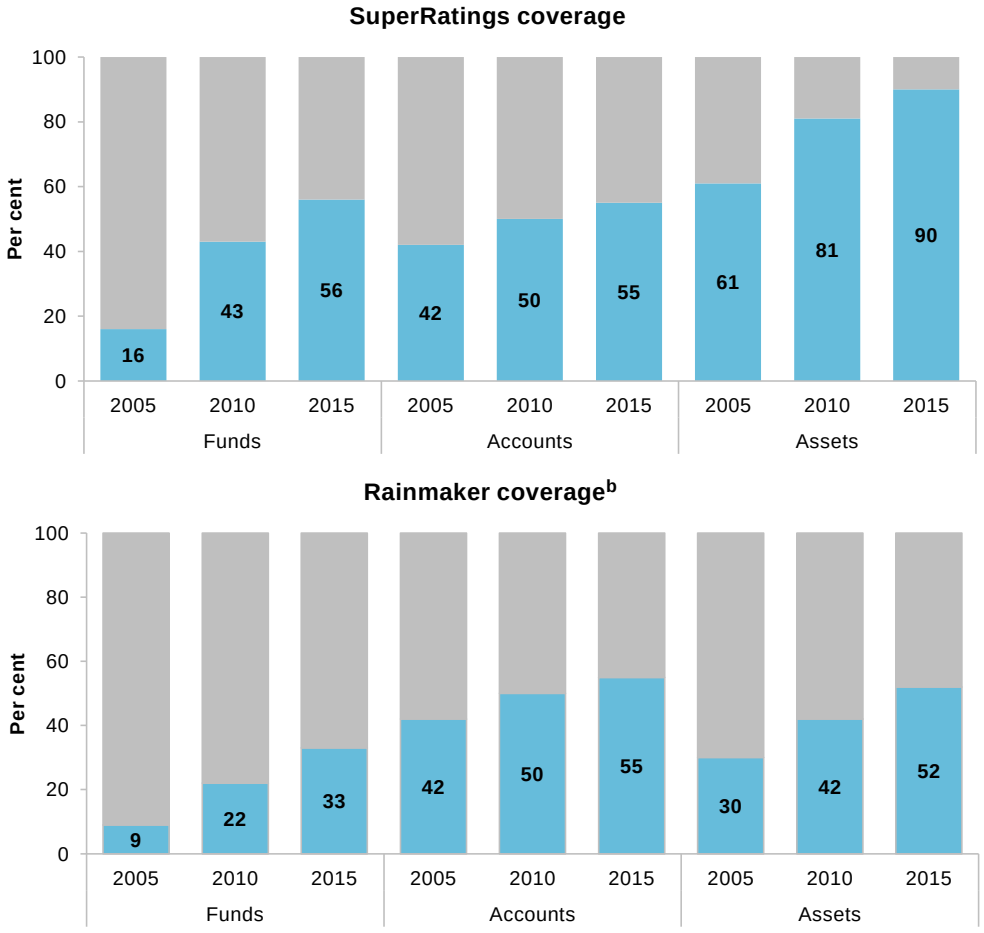
**a** DC denotes defined contribution. DB denotes defined benefit. **na** Not available.

*Source*: CEM Benchmarking.

## Selection bias

In order to measure any potential selection bias in research firm data, the Commission compared SuperRatings and Rainmaker data to APRA data on the full population of large APRA-regulated funds. The Commission counted an entire fund's assets and accounts as being present in a research firm dataset if at least one option from that fund appears.[2] Effectively, this approach produced an 'upper bound' of coverage. While the coverage has improved over time, large gaps remain (figure 4.1).

Figure 4.1 **Research firm data coverage**[a]




[a] Coverage is measured as a per cent of the system of large APRA-regulated funds. [b] Approximately 9000 out of 29 000 (about 33 per cent) of the option-year combinations in the Rainmaker dataset could not be matched to funds in the APRA data (based on the Australian Business Number), meaning the Rainmaker coverage 'upper bound' is underestimated.

*Sources*: PC analysis of unpublished APRA data, Rainmaker data and SuperRatings data.

2 Due to the lack of correspondence between fund and product/option data SuperRatings collect, the Commission assumed a fund was present in SuperRatings' product/option-level data if the fund was present in SuperRatings' fund information dataset.

The fact that research firm data are a subset of the broader population does not imply selection bias in itself. To assess whether the sample is biased, the Commission assessed representation by[3]:

- fund type (figure 4.2): industry funds are much better represented in both datasets than other fund types, and corporate and retail funds are generally poorly represented
- fund size (table 4.4): funds missing from research firm databases are typically much smaller
- fund returns (table 4.4): funds missing from research firm databases typically have lower returns.

Overall, analyses using research firm data are likely to be subject to selection bias in terms of fund type, fund size and fund returns. The combination of these factors is likely to produce a positive bias. That is, investment performance may appear better than is actually the case. And further, while overall coverage improves over time, this selection bias persists over time.

Table 4.4 **Research firm data coverage**[a]

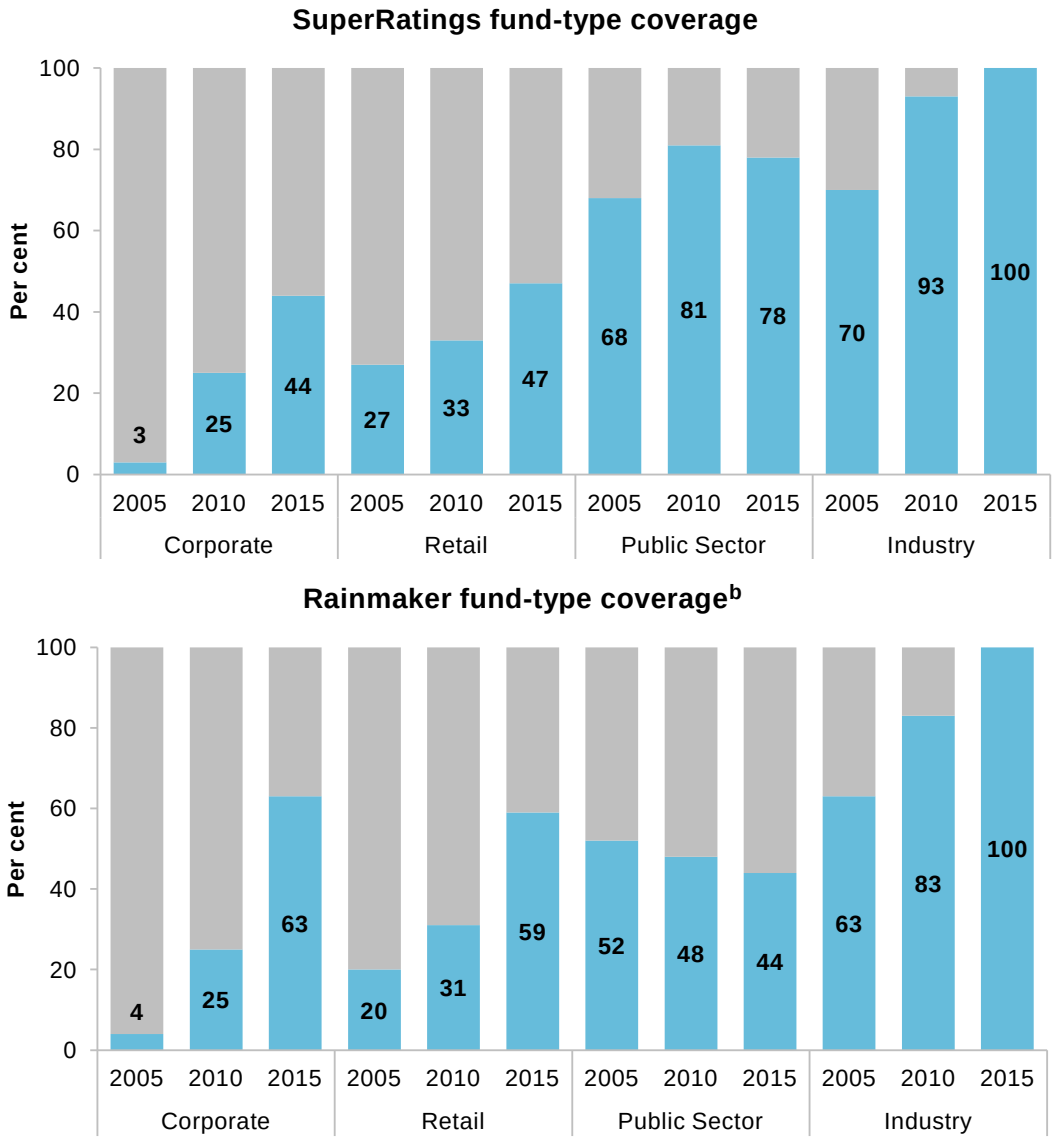
| | *Units* | *2005* | *2010* | *2015* |
|---|---|---|---|---|
| **SuperRatings** | | | | |
| Median return of funds in both | % | 12.2 | 8.6 | 8.1 |
| Median return of funds in APRA only | % | 11.8 | 9.1 | 6.8 |
| Median assets of funds in both | $b | 0.80 | 1.30 | 2.70 |
| Median assets of funds in APRA only | $b | 0.01 | 0.06 | 0.09 |
| **Rainmaker**[b] | | | | |
| Median return of funds in both | % | 13.0 | 9.0 | 8.6 |
| Median return of funds in APRA only | % | 11.8 | 8.8 | 7.1 |
| Median assets of funds in both | $b | 0.80 | 1.40 | 2.60 |
| Median assets of funds in APRA only | $b | 0.02 | 0.14 | 0.40 |

**a** Coverage is measured as a percentage of all APRA-regulated funds. **b** Approximately 9000 out of 29 000 (about 33 per cent) of the option-year combinations in the Rainmaker dataset could not be matched to funds in the APRA data (based on the Australian Business Number), meaning the Rainmaker coverage 'upper bound' is underestimated.

*Sources*: PC analysis of unpublished APRA data, Rainmaker data and SuperRatings data.

3 Fund type, fund size and fund returns data are always from APRA data. For the purposes of the selection bias assessment, research firm data are only used to break up APRA data into the two groups; 'Funds represented in research firm data' and 'Funds not represented in research firm data'.

Figure 4.2 **Research firm data coverage**[a]




**a** Coverage is measured as a percentage of all APRA-regulated funds. **b** Approximately 9000 out of 29 000 (about 33 per cent) of the option-year combinations in the Rainmaker dataset could not be matched to funds in the APRA data (based on the Australian Business Number), meaning the Rainmaker coverage 'upper bound' is underestimated.

*Sources*: PC analysis of unpublished APRA data, Rainmaker data and SuperRatings data.

### Matching and linking of options

A key aspect of the Commission's assessment was to assess the long-term performance of individual products or options, both in the default and choice segments.

For the default segment, product-level analysis with SuperRatings data[4] necessitated linking current MySuper products with pre-2013 precursor products. 64 of 105 current MySuper products were linked backwards to produce 11 years of returns data (only 53 were linked for 11 years of returns *and* asset allocation data). For most products, this process was relatively simple as the pre- and post-2013 product names were very similar. This linking was done with the support of SuperRatings where requested.

It is important to note that this linking exacerbates the selection bias in the SuperRatings data. Many retail MySuper products are new to the MySuper era, and could not be matched with a precursor. While SuperRatings data cover upwards of 50 per cent of retail funds in the APRA-regulated system overall (figure 4.2), only 32 per cent of current retail MySuper products could be linked with precursor returns and asset allocation data. Rainmaker data are sourced from funds' annual reports, product disclosure statements and other public information. Many options in the Rainmaker dataset have slight variations in names across years. The Commission has transformed the data and undertaken its own linking of investment options over time. This was necessary to undertake individual product- and option-level analysis.

In both these processes, the Commission was conservative, only matching options over time where there were obvious links (for example, minor rewording of option names). Inevitably, there are likely to be many products in both datasets that have existed for the relevant period but were not able to be linked due to being substantively renamed.

## Funds survey data

The Commission undertook two surveys of APRA-regulated superannuation funds, which included collecting data on returns (gross of tax but net of all investment fees and costs) by asset class, investment management costs by asset class, and fund expenses by expense category and related/unrelated parties (tech. supp. 2). Funds were asked to provide the data going back to 2008. While some of the data provided to the initial survey were of poor quality, responses to the supplementary survey (which focused on key evidence gaps remaining from the initial survey) were better.

In total, responses to the supplementary survey were received for 137 funds (out of a possible 186), with 104 of these funds providing data for the returns analysis by asset class. Not all funds were able to provide data for the entire time period, nor for all asset classes, particularly for earlier years (table 4.5).

4 Similar analysis was attempted with Rainmaker data but SuperRatings had superior coverage.

Table 4.5 **Survey responses: number of observations for asset class returns (2008–2017)**[a]

| *Asset class* | *2008* | *2009* | *2010* | *2011* | *2012* | *2013* | *2014* | *2015* | *2016* | *2017* |
|---|---|---|---|---|---|---|---|---|---|---|
| Cash | 53 | 56 | 61 | 64 | 68 | 71 | 90 | 95 | 95 | 97 |
| Australian listed equity | 54 | 57 | 60 | 63 | 67 | 70 | 91 | 95 | 95 | 97 |
| International listed equity | 53 | 56 | 59 | 61 | 65 | 68 | 88 | 95 | 94 | 95 |
| Australian fixed income | 41 | 49 | 51 | 52 | 54 | 57 | 74 | 80 | 81 | 83 |
| International fixed income | 40 | 43 | 44 | 46 | 46 | 48 | 63 | 70 | 72 | 74 |
| Private equity | 30 | 32 | 34 | 35 | 36 | 38 | 41 | 43 | 44 | 46 |
| Listed infrastructure | 3 | 3 | 7 | 11 | 11 | 12 | 22 | 28 | 32 | 32 |
| Unlisted infrastructure | 15 | 18 | 22 | 25 | 27 | 31 | 40 | 43 | 47 | 46 |
| Total infrastructure | 20 | 22 | 29 | 34 | 38 | 43 | 58 | 63 | 68 | 68 |
| Listed property | 22 | 24 | 24 | 22 | 22 | 29 | 43 | 49 | 52 | 51 |
| Unlisted property | 28 | 32 | 36 | 39 | 40 | 46 | 54 | 58 | 57 | 57 |
| Total property | 45 | 49 | 53 | 56 | 59 | 63 | 82 | 88 | 88 | 87 |

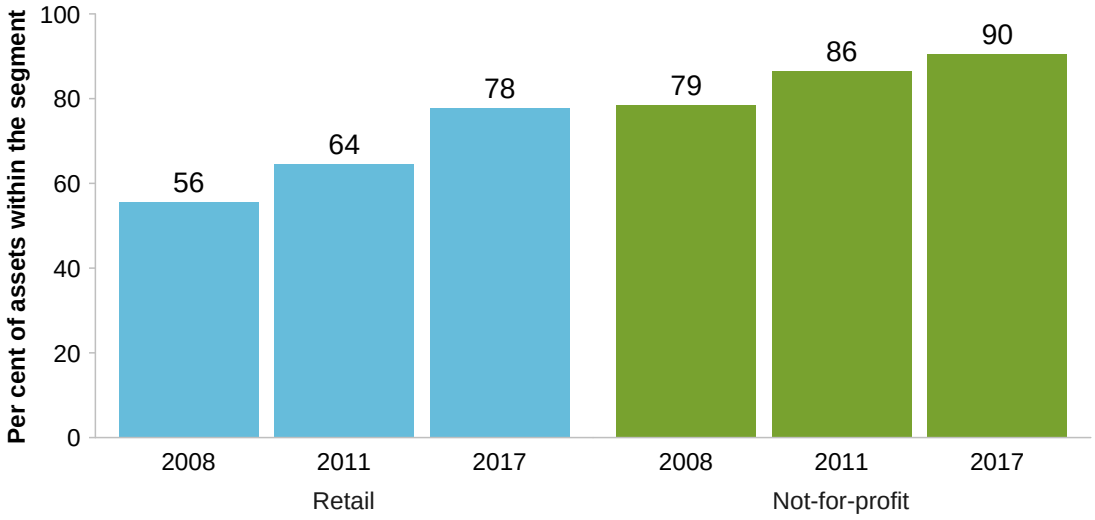
**a** Eligible rollover funds and observations where funds did not split fixed income into Australian and international categories have been excluded.

*Source*: Supplementary funds survey.

The funds which provided responses on asset-class returns accounted for 66 per cent of assets in the APRA-regulated system in 2008 and 86 per cent of assets in the APRA-regulated system in 2017. At the segment level, not-for-profit funds have a greater representation than retail funds across the time period (figure 4.3). This could be a reflection of the survey data containing both survivor bias (funds which were wound up during the period are not represented in the survey sample) and selection bias (poorer performing funds being less likely to volunteer data in the survey or only partially volunteering data for some years).

Additionally, 13 retail funds were unable to provide data at a fund level. The Commission agreed that these funds could provide product- or option-level data that they considered to be broadly representative of within-asset-class performance at the fund level. However, some participants argued that such product-level would represent a 'simplifying assumption' (ASFA, sub. DR221, pp. 2–3) by funds and that some funds 'are not confident this is [representative] of fund level performance' (FSC, sub. DR218, p. 10).

Figure 4.3 **Funds survey — returns data coverage**[a]




[a] Eligible rollover funds are excluded from this analysis.

*Sources*: Supplementary funds survey and PC analysis of unpublished APRA data.

## 4.2 Methods and assumptions

The Commission's analysis of investment performance can broadly be decomposed into two parts: calculating actual returns and calculating the benchmarks used to assess these returns. This section details the methods and assumptions involved in both parts.

### Calculating net returns

#### Net returns and investment returns

As in chapter 2, most returns analysis is on a 'net of everything' basis — all administration and investment expenses/fees, and tax. There are two exceptions. First, returns for the fund-level distributional analysis are calculated gross of tax (that is, net of administration and investment expenses only) because making tax adjustments using the available data would have created material distortions to benchmarks (described below).

Second, in analyses using SuperRatings returns data, the returns are reported crediting rates which are returns net of investment fees, tax and *implicit* asset-based administration fees. This means that fixed administration fees (separately levied on a member's account) are not factored in, and asset-based administration fees are only counted in the case that a fund

reports a crediting rate that is net of asset-based administration fees. This latter point represents an inconsistency the Commission was unable to overcome. In these cases, the Commission has calculated BPs net of asset-based administration fees, investment fees and tax, affording funds the benefit of the doubt.

In some cases, pure investment performance is of interest and the Commission has estimated net *investment* returns (net of investment fees but not administration fees or taxes).

### Time-weighted and money-weighted returns

In stage 1, the Commission considered using money-weighted returns in its assessment framework (PC 2016). Money-weighted returns are also known as internal rates of return and are often used to evaluate prospective investments by a firm. Money-weighted returns are the discount rate that equates the present value of outflows with the present value of inflows. This calculation takes account of the timing of when inflows and outflows are incurred.

APRA's annual rate of return is a money-weighted return, as it accounts for inflows and outflows. However, the data required to compute money-weighted returns over time were not fully available, meaning that many assumptions would have been necessary to construct such a measure. Instead, the Commission has used a combination of money-weighted *annual* returns and time-weighted (geometric average) *annualised average* returns. This is also consistent with the available benchmark measures (used to construct BPs), which are time weighted.

### Asset-weighted and account-weighted returns

In most cases, the Commission weighted returns by assets, meaning larger funds have a larger impact on system- or segment-level averages. This is consistent with the inquiry being an assessment of the *system*. Conceiving of the system as a large stock of money under management, asset weighting allows for an assessment of the overall return this aggregate stock produced. However, for analyses of distributions (for example, at the fund or product level), calculating returns at the individual unit level meant no weighting was necessary.

An alternative to weighting by assets is to weight by the number of member accounts. Such a measure could be more reflective of member experiences as a whole. The Commission has avoided use of account-weighted returns data as the number of member accounts is not available in many cases.

### Geometric and arithmetic averages

The Commission has calculated annualised returns as a geometric average of one-year returns. This takes account of compounding returns over time. Geometric returns were calculated as:

$$R_{iT} = \left( \prod_{t=1}^{T} (1 + r_{it}) \right)^{\frac{1}{T}} - 1$$

Where:

- $R_{iT}$ = the annualised return to system/segment/fund/option $i$ across $T$ years
- $r_{it}$ = the return to system/segment/fund/option $i$ in year $t$

As can be seen in this formula, geometric averages are non-linear. For the purposes of the Commission's decomposition analyses (described below), simple arithmetic averages have been used to make the analyses tractable.

## Constructing BPs

BPs are the primary measure used in the Commission's analysis to evaluate system and segment performance. They aim to account for the many influences on investment markets that are beyond funds' control, while providing insights into the efficiency by which funds add value for members.

In chapter 2, the Commission used two types of BPs. One is based on listed asset classes only (BP1) and the other blends listed with unlisted asset classes (BP2).

- BP1 was designed to reflect what the system (or segment/fund/option) could have achieved by passively enacting a purely listed investment strategy.
- BP2 was designed to more closely represent how asset allocations are implemented in practice. This means it was designed to represent (as closely as possible) the *expected* return from the system's (or segment/fund/option) actual asset allocation, including by investing in unlisted assets.

In this technical supplement, the Commission also presents a BP with a fixed 70 per cent growth allocation.

These BPs are weighted averages of financial market index returns, with the weights determined by the asset allocation of the unit under analysis. Because most index data are reported gross of fees and taxes, adjustments were made to subtract fees (both investment and administration) and tax from the benchmarks (box 4.1).

## Box 4.1 Calculating BP returns

The formula for a given year is as follows:

$$b_t = \left[\sum_{i=1}^{I}(r_{it} - f_{it})a_{it} - x_t \sum_{i=1}^{I} r_{it}a_{it}\right] - d_t$$

where:

- $b_t$ = the return to the BP in year *t*
- $I$ = the total number of asset classes in the BP
- $a_{it}$ = the allocation to asset class *i* in year *t*
- $r_{it}$ = the return to the relevant index for asset class *i* in year *t*
- $f_{it}$ = the fee associated with asset class *i* in year *t*
- $x_t$ = the applicable tax rate in year *t* (not always used)
- $d_t$ = the administration fee year in *t.*

Computing an annualised average return follows as:

$$B_T = \left(\prod_{t=1}^{T}(1 + b_t)\right)^{\frac{1}{T}} - 1$$

where:

- $B_T$ = the annualised BP return across $T$ years

This methodology implicitly assumes that no expenses are tax deductible, which is consistent with being conservative in constructing benchmarks.

The Commission encountered many challenges in constructing BPs. Most of these were driven by the lack of high quality, representative and publicly available data. The BPs constructed for use in this report therefore reflect the Commission's best efforts. These efforts were guided by transparency and a conservative approach in order to afford funds the benefit of the doubt. That is, where there was considerable uncertainty regarding an input into the BPs, the Commission has tended towards inputs that would *reduce* the overall level of the BP returns (and thus provide a lower benchmark).

Further to this, as outlined in chapter 2, the Commission defines underperformance as falling below BP2 by 0.25 percentage points (25 basis points). This acknowledges the uncertainty in some inputs, and allows a margin of error.

The use of BPs was first flagged in the Commission's stage 1 study. (PC 2016). The conceptual basis for using BPs received broad support during that study and prior to the release of the stage 3 draft report, though there were some differences in views on the implementation of the approach (box 4.2). In this stage 3 inquiry, the Commission has further refined the conceptualisation of BPs, drawing on participant feedback and further consultation with industry experts.

### Box 4.2 Participant views on BPs prior to the draft report

The Association of Superannuation Funds of Australia (sub. 47) suggested the application of different benchmark portfolios (BPs) for different groups of products (MySuper, choice, SMSFs, accumulation, and retirement). It also outlined its views on the construction of BPs, including that it would be appropriate to derive them based on average asset allocations for the different segments, and to draw on indexes for listed asset classes. It also noted the challenges in incorporating fees and taxes into BPs.

AustralianSuper (sub. 43) recommended that a BP be used that reflected the asset allocation of the average or median default fund, with index returns for each major asset class, adjusted for taxes.

The Centre for International Finance and Regulation (stage 1, sub. 10) recommended using a simple 70/30 growth/income assets portfolio to compare MySuper balanced products to. The Centre for International Finance and Regulation (stage 1, sub. DR57) also argued that a BP should comprise an investible and passive portfolio that reflects a static strategic asset allocation to the product-class in question.

Hartley (sub. DR82 to stage 1) argued that the BP asset allocation should be one that matches the overall volatility of returns that have been generated by the industry. Rice Warner (stage 1, sub. DR112) suggested something similar — constructing a number of BPs on the risk/return spectrum.

Mercer (sub. 57) submitted that to measure system-wide performance a BP would need to be:

- representative of the industry segment to be benchmarked
- investable, replicable and relevant for a large Australian institutional investor
- applicable to the member demographics
- easy to understand, explain and measure.

Mercer (stage 1, sub. DR104) also suggested calibrating a selection of BPs to various CPI + X targets, given different members have different investment goals.

Rice Warner (sub. 56) suggested that:

- system-level asset allocation should be used as the basis for the BP
- unlisted investments could be benchmarked against a listed equivalent if that is the most reflective index
- taxes could be netted from the BP at 15 per cent, but that would be giving trustees credit for optimising the tax position of the portfolio (via holding assets for the capital gains tax discount or overweighting to assets with franking credits)
- fees on passive products such as exchange-traded funds could be used to adjust BPs.

