Pension Protection Fund

The Purple Book 2023

DB pensions universe risk profile

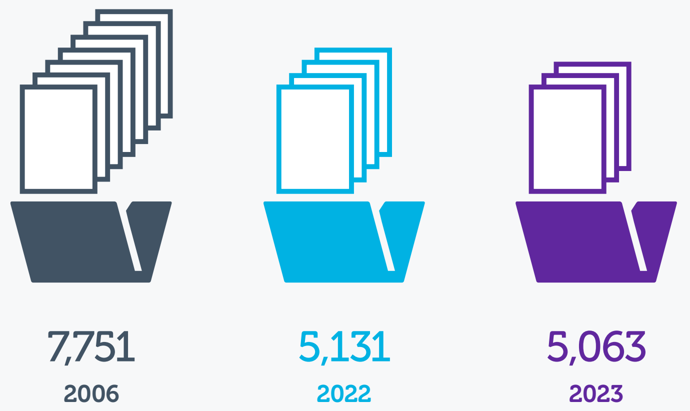
Contents

Introduction

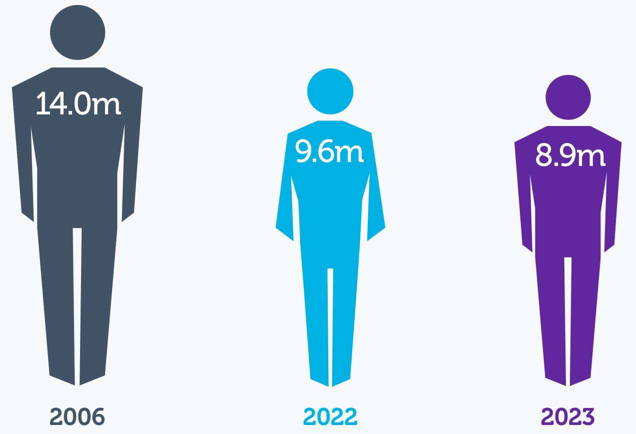
The Purple Book, also known as The Pensions Universe Risk Profile, is now in its 18th edition. We've published *The Purple Book* annually since 2006, giving the most comprehensive data and analysis of the UK defined benefit (DB) pensions landscape. This publication tracks trends in DB scheme funding, demographics, asset allocation, and more. It also gives us, the PPF, an in-depth understanding of the risks we face from the universe of schemes we protect. Understanding this information helps us to model the level of claims we may need to absorb in years to come, and helps inform decisions on our funding strategy. *The Purple Book* is the starting point of the PPF 7800, a simple roll-forward whose results we publish each month.

Overview

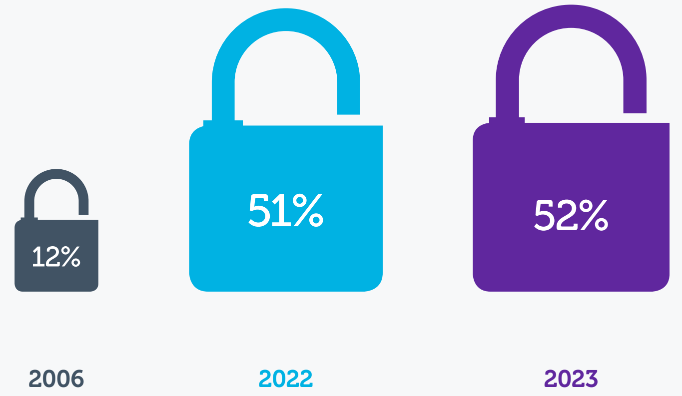
Number of PPF-eligible schemes



Number of members

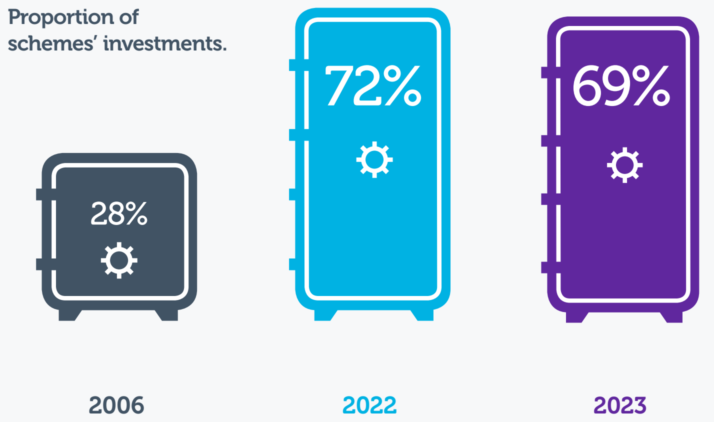


Proportion of schemes closed to new benefit accrual

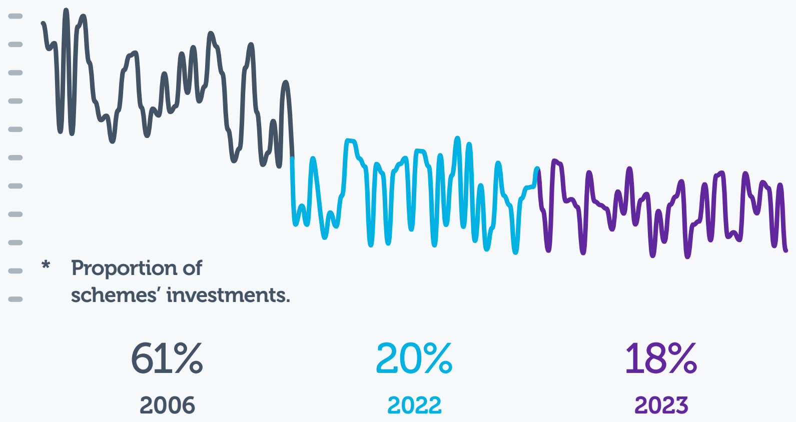


Bonds trend*

* Proportion of schemes' investments.

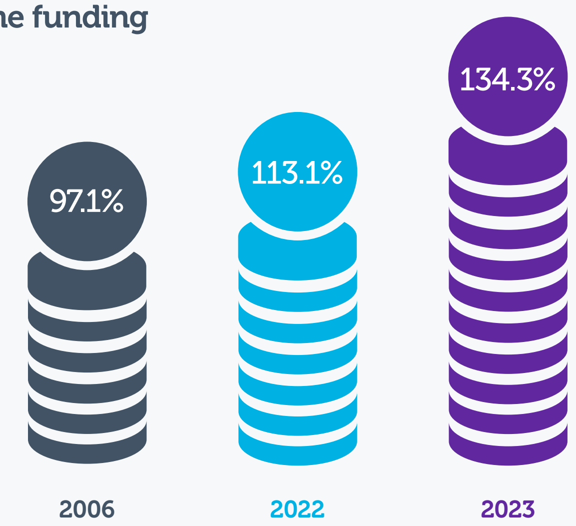


Equities trend*

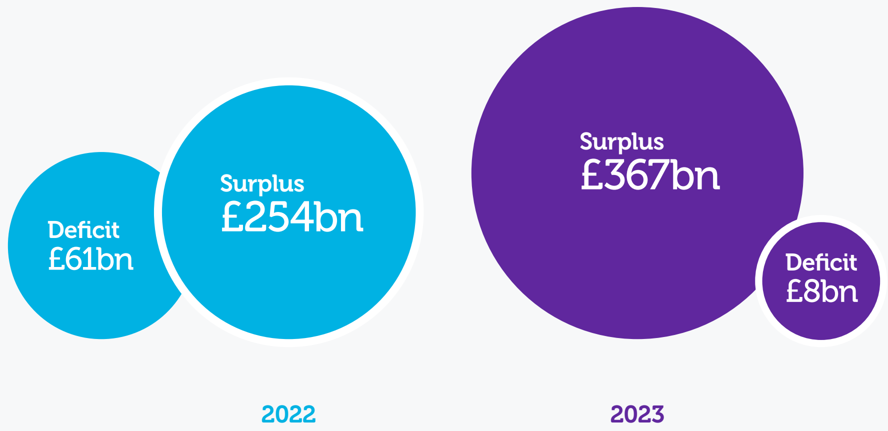


* Proportion of schemes' investments.

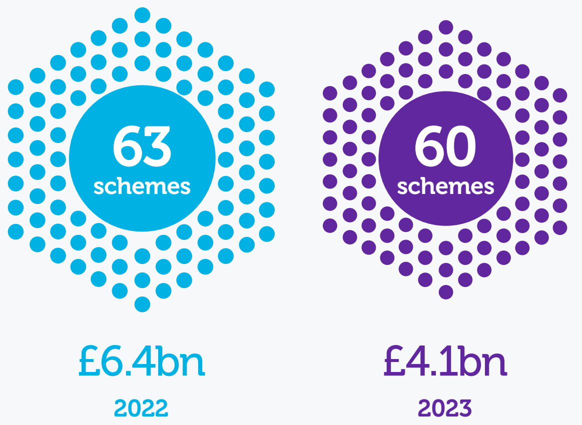
Scheme funding



Surplus/deficit of schemes in surplus/deficit



Number and liabilities of schemes in PPF assessment



01

Executive summary

Highlights and key trends from this year's *Purple Book*.

Data

We estimate there to be 5,063 schemes in the Pension Protection Fund (PPF) eligible universe as at 31 March 2023[1], a reduction from 5,131 as at 31 March 2022. The declining universe reflects schemes winding up, scheme mergers, and schemes entering PPF assessment. This year, *The Purple Book* dataset covers 5,051 schemes – 99.8 per cent of the estimated 5,063 schemes eligible for PPF compensation.

Schemes with more than 5,000 members make up almost 75 per cent of each of total assets, liabilities, and members, while only forming six per cent of the total number of schemes in *The Purple Book 2023* dataset. Conversely, schemes with fewer than 1,000 members make up 80 per cent of the total number of schemes but only around 10 per cent of total assets, liabilities, and members.

Scheme demographics

The proportion of schemes open to new members was nine per cent, a reduction from 10 per cent in *The Purple Book 2022*. While the open share fell sharply from 2006 to 2011, the decline has slowed since then. Schemes that are closed to new members continue to also close to new benefit accrual, albeit at a slow rate. Of the 91 per cent of remaining schemes that are closed to new members, 52 per cent were closed to new benefit accrual and 36 per cent were open to new benefit accrual with the remaining 3 per cent in wind-up.

There are around 0.7 million active members – i.e. members who continue to accrue benefits in a scheme still open to it – in *The Purple Book 2023* dataset. The number of active members has fallen each year since the first edition of *The Purple Book* in 2006, when there were 3.6 million.

Schemes that remain open tend to be larger in terms of membership. 21 per cent of members were in open schemes with a further 40 per cent in schemes that are closed to new members but open to new benefit accrual.

The Purple Book 2023 dataset includes 8.9 million DB scheme members. Of these:

- 45 per cent are pensioner members;
- 47 per cent are deferred members; and
- 8 per cent are active members.

Scheme funding

Universe scheme funding improved in the year to 31 March 2023. The net funding position on a section 179 (s179) basis[2] as shown in *The Purple Book 2023* improved to a surplus of £358.9 billion compared to a surplus of £193.0 billion the year before, while the aggregate funding ratio increased to 134.3 per cent from 113.1 per cent. This is mainly the result of market movements, primarily higher gilt yields driving down liability values by more than the corresponding decrease in asset values. There was a further small increase in the aggregate funding ratio from the new s179 valuations and the latest eligible universe available as a result of updating to the new *Purple Book 2023* dataset.

On an estimated full buy-out basis, the net funding position improved to a surplus of £149.5 billion from a deficit of £438.4 billion the year before and the funding ratio improved from 79.2 per cent to 111.9 per cent.

The funding ratios we have estimated as at 31 March 2023 are calculated from funding information supplied in scheme returns submitted to The Pensions Regulator (TPR). Specifically, the values of assets and liabilities are rolled forward to the effective date of *The Purple Book* from the schemes' s179 valuations. Our roll-forward methodology is designed to be approximate in nature. Importantly, there are a couple of key limitations:

- The roll-forward does not take account of benefits paid out to members since the s179 valuation dates. This means the roll-forward will overstate the value of both the assets and liabilities.
- Assets are rolled forward according to changes in a small set of market indices, although in many cases more recent (than the s179 valuations) asset splits are taken into account.

Asset allocation

The aggregate proportion of schemes' assets invested in equities fell from 19.5 per cent to 18.0 per cent and the proportion in bonds fell from 71.6 per cent to 69.0 per cent.

Within bonds, the largest shift was within corporate bonds which increased from 30.2 per cent to 36.5 per cent. Index-linked bonds decreased from 47.8 per cent to 44.1 per cent, while government fixed interest bonds fell from 22.0 per cent to 19.5 per cent.

Within equities, the largest shift was the increase in allocations to unquoted/private equity which increased from 21.5 per cent to 29.5 per cent. Investments in UK-quoted equity continued to decrease, falling from 9.9 per cent to 7.6 per cent. Overseas-quoted equities fell from 68.6 per cent to 62.8 per cent.

Risk reduction

DB pension schemes have continued to close to new benefit accrual. Although there has been little change in the proportion of assets in bonds and equities over the last year, schemes continued to invest a large proportion – almost 70 per cent – of their assets in bonds or bond-like investments such as leveraged LDI. The proportion of assets invested in equities is less than 20 per cent.

Based only on current recovery plans in place, total annual recovery plan payments are indicated to decrease by around 88 per cent over the next 10 years, from around £11.2 billion in 2023 to around £1.3 billion in 2033, as schemes increasingly become fully funded on a Technical Provisions basis. However, this only shows the current position so changes may be made to existing recovery plans and new recovery plans may be put in place in the future if experience is different from what has currently been assumed by schemes.

Analysis of TPR's latest Technical Provisions and recovery plan data shows that in Tranche 16[3], the average recovery plan length was 5.7 years, almost a year less than that of Tranche 13 (comparable given the three-year valuation cycle). Assets as a percentage of Technical Provisions were 93.5 per cent and 93.7 per cent in Tranches 13 and 16, respectively.

The total number of contingent assets submitted to the PPF for the 2023/24 levy year was 245, compared with 303 in 2022/23.

There were £44 billion worth of risk transfer deals (buy-ins, buy-outs and longevity swaps) in 2022, a very similar value to the previous year. This is a relatively small amount in the context of the whole universe of schemes.

1 The number of schemes in the PPF-eligible universe as at 31 March 2023 could be different from 5,063 if any of these schemes are discovered to be ineligible for PPF protection or if any other schemes are discovered to be eligible for PPF protection as at 31 March 2023.

2 s179 liabilities represent, broadly speaking, what would have to be paid to an insurance company to take on the payment of **PPF levels of compensation** (rather than full scheme benefits).

3 Tranche 16 covers schemes with valuation dates between 22 September 2020 and 21 September 2021. www.thepensionsregulator.gov.uk/en/document-library/research-and-analysis/scheme-funding-analysis-2023/scheme-funding-analysis-2023-annex.

Executive summary continued

PPF levy, claims, and compensation

Levy

For the levy year 2022/23, the total levy invoiced was £385 million, down from £476 million the previous levy year.

The top 100 levy payers accounted for 62 per cent of the total levy, up from 58 per cent last year.

40 per cent of schemes had no risk-based levy (up from 34 per cent last year) while 2.6 per cent of schemes saw the cap of 0.25 per cent of smoothed liabilities apply to their risk-based levy. Schemes with capped risk-based levies tend to have low funding ratios and sponsors with high insolvency risk.

83 per cent of the total levy came from schemes sponsored by employers with one of the three Dun & Bradstreet (D&B) scorecards 'Non-Subsidiaries £30 million+ and Large Subsidiaries', 'Credit Rated' or 'Group £50m+'.

Claims

In the year to 31 March 2023, 20 new schemes entered PPF assessment. While this is more than last year's 14 new schemes, the total value of the year's claims was £10 million (as measured on an s179 basis), lower than last year's £12 million.

Compensation

In the year to 31 March 2023, the PPF made compensation payments of £1.2 billion compared with £1.1 billion in the previous year. As at 31 March 2023, there were 199,895 records in respect of members receiving compensation[1], up from 193,983 a year earlier. The average annual payment per record to members receiving compensation was £4,882, up slightly from £4,825 as at 31 March 2022.

PPF risk developments

We published our funding strategy review in September 2022, which explains our approach to financial risk management as we move into a new phase of our funding journey. We enter this new stage in a strong financial position, and our strategic aim will shift from growing our reserves to 'Maintaining our Financial Resilience', which is our revised funding objective.

We defined a set of funding priorities to monitor our financial resilience. The strategic decisions on our future investment and levy strategies will be guided by how our reserves compare to these priorities. We therefore need to understand how our own funding, and that of the schemes we protect, may change over time. For that, we use our Long-Term Risk Model (LTRM), a stochastic model that runs a million different scenarios to project what the future may look like, allowing for future claims, levies, investment returns, and changes in economic conditions.

Like any complex modelling exercise, LTRM projections are subject to significant uncertainty. They depend crucially on modelling assumptions, which we continually refine to reflect how experience and expectations develop over time. We carried out sensitivity testing to understand the key financial risks to which we are exposed. Under each of these tests, we are comfortable that our current strategic decisions would be unchanged. We also continue to monitor, and seek to understand, the impacts of the key risks we face, including climate change and macro-economic changes.

Over the last year, there have been material improvements in both our own funding position and in that of the schemes we protect. This has increased the likelihood of us 'Maintaining our Financial Resilience'. The general economic environment remains volatile, but our modelling indicates that we are well placed to cope with the uncertainty.

Economy and market background

The following table sets out how some key market indicators in the assessment of universe scheme assets and s179 liabilities have changed over the year:

Market indicator	Change over the year to 31 March 2023
10-year fixed interest gilt yield	+1.91pp
15-year fixed interest gilt yield	+1.98pp
20-year fixed interest gilt yield	+2.04pp
5–15-year index-linked gilt yield	+2.56pp
FTSE All-Share Index (TR)	+2.92%
FTSE All-World Ex-UK Index (TR)	-1.15%

pp = percentage point(s).

TR = Total Return.

We are mindful of the interest in the landscape of the DB pension scheme universe following the LDI crisis in September 2022. In light of that, we'd like to call attention to the fact that most asset splits and s179 valuations (from which we roll-forward *The Purple Book* assets and liabilities) in *The Purple Book 2023* dataset are dated before September 2022.

From analysis of this year's initial scheme return dataset, it appeared to us that some tier 3 schemes had included less information on their leveraged Liability Driven Investment (LDI) exposure within the bond proportions than in previous years. It is possible that some schemes had included this in the scheme return risk factor stresses instead. *The Purple Book* currently only uses the former, for example in chapters 4 (scheme funding) and 7 (asset allocation), which raised the possibility of inconsistency between *Purple Book* datasets across time. In investigating this we concluded that for around 100 schemes in asset tier 3, the bond splits in last year's scheme returns would be a better reflection of the economic characteristics of their assets. In those instances, we used those prior bond splits in our data and analysis instead of those from the latest scheme returns.

For another approximately 350 schemes in asset tier 3, we wrote to them to request additional information on what their LDI exposure would look like if they fully incorporated it within their bond proportion. We updated the data for over 90 schemes based on the responses received. We would like to thank those schemes and their advisers that engaged with us on this additional request for information. We are working with TPR to clarify the scheme return help text to encourage schemes to include as much of their LDI exposure as possible in the scheme return bond proportion.

1 Some members have more than one record in the data.

02

The data

An overview of the dataset used in this edition of *The Purple Book*.

Summary

- This chapter contains information on the number and distribution of schemes in *The Purple Book 2023* dataset and the estimated universe of PPF-eligible schemes.
- The main analysis in *The Purple Book 2023* is based on the most recent scheme returns submitted to TPR by 31 March 2023. The resulting *Purple Book* dataset includes 5,051 DB schemes, covering 8.9 million members[1]. This represents 99.8 per cent of PPF-eligible schemes and universe liabilities. A full description of the data used is set out in the appendix.
- We also supplemented the scheme return data with some additional information on LDI exposure classified as bonds in the asset splits. We wrote to around 350 schemes (a subset of those classified in asset tier 3) to request more granular data. In around 90 cases we updated the asset splits in our data based on the responses received. We would like to thank those schemes and their advisers who engaged with us on this request for additional information.
- It is estimated that the number of schemes in the eligible universe was 5,063 as at 31 March 2023, a reduction from 5,131 as at 31 March 2022. The declining universe reflects such things as schemes winding up, merging, and entering PPF assessment.
- As in previous editions of *The Purple Book*, the bulk of the analysis uses funding with pension scheme liability values measured on an s179 basis. This is, broadly speaking, what would have to be paid to an insurance company to take on the payment of **PPF levels of compensation** (rather than full scheme benefits).
- The assets and liabilities shown in *The Purple Book* have been calculated through rolling forward from the latest s179 valuation. Over two-thirds of assets and liabilities at 31 March 2023 have been rolled forward from s179 valuations dated between April 2020 and March 2022.

Figure 2.1 | Distribution of schemes in the estimated eligible universe and *The Purple Book 2023* dataset, by size of scheme membership

The Purple Book 2023 sample covers 99.8% of the estimated PPF-eligible schemes.