PwC (sub. 62) agreed that indexed reference portfolios provide a good measure of the lowest cost option for executing an investment strategy. However, it noted that given such an approach is simply measuring the weighted average performance of individual asset classes, the Commission may do better to focus on individual asset class returns.

Table 4.6 summarises major areas of feedback on the draft report and the subsequent supplementary paper on investment performance, along with the Commission's response to

this feedback. Some more specific changes arising from participant feedback are explained in greater detail in the following subsections.

Table 4.6 **Feedback on the draft report and supplementary paper**

| *Claim or issue* | *Submissions* | *Commission's response* |
|---|---|---|
| Controlling for asset allocation obscures value added by funds through asset allocation | Australian Super (sub. DR150); Chant West (sub. DR224); Peterson Research Institute (sub. DR161); Sunsuper (sub. DR197). | Fund decisions on investment strategy can be a key source of value for members, but not controlling for asset allocation makes it much more difficult to compare the investment performance of funds and products with very different asset allocations. |
| Performance has a random element and/or 25 basis points is too small a margin | ASFA (sub. DR148); Asher (sub. DR151); MLC Wealth (sub. DR174); Peterson Research Institute (sub. DR161); Qantas Super (sub. DR137); Warren (sub. DR118). | The analysis is over the longest period permitted by the data, thus should mostly abstract from random variations.<br>The 25 basis point margin is intended to offset potential measurement error (not randomness).<br>Sensitivity testing over shorter time periods mostly yields similar results. |
| Returns should be risk adjusted and/or a measure of the persistency of returns should be considered | ASFA (sub. DR148); MTAA Super (pers. comm., 26 October 2018); QSuper (sub. DR168). | Risk is accounted for by controlling for asset allocation and conducting the analysis over the longest period permitted by the data.<br>There is no widely agreed measure for risk adjusting returns over shorter periods. |
| 10 years is not long enough to control for risk | QSuper (subs. DR168 and DR217). | The analysis is over the longest period permitted by the data and controls for asset allocation. |
| Default asset allocation assumption is misleading as some funds' MySuper products had higher allocations to growth assets (relative to the fund overall) compared with precursor default products | CFS (sub. DR163); FSC (subs. DR186 and DR218); MLC Wealth (sub. DR174). | Data on fund-level asset allocations prior to 2014 are not available.<br>To the extent that some funds may have historically had more conservative whole-of-fund asset allocations than their default allocations, this adjustment is in line with the Commission's conservative approach to benchmarking.<br>Sensitivity testing of alternative assumptions does not lead to fundamentally different results. |
| Linking current MySuper products to precursor default products can generate misleading results as some funds had higher fees (or embedded adviser commissions) on these precursor products | Chant West (subs. DR191 and DR224); FSC (subs. DR186 and DR218); Rice Warner (sub. DR202). | The benchmarks are intended to reflect the outcomes that members have received, including in prior years. |

(continued next page)

Table 4.6 (continued)

| *Claim or issue* | *Submissions* | *Commission's response* |
|---|---|---|
| Fund-level analysis is not representative of members' experiences in particular investment options | CFS (sub. DR163); Chant West (subs. DR191 and DR224); FSC (subs. DR186 and DR218); MLC Wealth (sub. DR174). | Fund-level returns reflect outcomes that members are collectively receiving and add a useful point of reference for a system-wide analysis. This is complemented by option-level analysis.<br>Poor performance at a fund level (controlling for asset allocation) means that members in at least some products must be getting poor returns.<br>Other research has found that product-level returns are correlated with fund-level returns (ISA 2018). |
| Fund-level data also cover legacy products that are irrelevant for assessing system performance | Chant West (subs. DR191 and DR224); FSC (subs. DR186 and DR218). | Legacy and terminated product returns are relevant for members in those products, either now or in past years, thus are key to overall system performance.<br>Some product-level analysis excludes legacy products. |
| Wraps/platforms mean members choose their specific investments | FSC (subs. DR186 and DR218); MLC Wealth (sub. DR223). | The analysis controls for differences in asset allocation.<br>The way in which individual assets are selected does not make the benchmarking results any less representative of collective member outcomes.<br>Trustees are ultimately responsible for acting in members' best interests in deciding which products and investment options to offer them. |
| Funds with stronger net cashflows (or lower liquidity needs) may be less able to invest in unlisted assets | AFA (sub. DR173); FSC (sub. DR199); MLC Wealth (sub. DR223); Rice Warner (sub. DR202) | The analysis controls for differences in asset allocation, including allocation to unlisted assets. |
| Some of the over/under performance of MySuper products is due to the use of an average asset allocation benchmark | ASFA (sub. DR148). | New analysis using product-level asset allocation does not lead to materially different conclusions. |
| There are inconsistencies in how funds classify growth and defensive assets | CFS (sub. DR163); FSC (sub. DR186); MLC Wealth (sub. DR223); Wilkins (sub. DR169). | This may affect the option-type and 11-year MySuper analysis but is not relevant for the other analyses.<br>Mainly an issue for how league tables are compiled by private research firms. |

## Indexes

BP returns are sensitive to the specific financial indexes used. The Commission used index data from AVCAL, Bloomberg, Cambridge Associates, FTSE Russell, MSCI and S&P. The decision about which indexes to use was informed by participant feedback in stages 1 and 3. Total return indexes (that is, returns inclusive of dividends as well as capital gains) are always used where applicable. Table 4.7 shows the application of indexes to asset classes. Annualised returns for each index are presented in section 4.3.

Table 4.7 **Indexes used in BPs**[a]

| *Asset class* | *BP1 (listed)* | *BP2 (blended)* |
|---|---|---|
| Cash | Funds, segments and system: Reserve Bank of Australia cash rate (30%) / Bloomberg AusBond Bank Bill Index (70%)<br>Products and options: Bloomberg AusBond Bank Bill Index | As per BP1 |
| Australian fixed income | Bloomberg AusBond Composite Index | As per BP1 |
| International fixed income | Bloomberg Barclays Global Aggregate Index (80% hedged / 20 % unhedged)[b] | As per BP1 |
| Australian listed equity | S&P/ASX 300 Index | As per BP1 |
| International listed equity | MSCI World ex-Australia (30% hedged/70% unhedged custom)[c] | As per BP1 |
| Domestic private (unlisted) equity | S&P ASX Small Ordinaries Index[d] | AVCAL Australia Private Equity and Venture Capital Index |
| International private (unlisted) equity | S&P ASX Small Ordinaries Index[d] | Cambridge Associates Global Private Equity Index[e] |
| Domestic listed property | S&P/ASX 200 A-REIT Index | As per BP1 |
| International listed property | FTSE EPRA/NAREIT Developed (100% hedged) | As per BP1 |
| Domestic unlisted property | S&P/ASX 200 A-REIT Index | Mercer/IPD/MSCI Australia Property Fund Index Core Wholesale |
| International unlisted property | FTSE EPRA/NAREIT Developed (100% hedged) | Mercer/IPD/MSCI Australia Property Fund Index Core Wholesale |
| Domestic listed infrastructure | 2005–2007: S&P Global Infrastructure Index (USD)<br>2008 onwards: S&P Global Infrastructure Index (80% AUD hedged, 20% AUD unhedged) | As per BP1 |
| International listed infrastructure | 2005–2007: S&P Global Infrastructure Index (USD)<br>2008 onwards: S&P Global Infrastructure Index (80% AUD hedged, 20% AUD unhedged) | As per BP1 |
| Domestic unlisted infrastructure | 2005–2007: S&P Global Infrastructure Index (USD)<br>2008 onwards: S&P Global Infrastructure Index (80% AUD hedged, 20% AUD unhedged) | MSCI IPD Australian Unlisted Infrastructure[f] |
| International unlisted infrastructure | 2005–2007: S&P Global Infrastructure Index (USD)<br>2008 onwards: S&P Global Infrastructure Index (80% AUD hedged, 20% AUD unhedged) | MSCI IPD Australian Unlisted Infrastructure[f] |
| Other (such as commodities) | 25% Bloomberg AusBond Composite Index<br>25% Bloomberg Barclays Global Aggregate Index (80% AUD hedged, 20% AUD unhedged)[b]<br>25% S&P/ASX 300 Index<br>25% MSCI World ex-Australia (30% AUD hedged, 70% AUD unhedged (custom)) | As per BP1 |

[a] All indexes are total return indexes, which are inclusive of dividends (where relevant). [b] Index levels as at 31 December (as opposed to 30 June). [c] Net of tax index. [d] AVCAL (sub. 33) suggested the ASX Small Ordinaries Index tracked listed companies of a comparable size to that of PE-backed companies. [e] Index levels as at 31 March. [f] Index levels as at 1 June.

Many indexes did not have a long enough time series, and assumptions or alternatives were used to allow for assessments over the required time period (2005–2017 for the system, most segments, individual funds and choice options, and 2008–2018 for MySuper products).

- For listed international property, the FTSE EPRA NAREIT (hedged) index only covers annual returns going back to 2006. The Commission assumed that the annual return for this index in 2005 was the same as the return for 2006. A simulated proxy for this index return in 2005 showed that assumption is likely to understate the returns for the index in 2005.[5] The proxy index delivered a return of 28.9 per cent in 2005 and 24.3 per cent in 2006. Further, the Commission was unable to obtain an unhedged index in Australian dollars.
- The Commission was unable to obtain an international unlisted property index, and thus benchmarked all unlisted property to an Australian index.
- For listed infrastructure, several inquiry participants suggested the use of the FTSE global core or FTSE developed core infrastructure index. The Commission was unable to source these indexes with a suitable time series. The Commission settled on using the S&P global infrastructure index, however this index was only available in Australian dollars (hedged or unhedged) from 2008 onwards. To address this gap, the Commission used the index in US dollars from 2005–2007.

The Commission was unable to obtain an international unlisted infrastructure index.

In some cases, there was ambiguity about the specific index to use, such as the appropriate domicile (domestic or international) and whether to use currency hedged or unhedged indexes, or a specific weighted combination of the two.

Some feedback was received on the specific indexes used in the draft report (table 4.8). Key areas where the Commission has done new work are explained below.

### *Cash investments*

The Commission understands that cash investments by funds may include both assets that are highly liquid to service members' needs, and assets that are less liquid (such as some certificates of deposit) but form part of a diversified investment strategy. Therefore, at the fund, segment and system level, the Commission used a cash benchmark that consists of a 30 per cent weight on the Reserve Bank of Australia cash rate, and a 70 per cent weight on the cash index. Because different investment options may represent different types of members, this blend of indexes has not been applied to product and option benchmarking.

5 The simulated proxy is a simulated local currency FTSE EPRA NAREIT Developed index.

Table 4.8 **Participant feedback on indexes**

| *Claim or issue* | *Submissions* | *Commission's response* |
|---|---|---|
| Unlisted indexes should not feature in benchmarks because they are not investible; including them obscures value added by accepting illiquidity risk. | Chant West (sub. DR191); Sunsuper (sub. DR197). | The decision to invest in unlisted assets is already reflected in a fund's asset allocation (which the benchmarking controls for).<br>The benchmarks are intended to reflect what an informed member should reasonably expect, at a minimum. For unlisted assets, this includes achieving returns in line with the broader market. |
| The analysis does not account for differences in hedging ratios across funds and over time. | AustralianSuper (sub. DR222); First State Super (sub. DR165); FSC (sub. DR218); MLC Wealth (subs. DR174 and DR223). | Fund-level hedging data are not available. The available system-wide data provide no strong evidential grounds for changing the assumptions (see main text). |
| The private equity index does not cover international investments. | Warren (sub. DR118); Sunsuper (sub. DR197). | Analysis updated to use the Cambridge Associates Private Equity Index and the average domestic–international split in SuperRatings data (see main text).[a] |
| The unlisted infrastructure benchmark is too high or not representative of investments in the system. | ASFA (sub. DR221); AustralianSuper (sub. DR222). | No alternative indexes available. Consultation with relevant industry experts suggests that the index is likely to be a suitable benchmark for Australian funds. |
| 'Other' assets category would contain a mix of defensive and growth assets with poor correlation to equities, thus should not be benchmarked to a pure equities index. | Chant West (sub. DR191); MLC Wealth (sub. DR174); Sunsuper (sub. DR197); Warren (sub. DR118). | Analysis updated to use 50 per cent equities and 50 per cent fixed income (see main text).[a] |
| No international indexes are applied for unlisted infrastructure and property. | AustralianSuper (sub. DR150); Sunsuper (sub. DR197). | Only domestic unlisted indexes were available. |
| Imputing returns to unlisted property over the period 2005–2007 led to overstated benchmarks | Chant West (sub. DR191); Sunsuper (sub. DR197). | Index data for unlisted property have been obtained for 2005–2007 (see main text).[a] |
| The international equities index omits emerging markets | AustralianSuper (sub. DR150); Warren (sub. DR118). | No change — not material enough. The MSCI ACWI Index has a 10-year return (in USD) only 4 basis points higher than the index used in the analysis (MSCI 2018b). |

[a] These changes were included in the analysis for the supplementary paper released in October 2018.

### *Hedging ratios*

In the draft report, the Commission applied a constant, system-wide hedging ratio for international asset classes: 30 per cent for international equities and 80 per cent for international fixed income. These values were based on a survey of superannuation funds (NAB 2015). Some participants questioned this approach, arguing that hedging ratios change materially over time (for example, MLC Wealth, sub. DR174), or that some funds may have

hedging ratios materially different from the assumption (for example, First State Super, sub. DR165).

Very little data are available on hedging ratios for international fixed income. Unpublished APRA data suggest an average ratio of 62 per cent over the period 2014–2017, whereas a recent survey by NAB estimated 88 per cent in 2017 (up from 72 per cent two years prior) (NAB 2017). Experts consulted by the Commission expected that hedging would be close to 100 per cent. As such, there are not strong evidential grounds for deviating from the assumptions in the draft report.

While sufficient data on hedging ratios at a fund or product level are not available, the Commission has examined data on hedging ratios over time at a system level. For international equities, unpublished APRA data indicate an average ratio of 28 per cent over the period 2014–2017. Separate data from Chant West's asset allocation survey indicated a simple average ratio of 27 per cent over the period 2010–2018 (covering 50 products across a range of fund types) (Chant West, pers. comm., 29 August 2018). In both cases, there is only modest variation between years. As such, the Commission has opted to keep its hedging ratio for international equities unchanged.

However, the Commission acknowledges the materiality of hedging assumptions and has thus conducted sensitivity testing by using a 100 per cent hedged international equities index and a completely unhedged international equities index, in place of the 30 per cent hedged international equities index (section 4.3).

### *Unlisted property*

Some participants raised concerns about the treatment of the unlisted property asset class in the draft report where, due to data availability, the Commission used a domestic unlisted index for all unlisted property from 2008 onwards, and listed indexes for the years 2005 to 2007 plus an imputed illiquidity premium. Chant West (sub. DR191) argued that this could have overstated BP2 by about 25 basis points, given much higher returns to listed property (relative to unlisted) during those years. Both Chant West and AustralianSuper (sub. DR150) argued that the use of a listed index plus illiquidity premium should be applied across the whole period, not just three years. Sunsuper (sub. DR197) submitted that it would be better to combine a set of regional listed indexes to proxy for a global index.

The Commission has since been able to obtain data for the Mercer Unlisted Property Index (Australia) for the years 2005–2007 (provided by Mercer to the Commission upon request). These data indicate an average return over those three years of 16.6 per cent, compared with 25.1 per cent under the assumptions used in the draft report. The unlisted property benchmark now comprises an unlisted index for the full time period.

*Unlisted infrastructure*

Analysis of funds survey data (described above) indicates that many funds' returns to unlisted infrastructure were well below the index over the period. Some participants suggested that this result indicated that the specific index used — the MSCI/IPD Unlisted Infrastructure Index — is not representative of the Australian superannuation system (ASFA, sub. DR221; AustralianSuper, sub. DR222). For example, the country composition of superannuation funds' holdings may differ to that in the index, which was 54 per cent Australian unlisted infrastructure at June 2018 (MSCI 2018a). However, some consultation with relevant industry experts suggested that the index is likely to be the most suitable benchmark available. Therefore, in the absence of an alternative index the Commission has decided not to make any change.

*Private equity*

The use of an Australian private equity index in the draft report was questioned by some participants, who argued that a global index may be more reflective of how superannuation funds invest (Warren, sub. DR118; Sunsuper, sub. DR197). The Commission has since obtained the Cambridge Associates Private Equity index, and updated the benchmarks to reflect the system average domestic–international split in private equity investment from SuperRatings data, varied by year and segment (table 4.9). For fund-level analysis, the corresponding fund-type shares are used. The system-level shares are broadly consistent with ABS data that indicate most private equity investment by Australian entities is domestic (ABS 2018).

Table 4.9 **Assumed share of international private equity**[a]

Percentage of total private equity

| *Segment* | *2005* | *2006* | *2007* | *2008* | *2009* | *2010* | *2011* | *2012* | *2013* | *2014* | *2015* | *2016* | *2017* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System | 63.8 | 37.7 | 45.2 | 51.2 | 68.5 | 62.5 | 69.8 | 66.7 | 70.9 | 69.8 | 72.0 | 75.4 | 76.1 |
| Corporate | 41.4 | 41.4 | 60.0 | 65.0 | 75.0 | 33.4 | 43.8 | 48.5 | 52.8 | 37.0 | – | – | 39.6 |
| Industry | 49.8 | 33.6 | 39.6 | 45.6 | 53.7 | 45.0 | 36.2 | 52.0 | 53.4 | 54.2 | 57.7 | 63.2 | 63.2 |
| Public Sector | 77.5 | 46.9 | 44.0 | 47.9 | 65.8 | 66.8 | 82.3 | 92.4 | 91.8 | 95.6 | 99.0 | 99.8 | 97.9 |
| Retail | 90.1 | 36.2 | 71.9 | 83.0 | 97.4 | 97.4 | 98.6 | 97.3 | 99.6 | 99.7 | 100.0 | 100.0 | 100.0 |

**a** Based on a sample including 140 options with available data in 2017 and 27 options with available data in 2006. **–** Nil or rounded to zero.

*Source*: PC analysis of SuperRatings data.

### *'Other' asset classes*

In the draft report, the Commission benchmarked the 'other' asset classes using 50 per cent S&P/ASX 300 and 50 per cent of the custom 30/70 hedged/unhedged MSCI international equities index.

Several participants questioned the use of equities indexes to proxy for the 'other' assets class in benchmarks, noting that equities are often poorly correlated with the assets in this class (such as hedge funds and commodities), and that some of these assets are more defensive in character (Chant West, sub. DR191; MLC Wealth, sub. DR174; Sunsuper, sub. DR197; Warren, sub. DR118). To reflect this, the Commission has decided to use a simple mix of 50 per cent equities and 50 per cent fixed income (with each split evenly into the relevant domestic and international indexes). This may still not accurately reflect the risk–return characteristics of the underlying assets in many cases, but the Commission considers this is the best approach available given the absence of more granular data on the composition of the 'other' assets category.

## Asset allocation

Asset allocation data (from APRA[6] and research firms) were used to determine the asset allocation at the system, segment, fund and product levels to use in conjunction with the relevant market indexes in constructing the BPs. In the case of SMSFs, ATO asset allocation data are largely inconsistent with the available indexes (discussed below).

### *Default asset allocation adjustment*

Much of the analysis in chapter 2 was subject to a 'break' in APRA asset allocation data occurring in 2013. This break has two key components. First, APRA data on asset allocation prior to 2014 only covers assets in each fund's default investment option. Using these data to create BPs for any unit under analysis would prove problematic if overall asset allocation differed from the default asset allocation. Second, the pre-2014 asset allocation data are much less granular than the post-2014 data. In particular, there are no separate categories for infrastructure (either listed or unlisted) or private equity.

To address the gaps in APRA asset allocation reporting prior to 2014, the Commission has assumed that the asset allocation of MySuper products in later years are broadly representative of the default investment options of funds. On the basis of this assumption, the magnitude of this issue was examined and corrected for. However, this inevitably meant that the analysis had to be confined to funds that have a MySuper product.

6 There are problems with asset allocations that some funds report to APRA in some years. For example, there are cases where funds have reported all assets being in 'other' assets or all assets being in cash. As these allocations are impossible to verify, but have been audited and reported by funds, the Commission considers it reasonable to include these asset allocations in its analysis.

The Commission has also explored the sensitivity of BPs to changes in asset allocation (section 4.3). This analysis finds that BPs with more conservative asset allocations do not necessarily have lower returns than their more growth-oriented counterparts, at least over the period under consideration. To some extent, this suggests that the BPs are less likely to be sensitive to asset allocation than other factors over the period of analysis. Some sensitivity testing of distributional analysis has also been conducted (figure 4.8 in section 4.3).

The asset allocation of the system, segments and funds was generally more conservative than for MySuper products (tables 4.10 and 4.11). Over 2014–2017, MySuper asset allocations had over 6 percentage points more in growth assets[7] than for whole-of-fund asset allocations, for all the funds considered (those with MySuper products) on an asset-weighted basis. Similarly, the average difference at the fund level was 7.2 percentage points more in growth assets for MySuper products than the whole of fund asset allocation.

Table 4.10 **Comparison of whole-of-fund asset allocation to MySuper asset allocation**

System and segment level, 2014-2017

| *Fund type* | *Additional proportion of assets in growth for default investment options (%)* | | | | |
|---|---|---|---|---|---|
| | *2014* | *2015* | *2016* | *2017* | *Average over 2014–2017* |
| Retail | -8.9 | +1.7 | +3.8 | +2.6 | +0.0 |
| Not-for-profit | +10.0 | +8.9 | +8.1 | +8.5 | +8.9 |
| All APRA-regulated funds | +3.9 | +6.6 | +6.8 | +7.2 | +6.1 |

*Source*: PC analysis of unpublished APRA data.

Table 4.11 **Comparison of whole-of-fund asset allocation to MySuper asset allocation**

Additional proportion of assets in growth for default investment options (%), 2014-2017

| *Min* | *1st quartile* | *Median* | *Mean* | *3rd quartile* | *Max* |
|---|---|---|---|---|---|
| -16.9 | +3.2 | +7.8 | +7.2 | +11.8 | +25.0 |

*Source*: PC analysis of unpublished APRA data.

However, this comparison of funds' MySuper and whole-of-fund asset allocations has problems. First, it does not capture funds that do not currently have a MySuper product. If such funds have quite different asset allocations when comparing the whole-of-fund and default investment option asset allocation, then the comparisons presented in tables 4.10 and 4.11 may

7 Asset classes which are considered to be defensive are cash and fixed income. All other asset classes are considered to be growth.

not be fully representative. Moreover, these comparisons rely on MySuper asset allocation being a proxy for the default investment option asset allocation. This need not always be true as funds may have previously offered multiple products that have default investment options with quite different asset allocations from a standard balanced MySuper product.

Some participants raised concerns that these adjustments may over-estimate the allocation to growth assets that some funds had prior to 2014 (CFS, sub. DR163; MLC Wealth, sub. DR174). However, to the extent that some funds may have historically had more conservative whole-of-fund asset allocations than their default allocations, this adjustment is broadly in line with the Commission's conservative approach to benchmarking. If the allocation to growth assets is overestimated, then the subtraction from the default allocations prior to 2014 will be overestimated, which would imply that the estimated whole-of-fund asset allocations are more conservative than they actually are.

In any case, the precise share of each asset class in the benchmark (and associated assumptions) has limited influence on many of the results (because of the effect of the global financial crisis (GFC) (section 4.3)). Sensitivity testing also reveals that alternative adjustments do not lead to fundamentally different results over the time period.

An alternative method of considering the differences between the default investment option allocation and whole-of-fund asset allocation is to consider the asset allocation reported by funds in 2013 compared with the asset allocation reported by funds in 2014 (when the reporting framework changed). This comparison addresses both concerns noted above, but comes with its own set of problems. It is impossible to identify how much of the change in asset allocation is due to the difference in whole-of-fund asset allocation and default investment option asset allocation or other differences, such as responses to an individual fund's assessment of the market between 2013 and 2014.

Nevertheless, this comparison shows that the reduction in proportion of growth assets was 1.6 percentage points between 2013 and 2014 for all APRA-regulated funds when weighted by assets (table 4.12). The median decrease of 1.7 percentage points is much smaller (table 4.13).

Table 4.12 **Comparison of pre and post reporting regime fund asset allocation**

System and segment level change in allocation to growth assets, 2013-2014

| *Fund type* | *Percentage points* |
|---|---|
| Retail | +2.3 |
| Not-for-profit | -3.8 |
| All APRA-regulated funds | -1.6 |

*Source*: PC analysis of unpublished APRA data.

Table 4.13 **Comparison of fund asset allocations before and after APRA reporting changes**

Fund level change in allocation to growth assets, percentage points, 2013-2014

| *Min* | *1st quartile* | *Median* | *Mean* | *3rd quartile* | *Max* |
|---|---|---|---|---|---|
| -76.0 | -9.5 | -1.7 | +2.0 | +5.7 | +76.0 |

*Source*: PC analysis of unpublished APRA data.

Taken together, the direction of the difference in asset allocation between the default investment option and whole-of-fund asset allocation is broadly consistent across both methods and suggests the need for an adjustment. The Commission has chosen the difference between whole-of-fund and MySuper asset allocation as the basis for the adjustment.