Number of members	2–99	100–999	1,000–4,999	5,000–9,999	10,000+	Total
Estimated 2023 universe (number of schemes)	1,882	2,194	668	153	166	**5,063**
The Purple Book 2023 dataset (number of schemes)	1,875	2,190	667	153	166	**5,051**
The Purple Book 2023 dataset as a % of 2023 PPF-eligible DB universe	99.6%	99.8%	99.9%	100.0%	100.0%	**99.8%**

Source: PPF

Figure 2.2 | Distribution of assets, s179 liabilities, and members in *The Purple Book 2023* dataset as at 31 March 2023

Schemes with over 5,000 members make up six per cent of schemes in *The Purple Book 2023* dataset but almost 75 per cent of each of total assets, liabilities, and members.

Number of members	2–99	100–999	1,000–4,999	5,000–9,999	10,000+	Total
Assets (£bn)	14.8	124.8	230.9	175.1	858.7	**1,404.4**
s179 liabilities (£bn)	11.1	97.8	179.1	134.1	623.3	**1,045.5**
Number of members (000s)	80	760	1,507	1,079	5,504	**8,931**

Source: PPF

Note: the components may not sum to the total because of rounding.

Figure 2.3 | *The Purple Book* datasets

The universe has declined by one per cent over the year, similar to recent years. This reflects schemes winding up, scheme mergers and schemes transferring into the PPF.

Year	Estimated universe	*Purple Book* dataset	Number of members (m)
2006	7,751	5,772	14.0
2011	6,550	6,432	12.0
2016	5,886	5,794	10.9
2017	5,671	5,588	10.5
2018	5,524	5,450	10.4
2019	5,436	5,422	10.1
2020	5,327	5,318	9.9
2021	5,220	5,215	9.7
2022	5,131	5,131	9.6
2023	5,063	5,051	8.9

Source: PPF

Note: The increase in *The Purple Book* dataset from 2006 to 2011 is mainly a result of improvements to the design of the scheme return intended to permit better PPF validation procedures.

Figure 2.4 | Distribution of assets and s179 liabilities in *The Purple Book 2023* dataset by date of s179 valuation

Over two-thirds of assets and liabilities at 31 March 2023 have been rolled forward from s179 valuations dated between April 2020 and March 2022.

For *The Purple Book* we roll forward the assets and liabilities from the values featured in the latest s179 valuation, as submitted in the annual scheme returns. The following table shows the distribution of assets and liabilities (as at 31 March 2023) across the effective dates of the s179 valuations from which we have rolled them forward.

s179 valuation dated between	Number of schemes	Assets (£bn)	s179 liabilities (£bn)
01/10/2022 and 31/03/2023	15	6.8	5.6
01/04/2022 and 30/09/2022	230	36.5	28.0
01/04/2021 and 31/03/2022	1,466	435.6	332.3
01/04/2020 and 31/03/2021	1,630	529.7	379.9
31/03/2005 and 31/03/2020	1,710	395.9	299.6
Total	**5,051**	**1,404.4**	**1,045.5**

Source: PPF

Note: some components may not sum to their totals because of rounding.

1 One individual can have multiple memberships (for example of different pension schemes). Hence the number of members exceeds the number of individuals.

03

Scheme demographics

This chapter looks at trends in scheme status and member status.

Schemes can be:

- open to new members;
- closed to new members but open to new benefit accrual;
- closed to new members and new benefit accrual; or
- winding up.

Members may be actively accruing benefits, deferred, or retired.

Summary

This chapter describes the dataset used for this year's edition of *The Purple Book* and includes some comparisons with data from previous years. We include figures for the total number of schemes and total scheme membership, with breakdowns by scheme size, scheme status, and member status.

How we categorise schemes has varied in previous editions of *The Purple Book* as more informative breakdowns became available. For more detailed information, see the appendix. Scheme status data presented in *The Purple Book 2023* is based on the data reported to TPR in the scheme returns. TPR is in the process of reviewing and enhancing its analytical methodology to confirm scheme status submitted. This is likely to lead to some changes in the scheme status proportions in next year's Purple Book.

Some statistics from this chapter are summarised in the following table:

	Date of *The Purple Book*	
	31 March 2023	31 March 2022
Number of schemes in *The Purple Book* dataset	**5,051**	5,131
Proportion of schemes that are:		
Open to new members	**9%**	10%
Closed to new members (but open to new benefit accrual)	**36%**	38%
Closed to new benefit accrual	**52%**	51%
Winding up	**3%**	2%
Number of members covered by schemes in *The Purple Book* dataset, of which:	**8.9m**	9.6m
Pensioner members	**45%**	43%
Deferred members	**47%**	47%
Active members (still accruing benefits)	**8%**	10%

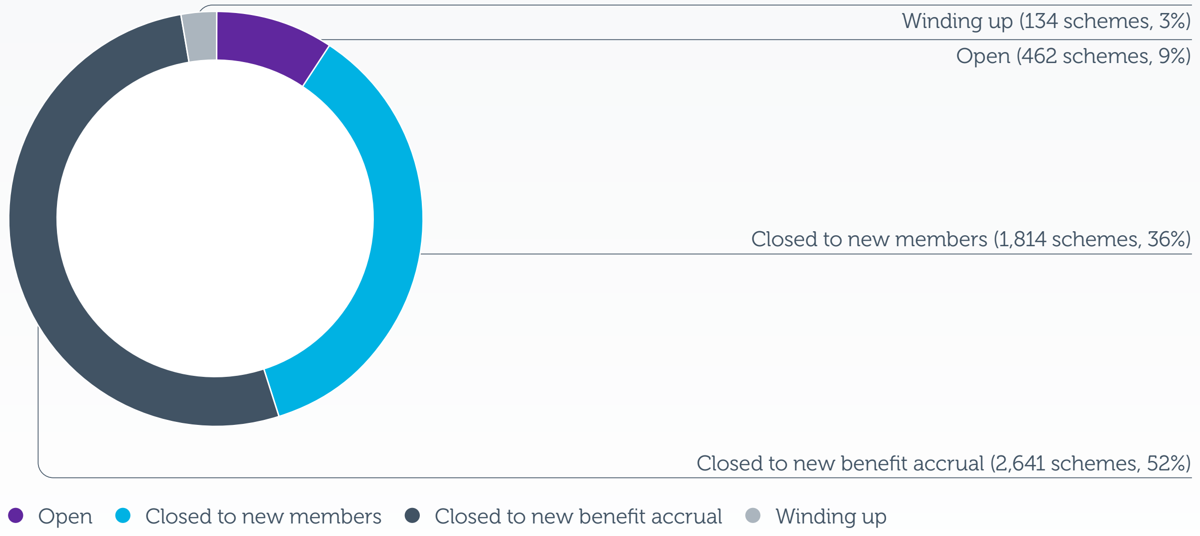
Note: the percentages may not sum to 100 per cent because of rounding.

- The number of active members has continued to fall and is now around 0.7 million. This is around 20 per cent of the number in the first *Purple Book* dataset in 2006.
- The gradual trend of schemes closing to both new members and new benefit accrual has continued and now accounts for more than half of all schemes (52 per cent). This compares with 12 per cent in *The Purple Book* dataset in 2006.
- 75 per cent of schemes have assets of less than £100 million.

Scheme status

Figure 3.1 | Distribution of schemes by scheme status

Less than 10 per cent of schemes are open to new members.

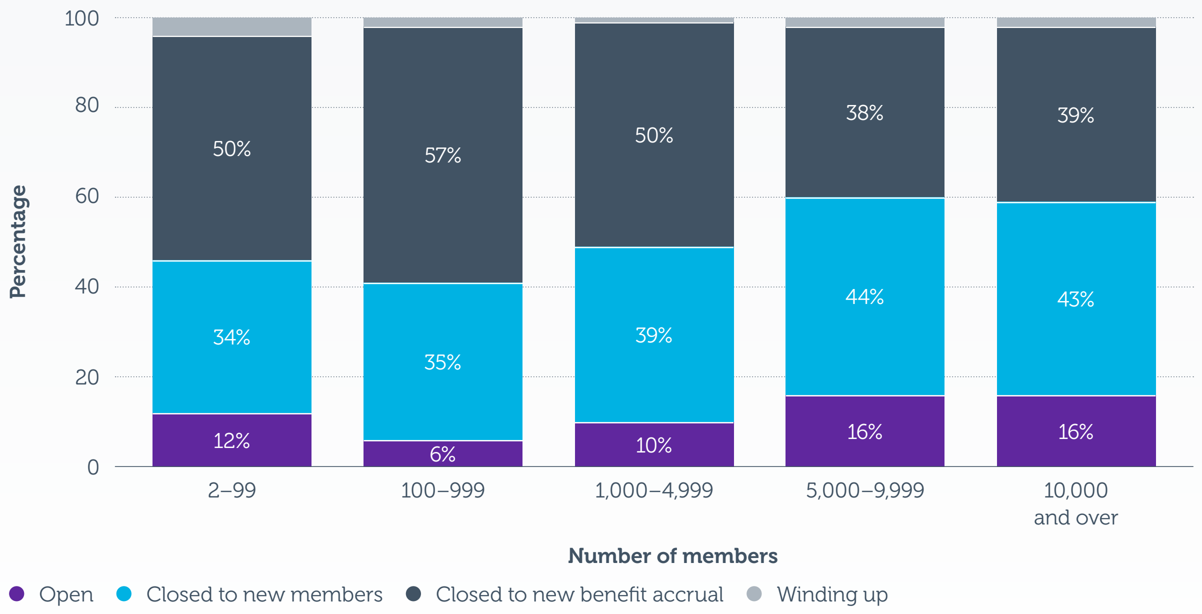


Source: PPF

Note: the percentages may not sum to 100 per cent because of rounding.

Figure 3.2 | Distribution of schemes by scheme status and member group

Large schemes are more likely to be open to new members or new benefit accrual.



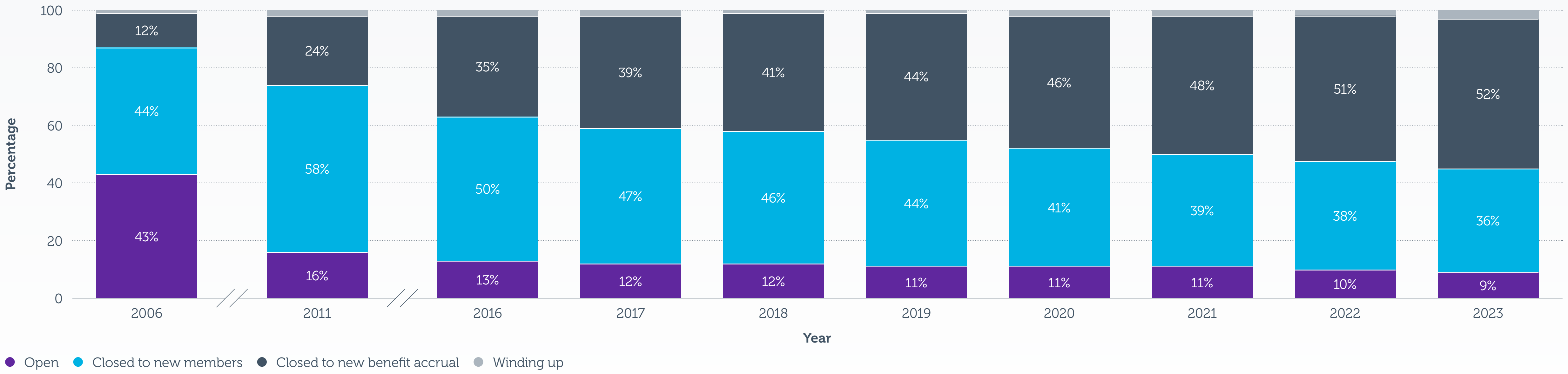
Source: PPF

Note: the percentages may not sum to 100 per cent because of rounding.

Scheme demographics continued

Figure 3.3 | Distribution of schemes by scheme status and year

The trend of schemes closing to new benefit accrual has continued, with this status now covering more than 50 per cent of schemes.

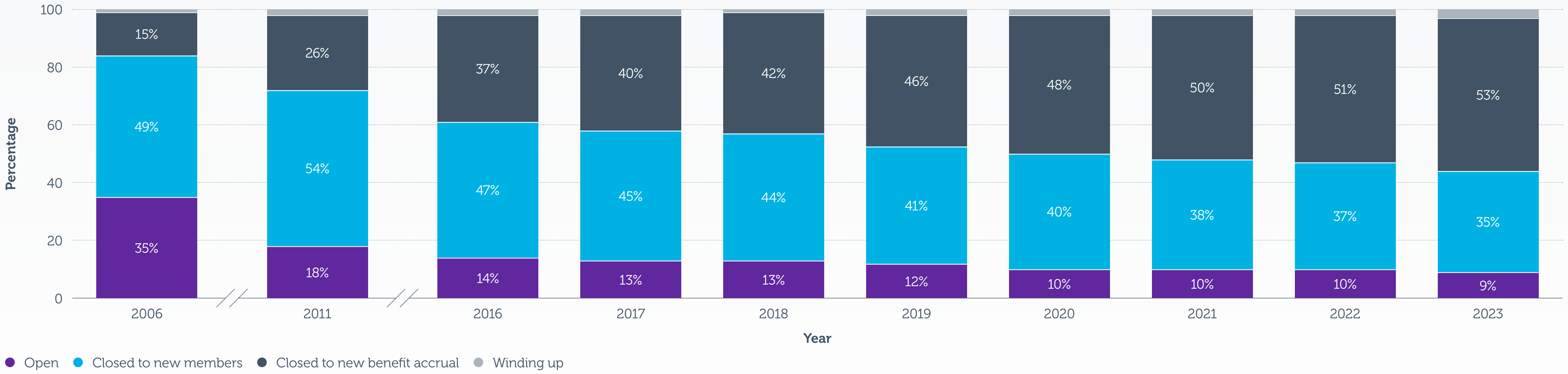


Source: PPF

Note: the percentages may not sum to 100 per cent because of rounding.

Figure 3.4 | Distribution of schemes by scheme status and year (excluding hybrid schemes[1])

The distribution of schemes by scheme status in *The Purple Book 2023* dataset is similar whether or not hybrid schemes are excluded.



Source: PPF

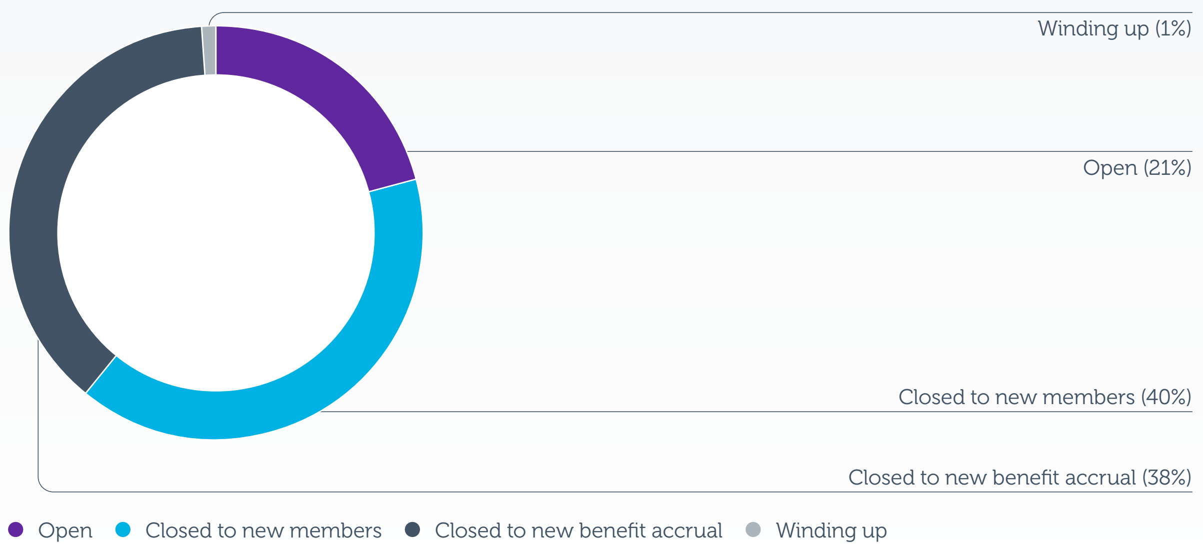
Note: the percentages may not sum to 100 per cent because of rounding.

1 A hybrid scheme is one that provides defined benefit (DB) and defined contribution (DC) benefits. The treatment of such schemes has varied in past editions of *The Purple Book* as better data has become available (see the appendix for a detailed explanation). At present we define a scheme as closed if the DB section is closed, even if the DC section remains open.

Scheme status and scheme members

Figure 3.5 | Distribution of members by scheme status

Around 61 per cent of members are in schemes that have new benefit accrual.



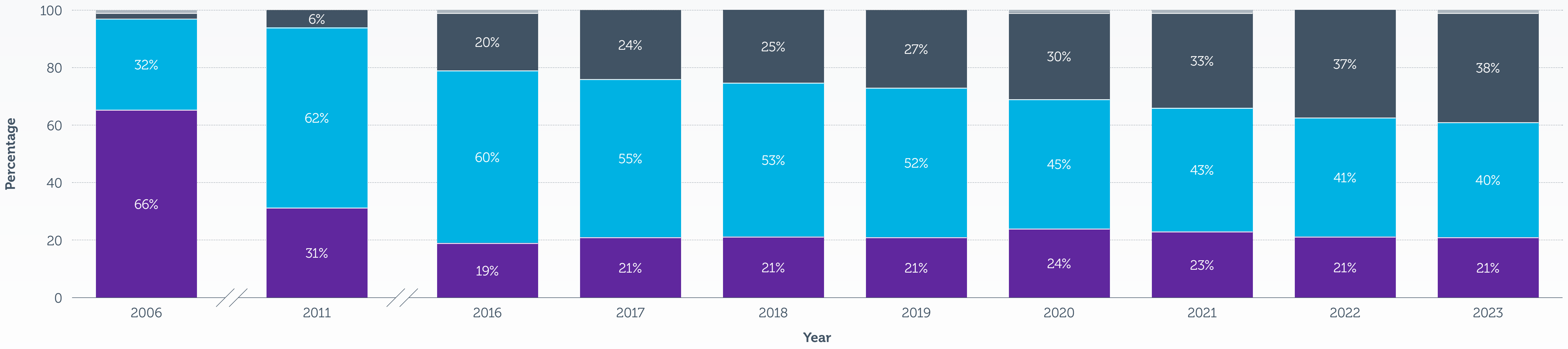
Source: PPF

Note: the percentages may not sum to 100 per cent because of rounding.

Scheme demographics continued

Figure 3.6 | Distribution of members by scheme status and year

The proportion of members in open schemes has stabilised in recent years following a significant decline between 2006 and 2016.



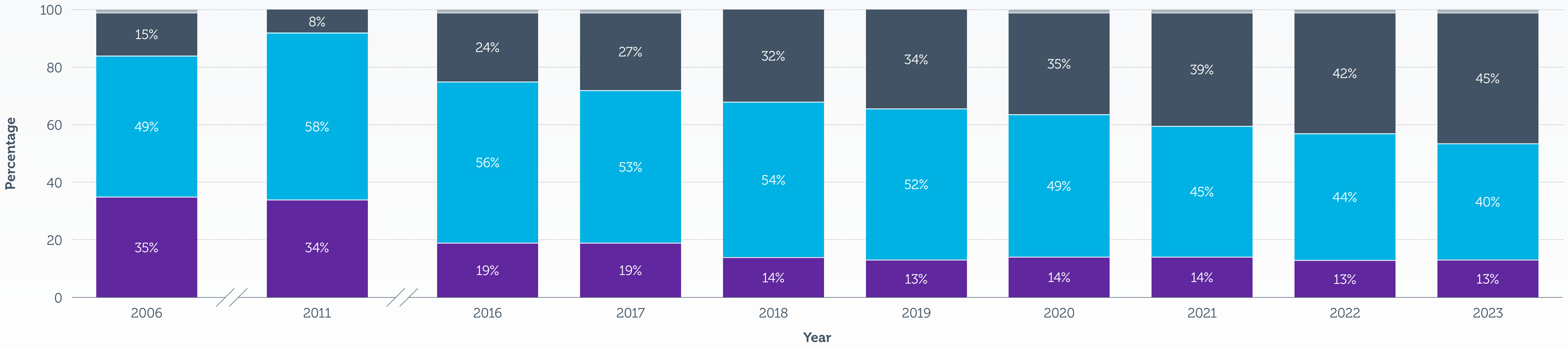
● Open ● Closed to new members ● Closed to new benefit accrual ● Winding up

Source: PPF

Note: the percentages may not sum to 100 per cent because of rounding.

Figure 3.7 | Distribution of members by scheme status and year (excluding hybrid schemes)

Excluding hybrid schemes has a notable effect on the distribution of members by scheme status in *The Purple Book 2023* dataset. This is partly due to one very large open scheme having a hybrid status.



● Open ● Closed to new members ● Closed to new benefit accrual ● Winding up

Source: PPF

Note: the percentages may not sum to 100 per cent because of rounding.