Default asset allocation adjustments have been applied at the system, fund-type segment and fund levels. This assumes that the relative allocation of defensive and growth asset classes (within the set of all defensive and growth asset classes, respectively) remains unchanged between the default investment option and whole-of-fund asset allocation. For example, if the adjustment results in a higher proportion of defensive assets, then cash and fixed income (domestic and international) are given more weight, but the relative allocations between these asset classes are the same (but not the same against growth assets). Also, if the adjustment causes an allocation to exceed 100 or go under 0 per cent, the allocation is capped at 100 per cent or 0 per cent respectively.

An alternative (but inferior) approach is to assume that each fund's asset allocation in all years prior to 2017 is the same as its 2017 asset allocation. This static assumption allows for every APRA-regulated fund to be assessed as it does not require the fund to have a MySuper product (section 4.3). However, it is likely to be less realistic as fund-level asset allocations would be expected to vary a lot over this time period, which includes the GFC.

*Imputing more granular APRA asset allocation data*

APRA asset allocation data do not contain separate categories for private equity or infrastructure. Further, neither listed nor unlisted property is split between domestic or international domiciles.

In these instances, splits and asset allocations are imputed using the most directly applicable data source. For the imputation of private equity and infrastructure asset allocation prior to 2014 in APRA data, the Commission used Rainmaker option-level asset allocation data to apportion 'other' assets into infrastructure, private equity and a new class of 'other' assets (including commodities and other assets not commonly invested in). Rainmaker asset allocation data were used as they allow for more accurate mapping to APRA's 'other' asset class prior to 2014 than other data sources.

The year-by-year proportions of infrastructure, private equity and the new class of other assets in the aggregated other asset class in Rainmaker data were then calculated, and these proportions used to apportion APRA's 'other' asset class prior to 2014 into infrastructure, private equity and the new class of other assets. For fund-level and fund-type APRA analysis, the proportions were allowed to differ by fund type. Notably, this is immaterial for many funds, as prior to 2014 in APRA fund level data, 'other' assets are poorly represented. No retail options included in Rainmaker's asset allocation data included any infrastructure or private equity assets prior to 2014, so the adjustment does not have an impact on the retail segment. Similarly, infrastructure allocations are only reported from 2011 onwards. This means that, prior to 2011, any infrastructure asset will still be included in 'other' assets.

In most other benchmarks constructed using APRA data (such as for system-level analysis), the other asset class proportions were calculated over the system (the four-year MySuper analysis uses the same method as the 11-year analysis). Ideally, the proportions would differ by a fund's individual circumstances for fund-level analysis, however the data were too patchy to allow for this. The proportions used are reported in table 4.14.

Table 4.14 **Apportioning out the 'other' asset class**[a]

| *Segment* | *Asset class* | *2005* | *2006* | *2007* | *2008* | *2009* | *2010* | *2011* | *2012* | *2013* |
|---|---|---|---|---|---|---|---|---|---|---|
| System | Infrastructure | – | – | – | – | – | – | 12.5 | 12.8 | 14.4 |
| | Private equity | 57.3 | 34.8 | 34.8 | 34.8 | 34.8 | 34.8 | 34.8 | 44.9 | 44.3 |
| | Other | 42.7 | 49.6 | 48.7 | 43.5 | 45.0 | 42.6 | 42.6 | 42.2 | 41.3 |
| Corporate | Infrastructure | – | – | – | – | – | – | 2.4 | 2.6 | 2.5 |
| | Private equity | 30.5 | 38.4 | 34.8 | 45.2 | 46.5 | 40.7 | 45.4 | 39.5 | 39.1 |
| | Other | 69.5 | 61.6 | 65.2 | 54.8 | 53.5 | 59.3 | 52.3 | 57.8 | 58.4 |
| Industry | Infrastructure | – | – | – | – | – | – | 19.9 | 20.5 | 22.7 |
| | Private equity | 64.1 | 60.1 | 54.4 | 57.5 | 61.9 | 62.5 | 42.8 | 42.1 | 42.5 |
| | Other | 35.9 | 39.9 | 45.6 | 42.5 | 38.1 | 37.5 | 37.3 | 37.4 | 34.8 |
| Public sector | Infrastructure | – | – | – | – | – | – | – | – | 0.9 |
| | Private equity | 50.4 | 30.7 | 48.1 | 57.1 | 43.3 | 51.0 | 49.1 | 50.8 | 48.4 |
| | Other | 49.6 | 69.3 | 51.9 | 42.9 | 56.7 | 49.0 | 50.9 | 49.2 | 50.6 |

**a** Retail funds are 100 per cent 'other' in all years. – Nil or rounded to zero.

*Sources*: PC analysis of unpublished APRA data and Rainmaker data.

While the apportioning of 'other' assets allows all infrastructure assets to be broken out from other assets in APRA fund-level asset allocation data prior to 2014, Rainmaker asset allocation data are particularly patchy regarding the shares of listed and unlisted infrastructure. Therefore, the Commission used APRA-level asset allocation data from 2014–2017 to impute the proportions of listed and unlisted infrastructure assets (table 4.15). These proportions were then averaged over the four years and applied to all years going back. This implicitly assumes that the listed and unlisted infrastructure splits have been relatively stable over time. The Commission does not have any evidence to examine the

validity of this assumption, but this was the only way in which unlisted infrastructure could be factored into the benchmarks. These proportions were calculated at the system level, and allowed to vary by individual fund for fund-level analysis, and by fund type for fund-type segment analysis.

Table 4.15 **Apportioning infrastructure into unlisted versus listed**

| *Segment* | *Per cent allocation to unlisted* |
|---|---|
| System | 73.7 |
| Corporate | 75.7 |
| Industry | 81.7 |
| Public sector | 70.5 |
| Retail | 18.7 |

*Sources*: PC analysis of unpublished APRA data and Rainmaker data.

Although APRA asset allocation data distinguish between unlisted property and listed property, there are no domicile breakdowns. All unlisted property was thus benchmarked against a domestic index, as the Commission was unable to acquire international unlisted property indexes. For listed property, the Commission used SuperRatings option-level asset allocation data (which have better coverage than Rainmaker data).

The domicile splits were calculated and applied in a similar way as for the apportioning out of infrastructure and private equity (table 4.16). In particular, the proportions of domestic and international listed property were calculated with the denominator being all listed property assets. For fund-level and fund-type APRA analysis, the splits were allowed to differ by fund type. In most other benchmarks constructed using APRA data (such as system-level analysis), the splits were calculated over all APRA-regulated funds. Ideally, the Commission would have allowed the splits to vary by individual fund for fund-level analysis, but the data were not sufficiently complete to allow for this. A similar approach was taken for the MySuper product-level analysis (see below).

Table 4.16 **Apportioning property into international versus domestic**
Per cent allocation to international property

| *Segment* | *2005* | *2006* | *2007* | *2008* | *2009* | *2010* | *2011* | *2012* | *2013* | *2014* | *2015* | *2016* | *2017* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System | 52.7 | 50.3 | 63.4 | 48.8 | 51.1 | 50.6 | 51.5 | 46.8 | 50.0 | 57.3 | 56.6 | 50.0 | 56.1 |
| Corporate | 45.2 | 38.0 | 45.0 | 47.1 | 35.9 | 59.9 | 68.5 | 86.8 | 71.0 | 34.2 | 20.3 | 17.1 | 19.0 |
| Industry | 42.0 | 14.1 | 39.0 | 45.2 | 52.6 | 46.2 | 32.5 | 29.4 | 34.0 | 50.5 | 43.6 | 54.8 | 62.7 |
| Public sector | 61.3 | 44.3 | 22.3 | 46.8 | 72.1 | 61.6 | 51.8 | – **a** | 46.7 | 90.4 | 100.0 | 100.0 | 100.0 |
| Retail | 55.3 | 70.9 | 73.5 | 49.5 | 50.8 | 50.8 | 53.3 | 48.2 | 50.9 | 56.6 | 56.2 | 48.5 | 54.6 |

**a** The public sector options that reported on property in this year only had investments in domestic property.
– Nil or rounded to zero.

*Sources*: PC analysis of unpublished APRA data and Rainmaker data.

*Research firm asset allocation data*

While research firm asset allocation data were useful for addressing gaps in APRA asset allocation data (as described above) and constructing BPs for some segments (such as default and choice), the unaudited nature of the asset allocation data meant they were sometimes of questionable quality. For example, for some options in some years, the asset allocation summed to well below 100 per cent despite a comprehensive set of asset classes being allowed for. In some cases 'other' assets occupied an unusually large proportion of an investment option's reported assets.

The Commission has applied adjustments when asset allocations do not sum to 100 per cent, by assuming that the asset-weighted asset allocation by segment is representative of the relative allocations between asset classes. Scaling factors were then applied to ensure the weighted segment asset allocation sums to 100 per cent while maintaining the relative allocation to each asset class.

For the choice segment option-level distributional analysis (figure 4.20), the Commission has not made similar adjustments. Whereas at a segment level the asset allocations were not too far from 100 per cent, at the option level, there were many instances where the asset allocation fell far short of 100 per cent, potentially due to nonreporting for some asset classes. In these cases, scaling the reported assets to 100 per cent would not necessarily be accurate. This approach of no adjustment means that some options may be treated generously by the analysis as the option's benchmark would place a zero weight on non-reported assets, meaning that the BPs would only be constructed on the basis of a proportion of the option's returns. This is consistent with giving funds the benefit of the doubt where there are significant uncertainties.

*Fixed 70:30 BPs*

In chapter 2, the Commission used BPs constructed from average asset allocations (weighted by assets) or the asset allocation of segments, individual funds or options. In this technical supplement, the Commission also used BPs which fix the asset allocation of the portfolio at 70 per cent in growth asset classes (equities, infrastructure and property) and 30 per cent in defensive asset classes (fixed income and cash) (a 70:30 BP). This was suggested by some participants in stage 1 as one of many benchmarks that could be drawn on.

To construct these BPs, the Commission drew on the asset allocation of balanced investment options as a starting point — many balanced options have growth orientations of approximately 70 per cent. The average asset allocation (to individual asset classes) among these options was calculated. Similar to other adjustments, the Commission then scaled growth and defensive assets so that the average asset allocation in each year was fixed at 70 per cent growth assets. Rainmaker option asset allocation data were used for this.

*Deriving individual default product asset allocation*

Adjustments also had to be made to asset allocation data for MySuper products so that these allocations would sum to 100 per cent and be consistent with reported growth and defensive ratios. The first step was to impute listed/unlisted and domestic/international breakdowns for those observations without them (table 4.17). For these observations, the average breakdown for a given year for other observations with the data was used.

Table 4.17 **Individual default product asset allocation imputations**
2008-2018

| *Asset class* | *Breakdown* | *Number of obs (% of sample)* | *Avg. annual imputation (%)* |
|---|---|---|---|
| Property | Unlisted / listed | 163 (27) | 66 / 34 |
| Listed property | Domestic / international | 204 (34) | 50 / 50 |
| Infrastructure | Domestic / international | 89 (15) | 64 / 36 |
| Private equity | Domestic / international | 66 (11) | 37 / 63 |
| Fixed income | Domestic / international | 142 (23) | 56 / 44 |

*Source*: PC analysis of SuperRatings data.

The second step was to ensure the asset allocation data summed to 100 per cent. After the imputations in the first step, the average total was 86 per cent. This was due to a mix of missing data and trace allocations to alternative asset classes. The missing percentage points were then allocated to 'other growth' (which was benchmarked against 50/50 domestic/international equities in the BP2), and 'other defensive' (benchmarked against 50/50 domestic/international fixed income) such that the final asset allocation is consistent with the reported growth and defensive ratio in the data. The downside of this approach is that the benchmarks would be sensitive to any misclassification of assets by funds, which some participants argued is common (CFS, sub. DR163; NAB Wealth, sub. 63, DR223; Richard Wilkins, sub. DR169).

*System and segment asset allocation*

The following tables (4.18–4.22) provide a description of the asset allocation data used for the system and segment benchmarking. There may be some discrepancies across segments due to the specific data sources used.

Table 4.18 **Asset allocation: System and fund-type segments[a]**

Per cent

| | *2007* | | | *2012* | | | *2017* | | |
|---|---|---|---|---|---|---|---|---|---|
| | *System* | *Retail* | *Not-for-profit* | *System* | *Retail* | *Not-for-profit* | *System* | *Retail* | *Not-for-profit* |
| Cash | 9.7 | 12.9 | 8.3 | 11.3 | 21.4 | 13.0 | 12.4 | 15.6 | 10.8 |
| Australian fixed income | 14.1 | 12.5 | 10.9 | 11.0 | 17.7 | 11.3 | 13.4 | 14.0 | 12.9 |
| International fixed income | 8.1 | 5.7 | 10.8 | 6.8 | 5.8 | 9.2 | 7.5 | 7.6 | 7.4 |
| Australian listed equity | 28.4 | 34.5 | 33.8 | 25.3 | 26.1 | 30.0 | 22.8 | 26.7 | 20.3 |
| International listed equity | 21.5 | 26.0 | 25.3 | 21.3 | 21.8 | 24.9 | 22.9 | 22.4 | 23.4 |
| Private equity | 4.8 | 0.0 | 0.0 | 6.7 | 0.0 | 0.0 | 4.2 | 1.9 | 5.7 |
| Property | 8.9 | 8.5 | 10.9 | 9.3 | 7.2 | 11.5 | 8.2 | 6.0 | 9.4 |
| Infrastructure | 0.0 | 0.0 | 0.0 | 1.9 | 0.0 | 0.0 | 5.0 | 1.8 | 7.1 |
| Other | 4.6 | 0.0 | 0.0 | 6.3 | 0.0 | 0.0 | 3.5 | 3.9 | 3.0 |

**a** System benchmarks are based on APRA system-level asset allocation data. Segment benchmarks are based on APRA fund-level asset allocation data. The underlying datasets do not reconcile, therefore the asset allocations may materially differ in some cases.

*Source*: PC analysis of unpublished APRA data.

Table 4.19 **Asset allocation: MySuper and choice segments**

Per cent

| | *2007* | | *2012* | | *2017* | |
|---|---|---|---|---|---|---|
| | *MySuper* | *Choice* | *MySuper* | *Choice* | *MySuper* | *Choice* |
| Cash | 5.4 | 9.2 | 5.6 | 16.8 | 9.1 | 11.9 |
| Australian fixed income | 5.1 | 7.0 | 5.4 | 6.9 | 3.9 | 4.0 |
| International fixed income | 4.8 | 6.1 | 2.9 | 4.8 | 3.4 | 3.9 |
| Australian listed equity | 33.1 | 33.1 | 29.8 | 27.4 | 23.8 | 25.6 |
| International listed equity | 26.2 | 25.9 | 22.4 | 20.9 | 26.3 | 25.3 |
| Private equity | 2.3 | 1.1 | 4.3 | 1.6 | 3.5 | 2.6 |
| Property | 6.6 | 8.1 | 7.2 | 6.1 | 5.5 | 6.1 |
| Infrastructure | 6.9 | 1.5 | 7.7 | 1.9 | 7.3 | 4.9 |
| Other | 9.6 | 8.0 | 14.6 | 13.6 | 17.3 | 15.9 |

*Source*: PC analysis of SuperRatings data.

Table 4.20 **Asset allocation: accumulation and retirement**

Per cent

| | *2007* | | *2012* | | *2017* | |
|---|---|---|---|---|---|---|
| | *Accumulation* | *Retirement* | *Accumulation* | *Retirement* | *Accumulation* | *Retirement* |
| Cash | 7.9 | 16.8 | 12.3 | 22.5 | 10.7 | 19.7 |
| Australian fixed income | 6.3 | 7.9 | 6.3 | 9.8 | 3.9 | 8.0 |
| International fixed income | 5.7 | 7.5 | 4.1 | 6.5 | 3.6 | 5.1 |
| Australian listed equity | 33.1 | 29.8 | 28.4 | 23.1 | 24.8 | 18.6 |
| International listed equity | 26.0 | 23.1 | 21.5 | 16.0 | 25.7 | 19.2 |
| Private equity | 1.5 | 1.0 | 2.7 | 1.0 | 3.0 | 1.5 |
| Property | 7.6 | 8.2 | 6.5 | 6.5 | 5.8 | 6.1 |
| Infrastructure | 3.4 | 1.0 | 4.2 | 2.1 | 6.0 | 4.4 |
| Other | 8.6 | 5.1 | 14.0 | 12.6 | 17.0 | 17.5 |

*Source*: PC analysis of SuperRatings data.

Table 4.21 **Asset allocation: option types**

Per cent

| | 2007 | | | 2012 | | | 2017 | | |
|---|---|---|---|---|---|---|---|---|---|
| | *Secure (0–19)* | *Capital stable (20–40)* | *Conservative balanced (41–59)* | *Secure (0–19)* | *Capital stable (20–40)* | *Conservative balanced (41–59)* | *Secure (0–19)* | *Capital stable (20–40)* | *Conservative balanced (41–59)* |
| Cash | 72.4 | 14.5 | 18.4 | 68.8 | 39.2 | 19.5 | 84.2 | 15.3 | 14.7 |
| Australian fixed income | 25.3 | 45.2 | 23.0 | 31.2 | 20.3 | 14.2 | 11.0 | 39.8 | 23.0 |
| International fixed income | 0.2 | 7.6 | 5.1 | 0.0 | 4.6 | 10.8 | 0.8 | 6.9 | 7.5 |
| Australian listed equity | 0.8 | 15.5 | 35.0 | 0.0 | 22.7 | 24.4 | 1.4 | 16.8 | 16.2 |
| International listed equity | 0.6 | 6.6 | 13.3 | 0.0 | 10.1 | 22.0 | 1.5 | 15.7 | 18.4 |
| Private equity | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 5.4 |
| Property | 0.7 | 10.5 | 5.2 | 0.0 | 3.1 | 9.0 | 0.5 | 3.9 | 7.0 |
| Infrastructure | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 1.2 | 5.1 |
| Other | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.5 | 2.7 |

*Source*: PC analysis of unpublished APRA data.

Table 4.22 **Asset allocation – option types**

Per cent

| | *2007* | | | *2012* | | | *2017* | | |
|---|---|---|---|---|---|---|---|---|---|
| | *Balanced (60–76)* | *Growth (77–90)* | *High growth (91–100)* | *Balanced (60–76)* | *Growth (77–90)* | *High growth (91–100)* | *Balanced (60–76)* | *Growth (77–90)* | *High growth (91–100)* |
| Cash | 7.8 | 4.4 | 3.1 | 10.0 | 5.9 | 3.3 | 12.4 | 6.5 | 6.6 |
| Australian fixed income | 12.7 | 5.9 | 1.4 | 11.5 | 6.6 | 0.3 | 11.8 | 8.6 | 0.0 |
| International fixed income | 9.3 | 6.8 | 1.8 | 6.8 | 6.4 | 0.5 | 7.7 | 4.8 | 0.6 |
| Australian listed equity | 33.3 | 41.0 | 43.8 | 32.4 | 37.4 | 33.7 | 23.8 | 21.2 | 23.8 |
| International listed equity | 26.3 | 29.4 | 39.5 | 28.8 | 29.2 | 40.5 | 23.7 | 26.1 | 6.4 |
| Private equity | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.8 | 10.4 | 23.4 |
| Property | 10.7 | 12.6 | 10.5 | 10.5 | 14.5 | 21.6 | 8.3 | 11.2 | 28.4 |
| Infrastructure | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.1 | 7.6 | 0.0 |
| Other | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.5 | 3.5 | 10.8 |

*Source*: PC analysis of unpublished APRA data.

*SMSF asset allocation*

In the draft report, the Commission noted that the asset holdings of SMSFs are difficult to observe in ATO datasets due to the way asset classes are defined. This also makes it difficult to compare the asset allocation of SMSFs with the APRA-regulated segment.

The Commission has been provided with data from Class Limited on the asset allocation of SMSFs on more of a 'look-through' basis than ATO data — that is, assigning the assets within various trusts and managed funds to specific asset classes (table 4.23). These data suggest broadly similar conclusions to the less-granular ATO data, but also reveal that SMSF holdings of fixed income assets and equities are likely to be materially higher than suggested by the ATO data. The share of 'other' assets that cannot be assigned to the main asset categories (and is likely to mostly comprise unlisted trusts) is substantially lower in the Class Limited data (11 per cent compared with 28 per cent). Importantly, these figures represent the average across SMSFs — the asset allocations of individual SMSFs could differ materially.

Because only one year of data is available for this more granular asset allocation, the Commission has not revisited the illustrative investment performance benchmarking for SMSFs in the draft report (beyond updating to an additional year of data).

Table 4.23 **Asset allocation of SMSFs versus APRA-regulated funds**

Share of total assets, June 2016

| *Asset category* | *SMSFs (Class Limited data[a])* | *SMSFs (ATO data)* | *APRA-regulated funds* |
|---|---|---|---|
| | % | % | % |
| Cash | 23.8 | 24.8 | 12.9 |
| Domestic fixed income | 3.4 | 1.5[b] | 13.3 |
| International fixed income | 2.6 | na | 7.5 |
| Domestic listed equities | 30.6 | 29.5 | 22.5 |
| International listed equities | 5.4 | 0.6 | 21.5 |
| Private equity | 1.3 | 1.0 | 4.4 |
| Listed property | 1.5 | na | 3.8 |
| Unlisted property | 19.2 | 14.9 | 5.2 |
| Listed infrastructure | 1.2 | na | 1.5 |
| Unlisted infrastructure | 0.0 | na | 3.5 |
| Other | 10.8 | 27.6 | 3.8 |

**a** Data adjusted from share of net assets to share of total assets. Where SMSF assets could not be split into domestic/international, they have been apportioned in line with the observed split for the remaining assets in the relevant category. **b** Value is for debt securities (total). na Not available.

*Sources*: ATO (2018b); APRA (2018c); Class Limited (pers. comm., 5 October 2018).

## Tax

Ideally, the BPs would reflect the tax rate a fund would have paid, had it earned those returns. While superannuation funds are taxed at 15 per cent on investment income and capital gains, there are numerous factors that lead to a lower effective rate. These include the one-third capital gains discount for assets held by superannuation funds for more than one year, the effect of imputation credits, and the tax-free status of assets in the retirement phase. In addition, assets may accrue a capital gains tax liability that is not realised in the time period of the analysis (unless the assets are sold). Inquiry participants noted such difficulties associated with adjusting BPs for tax (ASFA, sub. 47; AustralianSuper, sub. 43; PwC, sub. 62).

In the draft report, the Commission subtracted the median tax paid by superannuation funds (as reported to APRA) from the BPs for each year, combined with sensitivity testing at flat rates of 5 and 7.5 per cent.[8] (For the fund-level analysis, each fund's individual tax rate was applied). At the time, the Commission understood that the APRA data reflected actual tax paid. Several participants criticised this approach, given it does not reflect accrued or deferred tax liabilities, arguing instead that long-term average tax rates should be used (AustralianSuper, sub. DR150) or, alternatively, a flat rate of 6 to 7.5 per cent (Chant West, sub. DR191).

On further investigation, the Commission has ascertained that the APRA data do, in fact, include an allowance for deferred tax liabilities. Combined with the fact that net returns in APRA datasets are calculated using the same tax data, the APRA tax rates have been retained for benchmarking at the system level. However, rather than using the median rate across the system, an average tax rate has been used (weighted by each fund's investment earnings), by year.

The Commission opted against using segment-tailored tax rates for segment-level analyses. Retail fund tax data produce relatively stable, negative rates over time, whereas much more volatility is evident in the broader tax data. It is not clear what is driving this. To avoid this unduly impacting results, the system average tax rate was used for segment-level analysis (rather than segment-tailored ones). And further, to avoid complexities, where some funds experience investment earnings close to zero in some years (and thus have very high or low tax rates), the Commission undertook all fund-level benchmarking on a gross-of-tax basis.

Some participants questioned the use of fund-level tax rates for benchmarking MySuper products with SuperRatings product-level data, as the fund-level data would include (untaxed) earnings in the retirement phase (ASFA, sub. DR148). In response, the Commission has used APRA MySuper data from 2014–2018 to impute tax rates. For years prior to 2014, this imputation was done by taking the average fund-level tax rate and adding the average difference (across 2014–2018) between the average MySuper tax rate and the average fund-level tax rate.

8 The benchmarking analysis only adjusted for domestic tax; international tax was excluded from the analysis.

Because crediting-rate data (from SuperRatings) were used for some analyses, an upward adjustment has also been made to offset insurance-related deductions. Funds can deduct the cost of insurance premiums from their overall tax liability, the benefits of which in practice are expected to flow back to members in the form of lower insurance costs. Funds typically include these deductions in the income tax item when reporting to APRA (rather than in the contributions tax item). Because net returns calculated using crediting rates are gross of any insurance premiums, the amount of any insurance-related deductions needs to be offset from the MySuper tax data such that the tax calculation only pertains to investment earnings.

This tax rate (the 'accumulation rate') has also been applied for all other analyses using SuperRatings returns data. However, for the option-type analysis, where the variation in tax rates across different option types is important, different rates were calculated for the different option types by grouping fund tax data together based on the funds underlying asset allocation.

Further, the Commission used ATO (2018a) and SuperRatings data to estimate the impact of franking credits on an otherwise non-taxed retirement segment (the 'retirement rate'). Table 4.24 provides information on the different tax rates applied across analyses, the average rate across the time period under analysis, and any sensitivity test rates applied.

Table 4.24 **Tax rates applied to BPs**

| *Analysis* | *Tax rate applied* | *Average over period (%)* | *Sensitivity test rate applied (%)* |
|---|---|---|---|
| APRA-regulated funds (2005–2017) | APRA-regulated fund average | 0.3[a] | 5.0 |
| Option types (2005–2017) | Accumulation rate (option-type tailored) | .. | 5.0 |
| Default segment (2005–2017) | Accumulation rate | 5.5 | 7.5 |
| Choice segment (2005–2017) | Accumulation rate | 5.5 | 7.5 |
| Retail segment (2005–2007) | APRA-regulated fund average | 0.3[a] | 5.0 |
| Not-for-profit segment (2005–2017) | APRA-regulated fund average | 0.3[a] | 5.0 |
| Accumulation segment (2005–2017) | Accumulation rate | 5.5 | 7.5 |
| Retirement segment (2005–2017) | Retirement rate | -0.3 | 5.0 |
| Individual funds (2005–2017) | Gross of tax | .. | .. |
| Individual MySuper products (2015–2018) | Accumulation rate | 6.0 | 7.5 |
| Individual MySuper products (2008–2018) | Accumulation rate | 4.6 | 7.5 |
| Individual choice products (2005–2017) | Accumulation rate | 5.5 | 7.5 |

[a] This average tax rate excludes 2012, for which there was a very large negative tax rate. .. Not applicable.

*Sources*: PC analysis of APRA (2018b) and unpublished APRA data.

## Investment fees

For listed asset classes, investment fees in line with those on passive investment products have been subtracted from the benchmarks. Fees charged for passive management should be lower on average than those charged by superannuation funds (which typically engage in active management). Accordingly, the fees that are deducted from the BPs are generally lower than those charged by superannuation funds.

Fees charged on exchange-traded funds (ETF) currently offered on the Australian Stock Exchange (ASX) were used for the fee level for each listed asset class in the benchmarks for the latest year in the period. The Commission opted for the largest ETF for each asset class (by funds under management). An investment fee did not need to be calculated for the unlisted property and infrastructure indexes because these are reported net of fees. A fee of 1.6 per cent was used for private equity, based on participant input (AVCAL, sub. 33).

The Commission is aware that the passive fees large superannuation funds would pay are likely to be lower than those in the BP. While comparisons of the chosen ETF fees with advertised wholesale fees for (some) similar asset classes did not uncover material differences, this does not account for the fact that most superannuation funds will be able to negotiate discounts on advertised wholesale fees. Therefore, the Commission's use of ETF fees in the BPs is conservative. The Commission is also aware that not all funds are likely to channel passive investment through ETFs. However, it is the *level* of fees in the benchmarks that matters, not the source.

Because time series data on retail ETFs are not available for the full period, the investment fees in the benchmark were adjusted upwards by 5 per cent year-on-year going backwards (table 4.25). This accounts for the fact that passive investment fees have been falling over time. The magnitude of the adjustment was based on data from the United States (given the lack of information specific to Australia) (box 4.3). While fees may be higher on average in Australia, it is not obvious that the relative historical trend should be materially different from that observed in the United States.

### Box 4.3 **Adjusting passive fees historically**

The Commission had difficulty locating accurate, historical data on passive investment fees. Most publicly available analyses originate in the United States.

- The Investment Company Institute estimated that expense ratios for US equity ETFs dropped nearly a third between 2009 and 2016. A fall of a third over eight years roughly implies average annual falls of 5 per cent.
- Morningstar found that asset-weighted expense ratios for passive funds declined from about 0.30 to 0.20 per cent over the period 2008–2014. Again, this fall is roughly consistent with 5 per cent year-on-year falls.

*Sources*: Rawson and Johnson (2015); Vlastelica (2017).

Table 4.25 **Investment fees in the BPs**[a,b]

Current fee levels (per cent of assets under management) (2017) and backwards projections (2005–2016), by asset class

| | *Projections* | | | | | | | | | | | | *Actual* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Asset class* | *2005* | *2006* | *2007* | *2008* | *2009* | *2010* | *2011* | *2012* | *2013* | *2014* | *2015* | *2016* | *2017*[c] | *Source* |
| Cash | 0.13 | 0.12 | 0.11 | 0.11 | 0.10 | 0.10 | 0.09 | 0.09 | 0.09 | 0.08 | 0.08 | 0.07 | 0.07 | BlackRock iShares Core Cash ETF |
| Domestic fixed income | 0.43 | 0.41 | 0.39 | 0.37 | 0.35 | 0.34 | 0.32 | 0.31 | 0.29 | 0.28 | 0.26 | 0.25 | 0.24 | SPDR S&P/ASX Australian Bond Fund |
| International fixed income | 0.47 | 0.44 | 0.42 | 0.40 | 0.38 | 0.37 | 0.35 | 0.33 | 0.32 | 0.30 | 0.29 | 0.27 | 0.26 | BlackRock iShares Core Global Corporate Bond (AUD hedged) ETF |
| Domestic equity | 0.25 | 0.24 | 0.23 | 0.22 | 0.21 | 0.20 | 0.19 | 0.18 | 0.17 | 0.16 | 0.15 | 0.15 | 0.14 | Vanguard Australian Shares Index ETF |
| International equity | 0.54 | 0.51 | 0.49 | 0.47 | 0.44 | 0.42 | 0.40 | 0.38 | 0.36 | 0.35 | 0.33 | 0.32 | 0.30 | SPDR S&P World ex Australia Fund |
| Private equity (BP1) | 0.90 | 0.86 | 0.81 | 0.78 | 0.74 | 0.70 | 0.67 | 0.64 | 0.61 | 0.58 | 0.55 | 0.53 | 0.50 | SPDR S&P/ASX Small Ordinaries Fund |
| Private equity (BP2) | 2.87 | 2.74 | 2.61 | 2.48 | 2.36 | 2.25 | 2.14 | 2.04 | 1.94 | 1.85 | 1.76 | 1.68 | 1.60 | AVCAL (sub. 33) |
| Domestic listed property | 0.41 | 0.39 | 0.37 | 0.36 | 0.34 | 0.32 | 0.31 | 0.29 | 0.28 | 0.27 | 0.25 | 0.24 | 0.23 | Vanguard Australian Property Securities Index ETF |
| International listed property | 0.90 | 0.86 | 0.81 | 0.78 | 0.74 | 0.70 | 0.67 | 0.64 | 0.61 | 0.58 | 0.55 | 0.53 | 0.50 | SPDR Dow Jones Global Real Estate Fund |
| Listed infrastructure | 0.86 | 0.82 | 0.78 | 0.74 | 0.71 | 0.68 | 0.64 | 0.61 | 0.58 | 0.56 | 0.53 | 0.50 | 0.48 | BlackRock iShares Global Infrastructure ETF |

**a** All fees are for both BP1 and BP2 unless otherwise stated. **b** Unlisted property and unlisted infrastructure have fees built into the index returns. **c** The 2017 fee levels were used for 2018 in the MySuper analyses.

In the draft report analysis, the Commission applied an allowance to benchmarks for indirect investment expenses that are not reflected in asset-class investment costs, including custodian, valuation and search costs. The allowance was 0.15 percentage points (15 basis points) for BP1 and 40 basis points for BP2, based on pre-draft report consultation with experts.

There was little feedback on this assumption in submissions following the draft report. However, further consultation with industry experts and academics provided the basis to reduce this allowance to 10 basis points for all benchmarks. This reflects estimates provided to the Commission that custodian and search costs are likely to be within the range of 1–10 basis points (with 10 chosen as a conservative estimate). Most valuation costs are likely to be reflected in asset prices or investment management costs, and thus do not require a separate adjustment to the benchmarks.

## Administration fees

The BPs are intended to represent a counterfactual investment opportunity for superannuation members. As such, there would be administration costs incurred in undertaking this investment opportunity, and administration expenses have thus been deducted from BP returns. In most cases, the Commission has used the median administration expense ratio across the system (based on APRA data)[9] and the median (or 25$^{th}$ percentile in some cases) administration fee across particular segments (using SuperRatings data) (table 4.26). For fund level benchmarking, the fund's own administration expenses were used.

Note that for analysis using SuperRatings fees data, the administration fee comprises only asset-based administration fees, and not fixed fees, to align the BPs with the returns data (which are net of only implicit asset-based administration fees, meaning that applying the fixed fee to BPs would be overly generous). Some participants objected to this and suggested fixed administration fees should be deducted as well (FSC, sub. DR218; MLC Wealth, sub. DR223). The Commission maintained its approach to ensure the BPs best matched the 'raw' returns data.

### *MySuper analysis*

The 25$^{th}$ percentile asset-based administration fee was deducted from BPs for MySuper product-level analysis. This was done to reflect the fact that default products should be held to higher standards of administrative efficiency, particularly given their relatively homogeneous and largely disengaged membership.

9 In APRA data, administration expenses are distinguished from advice expenses. The Commission has included advice expenses when calculating administration expense ratios.

Table 4.26 **Administration fee adjustments in the BPs**[a,b]

Medians by segment (per cent of assets under management)

| *Analysis* | *Expense ratio or fee* | *Segment* | *Year end June* | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *2005* | *2006* | *2007* | *2008* | *2009* | *2010* | *2011* | *2012* | *2013* | *2014* | *2015* | *2016* | *2017* |
| System | Expense ratio | System | 0.80 | 0.80 | 0.60 | 0.60 | 0.60 | 0.70 | 0.70 | 0.65 | 0.80 | 0.71 | 0.60 | 0.55 | 0.57 |
| Accumulation/ retirement | Fee | Accumulation | 0.44 | 0.54 | 0.53 | 0.51 | 0.55 | 0.52 | 0.50 | 0.48 | 0.43 | 0.41 | 0.40 | 0.40 | 0.38 |
| | Fee | Retirement | 1.79 | 1.12 | 0.67 | 0.60 | 0.59 | 0.54 | 0.50 | 0.48 | 0.45 | 0.43 | 0.40 | 0.39 | 0.39 |
| Default/choice | Expense ratio | Default / MySuper[c] | 0.40 | 0.40 | 0.30 | 0.30 | 0.30 | 0.40 | 0.40 | 0.40 | 0.40 | 0.37 | 0.33 | 0.31 | 0.33 |
| | Fee | Choice | 0.44 | 0.54 | 0.53 | 0.51 | 0.55 | 0.52 | 0.50 | 0.48 | 0.47 | 0.45 | 0.44 | 0.43 | 0.42 |
| Profit status | Expense ratio | Retail | 0.80 | 0.80 | 0.60 | 0.60 | 0.60 | 0.70 | 0.70 | 0.65 | 0.80 | 0.71 | 0.60 | 0.55 | 0.57 |
| | Expense ratio | Not-for-profit | 0.80 | 0.80 | 0.60 | 0.60 | 0.60 | 0.70 | 0.70 | 0.65 | 0.80 | 0.71 | 0.60 | 0.55 | 0.57 |
| Fund-type | Expense ratio | Industry | 0.80 | 0.80 | 0.60 | 0.60 | 0.60 | 0.70 | 0.70 | 0.65 | 0.80 | 0.71 | 0.60 | 0.55 | 0.57 |
| | Expense ratio | Corporate | 0.80 | 0.80 | 0.60 | 0.60 | 0.60 | 0.70 | 0.70 | 0.65 | 0.80 | 0.71 | 0.60 | 0.55 | 0.57 |
| | Expense ratio | Public sector | 0.80 | 0.80 | 0.60 | 0.60 | 0.60 | 0.70 | 0.70 | 0.65 | 0.80 | 0.71 | 0.60 | 0.55 | 0.57 |
| | Expense ratio | Retail | 0.80 | 0.80 | 0.60 | 0.60 | 0.60 | 0.70 | 0.70 | 0.65 | 0.80 | 0.71 | 0.60 | 0.55 | 0.57 |

**a** Some analyses use a more granular, tailored administration expense ratio which is not amenable to presentation (for example, the individual fund-level benchmarking). **b** Individual option-level analysis used segment-level administration fee adjustments due to data limitations. **c** For default, as MySuper did not exist prior to 2014, the Commission drew on the APRA-regulated fund bottom quartile administration expense ratio, which was commensurate with fees from MySuper products in SuperRatings data for 2014–2016 where MySuper fees data were available.

*Source*: PC analysis of unpublished APRA data.

## Investment performance decomposition

To better understand the nature of investment performance, the Commission has undertaken an attribution analysis of historical net returns for the system, some segments, funds and MySuper products using unpublished APRA fund-level data and SuperRatings data. The analysis decomposes net returns into several measured factors — asset allocation, tax and expenses[10] — to attribute drivers of differences in investment performance, over the long term and relative to BPs. Asset allocation effects are calculated using the gross (of all fees and tax) return benchmark — that is, the return to a portfolio of market indexes. Tax and expenses are calculated using APRA or SuperRatings data, and then subtracted from the gross return benchmark.

What remains is a 'residual', which is likely to comprise asset selection (individual investment decisions within asset classes), deviations from the benchmark asset allocation within a year, unreported indirect expenses and measurement error. The primary candidate is asset selection, which in this context can be thought of as deviations in gross investment performance from the market average within each asset class. This will inherently vary by fund depending on specific investment strategies, selected asset holdings and choice of investment managers. In short, it reflects how well a fund is doing at securing exposure to an asset class, including via its intra-asset class investment strategy and the investment decisions of fund managers within those sub-classes (including for direct asset holdings).

The residual could also reflect measurement errors, including inaccuracies in the Commission's benchmarking assumptions and data sources. For example, the asset allocations used in the benchmark may not be completely representative for each individual fund. The residual may also include the effect of indirect expenses which are implicitly captured in returns, but not explicitly captured in expense data. For example, indirect investment expenses are embedded in APRA data on gross returns, but are not separately disclosed as expenses.

Importantly, the residual does not include anything which is not captured in the returns data, such as most advice fees and insurance premiums. Any fees that are not reflected in the underlying administration and investment expense data similarly cannot be used to explain the differences in performance across segments and funds in the Commission's analysis.

Some participants suggested the residuals presented in the supplementary paper released by the Commission following its draft report were too large to reflect a true measure of asset selection value-add (or 'alpha') (AustralianSuper, sub. DR222; MLC Wealth, sub. DR223; Rice Warner, sub. DR225). However, as discussed in chapter 2, the analysis was not intended to be a classic performance attribution analysis (that would usually be conducted at an asset-class level). Rather, due to data limitations, the Commission's analysis decomposes gross returns using the available system-, segment-, fund- or product-level data.

[10] Expenses incurred by funds are considered rather than fees because net returns in APRA fund-level data are calculated using expenses. However, fees are used in the MySuper product decompositions.

## Methodology

The Commission undertook two types of decomposition. Absolute performance decompositions take a given unit of analysis (system, segment, fund or product) and distinguish the components of the net returns for that unit of analysis, where:

*Net return = benchmark asset allocation – administration expenses – investment expenses – tax – residual*

Relative outperformance decompositions decompose the total **out**performance gap between segments and funds. In the case of the segment-level relative outperformance decomposition, the outperformance gap is calculated by subtracting the outperformance of one segment from the outperformance of the other.[11] Specifically, it is defined as:

*(Not-for-profit actual performance – Not-for-profit benchmark) – (Retail actual performance – Retail benchmark)*

Which is decomposed as:

*Outperformance gap = administration expense gap + investment expense gap + tax gap + residual gap*

The interpretation in this case is that the larger the total outperformance gap, the better the not-for-profit segment is performing compared with the retail segment, after accounting for differences in asset allocation.

In terms of the components the outperformance gap is decomposed into, these also represent differences relative to benchmarks. For example, for the tax gap:

*Tax gap = (Not-for-profit actual tax – Not-for-profit tax in benchmark) – (Retail actual tax – Retail tax in benchmark)*

The impact of asset allocation (the gross return of the BP) is contained in the difference between residuals:

*Difference in residuals = Not-for-profit residual – Retail residual*

*= (Not-for-profit gross return – Retail gross return) – (Not-for-profit gross benchmarked – Retail gross benchmark)*

*= Difference in gross returns – difference in asset allocation*

[11] Most retail funds have a negative outperformance gap, as the retail segment returns are below their benchmark. Subtracting this from the not-for-profit outperformance gap leads to a larger total outperformance gap (subtracting a negative number from a positive number).

In the case of fund-level relative outperformance decompositions (section 4.3), the total **out**performance gap is the fund's outperformance minus system outperformance. Funds with a large and positive total outperformance gap are performing better than the system as a whole, taking into account differences in asset allocation. And funds with a negative outperformance gap are performing worse than the system, even when accounting for differences in asset allocation.

The Commission has used simple arithmetic averages for the decomposition analysis because geometric averages (time-weighted measures) are not linear functions of inputs and thus pose computational difficulties for decomposing attribution quantities. However, arithmetic averages provide a reasonable approximation as the discrepancies are likely to be small.

### Exploratory analysis of residuals

The Commission also conducted simple regression analysis of the fund-level residuals to explore potential correlations with various fund characteristics. While the correlations might suggest avenues of further investigation and analysis by regulators and researchers, the results here are associative — they can only indicate correlation, not causation.

## Rate of return and return on assets (SMSFs)

Calculating a simple annual return is complicated by the fact that the level of underlying assets can change during the year due to contributions flows. Class Limited (sub. DR190) and the SMSF Association (sub. DR194) submitted that the 'return on assets' (ROA) formula used by the ATO to calculate SMSF returns provides systematically lower figures than the 'rate of return' (ROR) formula used by APRA to calculate returns for APRA-regulated funds[12]. This is because of how the measures are constructed:

$$ROA\ (ATO) = \frac{Net\ earnings\ after\ tax}{Average\ assets\ over\ the\ period} \qquad ROR\ (APRA) = \frac{Net\ earnings\ after\ tax}{Cashflow\ adjusted\ net\ assets}$$

One key difference is the denominator used in each of the two measures — the ROA measure simply uses the average value of net assets over the period (calculated by taking the average of the assets at the beginning, and the assets at end of the period), whereas the ROR measure takes the beginning value and adds adjustments for net member flows and net insurance flows.[13] The effect is that the ROA denominator is influenced by net earnings during the period through the value of assets at the end of the period, while the ROR denominator is not — meaning that the ROA measure will produce systematically lower estimates of returns than the ROR measure.

[12] Prior to 2004, APRA also used a ROA measure.

[13] Specifically, the adjustment is half of the sum of net member flows and net insurance flows.

The method for calculating 'net earnings after tax' also differs, affecting both the numerator and denominator of both measures. In the case of ROA (as calculated by the ATO), net earnings are measured as the difference between opening and closing assets over a given period, with adjustments for non-earnings cashflows contributions, inward rollovers and other income not considered income. In the case of ROR (as calculated by APRA), net earnings are calculated directly using data on net investment and operating income and on changes in asset values (data which are not reported to the ATO by SMSFs) (ATO, pers. comm., 8 August 2017). The consequence is that the ROA measure of net earnings is net of contributions tax and insurance flows, whereas the ROR measure is gross of contributions tax and insurance flows (Class Limited, sub. DR190). Again, this means that ROA estimates of returns will tend to be lower than ROR estimates.

In addition to these differences, the SMSF Association (sub. DR194) suggested that ATO calculations of ROA may capture a wider set of administration expenses than APRA calculations of ROR, and thus may be influenced by advice and establishment costs of SMSFs.

Some of the differences between the ROA and ROR formulas were acknowledged in the Commission's draft report. Since then, estimates have been provided to the Commission that attempt to replicate the ROR formula for SMSFs. This includes estimates from the ATO that attempt to more closely align the ROA formula for SMSFs to the ROR formula for APRA-regulated funds, allowing for improved comparisons (figure 4.4). These estimates were only provided for the SMSF segment as a whole.

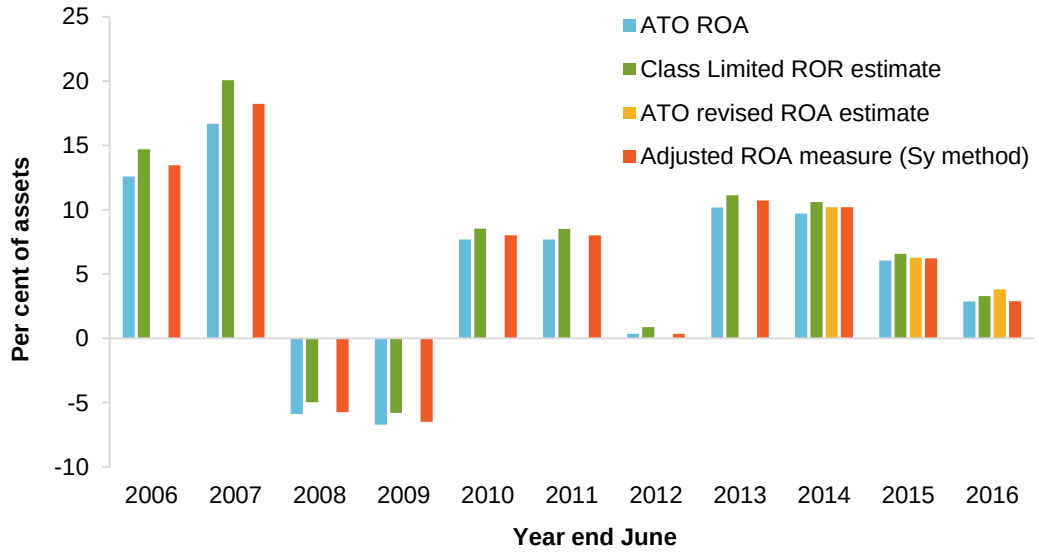
- Class Limited provided ROR estimates (based on publicly available data) that adjust for the time period in the denominator, as well as the effect of contributions tax and insurance flows.
- The ATO provided ROA estimates that only adjust for the time period in the denominator.

Class Limited estimates suggest that the standard ROA measure is, on average, about 1 percentage point below the ROR measure, with the difference greatest in the earlier years of the sample (though the ATO estimates suggest a smaller margin). To the extent that contributions tax and insurance flows are relatively larger for smaller SMSFs, the difference between the ROA and ROR measures is likely to be greatest for smaller SMSFs. A chart submitted by Class Limited (sub. DR216) based on a subset of SMSFs indicates that the difference between the two measures is small for SMSFs with over $1 million, but material (over 3 percentage points) for those with under $100 000 in assets.

Direct estimates of ROR for SMSFs are not available for all years. To account for this, the Commission has used a simple mathematical adjustment published by Sy (2009a):

$$ROR = \frac{ROA}{1 - \frac{ROA}{2}}$$

Figure 4.4 **ROA estimates are generally lower than ROR estimates**[a]
SMSFs, 2006–2016




[a] The estimates for Class Limited differ slightly from those in its submission (sub. DR190, p. 4) due to refinements to the calculation methodology. ATO revised ROA estimates are not available for all years.

*Sources*: ATO (pers. comm., 8 August 2017; 11 December 2017; 31 August 2018); Class Limited (pers. comm, 29 August 2018).

The effect of this adjustment it yields a similar difference to the conventional ROA measure as the other adjustments (figure 4.4). Over the period 2012–2016, this method yielded an SMSF returns estimate that was about 36 basis points more than the unadjusted ROA measure (on an annualised basis). Because the methodology is based only on the rate of return, it does not account for the factors that can create distortions across size brackets.

A further issue is that the ATO publishes data for SMSF returns in summary form according to a set of size brackets, with SMSFs assigned to brackets based on their average balance during the period (which reflects the size of the SMSF overall rather than of individual member balances). However, SMSFs that experience high returns (or, conversely, negative returns) may move up (or down) to another size bracket during the period. Class Limited (sub. DR190, p. 6) submitted that this can lead to 'selection bias', whereby the returns for smaller size brackets are brought down — by over 10 percentage points in the case of the smallest SMSFs. It argued that grouping SMSFs according to balance at the *beginning* of the period can avoid this type of selection bias. Grouping the data this way would mean that the measured net return better reflects the average experience of SMSFs that start out with similar balances.

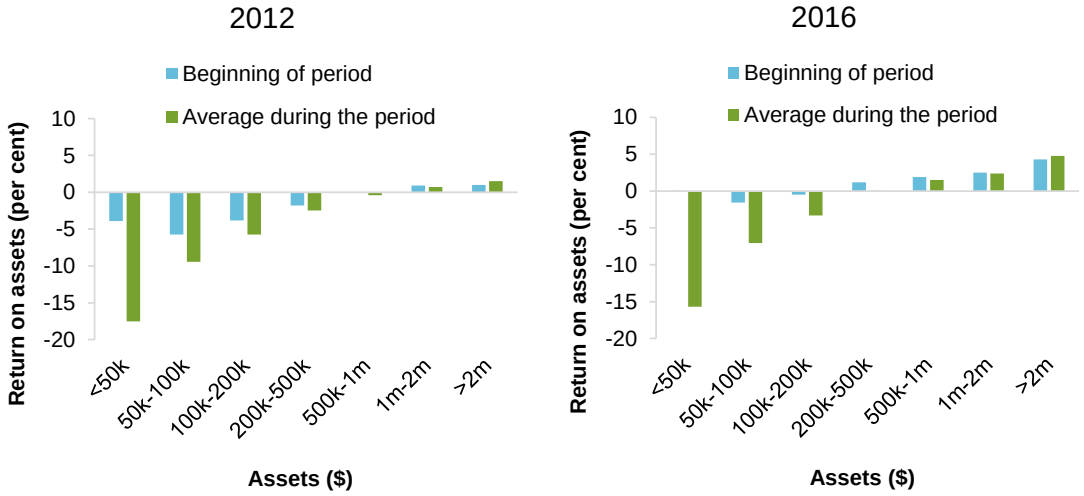
The ATO provided calculations of ROA using an amended methodology that use size brackets according to balance at the beginning of each year, rather than the average balance over the year (figure 4.5). In each year, the effect of measuring balances at the beginning of

the period is to lift the measured returns for all size brackets, with the exception of the very largest ($2 million or more). The differences are more pronounced for smaller SMSFs, especially those with balances under $500 000. In 2016, for example, the difference in estimated returns was about 1.2 percentage points for SMSFs between $200 000 and $500 000 in size, and as high as 17 percentage points for the smallest SMSFs (under $50 000). The differences were of similar magnitudes for other years.