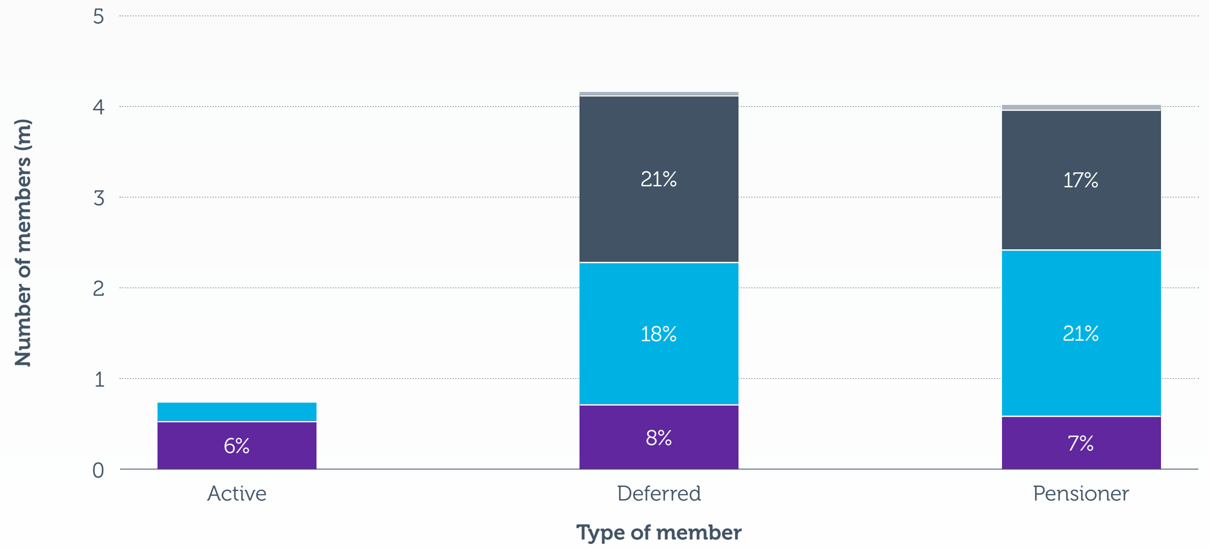
Scheme membership

Figure 3.8 | Number and distribution of members by member type and scheme status as at 31 March 2023

Only 8 per cent of members are accruing new benefits.

Number (000s)/%	Open	Closed to new members	Closed to new benefit accrual	Winding up	All
Active members	535.8	200.6	–	–	736.5
	6%	2%	0%	0%	8%
Deferred members	720.4	1,570.3	1,839.2	37.7	4,167.5
	8%	18%	21%	0%	47%
Pensioner members	594.5	1,839.7	1,543.3	49.1	4,026.6
	7%	21%	17%	1%	45%
Total	**1,850.8**	**3,610.5**	**3,382.5**	**86.8**	**8,930.6**
	21%	**40%**	**38%**	**1%**	**100%**

Note: the percentages may not sum to 100 per cent and the components may not sum to their totals because of rounding.



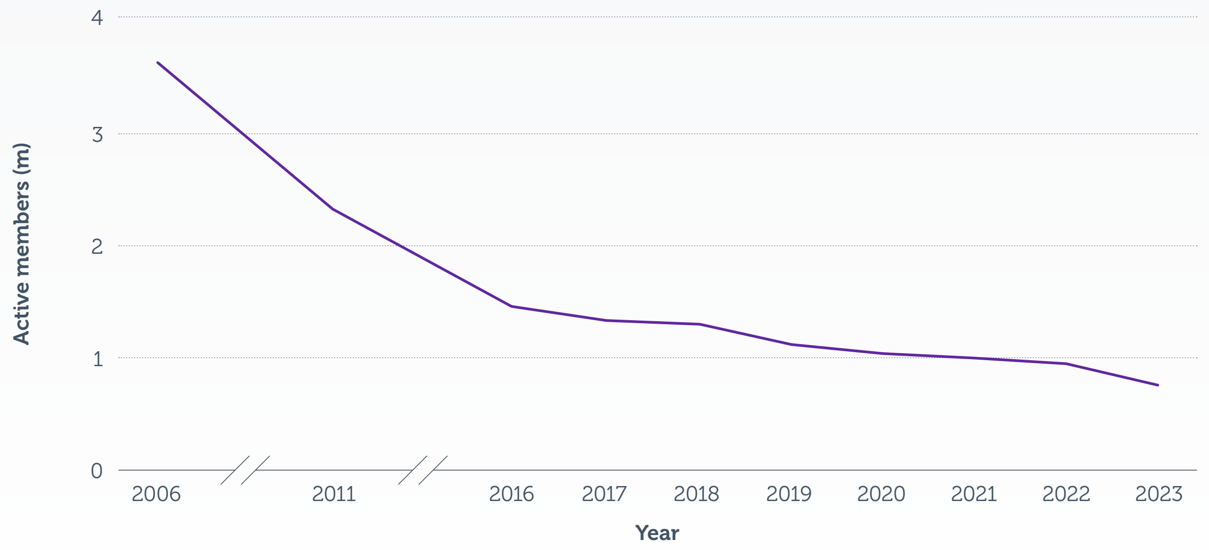
● Open ● Closed to new members ● Closed to new benefit accrual ● Winding up

Source: PPF

Scheme demographics continued

Figure 3.9 | Active members in *The Purple Book* datasets

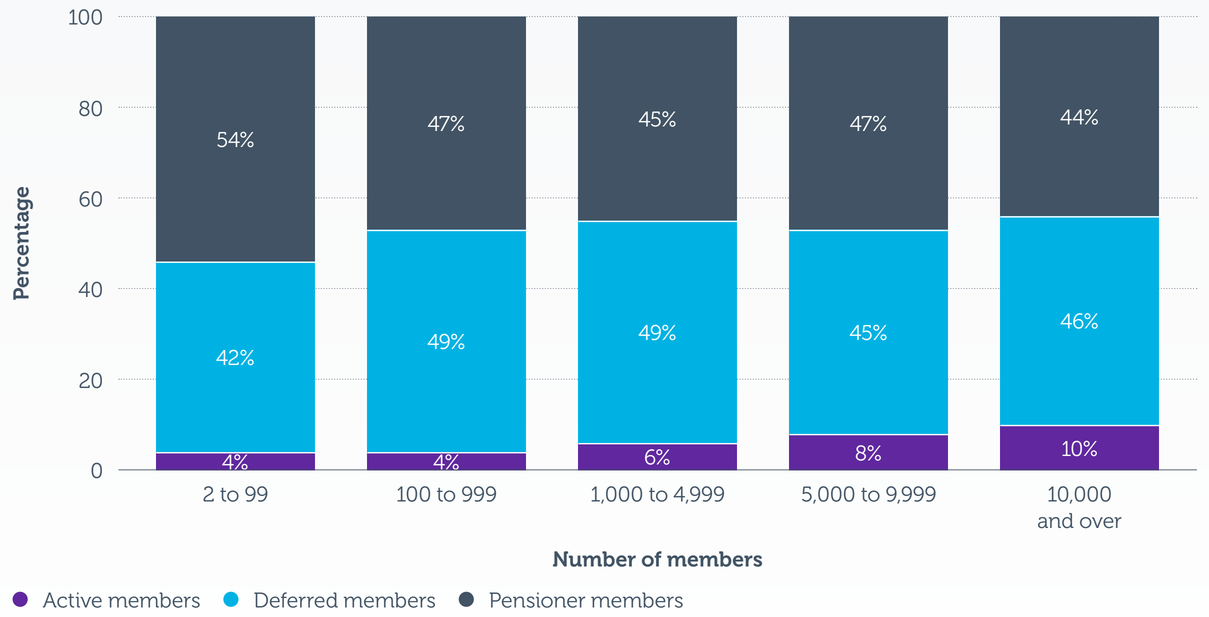
The number of active members has decreased to around 0.7 million, around 20 per cent of the number in the first *Purple Book* dataset in 2006.



Source: PPF

Figure 3.10 | Distribution of member type by scheme membership size

The proportion of active members increases as scheme membership size increases.

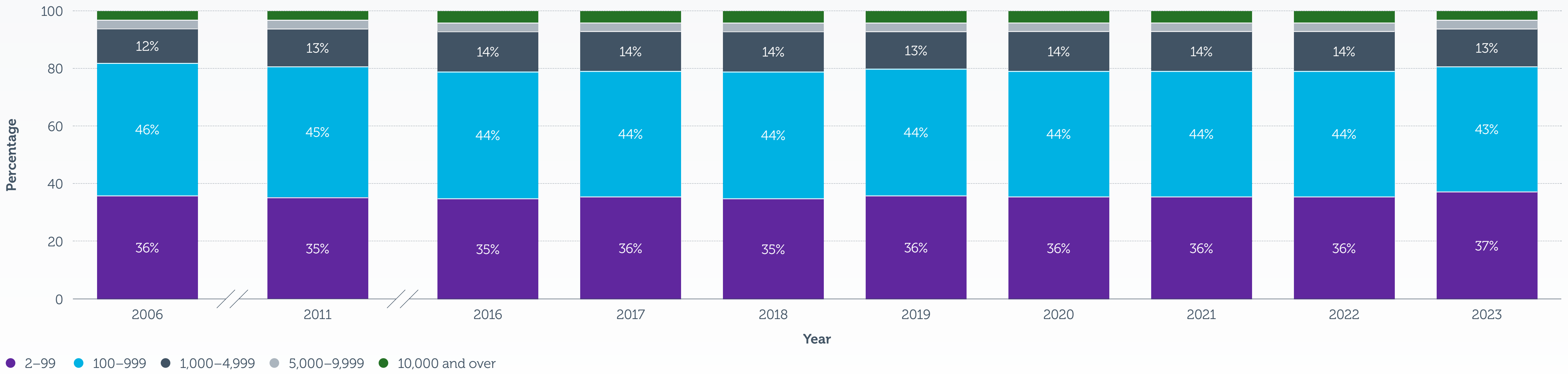


Source: PPF

Note: the percentages may not sum to 100 per cent because of rounding.

Figure 3.11 | Proportion of schemes by scheme membership size, by year

The distribution of schemes by scheme membership size has remained relatively stable over time, suggesting that there is little correlation between scheme size and removal from the eligible universe.



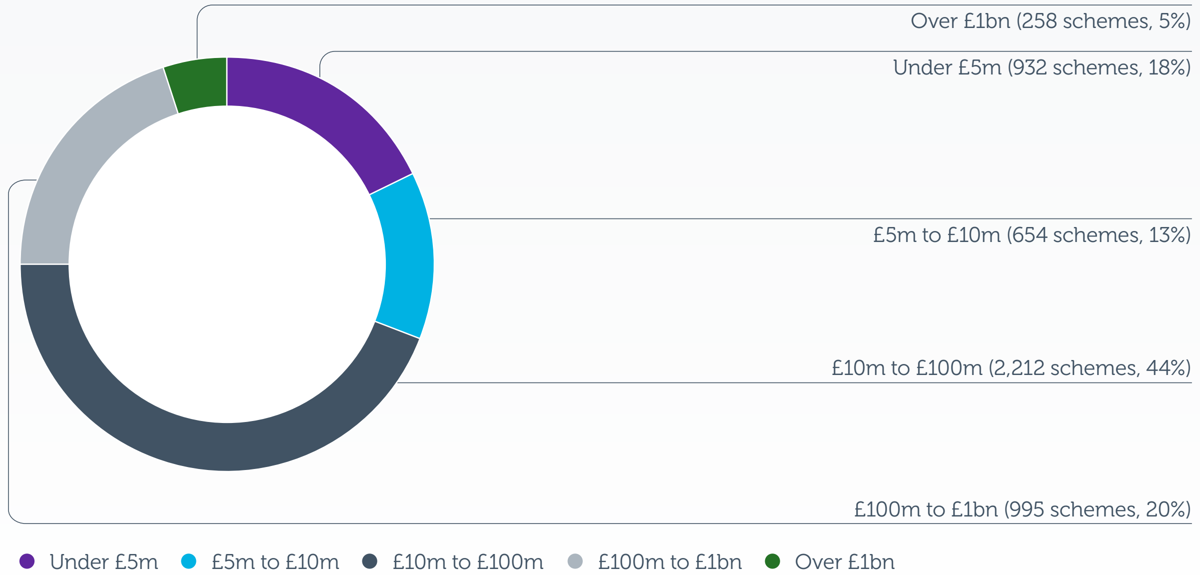
Source: PPF

Note: the percentages may not sum to 100 per cent because of rounding.

Asset size

Figure 3.12 | Distribution of schemes by asset size

75 per cent of schemes have assets of less than £100 million.



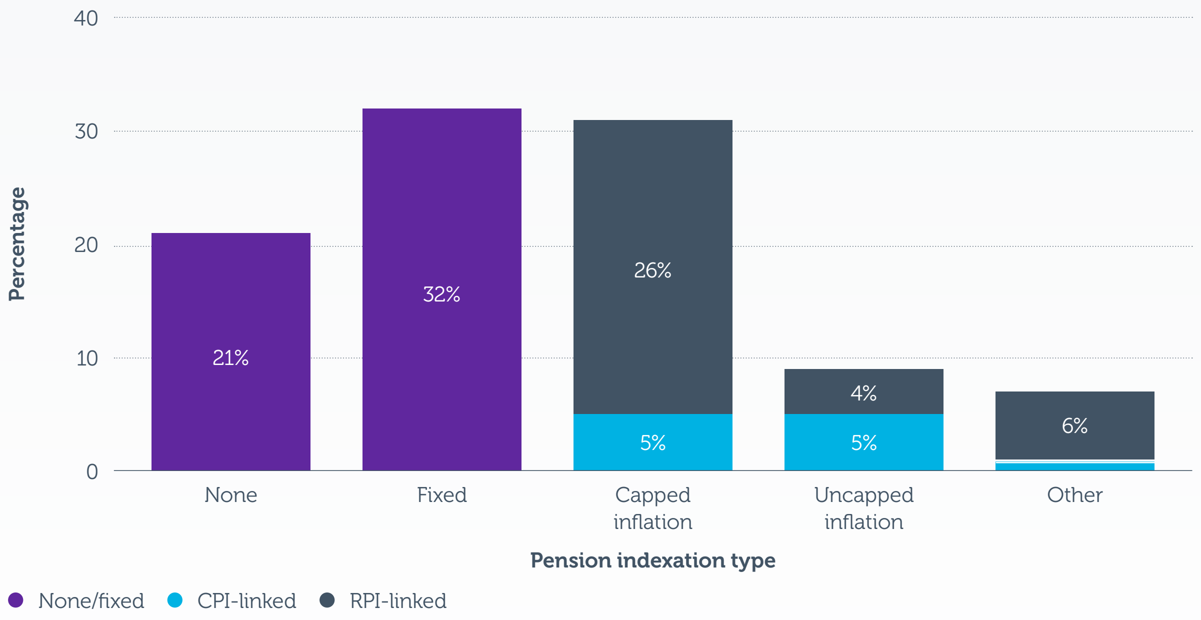
Source: PPF

Scheme demographics continued

Pension indexation types

Figure 3.13 | Pension indexation types for scheme benefits accrued before 6 April 1997

More than three quarters of schemes provide indexation on scheme benefits accrued before 6 April 1997.

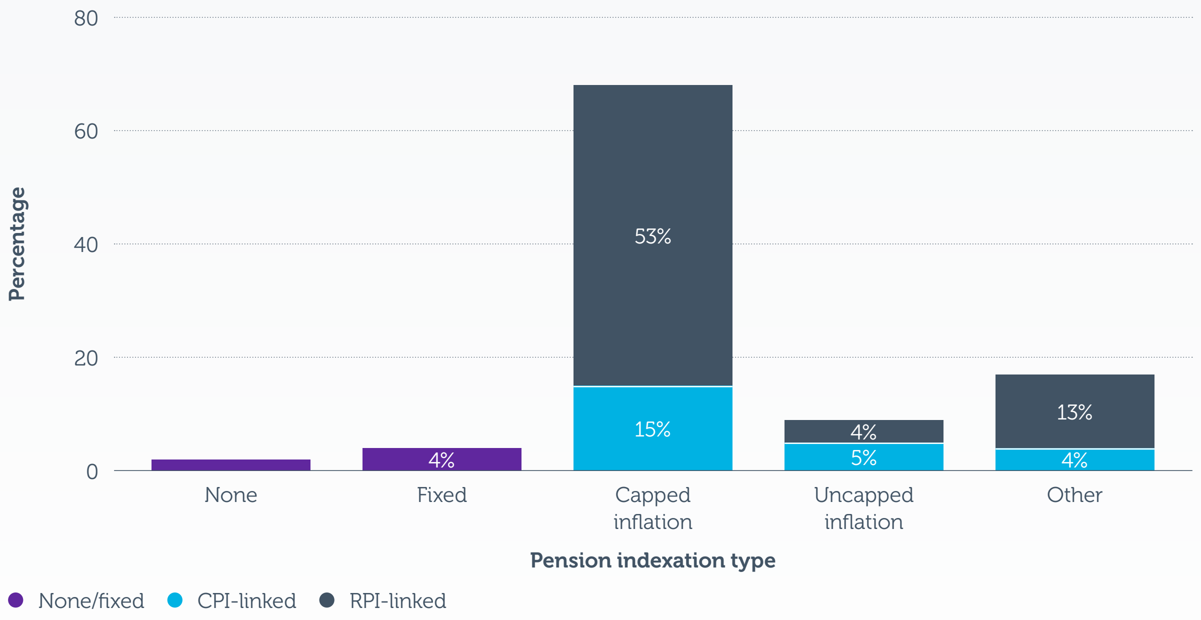


Source: PPF

The PPF pays increases in payment to compensation accrued after 5 April 1997. This is based on the Consumer Prices Index (CPI) and is capped at 2.5 per cent a year.

Figure 3.14 | Pension indexation types for scheme benefits accrued after 5 April 1997

Around two thirds of schemes provide indexation of capped inflation on scheme benefits accrued after 5 April 1997. For the vast majority of these schemes, the inflation cap is five per cent a year.



Source: PPF

Notes: the information contained in figures 3.13 and 3.14 is based on scheme return data provided by schemes, where the scheme return specifies that in cases where there is more than one rate of indexation, the rate applying to the largest proportion of protected liabilities should be submitted.

Most of the schemes with no pension indexation don't have any scheme benefits that were accrued after 5 April 1997, or they are cash balance schemes.

04

Scheme funding

This chapter looks at how well funded schemes are, and trends and scheme funding by scheme size, status, and maturity.

Summary

This chapter covers funding on an s179 basis as at 31 March 2023, which is based on version A10[1] of the s179 assumptions. This is the same version used in last year's *Purple Book*. We process funding information supplied in scheme returns submitted to TPR so that we can estimate the funding ratios at a common date, allowing consistent totals to be used. Specifically, we roll forward the values of assets and liabilities to the effective date of *The Purple Book* from the schemes' s179 valuations. Our roll-forward methodology is designed to be approximate in nature. Importantly, there are a couple of key limitations:

- The roll-forward does not take account of benefits paid out to members since the s179 valuation dates. This means the roll-forward will overstate the value of both the assets and the liabilities.
- Assets are rolled forward according to changes in a small set of market indices, although in many cases we take account of the more recent (than the s179 valuations) asset splits provided in the scheme return data.

More details of the methodology are available in the appendix.

In *The Purple Book*, we add Deficit-Reduction Contributions (DRCs) due up to 31 March 2023, as submitted for levy purposes, to the asset values in s179 valuations.

A scheme that is 100 per cent funded on an s179 basis has broadly enough assets to pay an insurance company to take on the scheme with PPF levels of compensation.

In addition, we consider estimated full buy-out funding information in this chapter. We've calculated this using the same valuation assumptions and underlying data as for the s179 calculations. We then make an approximate allowance for the difference between the PPF level of compensation and full scheme benefits.

Some of the statistics summarising these calculations are shown below:

Item	*The Purple Book* 31 March 2023	*The Purple Book* 31 March 2022
Net s179 funding position (£bn)	**358.9 surplus**	193.0 surplus
s179 liabilities (£bn)	**1,045.5**	1,473.9
Assets (£bn)	**1,404.4**	1,666.9
Funding ratio:		
s179 basis	**134.3%**	113.1%
Estimated full buy-out basis	**111.9%**	79.2%

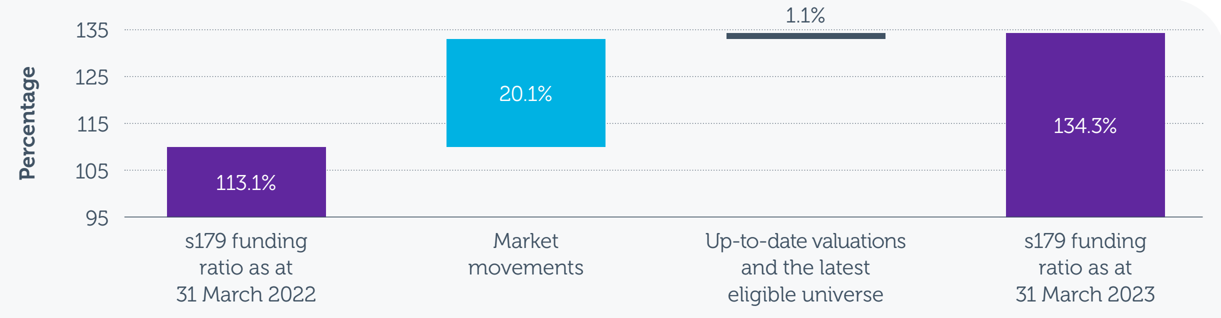
The following table sets out how some of the market indicators used to assess and roll forward pension scheme assets and s179 liabilities have changed over the year:

Market indicator	Change over the year to 31 March 2023
10-year fixed interest gilt yield	1.91pp
15-year fixed interest gilt yield	1.98pp
20-year fixed interest gilt yield	2.04pp
5–15-year index-linked gilt yield	2.56pp
FTSE All-Share Index (TR)	2.92%
FTSE All-World Ex-UK Index (TR)	-1.15%

pp = percentage point(s).
TR = Total Return.

1 More detail of the s179 assumptions is available on our website: https://www.ppf.co.uk/trustees-advisers/valuation-guidance.

The change in the aggregate s179 funding ratio over the year is a result of market movements and new data, as shown in the following chart.



- The 21.2 percentage point increase in the s179 funding ratio over the year to 31 March 2023 can be broken down as follows:
  - A 20.1 percentage point increase from market movements. Large increases in gilt yields over the year caused total liabilities to decrease.
  - An increase of 1.1 percentage points from adopting the new *Purple Book 2023* dataset, which includes more up-to-date scheme valuations.
- The s179 funding ratio as at 31 March 2023 is over 37 percentage points higher than the 97 per cent disclosed in the first *Purple Book* as at 31 March 2006. Total assets and liability values remain significantly larger in 2023 than 2006 for reasons including:
  - Large increases in assets from increases in equity values (UK and global indices are around 150 per cent and 340 per cent higher in 2023 than 2006, respectively), increases in bond values and DRCs, offset to some extent by schemes that have left the PPF universe.
  - While gilt yields have increased substantially since March 2022, they remain lower than their levels in March 2006. Together with longer life expectancies this means higher liability values but, again, offset to some extent by schemes that have left the PPF universe.
- The proportions of s179 liabilities relating to pensioners and active members are 54 per cent and 13 per cent, respectively. This is a historical high for pensioners and low for actives, consistent with an ever-maturing DB universe.

Overall funding

Figure 4.1 | Key funding statistics as at 31 March 2023

The net s179 funding position of the schemes in *The Purple Book 2023* dataset as at 31 March 2023 was a surplus of £358.9 billion, corresponding to a funding ratio of 134.3 per cent.

	s179	Estimated full buy-out
Total number of schemes	5,051	5,051
Total assets (£bn)	1,404.4	1,404.4
Total liabilities (£bn)	1,045.5	1,254.8
Net funding position (£bn)	358.9	149.5
Aggregate funding ratio	134.3%	111.9%
Number of schemes in deficit	799	1,888
Number of schemes in surplus	4,252	3,163
Net funding position for schemes in deficit (£bn)	-8.2	-50.2
Net funding position for schemes in surplus (£bn)	367.1	199.7

Source: PPF
Note: the component figures may not sum to the total because of rounding.

Scheme funding continued

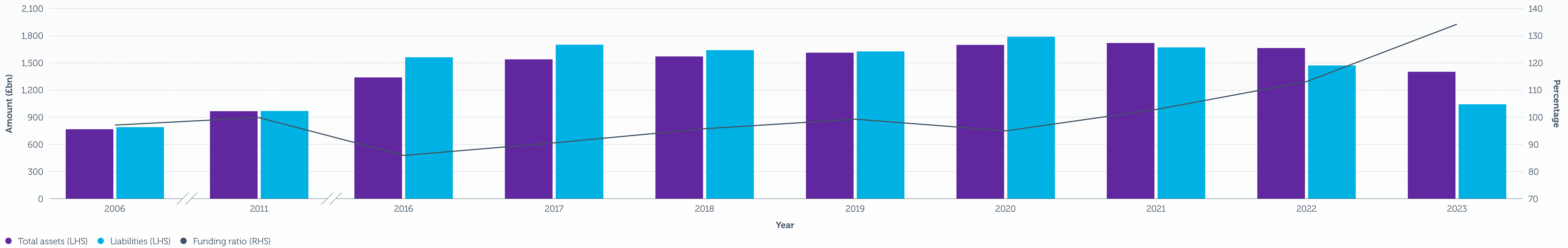
Figure 4.2 | Current and historical funding figures on an s179 basis

The aggregate s179 funding ratio improved by 21.2 percentage points over the year to 31 March 2023 to a record high of 134.3 per cent. The deficit of schemes in deficit improved from £61.1 billion to £8.2 billion.

			s179 liabilities				
Year	Number of schemes	Total assets (£bn)	Liabilities (£bn)	Net funding position (£bn)	Aggregate funding ratio	Deficit of schemes in deficit (£bn)	Surplus of schemes in surplus (£bn)
2006	7,751	769.5	792.2	-22.7	97.1%	-76.3	53.5
2011	6,432	968.5	969.7	-1.2	99.9%	-78.3	77.1
2016	5,794	1,341.4	1,563.1	-221.7	85.8%	-273.5	51.8
2017	5,588	1,541.1	1,702.9	-161.8	90.5%	-246.7	84.9
2018	5,450	1,573.3	1,643.8	-70.5	95.7%	-187.6	117.1
2019	5,422	1,615.3	1,628.0	-12.7	99.2%	-159.8	147.1
2020	5,318	1,700.6	1,791.3	-90.7	94.9%	-229.1	138.4
2021	5,215	1,720.7	1,673.8	46.9	102.8%	-128.5	175.3
2022	5,131	1,666.9	1,473.9	193.0	113.1%	-61.1	254.1
2023	5,051	1,404.4	1,045.5	358.9	134.3%	-8.2	367.1

Note: the component figures may not sum to the total because of rounding.

The aggregate s179 funding ratio as at 31 March 2023 is around 37 percentage points higher than as at 31 March 2006. In that time, liability values have increased by around £250 billion, and assets have almost doubled.



Source: PPF

Scheme funding continued

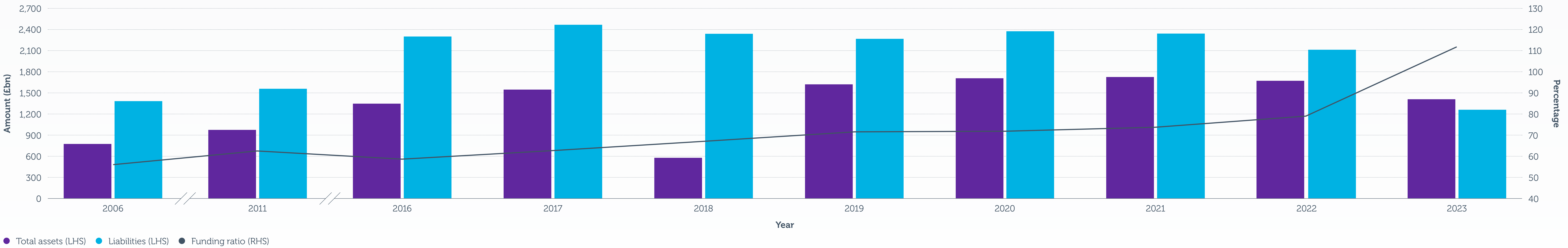
Figure 4.3 | Current and historical funding figures on an estimated full buy-out basis

The aggregate estimated full buy-out funding ratio has gone over 100% for the first time. This is due to a drop in inflation expectations, having a larger impact on buy-out liabilities relative to s179.

		Estimated full buy-out		
Year	Total assets (£bn)	Liabilities (£bn)	Net funding position (£bn)	Aggregate funding ratio
2006	769.5	1,376.7	-607.2	55.9%
2011	968.5	1,551.8	-583.3	62.4%
2016	1,341.4	2,293.1	-951.7	58.5%
2017	1,541.1	2,461.7	-920.6	62.6%
2018	1,573.3	2,332.0	-758.7	67.5%
2019	1,615.3	2,260.3	-644.9	71.5%
2020	1,700.6	2,369.1	-668.5	71.8%
2021	1,720.7	2,335.9	-615.3	73.7%
2022	1,666.9	2,105.3	-438.4	79.2%
2023	1,404.4	1,254.8	149.5	111.9%

Note: the component figures may not sum to the total because of rounding.

Since 2006, there has been a significant increase in the aggregate estimated full buy-out funding ratio, from 55.9 per cent to 111.9 per cent as at 31 March 2023.



Source: PPF

The s179 funding ratio has increased significantly over time from 97.1 per cent as at 31 March 2006 to 134.3 per cent as at 31 March 2023. The estimated full buy-out funding ratio has also increased significantly over the same period, from 55.9 per cent as at 31 March 2006 to 111.9 per cent at 31 March 2023. In each case there has been a particularly sharp improvement in the last year.

Scheme funding continued

Analysis of funding by scheme membership size

Figure 4.4 | s179 funding ratios by size of scheme membership as at 31 March 2023

The best funded schemes sit at opposite ends of the size spectrum. An aggregate s179 funding ratio of 137.8 per cent for schemes with more than 10,000 members and 133% for schemes with less than 100 members.

Scheme size (members)	Number of schemes	Total assets (£bn)	Liabilities (£bn)	Net funding position (£bn)	Aggregate funding ratio	Simple average funding ratio*
2 to 99	1,875	14.8	11.1	3.7	133.0%	130.9%
100 to 999	2,190	124.8	97.8	27.0	127.6%	124.0%
1,000 to 4,999	667	230.9	179.1	51.8	128.9%	125.2%
5,000 to 9,999	153	175.1	134.1	41.0	130.6%	128.2%
10,000 and over	166	858.7	623.3	235.4	137.8%	134.8%
Total	**5,051**	**1,404.4**	**1,045.5**	**358.9**	**134.3%**	**127.2%**

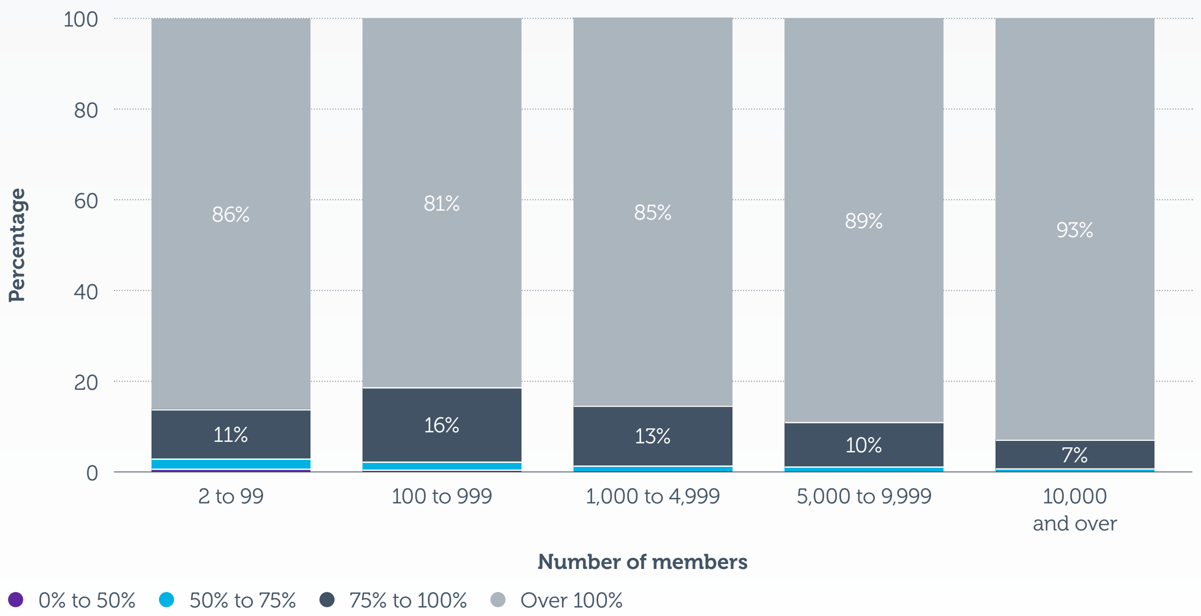
Source: PPF

Note: the component figures may not sum to the total because of rounding.

* Whereas aggregate funding ratios are determined by comparing the total assets and liabilities for all schemes, the simple average funding ratio is the average of all of the schemes' individual funding ratios. Note that 57 schemes with funding ratios over 200 per cent (on an estimated full buy-out measure) were excluded from the simple averages to avoid distortions. These schemes had total assets of £6.2 billion.

Figure 4.5 | Distribution of s179 funding ratios by size of scheme membership as at 31 March 2023

Schemes with between 100 and 999 members have the largest proportion of funding ratios below 100%.



Source: PPF

Note: the percentages in each column may not sum to 100 per cent because of rounding.

Figure 4.6 | Estimated full buy-out levels by size of scheme membership as at 31 March 2023

The very largest and very smallest schemes are the best funded on an estimated full buy-out measure.

Members (number)	Number of schemes	Total assets (£bn)	Liabilities (£bn)	Net funding position (£bn)	Aggregate funding ratio	Simple average funding ratio*
2 to 99	1,875	14.8	13.0	1.8	113.8%	112.1%
100 to 999	2,190	124.8	116.1	8.8	107.6%	105.5%
1,000 to 4,999	667	230.9	212.9	18.0	108.4%	106.0%
5,000 to 9,999	153	175.1	160.0	15.1	109.5%	108.3%
10,000 and over	166	858.7	752.9	105.9	114.1%	113.0%
Total	**5,051**	**1,404.4**	**1,254.8**	**149.5**	**111.9%**	**108.3%**

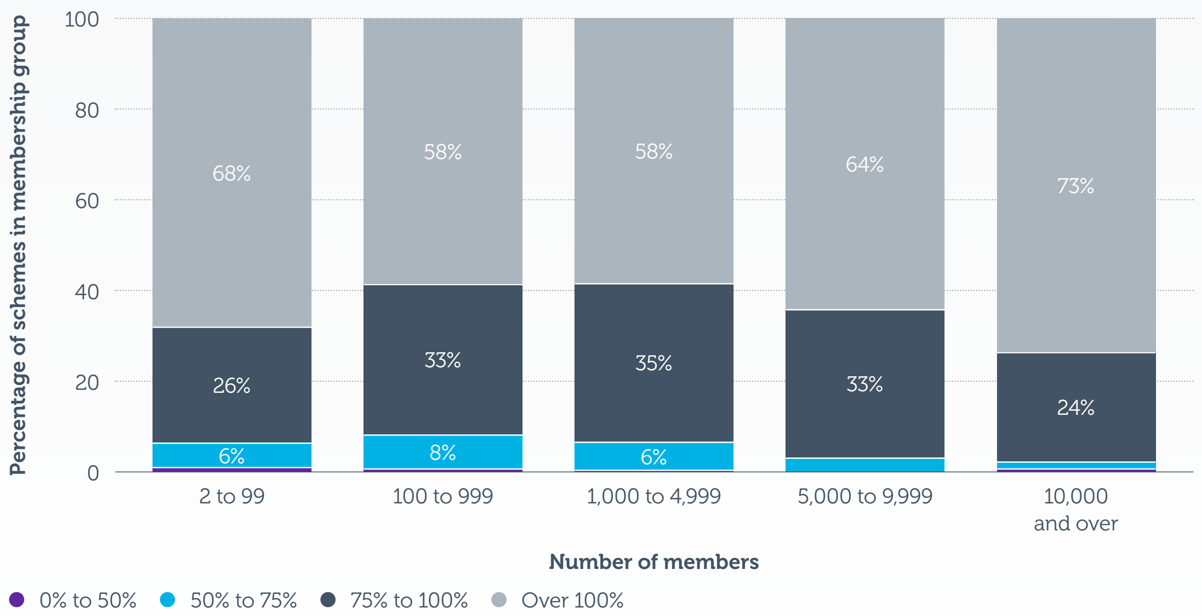
Source: PPF

Note: the component figures may not sum to the total because of rounding.

* 57 schemes with funding ratios over 200 per cent (on an estimated full buy-out measure) were excluded from the simple averages to avoid distortions. These schemes had total assets of £6.2 billion.

Figure 4.7 | Distribution of estimated full buy-out funding ratios by size of scheme membership as at 31 March 2023

A majority of schemes had buy-out funding ratios of over 100 per cent.



Source: PPF

Note: the percentages in each column may not sum to 100 per cent because of rounding.

Analysis of funding by scheme maturity

Maturity is measured here as the percentage of the scheme liabilities relating to pensioners.

Figure 4.8 | Analysis of s179 funding ratios by scheme maturity as at 31 March 2023

The least mature schemes have an aggregate s179 funding ratio that is around 19 percentage points higher than the most mature schemes.

Proportion of s179 liabilities relating to pensioners	Number of schemes	Total assets (£bn)	Liabilities (£bn)	Net funding position (£bn)	Aggregate funding ratio	Simple average funding ratio*
25% and less	473	43.1	28.4	14.7	151.8%	133.8%
Between 25% and 50%	1,831	515.4	392.4	123.0	131.4%	124.7%
Between 50% and 75%	2,217	745.7	549.1	196.6	135.8%	126.9%
Between 75% and 100%	530	100.2	75.6	24.6	132.5%	131.5%
Total	**5,051**	**1,404.4**	**1,045.5**	**358.9**	**134.3%**	**127.2%**

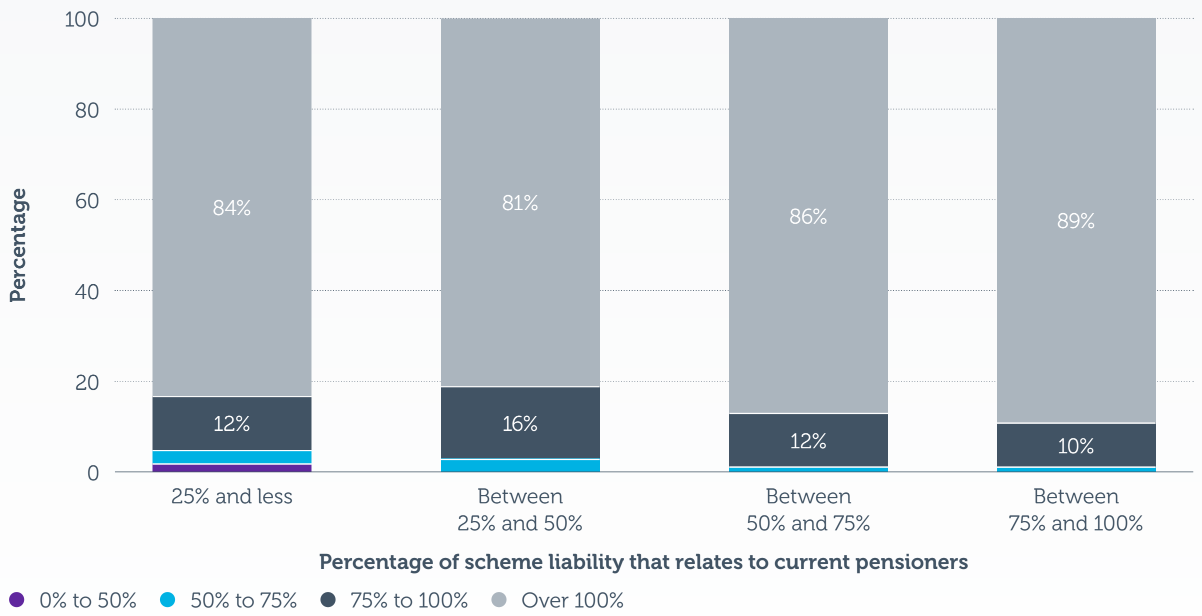
Source: PPF

Note: the components may not sum to the totals because of rounding.

* 57 schemes with funding ratios over 200 per cent (on an estimated full buy-out measure) were excluded from the simple averages to avoid distortions. These schemes had total assets of £6.2 billion.

Figure 4.9 | Distribution of funding ratios on an s179 basis by scheme maturity as at 31 March 2023

Over 80 per cent of schemes are overfunded on an s179 basis, regardless of scheme maturity.



Source: PPF

Note: the percentages in each column may not sum to 100 per cent because of rounding.

Scheme funding continued

Analysis of funding by scheme status

Figure 4.10 | Analysis of s179 funding ratios by scheme status as at 31 March 2023

Open schemes are around 11 percentage points worse funded than closed schemes, as measured by the aggregate s179 funding ratio.