These differences in estimated returns are explained by the fact that, most notably for the smaller SMSFs, the average size of SMSFs *within* each bracket is larger when grouped by assets at the beginning of the period, compared with when grouped by average assets over the period. This may be because SMSFs close to the top of their starting bracket that experience strong returns (or high inward rollovers or contributions) end up being reclassified into the next highest bracket for the average-assets measure. At the same time, SMSFs could be measured as having strongly negative returns using the average-assets measure if their assets (the denominator in the calculation) shrink over the period — for example, because of high expenses and/or drawdowns from retired members. This appears likely, at least in the smallest size brackets, as net earnings were negative for SMSFs starting with less than $100 000 for most years over the period 2012–2016.

Figure 4.5 **Different balance period methods produce different return estimates**[a]

SMSFs




**a** Size brackets calculated on assets at the beginning of the year (amended methodology) compared with size brackets calculated as the average balance over the year (current ATO methodology). Adjustments have been applied to SMSF returns data to approximate a 'rate of return' calculation, as per Sy (2009b).

*Sources*: ATO (pers. comm., 31 August 2018, 24 September 2018).

## 4.3 Supporting analysis

This section sets out the Commission's analysis and outputs, including sensitivity testing, to support the results provided in chapter 2. This section is structured in the same order as the analysis in chapter 2.

### Cameo simulations

Chapter 2 contains three simulations from the Commission's cameo model that illustrate the impact of different rates of return over a member's lifetime. The base case assumptions for the cameo model are set out in chapter 1.

- Cameo 2.1 shows the effect of a 5 per cent gross real rate of return compared with 6 per cent.
- Cameo 2.2 shows the effect of receiving the returns associated with the median bottom-quartile fund (over 13 years to 2017) compared with those associated with the median top-quartile fund, over a member's entire accumulation stage.
- Cameo 2.3 shows the effect of receiving the returns associated with the median bottom-quartile MySuper product (over 11 years to 2018) compared with those associated with the median top-quartile product, over a member's entire accumulation stage.

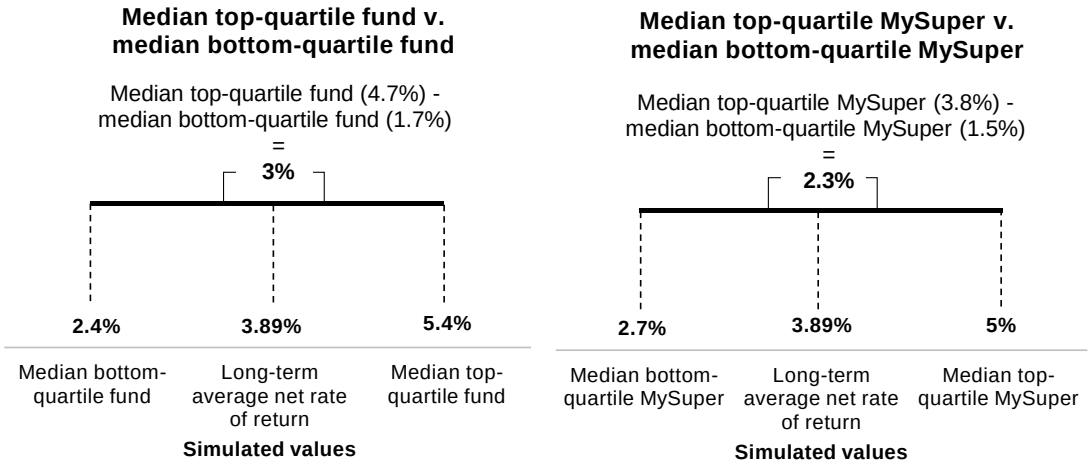
In the latter two cases, the real rates of return being compared were reduced by the impact of the GFC during the relevant time horizons. As such, the Commission 'normalised' the returns around the long-term average net real rate of return of 3.89 per cent used in its cameo model.[14] This involved taking the dispersion between the 'high' and 'low' returns being compared, and distributing it evenly either side of this long-term average (figure 4.6).

The final inquiry report also contains a simulation for a 55 year old individual (using the same returns as the left-hand panel in figure 4.6). Two different assumptions were made for this simulation. First, a starting wage of $46 800 was assumed (the median income for all 55 year olds in 2016) (ABS 2017a). Further, a starting balance of $129 000 was assumed (the median balance for 55–64 year olds in 2016) (ABS 2017b).

[14] Equivalent to a 5 per cent long-term gross real rate of return, less fixed and variable charges over the accumulation stage.

Figure 4.6 **Cameo simulations with altered rates of returns**[a]

Normalising to the Commission's cameo model's long-term average




[a] All returns are real.

*Sources*: ABS (*Consumer Price Index, Australia, June 2017, Cat. no. 6401.0);* PC analysis of unpublished APRA data and SuperRatings data.

## Index returns

Figure 4.7 shows the investment returns (net of fees[15] but not tax) to each index used in constructing the BPs (as outlined in table 4.7), over the 13 years to 2017. To understand how these indexes come together in a BP and the sensitivity of BPs to asset allocation, the Commission conducted simulations of BPs under different hypothetical asset allocations (figure 4.8). These simulations are all based on a listed portfolio (BP1), such that each asset class is benchmarked to a listed financial market index.

To construct these simulations, the Commission considered the set of all possible BPs which:

- consist of at most 10 listed asset classes (shown in table 4.27)
- have asset allocation 'increments' of 5 per cent (for example, 0 per cent, 5 per cent, 10 per cent, and so forth) for each asset class, with the maximum and minimum possible allocation provided in table 4.27. The maximum and minimum possible allocations were chosen on the basis of APRA actual fund-level asset allocation data[16]
- have a total asset allocation summing to 100 per cent.

15 These BPs also do not include the indirect investment fees as discussed in section 4.2.

16 In most cases, the Commission used the maximum and minimum asset allocations in the data. Discretion was applied where there were clear outliers or potential misreporting.

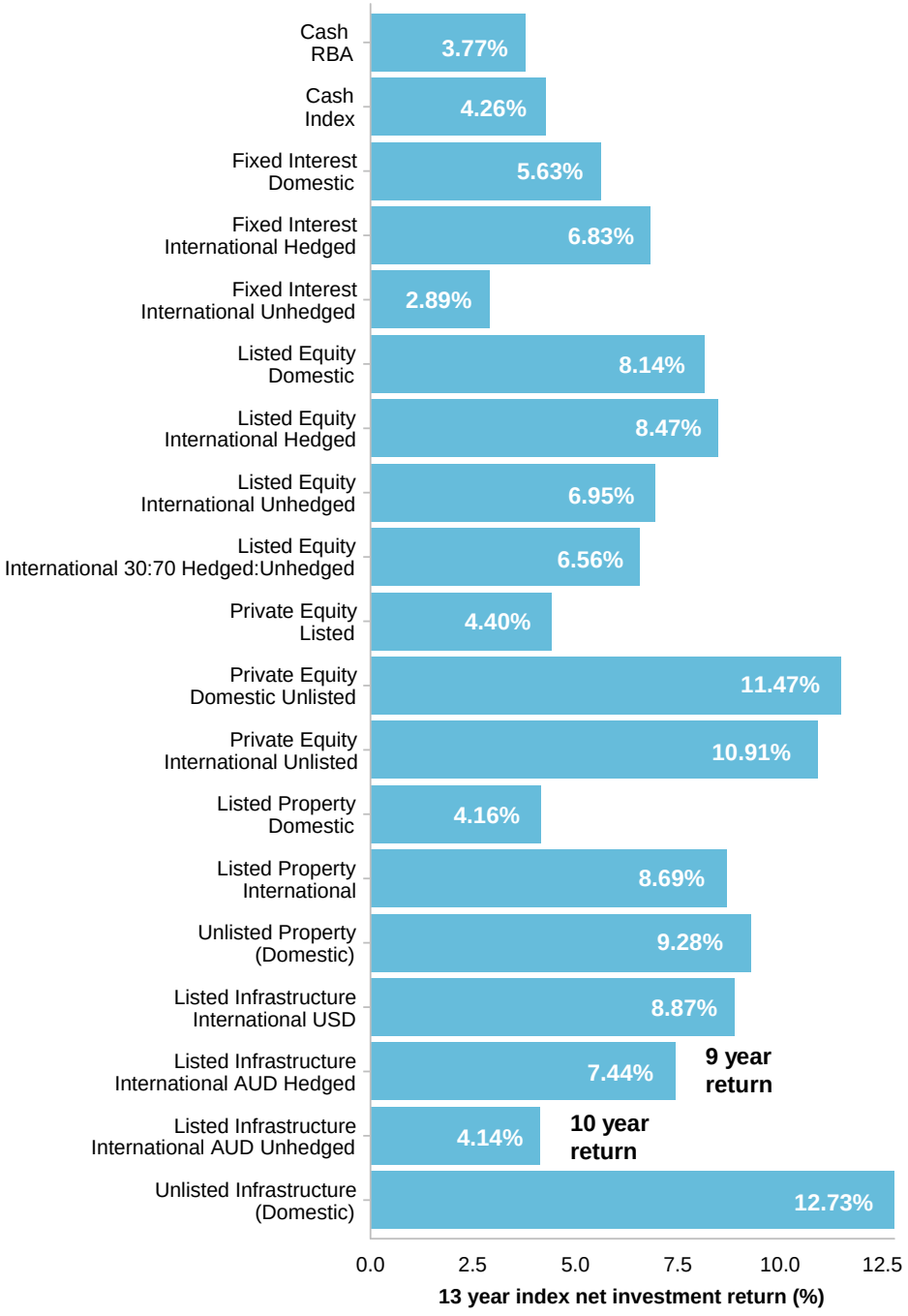
For example, one possible BP could be 50 per cent private equity and 50 per cent Australian listed equity, and another could be 50 per cent private equity, 25 per cent domestic listed property and 25 per cent Australian listed equity. In total, the Commission constructed 6 509 532 hypothetical listed BPs.

Table 4.27 **Asset classes and ranges used for simulations**

| *Asset class* | *Index* | *Min allocation* | *Max allocation* |
|---|---|---|---|
| | | % | % |
| Cash | Reserve Bank of Australia cash rate (30%) and Bloomberg AusBond Bank Bill Index (70%) | 0 | 35 |
| Australian fixed income | Bloomberg AusBond Composite Index | 0 | 55 |
| International fixed income | Bloomberg Barclays Global Aggregate Index (80% hedged, 20 % unhedged) | 0 | 35 |
| Australian listed equity | S&P/ASX 300 Index | 0 | 90 |
| International listed equity | MSCI World ex-Australia (30% hedged, 70% unhedged custom) | 0 | 50 |
| Private equity | S&P ASX Small Ordinaries Index | 0 | 50 |
| Domestic listed property | S&P/ASX 200 A-REIT Index | 0 | 50 |
| International listed property | FTSE EPRA/NAREIT Developed (100% hedged) | 0 | 50 |
| Listed infrastructure (international) | 2005–2007: S&P Global Infrastructure Index (USD)<br>2008 onwards: S&P Global Infrastructure Index (80% AUD hedged, 20% AUD unhedged) | 0 | 15 |
| Other | 25% S&P/ASX 300 Index<br>25% MSCI World ex-Australia (30% AUD hedged, 70% AUD unhedged (custom))<br>25% Bloomberg AusBond Composite Index<br>25% Bloomberg Barclays Global Aggregate Index (80% AUD hedged, 20% AUD unhedged) | 0 | 25 |

Figure 4.7 **Returns to indexes**

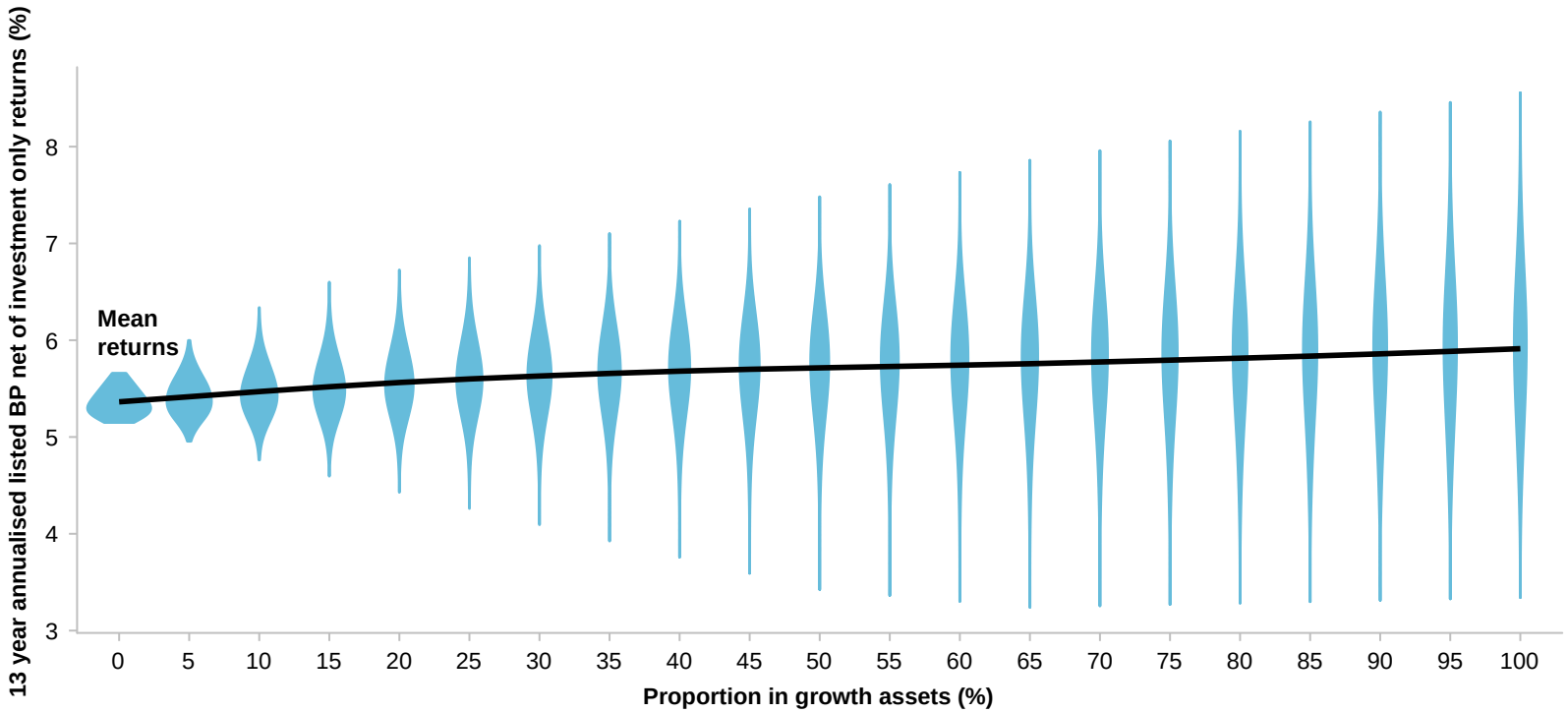
Nominal returns, 2005–2017




*Source*: PC analysis of financial market index data (various providers).

Figure 4.8 **Simulated BP returns**

2005–2017




*Source*: PC analysis of unpublished APRA data and financial market index data (various providers).

Figure 4.8 presents the results for groups of BPs, based on the proportion of growth assets in each BP. There is one 'band' for each of the possible 5 per cent increments of growth assets (as defined in section 4.2). Each band represents the distribution of the BP returns for the group of BPs with the same proportion of growth assets. For example, the first band at 0 per cent growth assets represents all BPs with only defensive assets. The second band represents all BPs with 5 per cent of growth assets and so on. The vertical axis represents the proportion of simulations delivering a given investment return. Accordingly, by construction, the figure shows the change in average asset returns and volatility as the riskiness of the portfolios increases.

The results are most starkly revealed through comparisons of the least risky (the 0 band) and the most risky portfolio groups (the 100 band).The minimum return for the first band is 5.15 per cent and the maximum 5.66 per cent (figure 4.8). The range in results is modest, as shown by the narrow bounds on asset returns. In contrast, the highest risk portfolios have a higher average return, but also a larger range of outcomes.

Figure 4.8 also shows that over the specific 13-year period under analysis:

- most BPs irrespective of their asset allocation would have achieved investment returns of at least 5.5 per cent
- more conservative asset allocations would not necessarily have delivered lower investment returns compared with asset allocations with more growth assets over the time period of analysis. Even a BP with 0 per cent growth assets could have achieved investment returns commensurate with a large proportion of BPs with 100 per cent growth assets, in part, this appears to be driven by relatively strong performance by international fixed income
  - it should be noted, however, that this result is for a particular 13 year horizon, which includes the GFC. The representativeness of these results depend on how representative the 2005–2017 period is in terms of the frequency and fluctuations of the business cycle, of the longer term (for example, 40 years)
- to the extent that the mean portfolio return varies by no more than 0.5 per cent over the spectrum of allocations to growth assets, the Commission's results and BPs are likely to be relatively insensitive to the Commission's assumptions about asset allocation over the time period (particularly, relative to other inputs such as indexes and fees).

However, several caveats should be noted. First, these simulations were constructed on the basis of static asset allocations over the 13 years to 2017. It is possible that funds may achieve higher or lower returns than these simulations suggest by dynamically managing asset allocation with the aim of achieving better returns. Second, returns over longer periods will be different from those over a 13-year horizon, and so what may appear to be a poor asset choice over one period may not be so over a different one. Finally, the simulations are non-probabilistic in that they act as if any given allocation of assets is equally probable. Funds will generally be less likely to have asset weightings at the extremes shown in table 4.27.

## System-level analysis

Analysis in chapter 2 shows that APRA-regulated funds delivered returns below both BP1 and BP2 over the long term (13 years). This result is robust to most alternative tests, including when returns are measured net of investment expenses, but gross of administration expenses. Exceptions include benchmarking over a 10-year time frame and with a 5 per cent tax rate applied to the BPs — in both cases, APRA-regulated funds perform above BP1, but still below BP2 (table 4.28).

It should be noted that the benchmarks used in chapter 2 for the system-level analysis are based on system-level asset allocation data from APRA, which appear to have irreconcilable differences with fund-level asset allocation data. The system-level asset allocation data are preferred as they appear to be of better quality and have a better representation of other assets.

Table 4.28 **APRA-regulated system analysis**[a,b,c,d]
Alternative approaches

| *Benchmark type* | *BP1 (%)* | *BP2 (%)* | *Actual return (%)* | *Result* |
|---|---|---|---|---|
| System-tailored (chapter 2) | 6.15 | 6.86 | 6.11 | Performance below both benchmarks |
| System-tailored, net investment returns[a] | 6.81 | 7.52 | 6.72 | Performance below both benchmarks |
| System-tailored, 10 years, 2008–2017 | 3.85 | 4.88 | 4.01 | Performance above BP1 but not BP2 |
| System-tailored, 5 years, 2013–2017 | 9.29 | 9.51 | 9.14 | Performance below both benchmarks |
| 70/30 (growth/defensive) | 6.17 | 7.00 | 6.11 | Performance below both benchmarks |
| System-tailored, 5% tax rate | 5.79 | 6.35 | 6.11 | Performance above BP1 but not BP2 |
| System-tailored no international equities hedging | 6.65 | 7.34 | 6.11 | Performance below both benchmarks |
| System-tailored full international equities hedging | 6.58 | 7.30 | 6.11 | Performance below both benchmarks |
| Static 2017 asset allocation | 6.38 | 6.86 | 5.87 | Performance below both benchmarks |
| Only current funds[b] | 6.15 | 6.86 | 5.65 | Performance below both benchmarks |
| Member-weighted returns[c] | 6.15 | 6.86 | 6.07 | Performance below both benchmarks |

**a** Net investment returns are returns measured net of investment fees but gross of administration fees. **b** Benchmarks are still based on all funds (meaning they are the same as in chapter 2). **c** Benchmarks are the same as in chapter 2, meaning they are not member-weighted. **d** Excludes exempt public sector superannuation schemes, eligible rollover funds, insurance-only superannuation funds and small APRA funds.

*Sources*: PC analysis of unpublished APRA data, ATO confidential data and financial market index data (various providers).

APRA-regulated funds delivered lower long-term volatility than all BPs. The standard deviation of net returns for APRA-regulated funds over the 13 year period to 2017 was

8.29 per cent, while the standard deviation of BP1 and BP2 respectively were 9.77 per cent and 8.59 per cent. The higher volatility exhibited by the 70:30 benchmarks of 9.53 per cent for BP1 and 8.83 per cent for BP2 suggests that the system has altered strategic asset allocation across time to 'smooth' out returns.

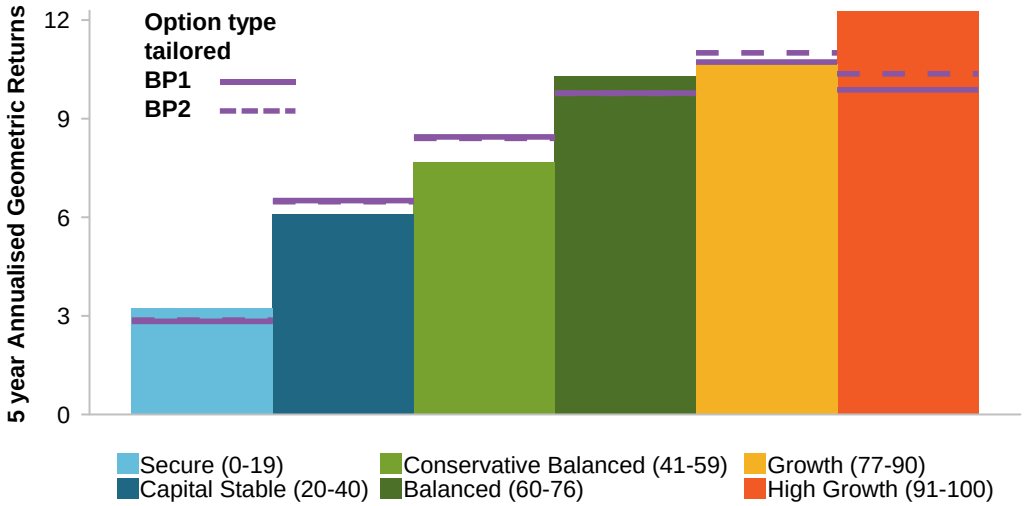
This could be seen as a positive given that abnormally low annual returns for even a single year can, through compounding over time, substantially reduce long-term net returns and thus members' balances on retirement. Volatility in returns also matters to members who are nearing retirement age and plan to withdraw some or all of their balance (sequencing risk, as examined in chapter 4).

## Option-type analysis

In chapter 2, the Commission analyses the performance of 'option-type' segments. That is, options are bundled together based on their percentage allocation to growth assets. Broadly, more growth-oriented options tended to perform better against their segment-tailored benchmarks compared with more conservative ones. However, this result is sensitive to the time period considered. Over a 5-year period, several option types fall below their benchmarks (figure 4.9). The relationship between returns and the proportion of growth assets is also more noticeable over a 5-year period. This contrasts with the result in chapter 2, that balanced, growth and high-growth options delivered similar returns, which might reflect the impact the GFC had on returns from growth assets in previous years and the relatively strong performance of fixed income assets.

Figure 4.9 **Option-type analysis**[a,b]

Benchmark adjusted for asset allocation, 2012–2017




| | |
|---|---|
| **Sources** | PC analysis of unpublished APRA data, financial market index data (various providers) and SuperRatings data. |
| **Benchmark** | Option-type tailored BP1, BP2. |
| **Coverage**[c] | This chart shows accumulation options from APRA-regulated funds. In 2017, funds in the dataset represented up to 85% of total assets and 82% of member accounts of APRA-regulated funds. |
| **Survivor bias** | No. **Selection bias** Yes. |

[a] Net returns are estimated less investment fees, taxes and implicit asset-based administration fees. This means that some options may be reported gross of asset-based administration fees.. [b] The option type categories have been taken as given from SuperRatings data. [c] These coverage estimates are likely to be overestimates due to the estimation method (section 4.1). The analysis excludes legacy products.

A different tax rate assumption for the BPs (from option-type tailored to 5 per cent) leads to improvements in the relative performance of option types, with capital-stable options outperforming their BPs, but conservative-balanced options remaining under both their BPs (table 4.29). And as expected, there is a clear correlation between the percentage allocation to growth assets and the volatility of returns (figure 4.10).