Status	Number of schemes	Total assets (£bn)	Liabilities (£bn)	Net funding position (£bn)	Aggregate funding ratio	Simple average funding ratio*
Open	462	240.6	190.2	50.4	126.5%	130.4%
Closed to new members	1,814	685.1	498.0	187.2	137.6%	128.9%
Closed to new benefit accrual	2,641	463.5	347.1	116.4	133.5%	125.1%
Winding up	134	15.2	10.2	5.0	148.7%	135.3%
Total	**5,051**	**1,404.4**	**1,045.5**	**358.9**	**134.3%**	**127.2%**

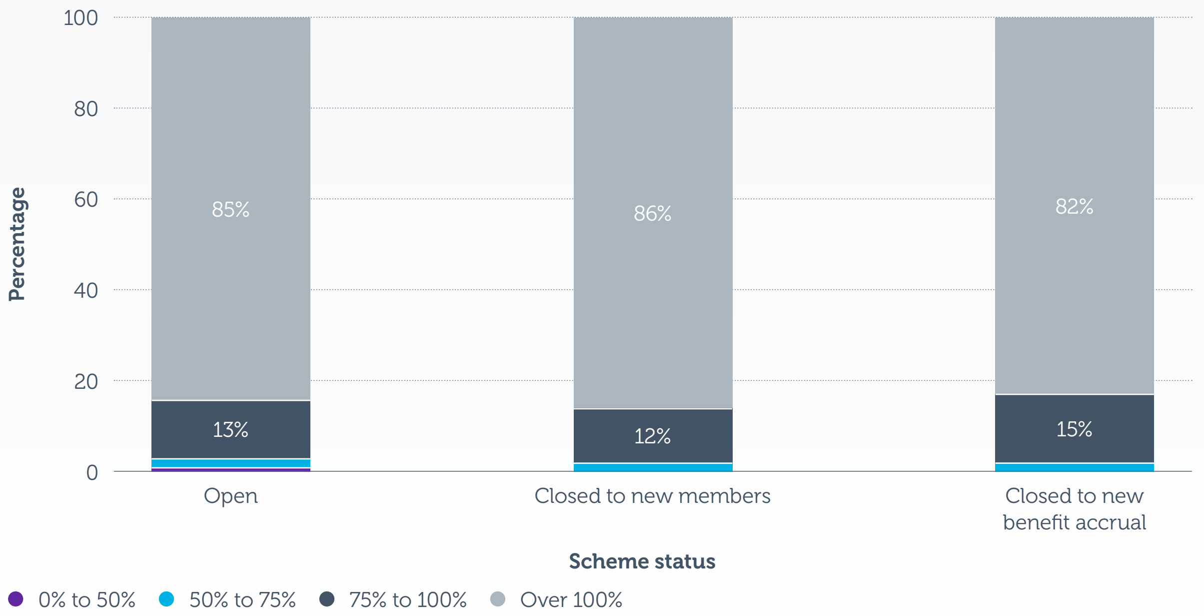
Source: PPF

Note: the component figures may not sum to the total because of rounding.

* 57 schemes with funding ratios over 200 per cent (on an estimated full buy-out measure) were excluded from the simple averages to avoid distortions. These schemes had total assets of £6.2 billion.

Figure 4.11 | Distribution of schemes by s179 funding ratios within scheme status groups as at 31 March 2023

Although on average open schemes are worse funded than schemes of other status type, there is little distinction in terms of the proportion over 100% funded.



Source: PPF

Note: the percentages may not sum to 100 per cent because of rounding.

Figure 4.12 | Analysis of estimated full buy-out funding ratios by scheme status as at 31 March 2023

Open schemes are around 10 percentage points worse funded than closed schemes, as measured by the aggregate buy-out funding ratio.

Status	Number of schemes	Total assets (£bn)	Liabilities (£bn)	Net funding position (£bn)	Aggregate funding ratio	Simple average funding ratio*
Open	462	240.6	231.1	9.5	104.1%	107.1%
Closed to new members	1,814	685.1	603.0	82.1	113.6%	109.6%
Closed to new benefit accrual	2,641	463.5	408.7	54.8	113.4%	107.3%
Winding up	134	15.2	12.0	3.2	126.6%	115.7%
Total	**5,051**	**1,404.4**	**1,254.8**	**149.5**	**111.9%**	**108.3%**

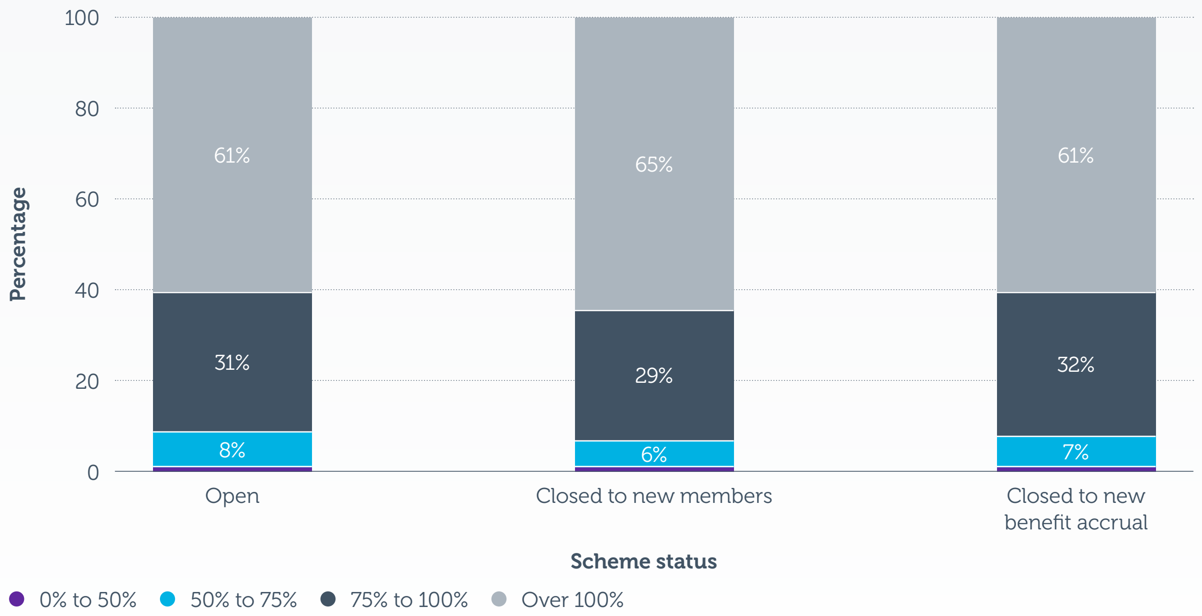
Source: PPF

Note: the component figures may not sum to the total because of rounding.

* 57 schemes with funding ratios over 200 per cent (on a full buy-out measure) were excluded from the simple averages to avoid distortions. All of these schemes were small, with total assets of £6.2 billion.

Figure 4.13 | Distribution of schemes by estimated full buy-out funding ratios within scheme status groups as at 31 March 2023

Over 60 per cent of schemes are overfunded on an estimated full buy-out basis, regardless of scheme maturity.



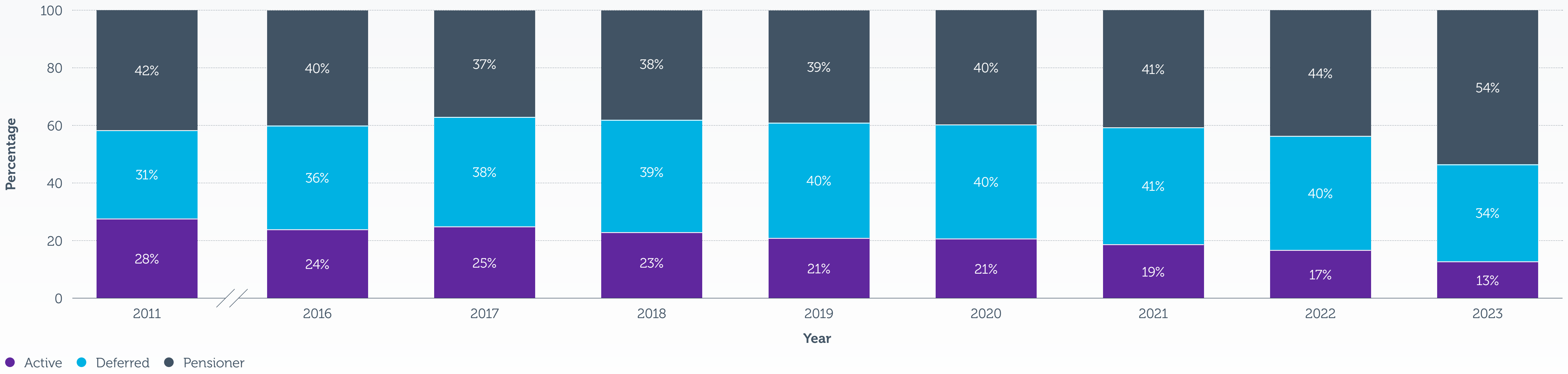
Source: PPF

Note: the percentages in each column may not sum to 100 per cent because of rounding.

Scheme funding continued

Figure 4.14 | s179 liabilities by member status in current and historical *Purple Book* datasets

The proportion of liabilities that relates to active members has reduced by 15 percentage points over the last 12 years.



Source: PPF

Note: the percentages in each column may not sum to 100 per cent because of rounding.

05

Funding sensitivities

This chapter looks at factors affecting scheme funding levels, including changes in equity prices, gilt yields and life expectancy.

Summary

- This chapter shows how the funding of DB schemes and markets has changed since 2006, and how the funding of DB schemes at 31 March 2023 would change as a result of plausible changes in markets and life expectancy.

The following sections cover:

- The historical changes in s179 scheme funding since 2006. The series in this section take the estimated funding position at 31 March in previous years' editions of *The Purple Book*.
- Various funding sensitivities. All of these are on an s179 basis, taking the funding position as at 31 March 2023[1] as the base and using *The Purple Book 2023* dataset.

Change in s179 funding position over time

- Both the historical net funding position and funding ratio had been broadly trending downwards between March 2006 and August 2016. This trend has subsequently reversed and both measures are now higher than the levels they were as at 31 March 2006, with a net funding position of £358.9 billion as at 31 March 2023.
- The proportion of schemes in deficit on an s179 basis reached 16 per cent in March 2023. This is 18 percentage points lower than the historical low of 34 per cent in March 2022.

Funding sensitivities as at 31 March 2023

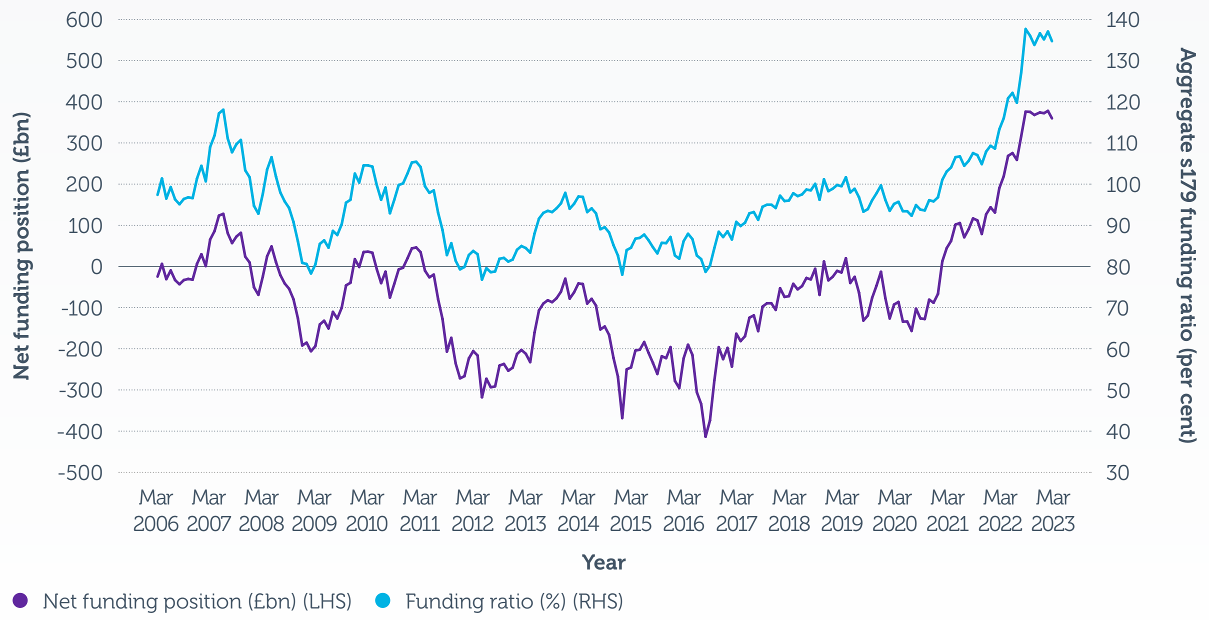
- A 0.1 percentage point (10 basis point) rise in both nominal and real gilt yields increases the 31 March 2023 net funding position by £1.1 billion from £358.9 billion to £360.0 billion. A 2.5 per cent rise in equity prices would improve the net funding position by £7.8 billion.
- A 0.1 percentage point (10 basis point) reduction in both nominal and real gilt yields raises aggregate scheme liabilities by 1.4 per cent and raises aggregate scheme assets by 1.0 per cent. A 2.5 per cent increase in equity markets increases scheme assets by 0.6 per cent.
- If individuals live two years longer than expected, s179 liabilities would increase by £62.0 billion, or 5.9 per cent.

Historical changes in s179 scheme funding since 2006

The estimated funding position of the universe of schemes can change over time owing to a number of factors including financial markets, actuarial assumptions, the decline in the number of DB schemes, and sponsoring employers' special contributions. The historical series in this section take the estimated funding position at 31 March from previous editions of *The Purple Book*. The monthly profiles between end-March of one year and end-February of the next are obtained by rolling forward the assets and liabilities using movements in nominal and real gilt yields and equity markets.

Figure 5.1 | Historical s179 aggregate funding ratio and net funding position of pension schemes in *The Purple Book* datasets

The aggregate s179 funding ratio and net funding position have both had a steep increase since their low points in 2016. The net funding position reached £358.9 billion while the aggregate s179 funding ratio is close to the highest historical level.



Source: PPF

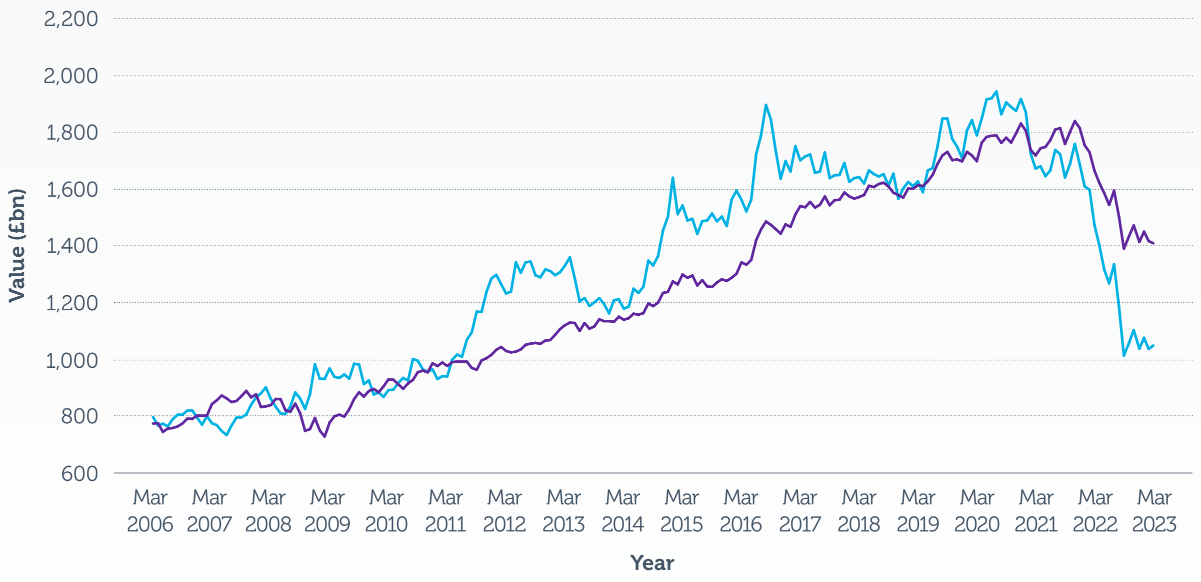
> The net funding position of schemes reached a near all-time high of £358.9 billion at 31 March 2023.

1 Using the valuation guidance as in Chapter 4. For more information, see the PPF website.

Funding sensitivities continued

Figure 5.2 | Historical movements in assets and s179 liabilities of schemes in *The Purple Book* datasets

There has been a general upward trend in both assets and liabilities since 2006, although liabilities have fallen significantly over the last two years.

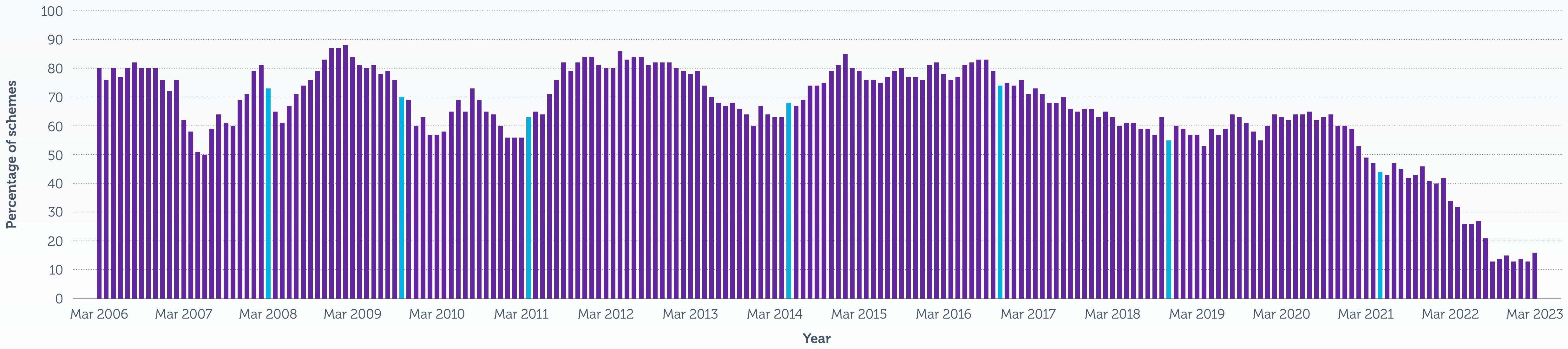


● Assets ● Liabilities

Source: PPF

Figure 5.4 | Historical percentage of schemes in deficit each month in *The Purple Book* datasets*

In March 2023, the percentage of schemes in deficit reached an all-time low of 16 per cent, which is 18 percentage points lower than the previous all-time low of 34 per cent last year.



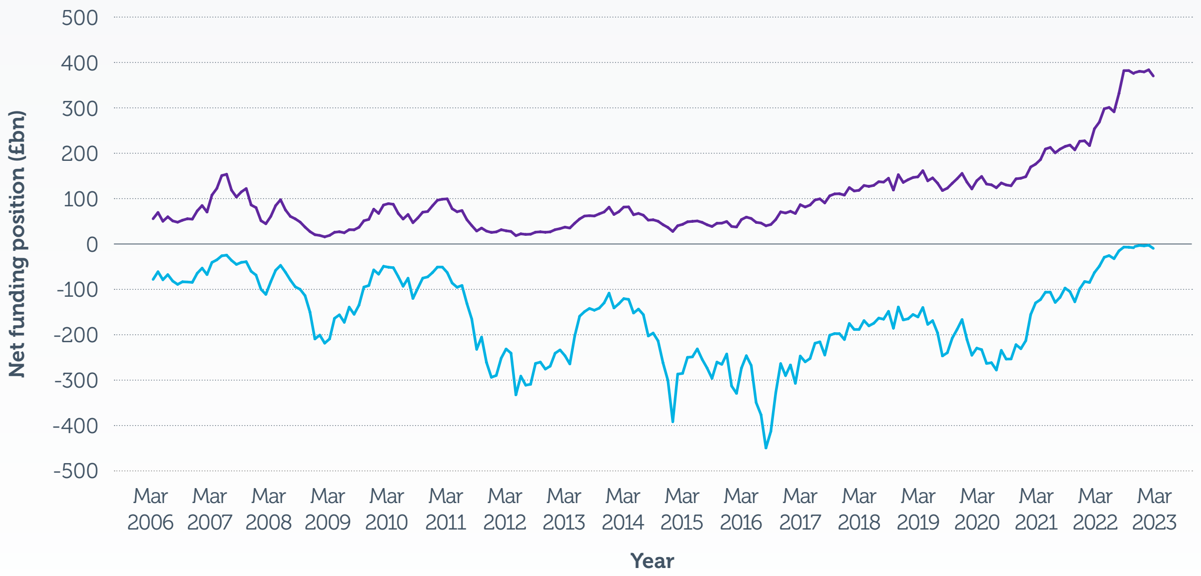
Source: PPF

* And the PPF 7800 index for the months in between *Purple Books*.

In the chart above, the blue lines indicate months in which changes were made to the assumptions used to value schemes on an s179 measure. The changes to assumptions in March 2008 and October 2009 reduced the number of schemes in deficit by 412 and 566, respectively, while the changes to assumptions in April 2011 and May 2014 raised the number of schemes in deficit by 107, and 259, respectively. The changes to assumptions in November 2016, November 2018, and May 2021 reduced the number of schemes in deficit by 157, 437, and 210, respectively.

Figure 5.3 | Historical aggregate s179 funding position for schemes in deficit and surplus

The s179 deficit of schemes in deficit was at its largest in August 2016 at £451 billion. At 31 March 2023 this deficit was £8 billion, down £53 billion from the £61 billion as at 31 March 2022.

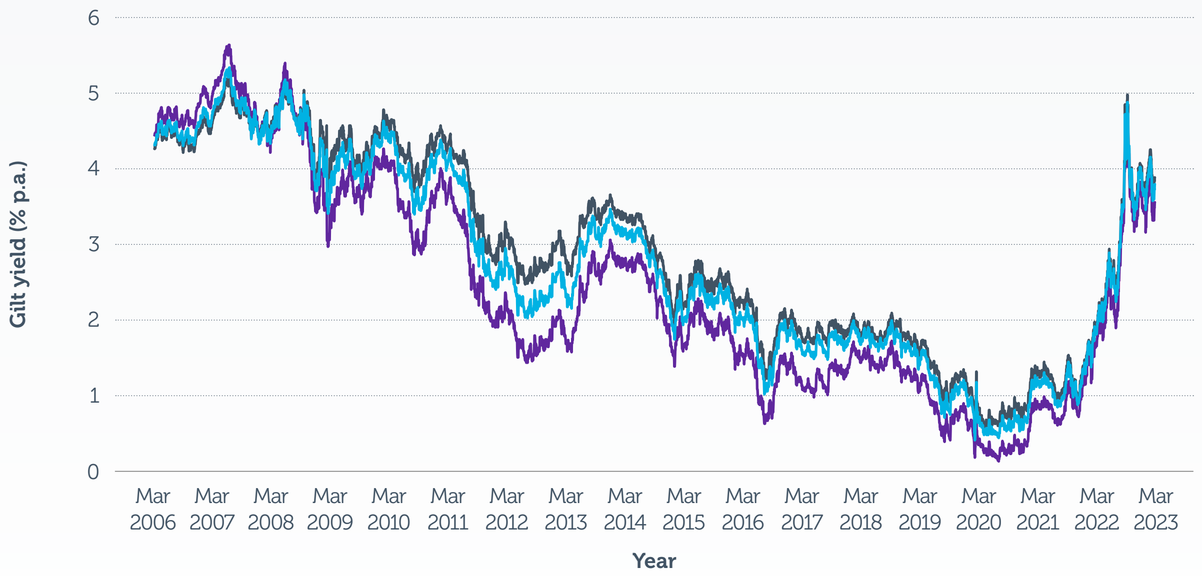


● Schemes in surplus ● Schemes in deficit

Source: PPF

Figure 5.5 | Movements in gilt yields

Gilt yields have increased since their all-time lows in March 2020.

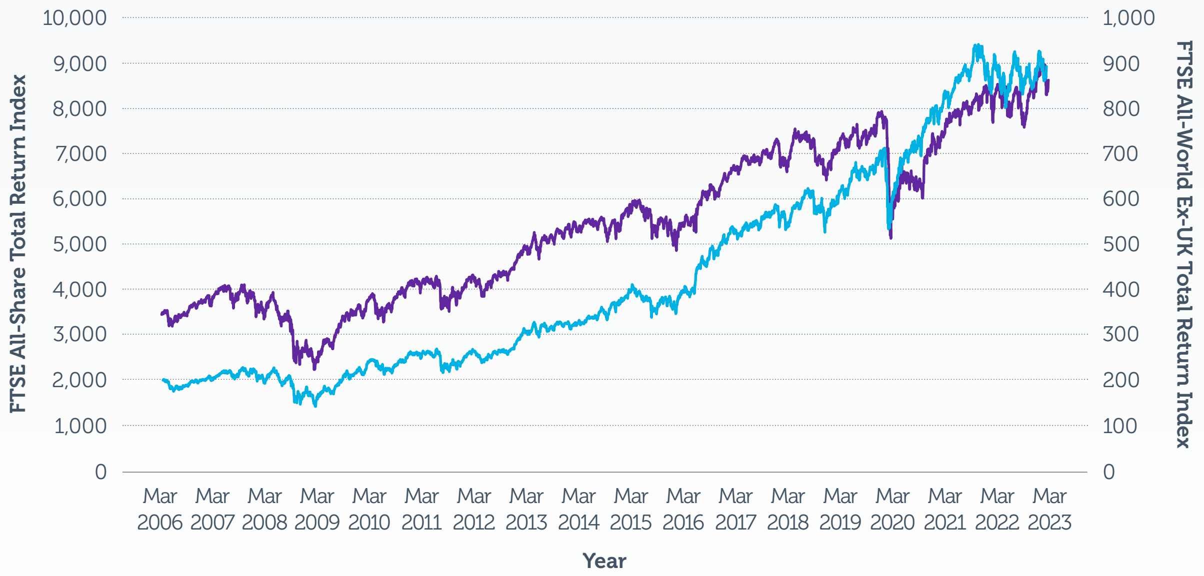


● 10-year gilt yield ● 15-year gilt yield ● 20-year gilt yield

Source: Bloomberg

Figure 5.6 | Movements in equity indices

The FTSE All-Share and All-World Ex-UK Total Return Indices have recovered from their sharp declines in March 2020 and have reached historical highs at various points in the years since.



● FTSE All-Share Total Return Index (LHS) ● FTSE All-World Ex-UK Total Return Index (RHS)

Source: Bloomberg

Funding sensitivities continued

Funding sensitivities: rules of thumb

Funding ratios are sensitive to movements in financial markets, with equity and gilt prices in particular having a major impact upon scheme assets, and gilt yields affecting liability values. This section shows the effect on scheme funding positions of changes in equity and gilt markets. The impact of a change of a 7.5 per cent rise in equity prices and a 0.3 percentage point increase in gilt yields have been accurately calculated and then the rest of the results have been calculated by pro-rating these two impacts.

The sensitivities do not take into account the use of derivative instruments to hedge changes in interest rates, inflation, equity levels, or life expectancy.

Figure 5.7 | Impact of changes in gilt yields and equity prices on s179 funding positions from a base net funding position of £358.9 billion as at 31 March 2023

Small changes in gilt yields have a slightly larger impact on s179 funding positions than small changes in equity prices.

	Assets less s179 liabilities (£ billion)						
Movement in equity prices	Movement in gilt yields						
	-0.3pp	-0.2pp	-0.1pp	0.0pp	0.1pp	0.2pp	0.3pp
7.5%	379.8	380.5	381.3	382.2	383.4	384.6	386.1
5.0%	372.0	372.7	373.5	374.5	375.6	376.9	378.3
2.5%	364.3	364.9	365.7	366.7	367.8	369.1	370.5
0.0%	356.5	357.1	358.0	**358.9**	360.0	361.3	362.7
-2.5%	348.7	349.4	350.2	351.1	352.3	353.5	355.0
-5.0%	340.9	341.6	342.4	343.4	344.5	345.8	347.2
-7.5%	333.2	333.8	334.6	335.6	336.7	338.0	339.4

Source: PPF

A 0.1 percentage point rise in both nominal and real gilt yields would have improved the end-March 2023 s179 net funding position by £1.1 billion from £358.9 billion (bold) to £360.0 billion (shaded). That's less than the £7.8 billion impact of a 2.5 per cent increase in equity prices (shaded).

Figure 5.8 | Impact of changes in gilt yields and equity prices on assets from a base of 100 as at 31 March 2023

Small changes in gilt yields have a slightly larger impact on assets than small changes in equity prices.

	Assets relative to a base of 100						
Movement in equity prices	Movement in gilt yields						
	-0.3pp	-0.2pp	-0.1pp	0.0pp	0.1pp	0.2pp	0.3pp
7.5%	104.6	103.6	102.6	101.7	100.7	99.8	98.9
5.0%	104.0	103.0	102.1	101.1	100.2	99.2	98.3
2.5%	103.4	102.5	101.5	100.6	99.6	98.7	97.8
0.0%	102.9	101.9	101.0	**100.0**	99.1	98.1	97.2
-2.5%	102.3	101.4	100.4	99.4	98.5	97.6	96.7
-5.0%	101.8	100.8	99.8	98.9	98.0	97.0	96.1
-7.5%	101.2	100.3	99.3	98.3	97.4	96.5	95.5

Source: PPF

A 2.5 per cent increase in equity prices would raise scheme assets by 0.6 per cent (shaded).
A 0.3 percentage point decrease in gilt yields would increase scheme assets by 2.9 per cent (shaded).

Figure 5.9 | Impact of changes in gilt yields on s179 liabilities as at 31 March 2023

A 0.1 percentage point movement in gilt yields would impact s179 liabilities by 1.4 per cent.

	Impact on s179 liabilities					
	Movement in gilt yields					
	-0.3pp	-0.2pp	-0.1pp	0.1pp	0.2pp	0.3pp
Percentage change	4.1%	2.7%	1.4%	-1.4%	-2.7%	-4.1%

Source: PPF

Figure 5.10 | Impact of changes in nominal or real gilt yields on s179 liabilities as at 31 March 2023 (base = £1,045.5 billion)

As at 31 March 2023, the s179 liabilities were almost three times as sensitive to changes in nominal yields as to changes in real yields.

	Impact on s179 liabilities			
	Change in nominal yields		Change in real yields	
	-0.1pp	0.1pp	-0.1pp	0.1pp
£ billions	1,056.7	1,034.3	1,049.0	1,042.0
Percentage change	1.1%	-1.1%	0.3%	-0.3%

Source: PPF

Note: s179 liabilities are assessed using a combination of various nominal and real gilt yields. Whereas figure 5.9 shows the impact of universal stresses across both nominal and real yields, figure 5.10 stresses the nominal and real gilt yields separately. It is not surprising that, for s179 liabilities, interest rate sensitivity is significantly higher for nominal yields versus real yields given the cap for post-97-accrued compensation and the absence of pension increases on pre-97 accrued compensation.

Figure 5.11 | Impact of changes in life expectancy assumptions on s179 liabilities as at 31 March 2023 (base = £1,045.5 billion)

If individuals live two years longer than expected, s179 liabilities would increase by around £62 billion, or 5.9 per cent.

	Impact on s179 liabilities	
	s179 liabilities (£bn)	% change from base
Age rating +2 years	982.3	-6.0%
Age rating -2 years	1,107.5	5.9%

Source: PPF

Note: the impact of increased length of life has been approximated by age rating down by two years – that is, replacing the life expectancy assumptions for each individual by an individual currently two years younger.

06

Insolvency risk

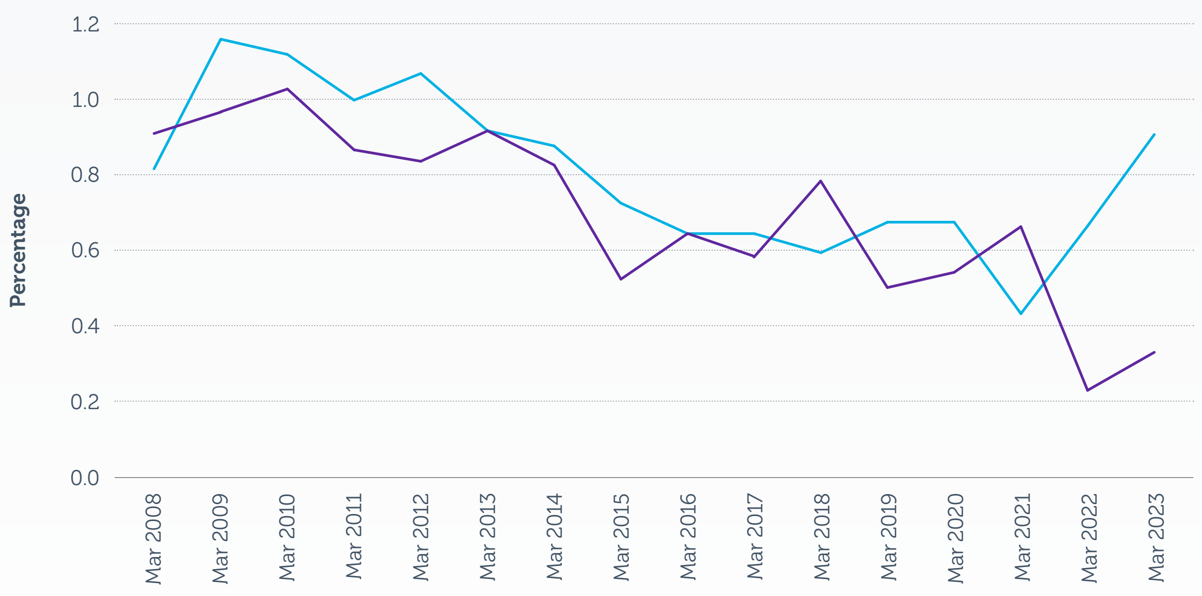
This chapter looks at the rate of insolvencies in DB scheme sponsors in the PPF universe, compared with the overall company insolvency rate in England and Wales, and insolvencies by scheme size.

Summary

- This chapter shows the annual insolvency rate for employers in the PPF universe and companies in England and Wales. It also shows the number of England and Wales company insolvencies compared with the rate of UK real GDP growth. Finally, it shows a proxy for insolvency risk over the next year, for different scheme sizes.
- The average insolvency rate in the PPF universe has increased from 0.24 per cent to 0.34 per cent over the year to 31 March 2023.
- The average annual insolvency rate of companies in England and Wales increased by 0.24 percentage points to 0.91 per cent as at 31 March 2023.
- UK real GDP growth was 0.2 per cent in Q1 2023, down from 10.6 per cent in Q1 2022.
- In aggregate, larger schemes tend to have a lower insolvency risk than those with fewer members.

Figure 6.1 | Annual insolvency rates*

This year has bucked the general downward trend for the rate of insolvencies that we have seen since the 2008/09 financial crisis.

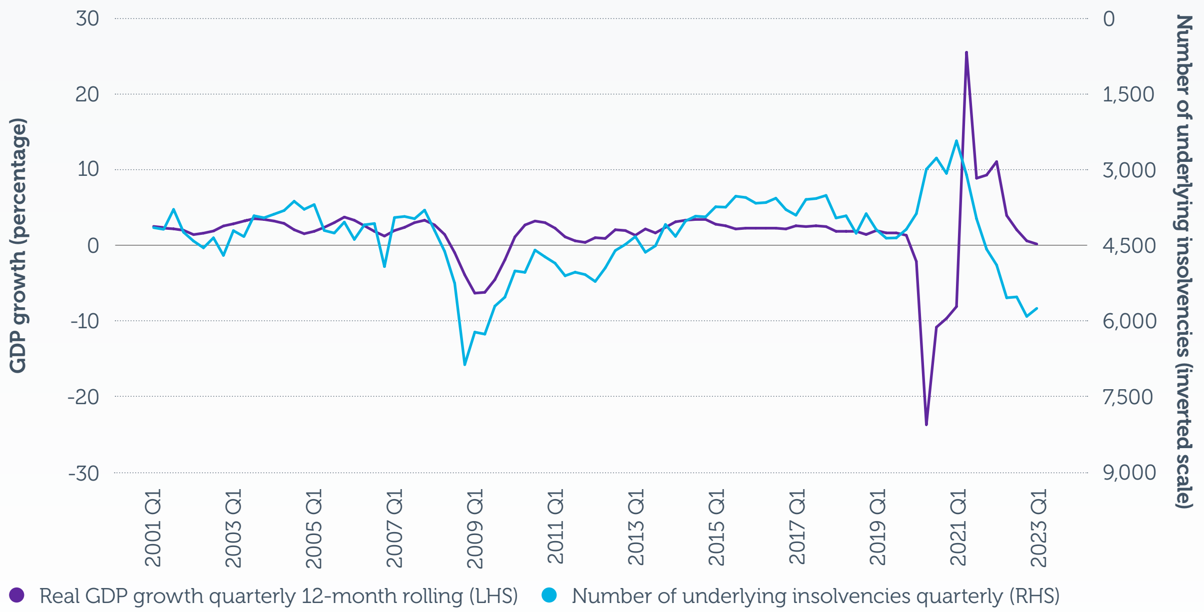


Source: PPF, Office for National Statistics (ONS)

* The England and Wales company insolvency rate has been calculated based on the 2.5 million companies in England and Wales that are VAT/PAYE registered with HMRC. Insolvencies in England and Wales account for around 95 per cent of UK insolvencies. In comparison, there are around 13,000 companies in the PPF universe, or around 12,000 if companies that participate in multiple schemes are only counted once.

Figure 6.2 | England and Wales underlying company insolvencies (seasonally adjusted)

Following two decades of relative stability, both real GDP growth and the number of insolvencies became very volatile at around the beginning of 2020.

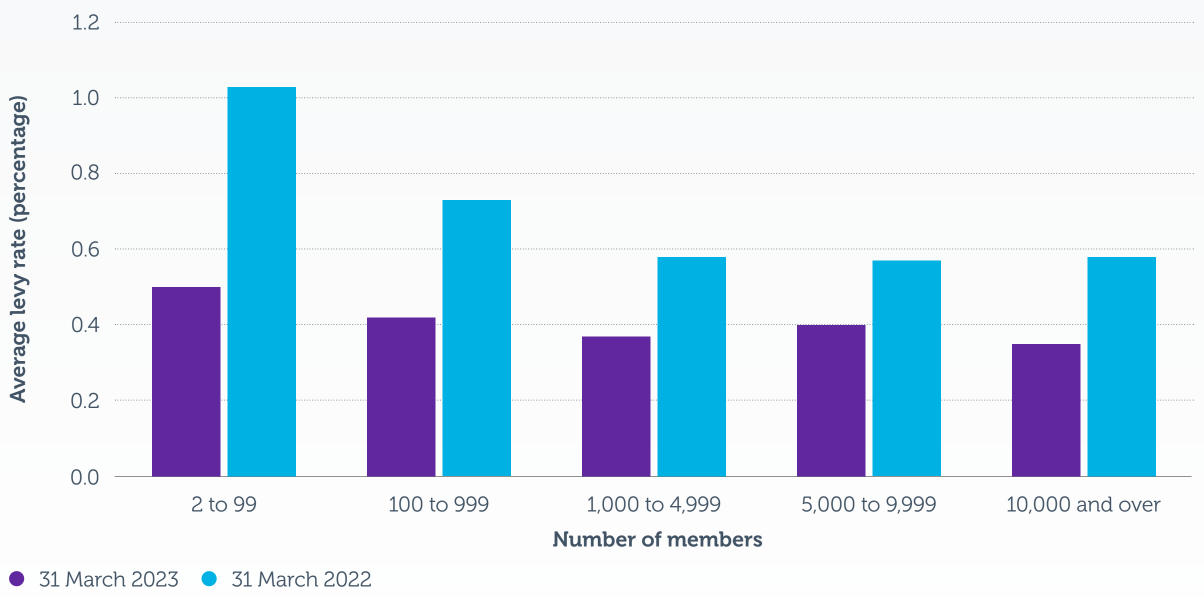


Note: as the ONS and UK Insolvency Service revise their methodology and receive new data, the figures for previous time periods may be updated.

Source: ONS and the UK Insolvency Service

Figure 6.3 | Average levy rates of sponsoring companies by scheme membership size*

Schemes with the fewest members tend to have sponsors with higher levy rates. Between 2022 and 2023 the dispersion of levy rates has reduced.



* Schemes' risk-based levy rates, as used in calculating the PPF levy, have been used as a proxy for the insolvency probabilities.

Source: PPF

07

Asset allocation

This chapter looks at trends in the types of assets DB schemes invest in.

Summary

- This chapter contains information on how DB schemes have invested scheme assets since 2006 and how asset allocations in *The Purple Book 2023* dataset vary according to different scheme characteristics, such as scheme size.
- In the scheme returns used in *The Purple Book 2023*, asset information was submitted according to a new three-tier system. The higher tiers submitted a more granular asset breakdown than in previous scheme returns. In addition, there were some changes to asset categories. In some cases, we requested additional information focusing on schemes' LDI exposure and we would like to thank those schemes and advisers who responded to that request.
- Around 95 per cent of schemes' asset allocations in *The Purple Book 2023* dataset were at a date between April 2021 and September 2022. 99 per cent of schemes' assets, but only 54 per cent of schemes, are in asset tiers 2 or 3.
- The aggregate proportion of schemes' assets invested in equities fell from 19.5 per cent to 18.0 per cent and the proportion in bonds fell from 71.6 per cent to 68.9 per cent. The category 'bonds' represents those physically held as well as other investments whose economic characteristics resemble bonds, such as LDI. For the purposes of *The Purple Book* it is useful for schemes to fill out their scheme returns in this way rather than, say, only including LDI exposure in the new risk factors stresses (for tier 3 schemes) instead. Given this preference, we wrote to schemes to ask for more information on their LDI allocation and in around 90 cases we updated the asset splits in our data based on the responses received. We would encourage schemes to continue to include as much of their LDI exposure in the bond proportions in the scheme returns as they possibly can (assuming that this approach accurately reflects the economic characteristics thereof).
- Within bonds, the proportion held in corporate bonds went up by nearly six percentage points to 36.5 per cent. Index-linked bonds continue to make up the biggest proportion with 44.1 per cent. Government fixed interest bonds contribute the remaining 19.5 per cent of the total.
- Government fixed interest and index-linked bonds are mostly long-dated. Corporate bond proportions are balanced between UK and overseas investment grade, and between short/medium and long dated.
- Larger schemes tend to have higher proportions in index-linked bonds than smaller schemes.
- Within equities, the proportion invested in UK equities continued to fall, to under 8 per cent, while the proportion invested in unquoted/private equities has risen to nearly 30 per cent. Larger schemes tend to hold lower proportions in UK equities and higher proportions in unquoted/private equities.
- The majority of total assets is invested in equities and bonds. The proportions in bonds and negative cash decrease as the funding ratio (category) increases.
- As scheme maturity increases, the proportion of assets invested in equities falls.
- There are now two new asset categories for all schemes: diversified growth funds and absolute returns. 1.5 per cent of assets are held within diversified growth funds and 3.1 per cent within absolute returns.

Asset data[1]

Figure 7.1 | Distribution of schemes and assets by tier and asset allocation date*

Around 95 per cent of schemes provided an asset allocation with an effective date between April 2021 and September 2022.