Table 4.29 **Option-type analysis**[a,b,c]

Alternative BP tax rates, 2005–2017

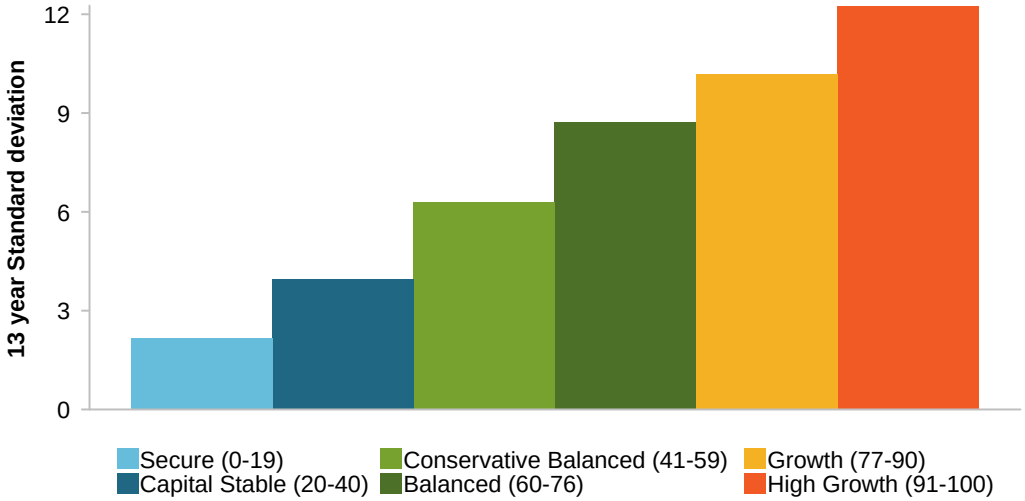
| *Benchmark type (% growth assets)* | *BP1 (%)* | *BP2 (%)* | *Actual return (%)* | *Result* |
|---|---|---|---|---|
| **Secure (0–19)** | | | | |
| Option-type tailored tax (chapter 2) | 4.37 | 4.38 | 4.52 | Performance above both benchmarks |
| 5% tax rate | 4.10 | 4.11 | 4.52 | Performance above both benchmarks |
| **Capital stable (20–40)** | | | | |
| Option-type tailored tax (chapter 2) | 5.51 | 5.57 | 5.28 | Performance below both benchmarks |
| 5% tax rate | 5.20 | 5.26 | 5.28 | Performance above both benchmarks |
| **Conservative balanced (41–59)** | | | | |
| Option-type tailored tax (chapter 2) | 6.19 | 6.25 | 5.81 | Performance below both benchmarks |
| 5% tax rate | 5.93 | 6.01 | 5.81 | Performance below both benchmarks |
| **Balanced (60–76)** | | | | |
| Option-type tailored tax (chapter 2) | 6.28 | 6.56 | 7.11 | Performance above both benchmarks |
| 5% tax rate | 5.89 | 6.20 | 7.11 | Performance above both benchmarks |
| **Growth (77–90)** | | | | |
| Option-type tailored tax (chapter 2) | 6.32 | 6.75 | 7.20 | Performance above both benchmarks |
| 5% tax rate | 6.11 | 6.55 | 7.20 | Performance above both benchmarks |
| **High growth (91–100)** | | | | |
| Option-type tailored tax (chapter 2) | 6.10 | 6.57 | 7.32 | Performance above both benchmarks |
| 5% tax rate | 5.60 | 6.13 | 7.32 | Performance above both benchmarks |

**a** Net returns are estimated less investment fees, taxes and implicit asset-based administration fees. This means that some options may be reported gross of asset-based administration fees. **b** The option type categories have been taken as given from SuperRatings data. **c** The analysis excludes legacy products.

*Source*: PC analysis of unpublished APRA data and financial market index data (various providers).

Figure 4.10 **Option-type analysis**[a,b]

Volatility of returns, 2005-2017




| | |
|---|---|
| **Sources** | PC analysis of unpublished APRA data, financial market index data (various providers) and SuperRatings data. |
| **Coverage**[c] | This chart shows accumulation options from APRA-regulated funds.<br>In 2005, funds in the dataset represented up to 61% of total assets and 64% of member accounts of APRA-regulated funds.<br>In 2017, funds in the dataset represented up to 85% of total assets and 82% of member accounts of APRA-regulated funds. |
| **Survivor bias** | No. **Selection bias** Yes. |

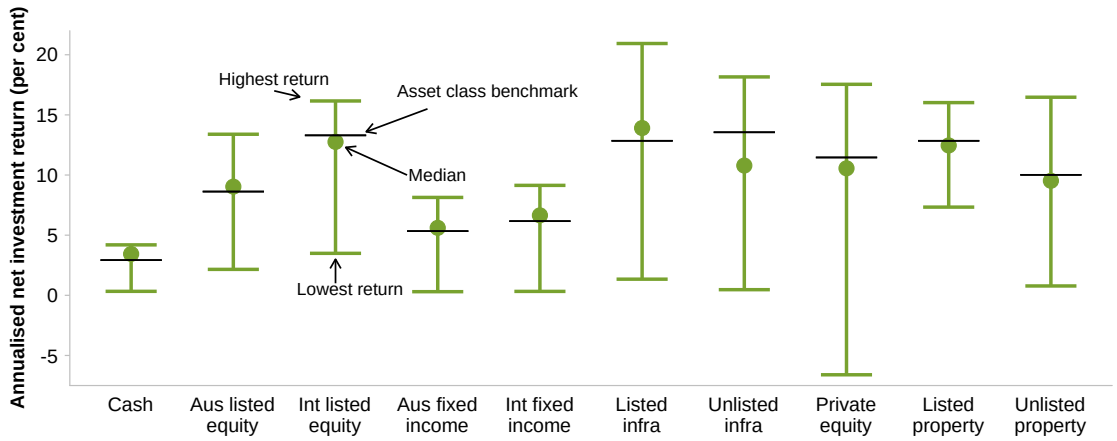
[a] Net returns are estimated less investment fees, taxes and implicit asset-based administration fees. This means that some options may be reported gross of asset-based administration fees. [b] The option-type categories have been taken as given from SuperRatings data. [c] These coverage estimates are likely to be overestimates due to the estimation method (section 4.1). The analysis excludes legacy products.

## Asset-class returns

The Commission sought to benchmark returns to individual asset classes using data from its supplementary funds survey. Performance at the system and segment level and a comparison with international pension funds are presented in chapter 2. Additionally, an analysis of fund-level returns was conducted using survey data from 2011 to 2017 along with the corresponding asset class benchmarks over this time period.

The distribution of reported returns for cash and fixed income (both Australian and international) exhibits relatively low variance across funds, while listed infrastructure and private equity display a higher variance over the period (figure 4.11). A significant percentage of assets were held in funds that performed below the benchmark for international equity (77 per cent of assets below the benchmark), unlisted infrastructure (78 per cent) and both listed and unlisted property (95 per cent and 52 per cent respectively) (figure 4.12).

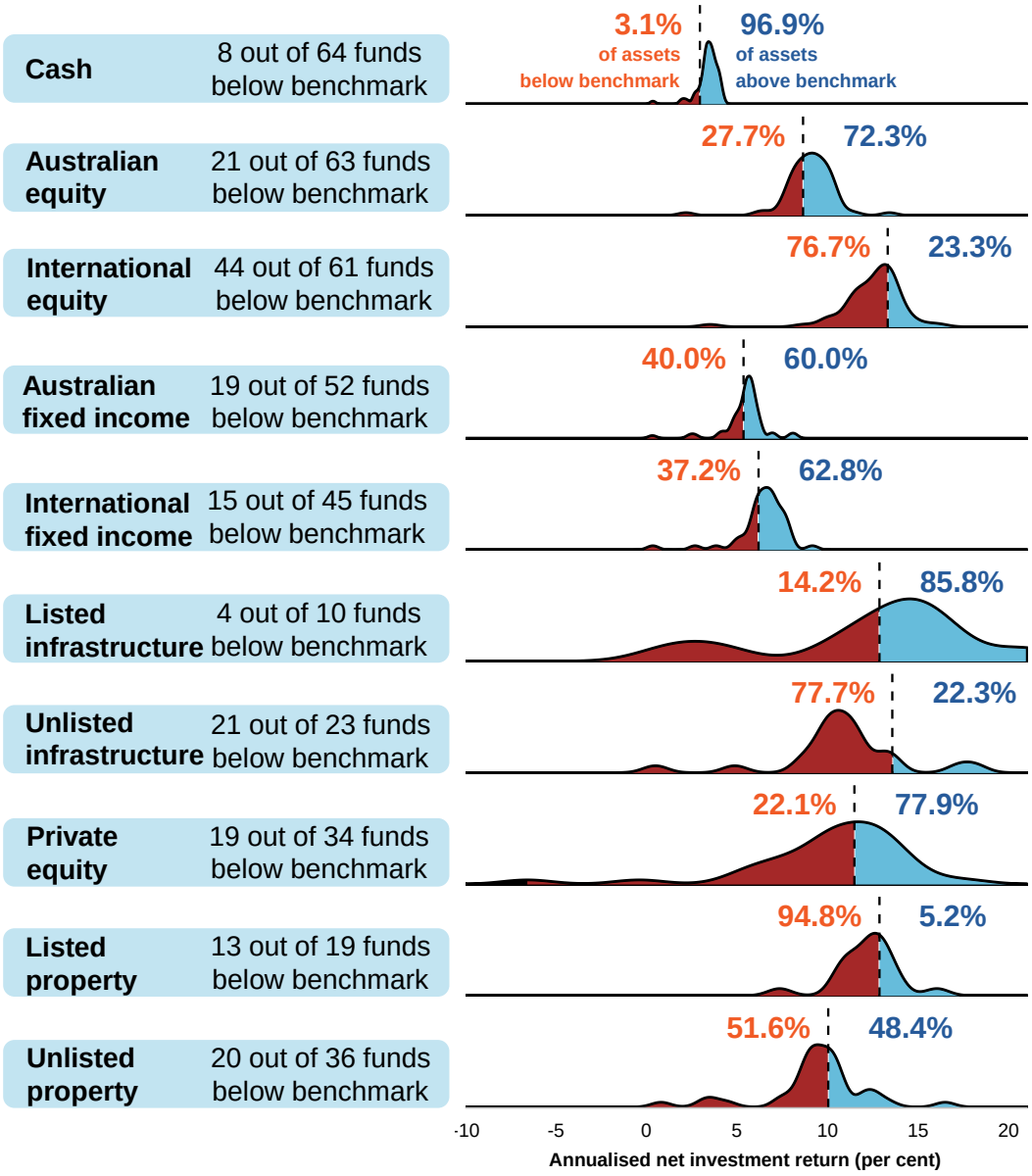
Figure 4.11 **Variation in returns by asset class, 2011–2017**[a]




| | | | |
|---|---|---|---|
| **Sources** | Supplementary funds survey and financial market index data (various providers). | | |
| **Coverage** | In 2017, the funds in this figure represent up to 66% of total assets and 62% of member accounts of APRA-regulated funds. | | |
| **Survivor bias** | Yes. | **Selection bias** | Yes. |

[a] Annualised returns are calculated by calculating the geometric mean over the period for each fund. Only asset classes with a sufficient number of observations were used for the comparison between retail and not-for-profit funds. Observations where funds did not split fixed income into Australian and international categories have been excluded.

Figure 4.12 **Distribution of returns by asset class, 2011–2017**[a]




| | |
|---|---|
| **Sources** | Supplementary funds survey and financial market index data (various providers). |
| **Benchmark** | Asset-class benchmarks as per BP2. |
| **Coverage** | In 2017, the funds in this figure represent up to 66% of total assets and 62% of member accounts of APRA-regulated funds. |
| **Survivor bias** | Yes. **Selection bias** Yes. |

[a] The dashed line is the asset class index over the period. The density plots are a measure of the distribution of returns at the fund level — they are not weighted by assets. The height of the plots indicate the number of funds that obtained a return of that value (a similar interpretation to a histogram). The percentage of assets that are below the benchmark is calculated by dividing the assets from funds below the benchmark by the total assets invested in an asset class. Observations where funds did not split fixed income into Australian and international categories have been excluded.

Within segments, a larger proportion of retail fund assets fell below the benchmark compared with not-for-profit fund assets, in all asset classes excluding listed infrastructure and private equity (table 4.30). However, a caveat is that some asset classes have a very small number of retail funds reporting their returns over the period 2011 to 2017, and thus the data may not be fully representative of all retail funds in the system.

Table 4.30 **Distribution of returns by asset class, 2011–2017**[a]

| | *Share of assets below benchmark (within the segment)* | |
|---|---|---|
| *Asset class* | *Retail* | *Not-for-profit* |
| | % | % |
| Cash | 3 | 3 |
| Australian listed equity | 45 | 11 |
| International listed equity | 96 | 62 |
| Australian fixed income | 61 | 12 |
| International fixed income | 61 | 11 |
| Listed infrastructure | 10 | 50 |
| Unlisted infrastructure | 100 | 77 |
| Private equity | 1 | 25 |
| Listed property | 100 | 28 |
| Unlisted property | 100 | 50 |

**a** In 2017, the funds in this table represent up to 66% of total assets and 62% of member accounts of APRA-regulated funds. The asset-class benchmarks are as per BP2. Observations where funds did not split fixed income into Australian and international categories have been excluded. The total survey coverage indicates the number of retail and not-for-profit funds providing usable data on returns by asset class, but not all of these funds are represented in this table. Only funds that provided returns data for all years between 2011 and 2017 for an asset class are included in this analysis.

*Sources*: Supplementary funds survey and financial market index data (various providers).

## The default and choice segments

Analysis presented in chapter 2 shows that both the default and choice segments outperformed their BPs. However, this result is (marginally) sensitive to changes to the time period under analysis and the tax rate. Shortening the time frame to 2013–2017 sees the choice segment underperform, regardless of the tax rate applied to the BPs. Similarly, applying a 7.5 per cent tax rate (instead of the accumulation-segment tax rate) over 2008–2017 sees the choice segment perform below both BPs (table 4.31).

The default segment can be defined in multiple ways. The analysis in chapter 2 is based on current MySuper products and their predecessors. This is the Commission's preferred definition throughout the draft report as it best captures those disengaged individuals not

making an active choice.[17] For the same reason, throughout this supplement unless otherwise stated, the default segment refers to current MySuper products and their predecessors. An alternative definition involves counting all default investment options. These are the investment options applied to new fund members, whether they join through an employer default or voluntarily, who do not actively choose their own investment option within the fund. Therefore, it captures those actively choosing a fund, but not a product. This was recommended by Australian Institute of Superannuation Trustees (sub. 39). On this definition, default investment options on average outperform BP1 but not BP2 (figure 4.13).

As noted in chapter 2, similar results to those reported in figure 2.7 are obtained when conducting this analysis using the Rainmaker dataset (rather than SuperRatings), although the performance of the choice segment falls under BP2.

Table 4.31 **Choice and default (MySuper) segment**[a,b,c]
Tax and time period sensitivity

| *Benchmark type* | *BP1 (%)* | *BP2 (%)* | *Actual return (%)* | *Result* |
|---|---|---|---|---|
| **Choice** | | | | |
| 2005–2017 (chapter 2) | 5.98 | 6.25 | 6.45 | Performance above both benchmarks |
| 2005–2017, 7.5% tax rate | 6.14 | 6.40 | 6.45 | Performance above both benchmarks |
| 2008–2017, accumulation tax rate | 3.70 | 4.16 | 4.13 | Performance above BP1, but below BP2 |
| 2008–2017, 7.5% tax rate | 3.84 | 4.28 | 4.13 | Performance above BP1, but below BP2 |
| 2013–2017, accumulation tax rate | 9.58 | 9.59 | 8.85 | Performance below both benchmarks |
| 2013–2017, 7.5% tax rate | 9.62 | 9.63 | 8.85 | Performance below both benchmarks |
| 2005-2017, Rainmaker sample | 5.98 | 6.25 | 6.20 | Performance above BP1, but below BP2 |
| **Default (MySuper)** | | | | |
| 2005–2017 (chapter 2) | | 6.62 | 7.29 | Performance above both benchmarks |
| 2005–2017, 7.5% tax rate | 6.20 | 6.78 | 7.29 | Performance above both benchmarks |
| 2008–2017, accumulation tax rate | 3.42 | 4.40 | 5.07 | Performance above both benchmarks |
| 2008–2017, 7.5% tax rate | 3.61 | 4.54 | 5.07 | Performance above both benchmarks |
| 2013–2017, accumulation tax rate | 10.17 | 10.28 | 10.30 | Performance above both benchmarks |
| 2013–2017, 7.5% tax rate | 10.21 | 10.32 | 10.30 | Performance above BP1, but below BP2 |
| 2005-2017, Rainmaker sample | | 6.62 | 6.87 | Performance above both benchmarks |

**a** Net returns are estimated less investment fees, taxes and implicit asset-based administration fees. This means that some options may be reported gross of asset-based administration fees. **b** The option type categories have been taken as given from SuperRatings data. **c** The analysis excludes legacy products.

*Sources*: PC analysis of unpublished APRA data, financial market index data (various providers) and SuperRatings data.

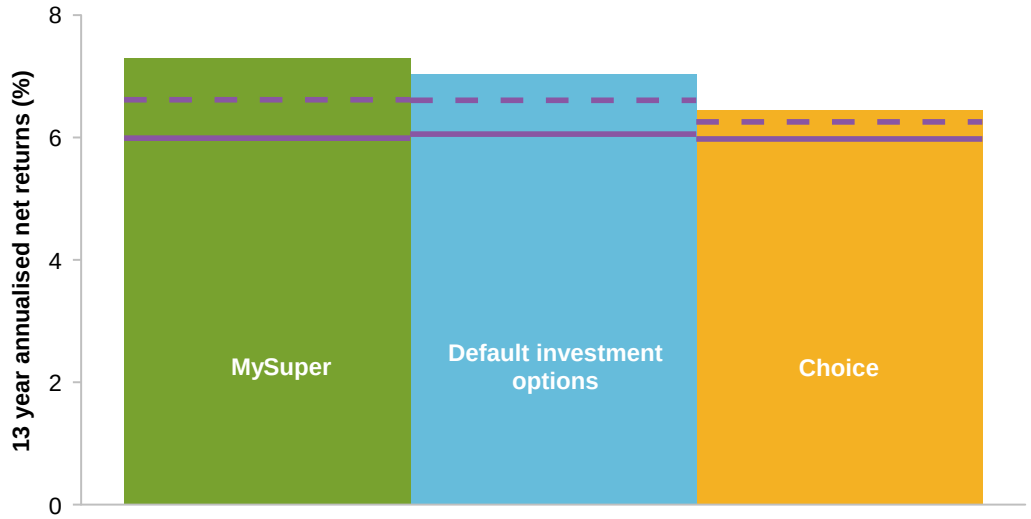
[17] Although the definition is an imperfect measure of this — many MySuper members are likely to have actively selected that product.

Table 4.31 **Choice and default (MySuper) segment**[a,b,c]

Tax and time period sensitivity

Figure 4.13 **A broader default definition**[a,b]

Returns compared with segment-tailored BPs, 2005-2016




| | |
|---|---|
| **Sources** | PC analysis of ABS data (*Consumer Price Index, Australia, June 2017*, Cat. no. 6401.0), SuperRatings data and financial market index data (various providers). |
| **Benchmark** | Segment tailored BP1 and BP2 |
| **Coverage**[c] | The chart shows accumulation options from APRA-regulated funds.<br>In 2005, funds in the dataset represented up to 61% of total assets and 64% of member accounts of APRA-regulated funds.<br>In 2017, funds in the dataset represented up to 85% of total assets and 82% of member accounts of APRA-regulated funds. |
| **Survivor bias** | No. **Selection bias** Yes. |

[a] The MySuper segment includes options which could be linked to their MySuper successors. The 'default investment options' segment includes MySuper products and non-MySuper default products assigned to members who actively select a fund, but not an investment option. [b] Net returns are estimated less investment fees, taxes and implicit asset-based administration fees. This means that some options may be reported gross of asset-based administration fees. [c] These coverage estimates are likely to be overestimates due to the estimation method (section 4.1).The analysis excludes legacy products.

## Retail and not-for-profit segments

Analysis in chapter 2 shows that not-for-profit funds beat their tailored BPs while retail funds fall short of theirs. This result is not sensitive to the tax rates used in the BPs, or whether the analysis is confined just to funds that are still in existence. It is marginally sensitive to altering the asset allocation assumption and weighted returns by members. It is most sensitive to the time period used (table 4.32).

Table 4.32 **Retail and not-for-profit segments**[a,b,c]

BP sensitivity tests, 2005–2017 unless stated otherwise

| *Benchmark type* | *BP1 (%)* | *BP2 (%)* | *Actual return (%)* | *Result* |
|---|---|---|---|---|
| **Retail** | | | | |
| System average tax (chapter 2) | 6.52 | 6.62 | 5.12 | Performance below both benchmarks |
| 5% tax rate | 6.00 | 6.11 | 5.12 | Performance below both benchmarks |
| Static 2017 asset allocation | 6.22 | 6.39 | 4.91 | Performance below both benchmarks |
| Only current funds[a] | 6.52 | 6.62 | 5.04 | Performance below both benchmarks |
| Member-weighted returns[b] | 6.52 | 6.62 | 5.02 | Performance below both benchmarks |
| 2008–2017 | 4.35 | 4.52 | 3.04 | Performance below both benchmarks |
| 2013–2017 | 9.18 | 9.25 | 8.13 | Performance below both benchmarks |
| No international equities hedging | 6.96 | 7.06 | 5.12 | Performance below both benchmarks |
| Full international equities hedging | 6.99 | 7.10 | 5.12 | Performance below both benchmarks |
| **Not-for-profit** | | | | |
| System average tax (chapter 2) | 6.46 | 6.72 | 7.11 | Performance above both benchmarks |
| 5% tax rate | 5.98 | 6.28 | 7.11 | Performance above both benchmarks |
| Static 2017 asset allocation | 6.49 | 7.15 | 6.84 | Performance above BP1 but not BP2 |
| Only current funds[a] | 6.46 | 6.72 | 7.14 | Performance above both benchmarks |
| Member-weighted returns[b] | 6.46 | 6.72 | 6.88 | Performance above both benchmarks |
| 2008–2017 | 4.30 | 4.73 | 4.88 | Performance above both benchmarks |
| 2013–2017 | 9.89 | 9.91 | 10.13 | Performance above both benchmarks |
| No international equities hedging | 7.00 | 7.26 | 7.11 | Performance above BP1 but not BP2 |
| Full international equities hedging | 6.93 | 7.20 | 7.11 | Performance above BP1 but not BP2 |

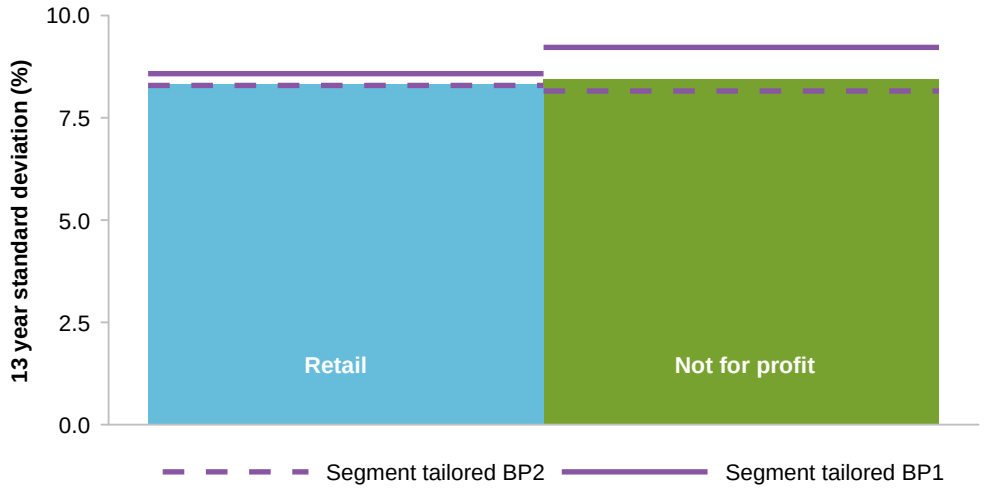
**a** Benchmarks are still based on all funds (meaning they are the same as in chapter 2). **b** Benchmarks are the same as in chapter 2, meaning they are not member-weighted. **c** Excludes exempt public sector superannuation schemes, eligible rollover funds, insurance-only superannuation funds and small APRA funds.

*Sources*: PC analysis of unpublished APRA data and financial market index data (various providers).

Realised volatility is similar across all segments. Both the retail and not-for-profit segment were able to deliver 'smoother' returns than their BP1, but not less volatility than their BP2 (figure 4.14). As reported in chapter 2, analysing the segments net of investment fees and taxes (but gross of administration expenses) does not alter the result that not-for-profit funds outperform retail funds (figure 4.15).

Figure 4.14 **Retail and not-for-profit segments**

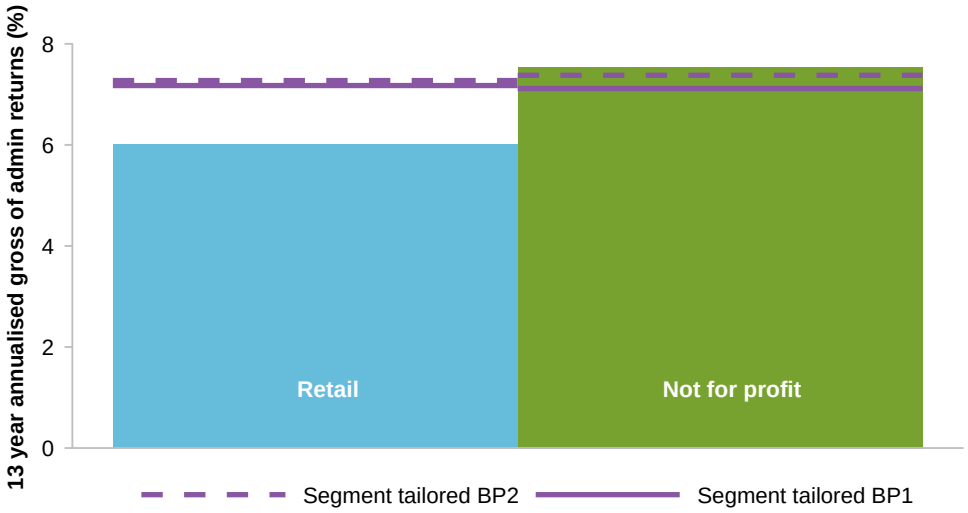
Standard deviation, 2005–2017




| | | | |
|---|---|---|---|
| **Sources** | PC analysis of unpublished APRA data and financial market index data (various providers). | | |
| **Benchmark** | Segment average BP1 and BP2 | | |
| **Coverage** | All APRA-regulated funds. Excludes exempt public sector superannuation schemes, eligible rollover funds and insurance-only superannuation funds. | | |
| **Survivor bias** | No. | **Selection bias** | No. |

Figure 4.15 **Retail and not-for-profit segments**

Returns gross of administration expenses, 2005–2017




| | | | |
|---|---|---|---|
| **Sources** | PC analysis of unpublished APRA data and financial market index data (various providers). | | |
| **Benchmark** | Segment tailored (gross of administration expenses) BP1 and BP2. | | |
| **Coverage** | All APRA-regulated funds. Excludes exempt public sector superannuation schemes, eligible rollover funds and insurance-only superannuation funds. | | |
| **Survivor bias** | No. | **Selection bias** | No. |

## Fund-type and option-type level

Analysis in chapter 2 shows that for most option types (and when legacy and terminated options are excluded), not-for-profit products beat their option-type tailored BPs, while retail fund products fall below all BPs for all option types except high growth. This result is relatively unaffected by alterations to the tax rate applied to the BPs (table 4.33).

Table 4.33 **Option-type – fund-type segments**[a,b,c,d,e]

Sensitivity tests, 2005–2017

| *BP type* | *Fund type* | *Actual return (%)* | *BP1 (%)* | *BP2 (%)* | *Result* |
|---|---|---|---|---|---|
| **Secure (0–19)**[b] | | | | | |
| Option-type tailored tax | Corporate | 4.24 | 4.37 | 4.38 | Performance below both benchmarks |
| | Industry | 4.85 | | | Performance above both benchmarks |
| | Public sector | na | | | na |
| | Retail | 3.05 | | | Performance below both benchmarks |
| 5% tax | Corporate | 4.24 | 4.10 | 4.11 | Performance above both benchmarks |
| | Industry | 4.85 | | | Performance above both benchmarks |
| | Public sector | na | | | na |
| | Retail | 3.05 | | | Performance below both benchmarks |
| **Capital stable (20–40)** | | | | | |
| Option-type tailored tax | Corporate | 6.23 | 5.51 | 5.57 | Performance above both benchmarks |
| | Industry | 5.75 | | | Performance above both benchmarks |
| | Public sector | 5.68 | | | Performance above both benchmarks |
| | Retail | 4.34 | | | Performance below both benchmarks |
| 5% tax | Corporate | 6.23 | 5.20 | 5.26 | Performance above both benchmarks |
| | Industry | 5.75 | | | Performance above both benchmarks |
| | Public sector | 5.68 | | | Performance above both benchmarks |
| | Retail | 4.34 | | | Performance below both benchmarks |
| **Conservative balanced (41–59)** | | | | | |
| Option-type tailored tax | Corporate | 6.39 | 6.19 | 6.25 | Performance above both benchmarks |
| | Industry | 6.43 | | | Performance above both benchmarks |
| | Public sector | na | | | na |
| | Retail | 4.98 | | | Performance below both benchmarks |
| 5% tax | Corporate | 6.39 | 5.93 | 6.01 | Performance above both benchmarks |
| | Industry | 6.43 | | | Performance above both benchmarks |
| | Public sector | na | | | na |
| | Retail | 4.98 | | | Performance below both benchmarks |

(continued next page)

Table 4.33 (continued)

| *BP type* | *Fund type* | *Actual return (%)* | *BP1 (%)* | *BP2 (%)* | *Result* |
|---|---|---|---|---|---|
| **Balanced (60–76)** | | | | | |
| Option-type tailored tax | Corporate | 7.55 | 6.28 | 6.56 | Performance above both benchmarks |
| | Industry | 7.29 | | | Performance above both benchmarks |
| | Public sector | 7.33 | | | Performance above both benchmarks |
| | Retail | 5.73 | | | Performance below both benchmarks |
| 5% tax | Corporate | 7.55 | 5.89 | 6.20 | Performance above both benchmarks |
| | Industry | 7.29 | | | Performance above both benchmarks |
| | Public sector | 7.33 | | | Performance above both benchmarks |
| | Retail | 5.73 | | | Performance below both benchmarks |
| **Growth (77–90)** | | | | | |
| Option-type tailored tax | Corporate | 7.30 | 6.32 | 6.75 | Performance above both benchmarks |
| | Industry | 7.86 | | | Performance above both benchmarks |
| | Public sector | 7.02 | | | Performance above both benchmarks |
| | Retail | 6.13 | | | Performance below both benchmarks |
| 5% tax | Corporate | 7.30 | 6.11 | 6.55 | Performance above both benchmarks |
| | Industry | 7.86 | | | Performance above both benchmarks |
| | Public sector | 7.02 | | | Performance above both benchmarks |
| | Retail | 6.13 | | | Performance above BP1 but not BP2 |
| **High growth (91–100)** | | | | | |
| Option-type tailored tax | Corporate | 6.09 | 6.10 | 6.57 | Performance below both benchmarks |
| | Industry | 7.88 | | | Performance above both benchmarks |
| | Public sector | 6.81 | | | Performance above both benchmarks |
| | Retail | 6.52 | | | Performance above BP1, but not BP2 |
| 5% tax | Corporate | 6.09 | 5.60 | 6.13 | Performance above BP1, but not BP2 |
| | Industry | 7.88 | | | Performance above both benchmarks |
| | Public sector | 6.81 | | | Performance above both benchmarks |
| | Retail | 6.52 | | | Performance above both benchmarks |

**a** Benchmarks are option-type level, not option-type *and* fund-type level. **b** Figures in parentheses refer to the share of growth assets. **c** Net returns are estimated less investment fees, taxes and implicit asset-based administration fees. This means that some options may be reported gross of asset-based administration fees. **d** The option type categories have been taken as given from SuperRatings data. **e** The analysis excludes legacy products. na Not available.

*Sources*: PC analysis of unpublished APRA data, financial market index data (various providers), Rainmaker data and SuperRatings data.

## Retirement and accumulation

The accumulation segment beat both benchmarks, while the retirement segment fell below both (chapter 2). A five per cent tax rate (only applicable to the accumulation stage) results in the accumulation stage beating both BPs (alternative tax rates were not applied to the retirement stage analysis). The results are also sensitive to the time period used (table 4.34).

Both the retirement and accumulation segments handled volatility better than their BPs (figure 4.16). The results are different when analysing Rainmaker data (figure 4.17).

Table 4.34 **Retirement and accumulation segment**[a,b,c]
Alternative approaches

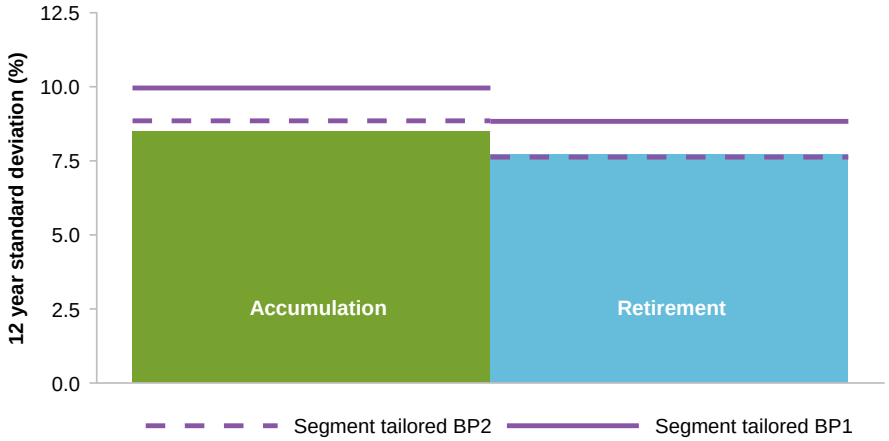
| *Benchmark type* | *BP1 (%)* | *BP2 (%)* | *Actual return (%)* | *Result* |
|---|---|---|---|---|
| **Accumulation** | | | | |
| 2005–2017 (chapter 2) | 5.96 | 6.37 | 6.84 | Beats both benchmarks |
| 2005–2017, 7.5% tax rate | 6.14 | 6.52 | 6.84 | Beats both benchmarks |
| 2008-2017 | 3.58 | 4.24 | 4.58 | Beats both benchmarks |
| 2013-2017 | 9.83 | 9.89 | 9.60 | Falls below both benchmarks |
| **Retirement** | | | | |
| 2005–2016 (chapter 2) | 6.56 | 6.62 | 6.07 | Falls below both benchmarks |
| 2008–2017 | 4.03 | 4.48 | 4.95 | Beats both benchmarks |
| 2013–2017 | 8.98 | 8.94 | 9.09 | Beats both benchmarks |

**a** Net returns are estimated less investment fees, taxes and implicit asset-based administration fees. This means that some options may be reported gross of asset-based administration fees. **b** The option type categories have been taken as given from SuperRatings data. **c** The analysis excludes legacy products.

*Sources*: PC analysis of unpublished APRA data, financial market index data (various providers), Rainmaker data and SuperRatings data.

Figure 4.16 **Accumulation and retirement segments**[a,b,c]

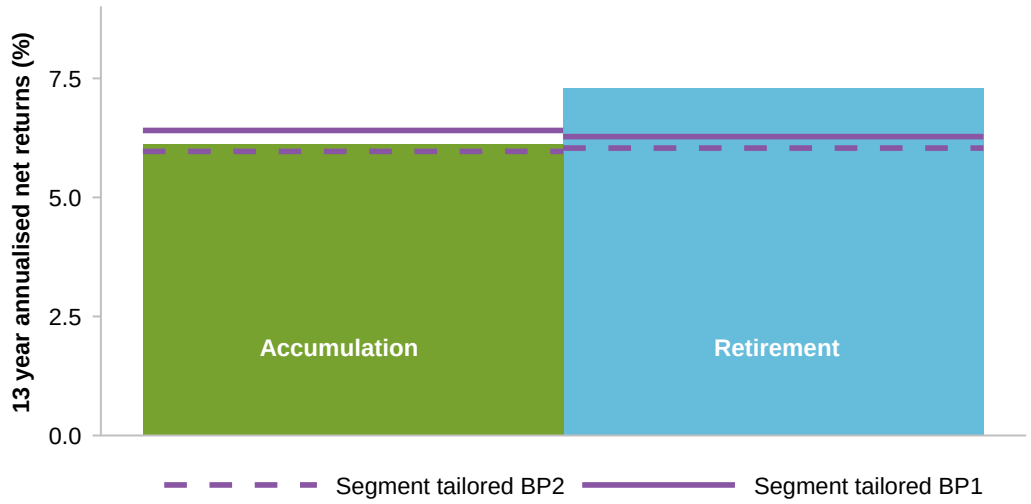
Volatility, 2005–2016




| | |
|---|---|
| **Sources** | PC analysis of SuperRatings data and financial market index data (various providers). |
| **Benchmark** | Segment tailored BP1, BP2. |
| **Coverage**[a] | This chart shows accumulation options from APRA-regulated funds.<br>In 2005, funds in the dataset represented up to 61% of total assets and 64% of member accounts of APRA-regulated funds.<br>In 2017, funds in the dataset represented up to 85% of total assets and 82% of member accounts of APRA-regulated funds. |
| **Survivor bias** | No. **Selection bias** Yes. |

[a] These coverage estimates are likely to be overestimates due to the estimation method (section 4.1). [b] Net returns are estimated less investment fees, taxes and implicit asset-based administration fees. This means that some options may be reported gross of asset-based administration fees. [c] Coverage estimates are likely to be overestimates due to the estimation method (section 4.1).The analysis excludes legacy products.

Figure 4.17 **Accumulation and retirement segments returns**
Rainmaker data, 2005–2017




| | |
|---|---|
| **Sources** | PC analysis of Rainmaker data and financial market index data (various providers). |
| **Benchmark** | Segment tailored BP1, BP2. |
| **Coverage**[a] | This chart shows accumulation options from APRA-regulated funds.<br>In 2004, funds in the dataset represented up to 30% of total assets and 42% of member accounts of APRA-regulated funds<br>In 2017, funds in the dataset represented up to 77% of total assets and 92% of member accounts of APRA-regulated funds |
| **Survivor bias** | No. **Selection bias** Yes. |

[a] These coverage estimates are likely to be overestimates due to the estimation method (section 4.1). The analysis excludes legacy products.

## Fund-level analysis

In chapter 2, analysis on the distribution of fund performance shows that about two in five funds in the sample underperformed a tailored BP2 by more than 25 basis points. The dataset used for the analysis was based on funds with a MySuper product in 2017 that could be tracked back over earlier years. The method is robust with respect to mergers involving a larger fund absorbing a smaller fund. In cases where multiple funds were combined to form a new merged fund (with a different name), the largest of the preceding funds was linked to the new merged fund.

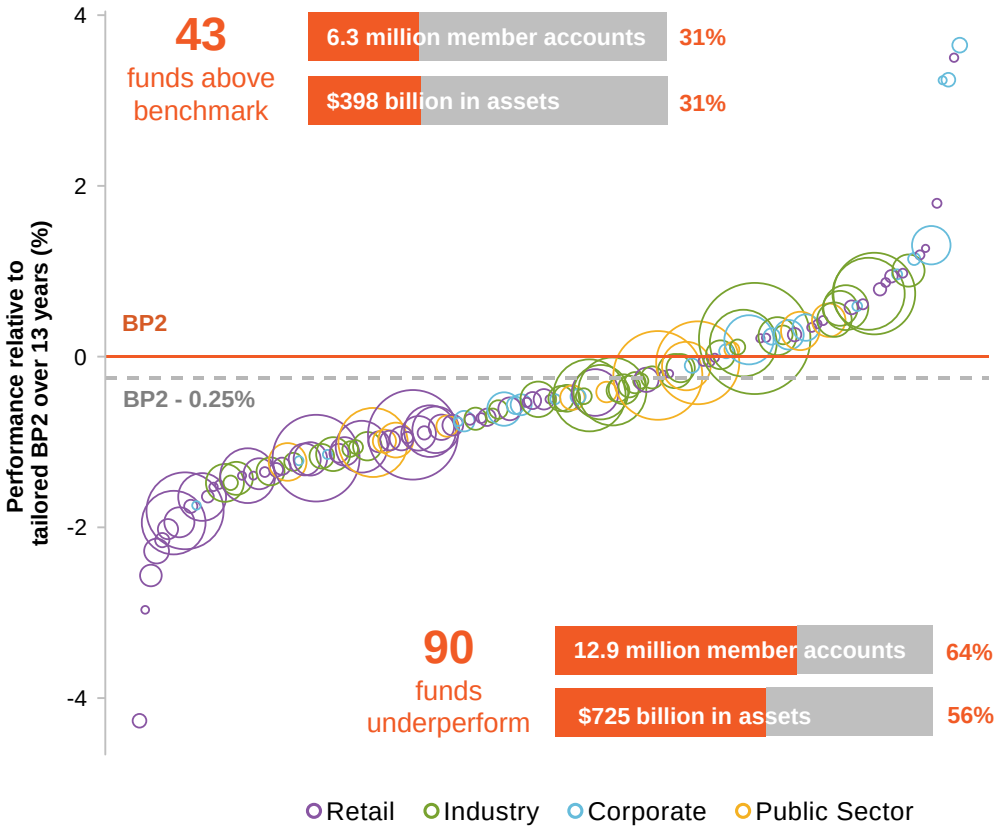
However, only funds with a MySuper product were considered in this analysis so that the default asset allocation adjustments could be applied (section 4.2). An analysis was also conducted using the entire sample of funds available by fixing each fund's asset allocation over time to their 2017 asset allocation. While the Commission prefers applying the default

asset allocation adjustment, this alternative approach was undertaken to allow for an assessment of all funds in the system.

Subject to this assumption, the analysis shows that the extent of underperformance in the system is much larger than the analysis in chapter 2 would suggest, with over 50 per cent of assets and members in underperforming funds (figure 4.18). Nonetheless, the result that retail funds are overrepresented in the underperforming funds still holds — with almost all the member accounts and assets in retail funds being in these funds (table 4.35). While a higher number of retail funds perform well above their benchmark in this analysis, all are small.

Figure 4.18 **Distribution of fund performance under static asset allocations**

Performance relative to individual funds' benchmark portfolios, 2005–2017
Size of circles indicates the size of each fund's assets under management




| | |
|---|---|
| **Sources** | PC analysis of unpublished APRA data and financial market index data (various providers). |
| **Benchmark** | Fund tailored BP2. |
| **Coverage** | All APRA-regulated funds which were still operating in 2017. Excludes exempt public sector superannuation schemes, eligible rollover funds and insurance-only superannuation funds. Over the whole system, the figure represents 145 funds, 52% of assets and 70% of member accounts in 2017. |
| **Survivor bias** | Yes. **Selection bias** No. |
| **Further results** | 12 funds performed less than 0.25 percentage points below BP2 (0.9 million member accounts and $177.0.3 billion in assets). |

Of the 90 underperforming funds, 52 are funds which also have a MySuper product. In other words, 38 of the underperforming funds are funds without a MySuper product. This indicates that the use of a 2017 static asset allocation results in generally higher benchmarks when compared with use of the default asset allocation adjustment.

Table 4.35 **Composition of underperforming funds**

2005–2017, with 2017 static asset allocation

| *Fund type* | *Number of funds in population*[a] | *% of population in sample (number of funds)* | *Composition of under-performers (%)* | *% of funds (in each fund type) that are underperforming* | *% of assets (in each fund type) in underperforming funds* | *% of accounts (in each fund type) in underperforming funds* |
|---|---|---|---|---|---|---|
| Corporate | 23 | 100 (23) | 11 | 43 | 24 | 22 |
| Industry | 40 | 100 (40) | 28 | 63 | 36 | 45 |
| Public Sector | 17 | 76 (13) | 8 | 54 | 29 | 38 |
| Retail | 107 | 64 (69) | 53 | 70 | 99.5 | 99.7 |

[a] The population of funds in this table includes all APRA-regulated funds which have provided annual returns for every year over the period 2005–2017, and which are not insurance only or eligible rollover funds.

*Sources*: PC analysis of unpublished APRA data and financial market index data (various providers).

The sensitivity of the results (using the default asset allocation adjustment method) to tax and administration fees was tested by varying assumptions from the use of reported tax and reported administration expense ratios. In particular, this has been done by constructing fund-tailored benchmarks using system median administration fees, or both of these, in place of the Commission's preferred assumptions (table 4.36).

Allowing for higher taxes and potentially higher administration fees reduces the magnitude of underperformance and increases the magnitude of performance above benchmarks, but under each set of assumptions, there remains a substantial tail of underperforming funds. In each case, retail funds are overrepresented amongst the underperforming funds.

Table 4.36 **Fund-level tailored benchmarking**[a]

Alternative approaches

| | | *Own tax, own admin expense (Baseline)* | *Own tax, system median admin expense* |
|---|---|---|---|
| **Number of funds in sample** | | | |
| | Corporate | 13 | 13 |
| | Industry | 38 | 38 |
| | Public Sector | 6 | 6 |
| | Retail | 11 | 11 |
| **Number of funds in population**[b] | | | |
| | Corporate | 23 | 23 |
| | Industry | 40 | 40 |
| | Public Sector | 17 | 17 |
| | Retail | 107 | 107 |
| **Funds performing above BP2** | | | |
| | Number of funds | 26 | 32 |
| | Accounts (m) | 7.2 | 7.7 |
| | Assets ($b) | 405 | 443 |
| **Funds less than 0.25% under BP2** | | | |
| | Number of funds | 13 | 7 |
| | Accounts (m) | 2.4 | 0.4 |
| | Assets ($b) | 85 | 23 |
| **Underperforming funds (under BP2 – 0.25%)** | | | |
| | Number of funds | 29 | 29 |
| | Accounts (m) | 5.0 | 6.4 |
| | Assets ($b) | 269 | 293 |
| **Composition of underperformers (%)** | | | |
| | Corporate | 10 | 7 |
| | Industry | 48 | 52 |
| | Public Sector | 10 | 10 |
| | Retail | 31 | 31 |
| **% of funds (in each fund type) that are underperforming** | | | |
| | Corporate | 23 | 15 |
| | Industry | 37 | 39 |
| | Public Sector | 50 | 50 |
| | Retail | 82 | 82 |

**(continued next page)**

Table 4.36 (continued)

| | | *Own tax, own admin expense (Baseline)* | *Own tax, system median admin expense* |
|---|---|---|---|
| **% of assets (in each fund type) that are in underperforming funds** | | | |
| | Corporate | 28 | 6 |
| | Industry | 10 | 17 |
| | Public Sector | 34 | 34 |
| | Retail | 99 | 99 |
| **% of accounts (in each fund type) that are in underperforming funds** | | | |
| | Corporate | 22 | 8 |
| | Industry | 9 | 24 |
| | Public Sector | 36 | 36 |
| | Retail | 99 | 99 |

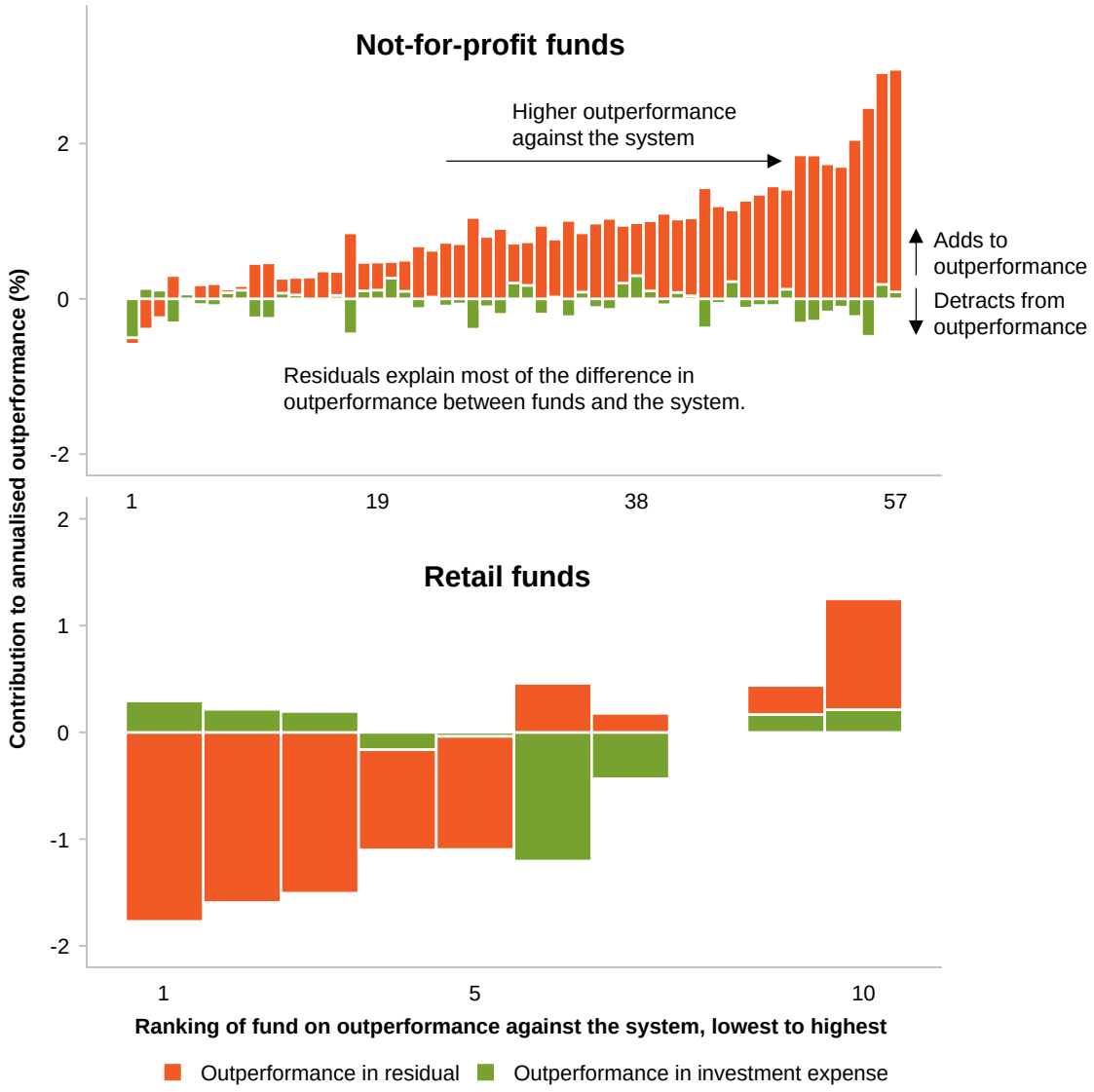
**a** 'Own' in column headings refers to the individual fund's own actual tax rate paid or administration expense ratio. **b** The population of funds in this table includes all APRA-regulated funds which have provided annual returns for every year over the period 2005–2017, and which are not insurance only or eligible rollover funds. **–** Nil or rounded to zero.