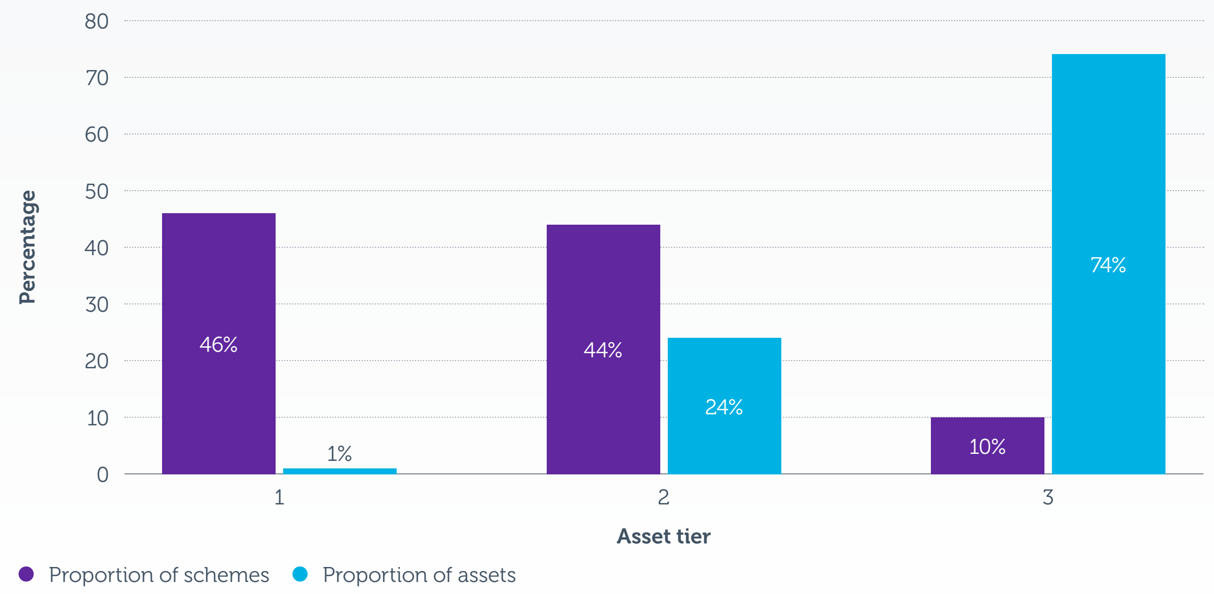
Asset allocation dated between	Number of schemes	Assets, £bn Tier 1	Tier 2	Tier 3	Total	Proportion of total assets
01/10/2022 and 31/03/2023	157	0.5	10.9	25.0	**36.4**	2.6%
01/04/2022 and 30/09/2022	1,713	7.2	102.0	188.8	**298.0**	21.2%
01/04/2021 and 31/03/2022	3,102	12.9	228.7	824.2	**1,065.8**	75.9%
01/04/2020 and 31/03/2021	51	0.2	0.5	3.2	**3.9**	0.3%
31/08/2007 and 31/03/2020	28	0.2	0.0	0.1	**0.3**	0.0%
Total	**5,051**	**21.0**	**342.1**	**1,041.3**	**1,404.4**	**100%**
Number of schemes		2,337	2,205	509	**5,051**	

Source: PPF

* There can be a significant gap between the date of the scheme return and the date of the asset allocation.

Figure 7.2 | Proportion of schemes and assets in each asset tier

54 per cent of schemes, but 99 per cent of assets held, are in asset tiers 2 or 3.



More information on asset tiers can be found on TPR's website: https://www.thepensionsregulator.gov.uk/en/trustees/submit-reports-payments-and-requests-to-us/scheme-return/db-and-mixed-benefit-scheme-return

1 Asset allocations submitted by schemes are not adjusted for market movements. Most of this chapter uses weighted average asset allocations. For example, the weighted average share of equities is the total amount of equities across all schemes divided by the total amount of assets across all schemes. The simple average takes the arithmetic average of each scheme's proportion of its assets held in equities.

Asset allocation continued

Figure 7.3 | Weighted average asset allocation in total assets

The proportions of assets invested in equities and bonds have been broadly stable since March 2020.

	Asset class										
				Breakdown of other investments							
Year/*The Purple Book* dataset	Equities	Bonds	Other investments	Cash and deposits	Property	Annuities	Diversified growth funds	Absolute returns	Insurance policies	Hedge funds	Miscellaneous
2006	61.1%	28.3%	10.6%	2.3%	4.3%	n/a	n/a	n/a	0.9%	n/a	3.1%
2011	41.1%	40.1%	18.8%	4.1%	4.4%	n/a	n/a	n/a	1.6%	2.4%	6.3%
2016	30.3%	51.3%	18.4%	3.0%	4.8%	2.1%	n/a	n/a	0.1%	6.6%	1.7%
2017	29.0%	55.7%	15.3%	-0.9%	5.3%	3.3%	n/a	n/a	0.1%	6.7%	0.8%
2018	27.0%	59.0%	14.0%	-2.5%	4.8%	3.4%	n/a	n/a	0.1%	7.0%	1.2%
2019	24.0%	62.8%	13.2%	-4.4%	5.0%	4.0%	n/a	n/a	0.3%	7.4%	1.0%
2020	20.4%	69.2%	10.4%	-7.2%	4.9%	5.0%	n/a	n/a	0.1%	6.8%	0.8%
2021	19.0%	72.0%	9.1%	-9.5%	4.7%	6.6%	n/a	n/a	0.1%	6.1%	0.9%
2022	19.5%	71.6%	8.9%	-8.8%	4.6%	6.8%	n/a	n/a	0.1%	5.2%	1.0%
2023	18.0%	68.9%	13.1%	-5.1%	5.3%	7.4%	1.5%	3.1%	n/a	n/a	0.9%

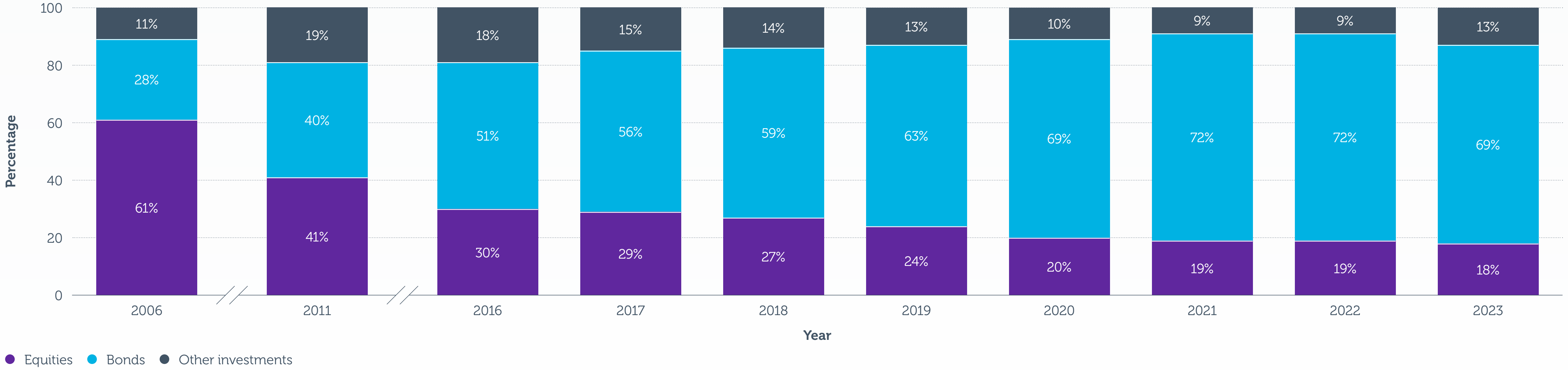
The category 'bonds' represents those physically held as well as other investments whose economic characteristics resemble bonds, such as LDI.

From 2023 the categories 'insurance policies' and 'hedge funds' have been discontinued. There are two new categories: 'diversified growth funds' and 'absolute returns'.

The weighted average proportion of assets held in cash and deposits is negative which represents a number of large schemes with significant negative cash holdings. These are likely to be related to investments such as swaps and repurchase agreements held as part of LDI strategies.

'n/a' denotes not available, where schemes may have been invested in these asset classes but the percentages cannot be determined from the data held, or because the category is new or no longer exists.

Note: figures may not sum to 100 per cent or the 'Other investments' total due to rounding.



Note: figures may not sum to 100 per cent or the 'Other investments' total due to rounding.

Source: PPF

Asset allocation continued

Figure 7.4 | Asset allocation: simple averages

For the first time in *Purple Book* history the simple average proportion in cash and deposits is more negative than the weighted average. This might suggest that larger schemes have a smaller negative proportion in cash.

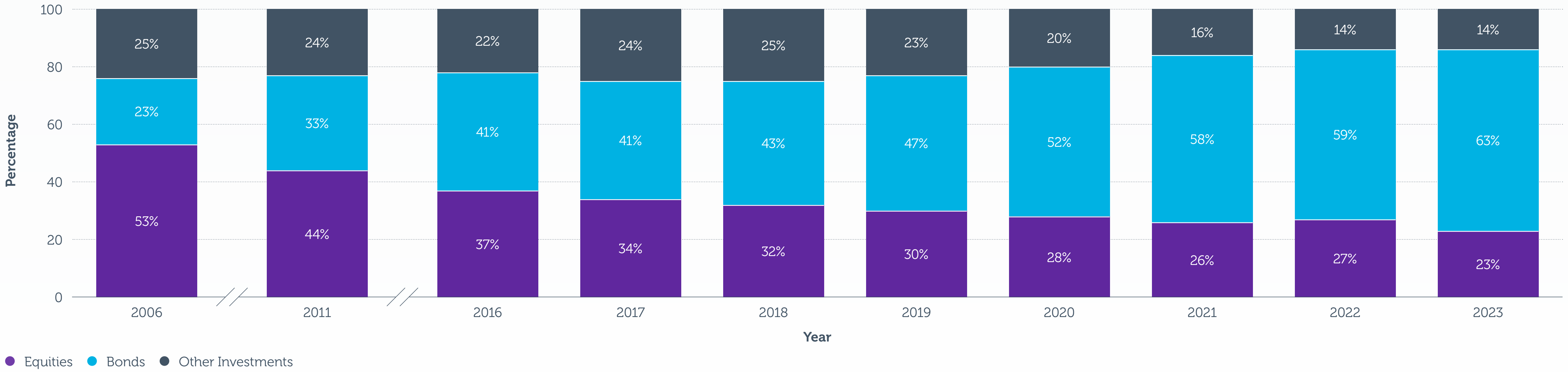
	Asset class										
				Breakdown of other investments							
Year/*The Purple Book* dataset	Equities	Bonds	Other investments	Cash and deposits	Property	Annuities	Diversified growth funds	Absolute returns	Insurance policies	Hedge funds	Miscellaneous
2006	52.6%	22.6%	24.8%	3.9%	2.1%	n/a	n/a	n/a	14.9%	n/a	3.6%
2011	43.7%	32.6%	23.7%	4.9%	2.7%	n/a	n/a	n/a	11.8%	1.0%	3.3%
2016	36.8%	41.1%	22.1%	5.4%	3.7%	2.4%	n/a	n/a	1.2%	7.9%	1.5%
2017	34.5%	41.4%	24.1%	3.6%	3.7%	6.8%	n/a	n/a	0.7%	7.9%	1.3%
2018	32.4%	43.1%	24.5%	1.8%	3.3%	8.9%	n/a	n/a	0.6%	8.5%	1.4%
2019	30.4%	47.0%	22.7%	-0.8%	3.4%	9.4%	n/a	n/a	0.5%	8.9%	1.3%
2020	27.8%	52.3%	19.9%	-3.2%	3.4%	9.7%	n/a	n/a	0.6%	7.9%	1.7%
2021	25.8%	58.0%	16.3%	-6.6%	3.2%	10.6%	n/a	n/a	0.6%	6.9%	1.7%
2022	27.1%	58.5%	14.4%	-7.5%	3.0%	10.7%	n/a	n/a	0.6%	6.0%	1.6%
2023	23.1%	62.9%	14.0%	-10.8%	2.8%	11.5%	6.7%	1.7%	n/a	n/a	1.9%

Note: figures may not sum to 100 per cent or the 'Other investments' total due to rounding.

From 2023 the categories 'insurance policies' and 'hedge funds' have been discontinued. There are two new categories: 'diversified growth funds' and 'absolute returns'.

The simple average proportion of assets held in cash and deposits being negative represents a number of schemes with negative cash holdings which are likely to be related to investments such as swaps and repurchase agreements held as part of LDI strategies.

'n/a' denotes not available, where schemes may have been invested in these asset classes but the percentages cannot be determined from the data held, or because the category is new or no longer exists.



Note: figures may not sum to 100 per cent or the 'Other investments' total due to rounding.
Source: PPF

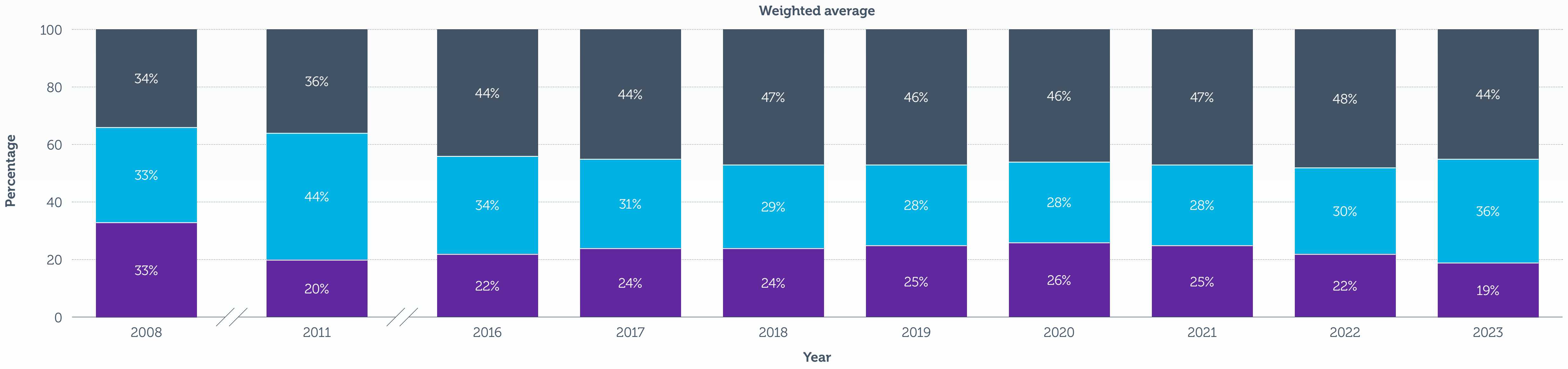
Asset allocation continued

Figure 7.5 | Bond splits – high-level breakdown

The proportion of corporate bonds within scheme bond portfolios has increased in the last year by over 6 percentage points.

	Weighted average			Simple average		
Year/*The Purple Book* dataset	Government fixed interest	Corporate fixed interest	Index-linked	Government fixed interest	Corporate fixed interest	Index-linked
2008	33.2%	32.6%	33.9%	47.2%	33.0%	19.8%
2011	19.6%	44.3%	36.1%	31.2%	47.1%	21.7%
2016	21.9%	33.7%	44.4%	24.4%	49.0%	26.6%
2017	24.1%	31.4%	44.5%	25.9%	46.8%	27.3%
2018	24.1%	28.8%	47.1%	27.2%	42.1%	30.8%
2019	25.4%	28.4%	46.2%	29.0%	38.9%	32.1%
2020	25.9%	28.0%	46.1%	29.4%	36.1%	34.6%
2021	24.6%	28.2%	47.2%	30.4%	34.8%	34.8%
2022	22.0%	30.2%	47.8%	30.2%	35.7%	34.1%
2023	19.5%	36.5%	44.1%	25.6%	36.9%	37.5%

Note: the rows may not sum to 100 per cent due to rounding.



● Government fixed interest ● Corporate fixed interest ● Index-linked

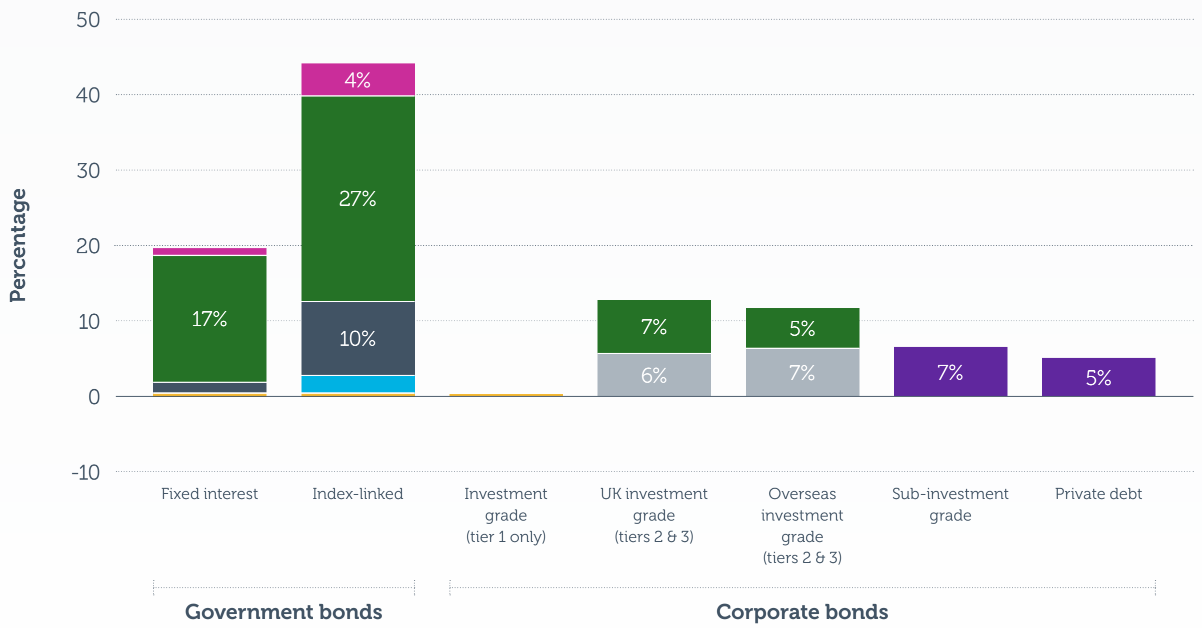
Source: PPF

Figure 7.6 | Bond splits – granular breakdown of *The Purple Book 2023* dataset

Government fixed interest and index-linked bonds are mostly long-dated. Corporate bond proportions are balanced between UK and overseas investment grade, and between short/medium and long dated.

	Weighted average						
Bond category	All	Tier 1	Short	Medium	Short and medium	Long	Unassigned*
Government fixed interest	**19.5%**	0.4%	-0.1%	1.6%	n/a	16.8%	0.8%
Index-linked	**44.1%**	0.4%	2.5%	9.8%	n/a	27.2%	4.2%
Corporate fixed interest, of which:	**36.5%**	n/a	n/a	n/a	n/a	n/a	n/a
Investment grade	0.3%	0.3%	n/a	n/a	n/a	n/a	n/a
UK investment grade	12.8%	n/a	n/a	n/a	5.8%	7.0%	n/a
Overseas investment grade	11.7%	n/a	n/a	n/a	6.5%	5.2%	n/a
Sub-investment grade	6.6%	n/a	n/a	n/a	n/a	n/a	n/a
Private debt	5.1%	n/a	n/a	n/a	n/a	n/a	n/a
Total	**100%**	**1.1%**	**2.4%**	**11.4%**	**12.3%**	**56.2%**	**5.0%**

Note: the figures may not sum to 100 per cent or to the 'All' column due to rounding.
* 'Unassigned' is generally where a scheme is in tiers 2 or 3 but did not provide the granular breakdown.
Blank cells are n/a for that category of bond.



● Tier 1 ● All ● Short ● Medium ● Short and Medium ● Long ● Unassigned

Source: PPF

Asset allocation continued

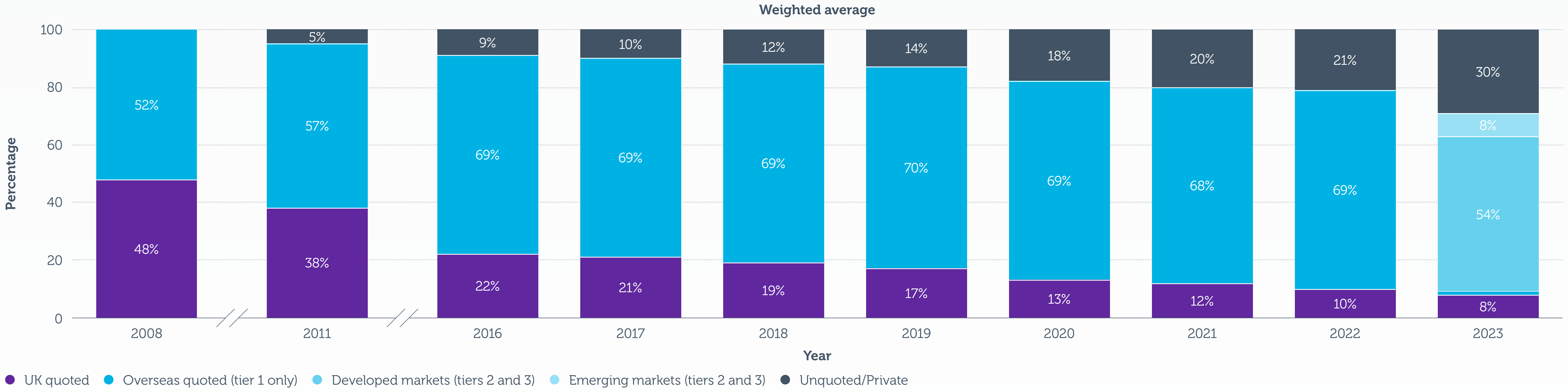
Figure 7.7 | Equity splits

Within equities, the proportion invested in UK equities continued to fall, while the proportion invested in private equity has risen to nearly 30 per cent.