*Sources*: PC analysis of unpublished APRA data and financial market index data (various providers).

## Fund-level relative outperformance decomposition

In chapter 2, analysis of the fund-level absolute performance decomposition indicates that residuals appear to explain much of the variation in performance. Figure 4.19 presents a fund-level *relative* outperformance decomposition (split by fund type) — where individual fund outperformance is compared against system outperformance. Because this figure compares outperformance gaps (which are calculated relative to benchmarks), differences in asset allocation are already controlled for. Administration expenses are also absent from this chart because, by construction, there will be no fund-level variation as the expenses are the same in the performance data and the benchmarks. This figure provides a clear indication that residuals play a large role in differences in fund-level performance relative to benchmarks.

Figure 4.19 **Fund-level relative outperformance decomposition (against system outperformance)**
2005–2017




| | |
|---|---|
| **Note** | One retail fund approximately matched the system exactly on outperformance. |
| **Sources** | PC analysis of unpublished APRA data and financial market index data (various providers). |
| **Benchmark** | Fund tailored BP2. |
| **Coverage** | All APRA-regulated funds with a MySuper product in the dataset over the full period (54% of assets and 61% of member accounts in all APRA-regulated funds with a MySuper product in 2017). Excludes exempt public sector superannuation schemes, eligible rollover funds and insurance-only superannuation funds. Over the whole system, the figure represents 67 funds, 27% of assets and 47% of member accounts in 2017. |
| **Survivor bias** | Yes. **Selection bias** Yes. |

## Fund-level residual analysis

While all components of the decomposition are ultimately a reflection of a fund's overall governance, without data on the factors that influence a fund's overall strategy in investment and administration it is impossible to fully distinguish the effects of governance. The Commission undertook exploratory analysis of fund-level residuals (on a gross of tax basis) to identify factors that may be driving the residuals. Factors considered include proxies of fund governance efficacy in an attempt to discern any distinguishable (albeit partial) effects of governance on performance.

Small sample sizes, dependence of the residuals on the benchmarks, and the assumptions that come with the benchmarks preclude definitive answers on the underlying drivers of investment performance — hence, the analysis is exploratory.

As the residuals are constructed using fund-level benchmarks, the sample in these analyses consists only of funds that have a MySuper product (representing 54 per cent of assets and 61 per cent of member accounts in funds that had a MySuper product in 2017). Because the residuals are constructed with reference to benchmarks, they may include some degree of measurement error flowing from the specific assumptions and data sources used to construct the benchmarks (section 4.2).

### *How long it took for funds to launch their MySuper products*

The Commission examined the length of time each fund took to launch a MySuper product. The MySuper regime was a well-known change in the policy environment with significant lead time of about 3.5 years, from December 2010 (when the Australian Government announced it would move to implement the regime) to July 2013. It can be reasonably assumed that funds had the same information, and while some funds may have required more preparation, given the lead time, all funds had the same opportunity to launch a MySuper product at the start of the regime. Variation in the time taken to launch a MySuper product could therefore arguably reflect variation in funds' capability and readiness to design a MySuper product, as well as the suitability of its precursor products to default members' needs.

Table 4.37 presents the results of the regression analysis. While the sample sizes are small, there is likely to be a negative association — the more time it took to launch a MySuper product, the more negative the residual. In this table, each row corresponds to the estimated value of the residual given the number of months taken to launch a MySuper product, such that differences between the first row and another row correspond to the marginal effect of a longer launch time.

Pooling all the data together (treating the time taken as a continuous variable) suggests that there is an approximately 11 basis point decrease in the residual for each additional month it took a fund to launch a MySuper product (this is statistically significant). Using dummy variables for each month suggests a less clear-cut relationship. The average reduction in the

residual for funds launching their MySuper product after three months is well over 100 basis points in this analysis, but only 8 basis points for funds that launched after six months.

These results do not appear to be clearly driven by the not-for-profit and retail segmentation. For instance, it is not true that all not-for-profit funds launched their products before retail funds; a number of not-for-profit funds launched their MySuper products late relative to other funds.

Table 4.37 **Residuals and MySuper launch dates**[a]

Residuals calculated over 2005–2017

| *Months taken to launch MySuper after the start of the MySuper regime*[b] | *Pooled data model, averages (bp)* | *Dummy variable model, averages (bp)* | *Number of funds* | *Number of not-for-profit funds* | *Number of retail funds* |
|---|---|---|---|---|---|
| Within 1 month | -9 | -4 | 33 | 33 | 0 |
| 1 | -20 | -27 | 8 | 8 | 0 |
| 2 | -31 | -33 | 2 | 2 | 0 |
| 3 | -42 | -125 | 3 | 0 | 3 |
| 4 | -53 | +41 | 4 | 4 | 0 |
| 5 | -64 | -117 | 10 | 5 | 5 |
| 6 | -75 | -15 | 5 | 3 | 2 |
| 7 | -86 | -62 | 1 | 1 | 0 |

**a** The linear trend for the pooled data model and the 3 and 5 month dummies in the dummy variable model were all significant at the 90 per cent level. **b** The first row corresponds to the intercept, with each subsequent row adding the corresponding linear trend effect or dummy variable effect to arrive at the averages.

*Source*: PC analysis of unpublished APRA data.

*How long it took for funds to complete the transfer of default assets to their MySuper product*

In principle, the length of time taken by a fund to complete the transfer of default assets to their MySuper product should be an indicator of the fund's ability to manage member flows and ability to move members into a low-fee default product in a timely manner. However, APRA data only tracked the progress of funds on an annual basis. This frequency of reporting is not granular enough to identify any clear relationships.

The overwhelming majority of funds completed the transfer between 1 and 2 years after the MySuper regime started, leaving the data with little variation to extract a meaningful relationship. The average fund that completed the transfer after 1 year had a more positive residual, at 16 basis points higher than for funds that completed the transfer immediately (table 4.38). The associations for funds which completed their transfers after 2 years are distinctly negative (but not statistically significant). However, this result could also be, in part, a direct effect of the delay (to the extent that delay was associated with funds having administrative expenses higher than otherwise for a longer period of time, and thus lower residuals when measured over the whole period), rather than the quality of fund governance per se.

Table 4.38 **Residuals and completion of MySuper default transfers**
Residuals calculated over 2005–2017

| *Years taken to complete MySuper default transfers after the start of the MySuper Regime*[a] | *Non-linear model, averages (bp)*[b] | *Number of funds* |
|---|---|---|
| Within 1 year | -23 | 15 |
| 1 | -11 | 44 |
| 2 | -73 | 5 |
| 3 | -196 | 1 |
| 4 | -170 | 2 |

[a] The first row corresponds to the intercept, with each subsequent row adding the corresponding dummy variable effect to arrive at the averages. [b] None of the associations are statistically significant.

*Source*: PC analysis of unpublished APRA data.

*Related parties*

The Commission sought to identify if there was a distinguishable association between the use of related parties and the residual. This would be an indirect association, because any impact of using related parties on administration or reported investment expenses would already have been adjusted for directly (and not in the residual). It could arise where use of related parties is associated with higher indirect investment expenses, or with a fund's asset selection (within asset classes). To the extent that use of related parties reflects poorer governance, then poor governance may be correlated with residuals.

Table 4.39 presents regression analysis of residuals and calculated service provider expense ratios (expenses divided by total fund assets), based on APRA data. Expense ratios are used to avoid the problem that larger expenses are likely to be associated with larger funds. The results suggest that increased usage of related party service providers is associated with more negative residuals. The effects are statistically significant at the 90 per cent level. An increase in related party service provider expense ratios by 20 basis points (a relatively large increase according to the standard deviation) is associated with a 20 basis point decrease in the residual. However, gaps and inconsistencies in the expenses data (especially expenses by related parties) mean that these results could possibly be driven by measurement error.

Table 4.39 also shows the effects for the retail and not-for-profit segments, although it should be noted that small sample sizes make it difficult to separate out these effects. The results for retail funds may seem counterintuitive but are heavily skewed by the small sample of 10 funds, and in particular, two funds that deviate significantly from the broader trend. The result for not-for-profit funds is consistent with the overall sample results, although the magnitude is diminished. None of the results by segment are statistically significant. These results are subject to significant data limitations, particularly in terms of the quality and completeness of data on related party arrangements.

Table 4.39 **Residuals and related party expense ratios**

Residuals calculated over 2005–2017; related party data for 2017

| *Coefficient* | *One standard deviation (bp)* | *All funds (bp)* | *Retail funds only (bp)* | *Not-for-profit funds only (bp)* |
|---|---|---|---|---|
| Increase in non-associated service provider expense ratio by 100 bp | 27 | -9 | +102 | -21 |
| Increase in related party service provider expense ratio by 100 bp | 23 | -94* | +148 | -26 |

* denotes significance at the 90% confidence level.

*Source*: PC analysis of unpublished APRA data.

## MySuper analysis

### 4-year analysis

Chapter 2 presents the 4-year net returns for MySuper products relative to a tailored BP2. Conducting the analysis with a flat 7.5 per cent tax (rather than a time-varying rate that averages 5.8 per cent) does not materially alter the results (table 4.40). Conducting the analysis relative to the MySuper segment-average BP2 sees fewer underperforming products (table 4.41).

However, analyses gross of administration fees see a somewhat material fall in the number of underperforming products. This is essentially by construction as BP2 is net of the 25$^{th}$ percentile administration fee of the sample, meaning that in any given year, 75 per cent of products have administration fees above the BP2 administration fee.

All 4-year results presented here and in chapter 2 differ markedly from those presented in the draft report. This is primarily because of a change in the BP2 asset allocation data source. The draft report used SuperRatings data to build a MySuper segment-average BP2, whereas the updated analyses used APRA MySuper data to build a MySuper segment-average BP2 and tailored BP2s. The selection bias in SuperRatings data meant the previous MySuper segment-average BP2 was more growth-oriented (with more unlisted allocations) than the 'true' average that emerged when the more comprehensive APRA data were used. Constructing an updated BP2 with SuperRatings data produced a MySuper segment-average BP2 over 50 basis points higher than the BP2 produced with APRA data. The extra year of data, and changes to underlying assumptions (particularly tax) also played a role in bringing BP2 down, relative to product returns from the draft report.

Table 4.40 **MySuper performance: tailored benchmark**
Sensitivity tests, 2014–2017

| | *Chapter 2* | *Gross of admin fees* | *7.5% flat tax* |
|---|---|---|---|
| **Products performing above BP2** | | | |
| Number of products | 46 | 58 | 50 |
| Accounts (m) | 8.9 | 10.3 | 8.9 |
| Assets ($b) | 455 | 493 | 457 |
| **Products under BP2 but not underperforming** | | | |
| Number of products | 12 | 16 | 10 |
| Accounts (m) | 2.3 | 3.1 | 2.3 |
| Assets ($b) | 65 | 107 | 65 |
| **Underperforming products** | | | |
| Number of products | 38 | 22 | 36 |
| Accounts (m) | 3.6 | 1.5 | 3.6 |
| Assets ($b) | 138 | 57 | 136 |
| **Composition of underperformers (%)** | | | |
| Corporate | 13 | 9 | 14 |
| Industry | 26 | 36 | 22 |
| Public Sector | 11 | 14 | 11 |
| Retail | 50 | 41 | 53 |
| **% of all MySuper products (in each fund type) that are underperforming** | | | |
| Corporate | 45 | 18 | 45 |
| Industry | 26 | 21 | 21 |
| Public Sector | 44 | 33 | 44 |
| Retail | 51 | 24 | 51 |

*Sources*: PC analysis of APRA (2018b, 2018a), and financial market index data (various providers).

Table 4.41 **MySuper performance: segment-average benchmark**
Sensitivity tests, 2014–2017

| | *Chapter 2* | *Gross of admin fees* | *7.5% flat tax* |
|---|---|---|---|
| **Products performing above BP2** | | | |
| Number of products | 53 | 62 | 56 |
| Accounts (m) | 11.9 | 12.6 | 12 |
| Assets ($b) | 552 | 572 | 555 |
| **Products under BP2 but not underperforming** | | | |
| Number of products | 14 | 13 | 13 |
| Accounts (m) | 1.1 | 1.2 | 1.1 |
| Assets ($b) | 37 | 55 | 42 |
| **Underperforming products** | | | |
| Number of products | 29 | 21 | 27 |
| Accounts (m) | 1.8 | 0.9 | 1.7 |
| Assets ($b) | 69 | 31 | 61 |
| **Composition of underperformers (%)** | | | |
| Corporate | 17 | 10 | 19 |
| Industry | 21 | 24 | 19 |
| Public Sector | 7 | 10 | 7 |
| Retail | 55 | 57 | 56 |
| **% of all MySuper products (in each fund type) that are underperforming** | | | |
| Corporate | 45 | 18 | 45 |
| Industry | 15 | 13 | 13 |
| Public Sector | 22 | 22 | 22 |
| Retail | 43 | 32 | 41 |

*Sources*: PC analysis of APRA (2018b, 2018a), and financial market index data (various providers).

## 11-year analysis

The results from the 11-year analysis of MySuper products and connected precursors (for both a segment-average BP2 and tailored BP2) are not sensitive to the tax rate or the treatment of fixed administration fees, but are sensitive to the time period used. A shorter time period of (6 years) nearly doubles the amount of underperforming products (tables 4.42 and 4.43).

The results presented here and in chapter 2 differ slightly from those presented in the supplementary paper released following the draft report. This is because the BP2 used in the supplementary paper did not deduct an asset-based administration fee. This fee has now been deducted to better align the BP2s with the SuperRatings returns data (which are net of implicit asset-based administration fees). They differ slightly again from those presented in the draft report primarily because of the different tax and custodian cost adjustments.

## Table 4.42 **MySuper performance: tailored benchmark**[a]

Sensitivity tests, 2008–2017

| | *Chapter 2* | *6-year period (2012–2017)* | *Net of fixed admin fees* | *7.5% flat tax* |
|---|---|---|---|---|
| **Products in population by fund type** | | | | |
| Corporate | 13 | 13 | 13 | 13 |
| Industry | 39 | 39 | 39 | 39 |
| Public Sector | 12 | 12 | 12 | 12 |
| Retail | 41 | 41 | 41 | 41 |
| **Products in sample by fund type** | | | | |
| Percentage of fund-type population (number of funds) | | | | |
| Corporate | 23 (3) | 23 (3) | 23 (3) | 23 (3) |
| Industry | 77 (30) | 77 (30) | 77 (30) | 77 (30) |
| Public Sector | 58 (7) | 58 (7) | 58 (7) | 58 (7) |
| Retail | 32 (13) | 32 (13) | 32 (13) | 32 (13) |
| **Products performing above BP2** | | | | |
| Number of products | 32 | 16 | 32 | 30 |
| Accounts (m) | 9.7 | 6.2 | 9.7 | 9.5 |
| Assets ($b) | 436 | 307 | 436 | 428 |
| **Products under BP2 but not underperforming** | | | | |
| Number of products | 4 | 4 | 3 | 5 |
| Accounts (m) | 0.1 | 2 | 0.1 | 0.3 |
| Assets ($b) | 13 | 52 | 11 | 18 |
| **Underperforming products** | | | | |
| Number of products | 17 | 33 | 18 | 18 |
| Accounts (m) | 1.6 | 3.2 | 1.6 | 1.6 |
| Assets ($b) | 57 | 147 | 59 | 59 |
| **Composition of underperformers (%)** | | | | |
| Corporate | 0 | 3 | 0 | 0 |
| Industry | 35 | 42 | 33 | 33 |
| Public Sector | 6 | 15 | 6 | 6 |
| Retail | 59 | 39 | 61 | 61 |
| **% of all MySuper products (in each fund type) that are underperforming** | | | | |
| Corporate | 0 | 33 | 0 | 0 |
| Industry | 20 | 47 | 20 | 20 |
| Public Sector | 14 | 71 | 14 | 14 |
| Retail | 77 | 100 | 85 | 85 |
| **% of all MySuper assets (in each fund type) that are in underperforming products** | | | | |
| Corporate | 0 | 53 | 0 | 0 |
| Industry | 5 | 18 | 5 | 5 |
| Public Sector | 1 | 38 | 1 | 1 |
| Retail | 95 | 100 | 99 | 99 |

**(continued next page)**

Table 4.42 (continued)

| | *Chapter 2* | *6-year period (2012–2017)* | *Net of fixed admin fees* | *7.5% flat tax* |
|---|---|---|---|---|
| **% of all MySuper accounts (in each fund type) that are in underperforming products** | | | | |
| Corporate | 0 | 48 | 0 | 0 |
| Industry | 6 | 18 | 6 | 6 |
| Public Sector | 5 | 42 | 5 | 5 |
| Retail | 98 | 100 | 99 | 99 |

**a** Composition percentages may not sum to 100 due to rounding. Some percentages have also been rounded up to 100 from >99.5 per cent.

*Source*: PC analysis of APRA (2018b, 2018a), financial market index data (various providers), and SuperRatings data.

Table 4.43 **MySuper performance: segment-average benchmark**[a]

Sensitivity tests, 2008–2017

| | *Chapter 2* | *6-year period (2012–2017)* | *Net of fixed admin fees* | *7.5% flat tax* |
|---|---|---|---|---|
| **Products in population by fund type** | | | | |
| Corporate | 13 | 13 | 13 | 13 |
| Industry | 39 | 39 | 39 | 39 |
| Public Sector | 12 | 12 | 12 | 12 |
| Retail | 41 | 41 | 41 | 41 |
| **Products in sample by fund type** Percentage of fund-type population (number of funds) | | | | |
| Corporate | 62 (8) | 62 (8) | 62 (8) | 62 (8) |
| Industry | 85 (33) | 85 (33) | 85 (33) | 85 (33) |
| Public Sector | 58 (7) | 58 (7) | 58 (7) | 58 (7) |
| Retail | 39 (16) | 39 (16) | 39 (16) | 39 (16) |
| **Products performing above BP2** | | | | |
| Number of products | 37 | 21 | 37 | 33 |
| Accounts (m) | 9.7 | 8.6 | 9.7 | 9.7 |
| Assets ($b) | 450 | 378 | 450 | 447 |
| **Products under BP2 but not underperforming** | | | | |
| Number of products | 6 | 9 | 4 | 8 |
| Accounts (m) | 0.3 | 0.9 | 0.3 | 0.2 |
| Assets ($b) | 12 | 49 | 9 | 9 |
| **Underperforming products** | | | | |
| Number of products | 21 | 34 | 23 | 23 |
| Accounts (m) | 1.6 | 2.1 | 1.6 | 1.8 |
| Assets ($b) | 55 | 90 | 58 | 62 |

**(continued next page)**

Table 4.43 (continued)

| | *Chapter 2* | *6-year period (2012–2017)* | *Net of fixed admin fees* | *7.5% flat tax* |
|---|---|---|---|---|
| **Composition of underperformers (%)** | | | | |
| Corporate | 5 | 15 | 9 | 4 |
| Industry | 29 | 32 | 26 | 30 |
| Public Sector | 5 | 9 | 4 | 4 |
| Retail | 62 | 44 | 61 | 61 |
| **% of all MySuper products (in each fund type) that are underperforming** | | | | |
| Corporate | 13 | 63 | 25 | 12 |
| Industry | 18 | 33 | 18 | 21 |
| Public Sector | 14 | 43 | 14 | 14 |
| Retail | 81 | 94 | 88 | 88 |
| **% of all MySuper assets (in each fund type) that are in underperforming products** | | | | |
| Corporate | 2 | 62 | 11 | 2 |
| Industry | 3 | 5 | 3 | 5 |
| Public Sector | 1 | 20 | 1 | 1 |
| Retail | 96 | 100 | 100 | 100 |
| **% of all MySuper accounts (in each fund type) that are in underperforming products** | | | | |
| Corporate | 3 | 57 | 10 | 3 |
| Industry | 4 | 6 | 4 | 6 |
| Public Sector | 5 | 20 | 5 | 5 |
| Retail | 99 | 100 | 100 | 100 |

**a** Composition percentages may not sum to 100 due to rounding. Some percentages have also been rounded up to 100 from >99.5 per cent.

*Source*: PC analysis of APRA (2018b, 2018a), financial market index data (various providers), and SuperRatings data.

## Choice option-level analysis

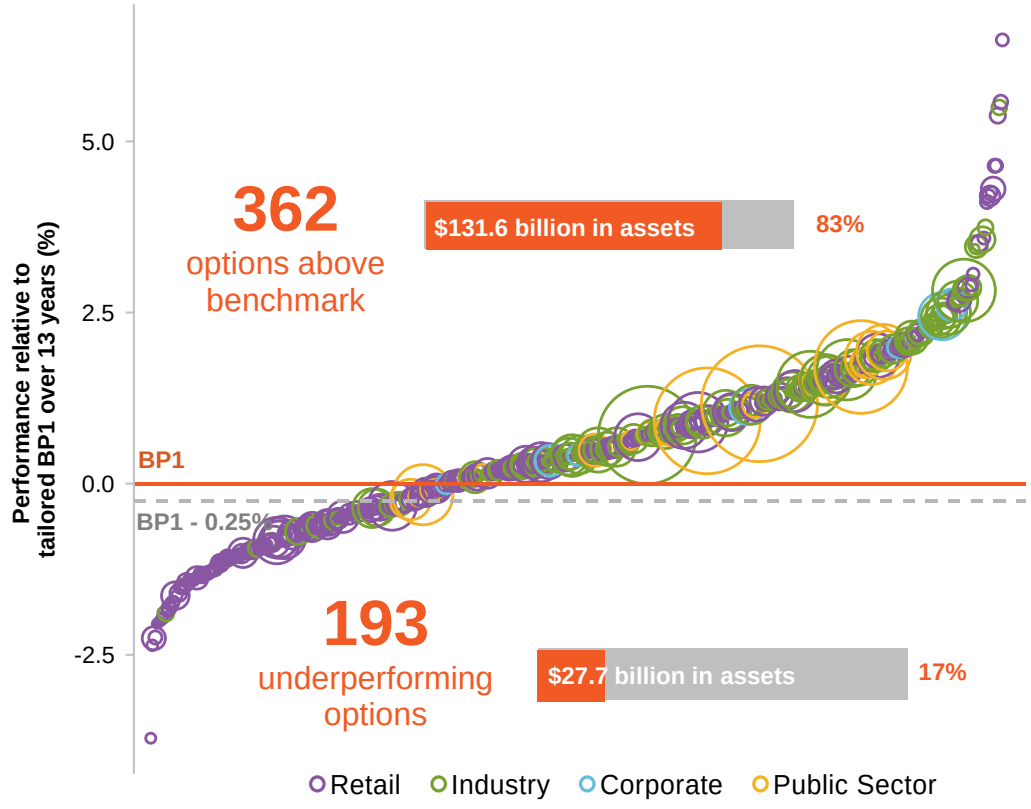
In chapter 2, the distribution of choice option performance points to about 36 per cent of options in the sample as underperforming a listed benchmark (BP1) by more than 25 basis points. This analysis, however, assumed an administration fee equal to the choice segment median administration fee. Some choice options may have substantially higher administration fees.

To test the sensitivity of the analysis to administration fees, the administration fee assumption was relaxed by allowing for administration fees to vary by the fund-type medians in the tailored BPs. This means, for example, that the administration fees applied to retail option benchmarks are substantially higher. Figure 4.20 presents this analysis and shows that under this alternative fee assumption there is a smaller tail of underperforming choice options and more options performing above their tailored benchmark. The composition of

underperforming choice options changes slightly, but retail funds continue to be overrepresented (table 4.44).

Figure 4.20 **Distribution of choice options using fund-type administration fees**[a]

Performance relative to option-tailored benchmark portfolios, 2005–2017
Size of circles indicates the size of each option's assets under management




| | |
|---|---|
| **Sources** | PC analysis of unpublished APRA data, financial market index data (various providers) and SuperRatings data. |
| **Benchmark** | Option tailored BP1. |
| **Coverage** | The chart shows 362 accumulation options from APRA-regulated funds with an estimated $161 billion in assets in the choice segment. Legacy products are excluded. |
| **Survivor bias** | Yes. **Selection bias** Yes. |
| **Further results** | 26 options performed less than 25 basis points below BP1 ($7.6 billion in assets). |

[a] Net returns are estimated less investment fees, taxes and implicit asset-based administration fees. This means that some options may be reported gross of asset-based administration fees.

Table 4.44 **Composition of underperforming choice options**[a]
2005–2017, with fund-type administration fees

| *Fund type* | *Composition of underperformers* | *Underperformers as a percentage of all in fund type* |
|---|---|---|
| | % | % |
| Corporate | 1 | 14 |
| Industry | 8 | 10 |
| Public Sector | 3 | 21 |
| Retail | 88 | 48 |

**a** The percentage of choice option assets and accounts (in each fund type) that are underperforming has not been reported due to the small sample sizes.

*Sources*: PC analysis of unpublished APRA data, financial market index data (various providers) and SuperRatings data.

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