	Weighted average					Simple average				
Year/*The Purple Book* dataset	UK quoted	Overseas quoted (tier 1 only in 2023)	Developed markets (tiers 2 and 3)*	Emerging markets (tiers 2 and 3)*	Unquoted/ Private	UK quoted	Overseas quoted (tier 1 only in 2023)	Developed markets (tiers 2 and 3)	Emerging markets (tiers 2 and 3)	Unquoted/ Private
2008	48.2%	51.8%	n/a	n/a	n/a	60.4%	39.6%	n/a	n/a	n/a
2011	38.0%	57.2%	n/a	n/a	4.8%	52.7%	46.1%	n/a	n/a	1.2%
2016	22.4%	68.6%	n/a	n/a	9.0%	38.8%	58.6%	n/a	n/a	2.6%
2017	20.5%	69.0%	n/a	n/a	10.5%	36.3%	61.0%	n/a	n/a	2.7%
2018	18.6%	69.4%	n/a	n/a	12.0%	32.1%	65.0%	n/a	n/a	3.0%
2019	16.6%	69.7%	n/a	n/a	13.7%	29.6%	66.7%	n/a	n/a	3.7%
2020	13.3%	69.0%	n/a	n/a	17.7%	26.9%	68.4%	n/a	n/a	4.8%
2021	11.6%	68.3%	n/a	n/a	20.1%	24.9%	69.4%	n/a	n/a	5.8%
2022	9.9%	68.6%	n/a	n/a	21.5%	22.5%	70.9%	n/a	n/a	6.6%
2023	7.6%	1.4%	53.6%	7.8%	29.5%	20.3%	28.7%	37.1%	4.7%	9.3%

Note: the rows may not sum to 100 per cent due to rounding.

* New for 2023.



Note: figures may not sum to 100 per cent due to rounding.

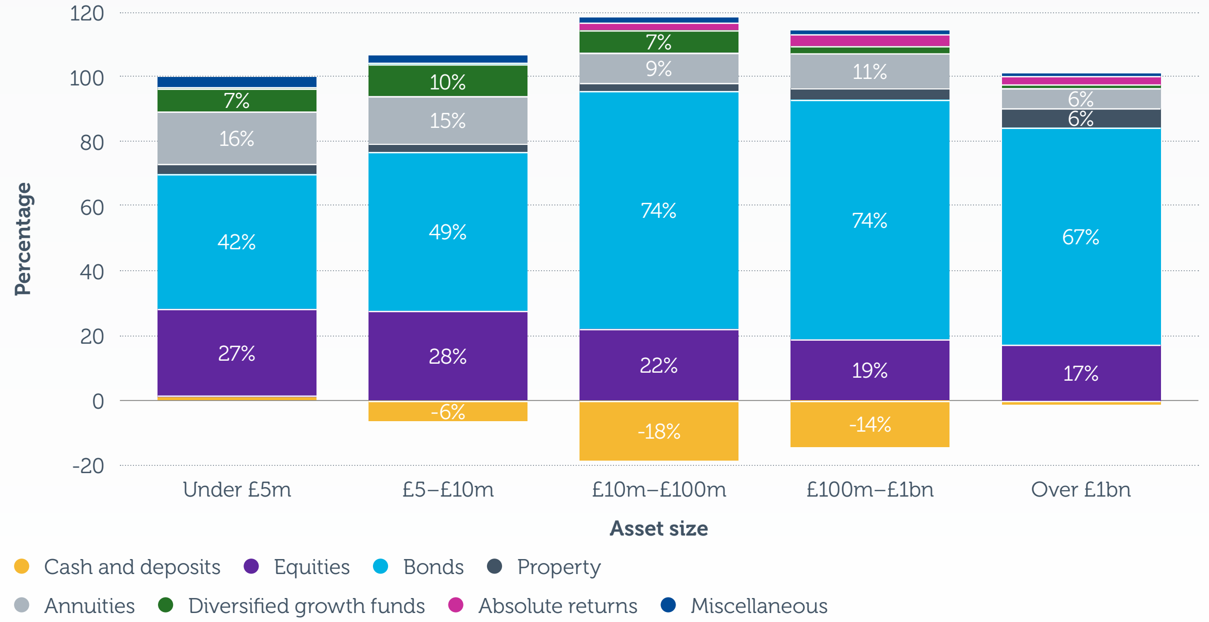
In the 2023 scheme return, 'overseas quoted' has now been split into two categories for tier 2 and 3 schemes, specifically into 'developed markets' and 'emerging markets'. The three overseas equities in shades of blue should be compared with the blue bars in previous years.

Source: PPF

Figure 7.8 | Weighted average asset allocation of schemes by asset size

Schemes with assets less than £10 million have a lower proportion of their assets invested in bonds, but a higher proportion invested in annuities and equities.

Asset size	Equities	Bonds	Cash and deposits	Property	Annuities	Diversified growth funds	Absolute returns	Miscellaneous
Under £5m	27.2%	41.7%	1.0%	3.2%	16.2%	7.1%	0.1%	3.5%
£5m–£10m	27.6%	49.2%	-6.3%	2.6%	14.7%	9.9%	0.1%	2.3%
£10m–£100m	22.0%	73.6%	-18.4%	2.5%	9.3%	7.0%	2.4%	1.6%
£100m–£1bn	18.8%	74.1%	-14.4%	3.6%	10.8%	2.2%	3.7%	1.2%
Over £1bn	17.4%	67.2%	-1.3%	6.0%	6.2%	0.8%	3.0%	0.8%



Source: PPF

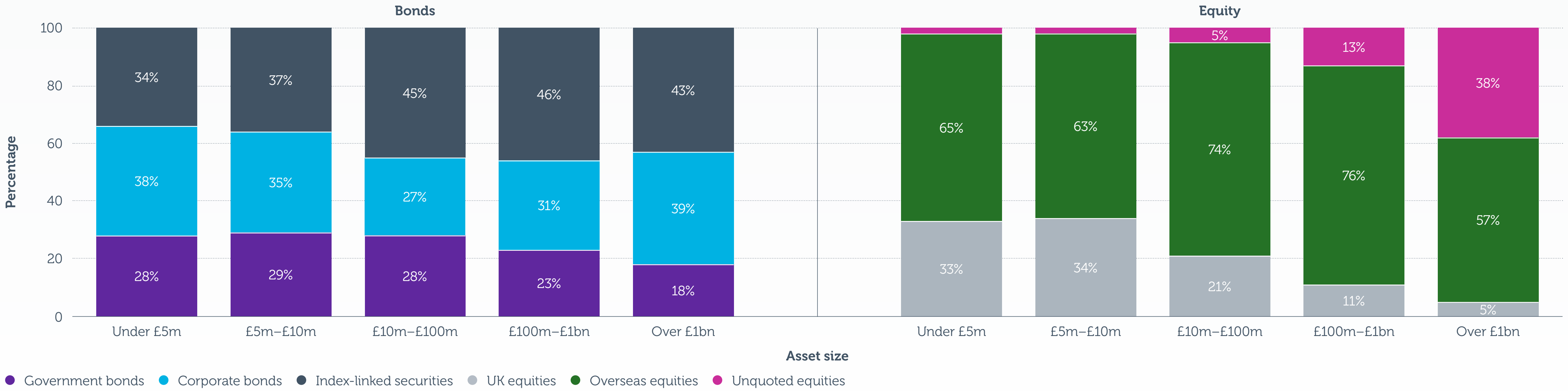
Asset allocation continued

Figure 7.9 | Weighted averages of equity and bond holdings split by asset size

Larger schemes tend to hold a higher proportion of private/unquoted equity within their equity portfolio, and a higher proportion of corporate bonds in their bond portfolio.

	Bonds			Equities		
Asset size	Government	Corporate	Index-linked	UK quoted	Overseas quoted	Unquoted/ Private
Under £5m	27.7%	37.9%	34.4%	33.1%	65.3%	1.6%
£5m–£10m	28.6%	34.6%	36.8%	34.4%	63.5%	2.1%
£10m–£100m	28.0%	27.4%	44.6%	20.5%	74.2%	5.3%
£100m–£1bn	23.1%	30.6%	46.3%	10.8%	76.3%	12.9%
Over £1bn	17.5%	39.1%	43.3%	5.1%	57.4%	37.6%

Note: the rows may not sum to 100 per cent due to rounding.



Source: PPF

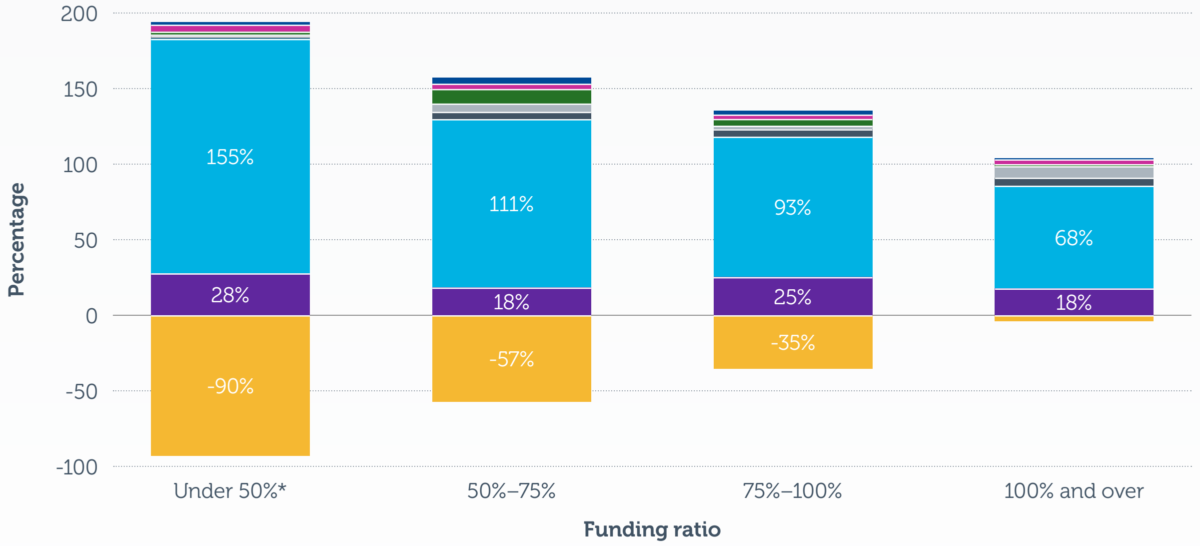
Asset allocation continued

Figure 7.10 | Weighted average asset allocation by s179 funding ratio

The majority of scheme assets are invested in equities and bonds for all funding ratio groups.

Funding ratio	Equities	Bonds	Cash and deposits	Property	Annuities	Diversified growth funds	Absolute returns	Miscellaneous
Under 50%*	27.7%	154.9%	-92.8%	1.8%	0.3%	1.8%	4.6%	1.8%
50%–75%	18.3%	111.3%	-57.0%	4.8%	5.5%	9.6%	3.5%	4.1%
75%–100%	25.2%	92.8%	-35.2%	4.9%	2.3%	4.5%	2.9%	2.5%
100% and over	17.7%	67.9%	-3.9%	5.3%	7.6%	1.4%	3.1%	0.9%

Note: the rows may not sum to 100 per cent because of rounding.



Cash and deposits • Equities • Bonds • Property • Annuities • Diversified growth funds • Absolute returns • Miscellaneous

Source: PPF

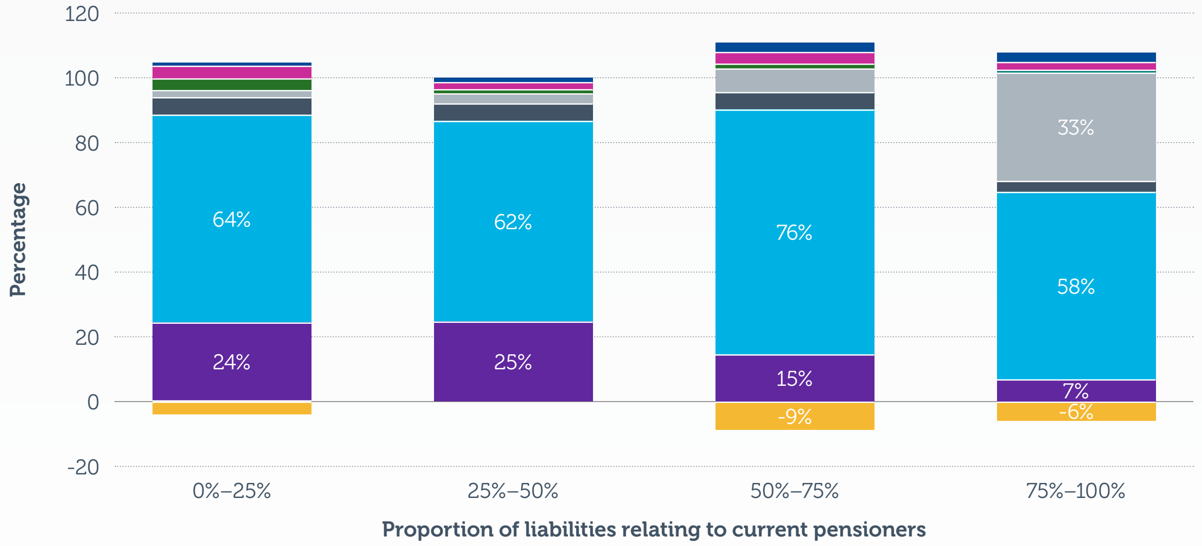
* There are only a small number of schemes in the under 50% funded category. If one scheme in particular was excluded then the bar would come in by around 50pp at each end, and the bond and cash proportions would also reduce by around 50pp each.

Figure 7.11 | Weighted average asset allocation of schemes by scheme maturity

As scheme maturity increases, the proportion of equities falls.

Proportion of liabilities relating to current pensioners	Equities	Bonds	Cash and deposits	Property	Annuities	Diversified growth funds	Absolute returns	Miscellaneous
Under 25%	24.0%	64.1%	-3.9%	5.4%	2.2%	3.6%	3.9%	0.9%
25%–50%	24.7%	61.9%	0.0%	5.4%	2.9%	1.5%	2.2%	1.3%
50%–75%	14.6%	75.5%	-8.7%	5.4%	7.3%	1.5%	3.6%	0.6%
75%–100%	6.9%	57.8%	-5.9%	3.4%	33.4%	0.5%	2.8%	1.1%

Note: the rows may not sum to 100 per cent because of rounding.



Cash and deposits • Equities • Bonds • Property • Annuities • Diversified growth funds • Absolute returns • Miscellaneous

Source: PPF

Note: the high proportion in 'annuities' for mature schemes is mostly driven by the 10 largest holdings in this category. These 10 schemes account for less than two per cent of the number of schemes in this category.

08

Risk reduction

This chapter looks at the measures that schemes have taken to reduce their funding risk, which will also act to reduce the risk of schemes claiming on the PPF. These actions may also help schemes to reduce the amount of PPF levy they pay.

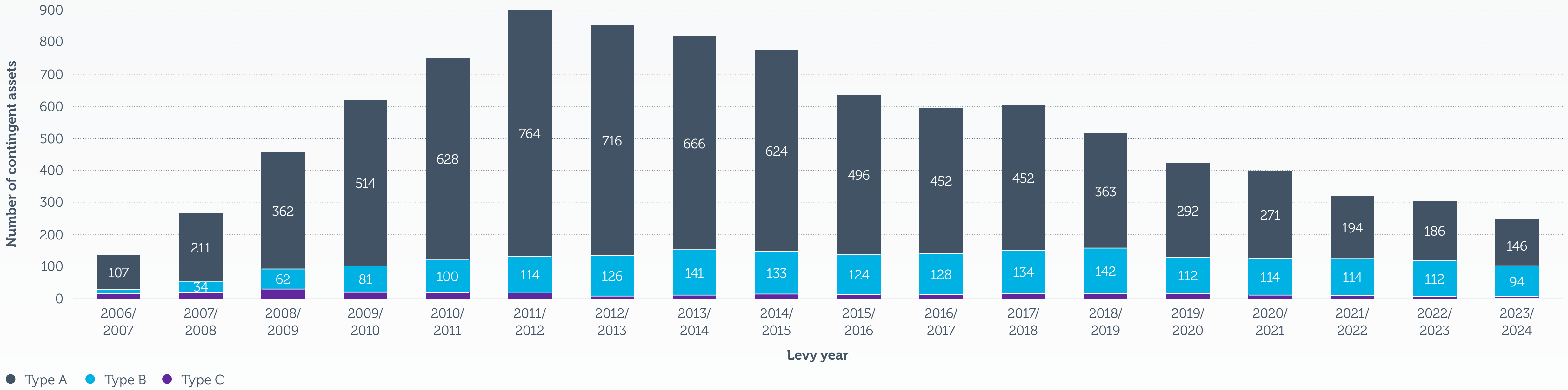
Summary

- This chapter contains information on some of the risk reduction measures DB schemes have put in place, including contingent assets, longevity swaps, buy-ins, and buy-outs. It also shows information on how recovery plan lengths and funding measures relative to DB schemes' Technical Provisions have changed over time.
- The total number of contingent assets submitted to the PPF for the 2023/24 levy year was 245, compared with 303 in 2022/23.
- Based only on current recovery plans in place, total annual recovery plan payments are indicated to decrease by around 88 per cent over the next 10 years as schemes increasingly become fully funded on a Technical Provisions basis. The rate of decrease is planned to be similar between different scheme sizes and, in aggregate, annual recovery plan payments are set to fall from around £11.2 billion in 2023 to around £1.3 billion in 2033. Changes may be made to existing recovery plans and new recovery plans may be put in place in the future if experience is different from what has currently been assumed by schemes.
- Analysis of TPR's latest Technical Provisions and recovery plan data shows that in Tranche 16[1], the average recovery plan length was 5.7 years, almost a year less than that of Tranche 13 (comparable given the three-year valuation cycle). The average funding ratio as measured by assets divided by Technical Provisions was 93.7 per cent in Tranche 16.
- Technical Provisions as a percentage of s179 liabilities increased to 105.2 per cent from 100.0 per cent in Tranche 13. There was also a rise in Technical Provisions as a percentage of buy-out liabilities, from 73.5 per cent to 79.3 per cent.
- Total risk transfer business covering buy-outs, buy-ins and longevity swaps amounted to £400 billion between the end of 2007 and the second quarter of 2023. 35 per cent of these deals were longevity swaps.
- The total value of risk transfer deals was £44 billion in 2022, just slightly higher than the £43 billion in 2021.

Contingent assets

Figure 8.1 | Contingent assets by type

The number of recognised contingent assets has followed a general downward trend over the last 11 years and is at its lowest level since levy year 2006/07.



Source: PPF

Type A Contingent Assets are parent/group companies' guarantees to fund the scheme, up to a pre-arranged amount.

Type B Contingent Assets comprise security over holdings of cash, real estate and/or securities.

Type C Contingent Assets consist of letters of credit and bank guarantees.

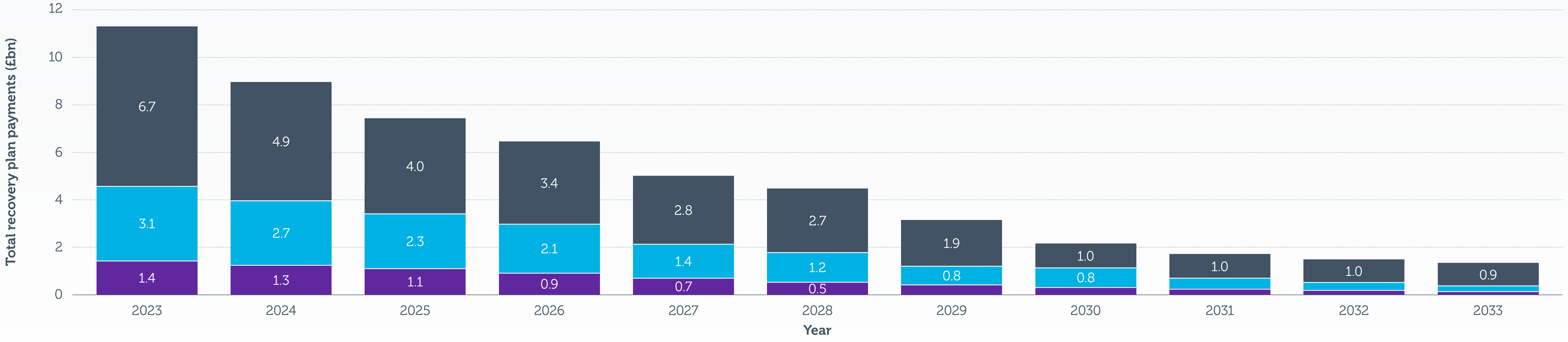
1 Tranche 16 covers schemes with valuation dates between 22 September 2020 and 21 September 2021.

Risk reduction continued

Recovery plan payments

Figure 8.2 | Planned recovery plan payments until 2033 by asset size

Total annual recovery plan payments are planned to reduce by around 88 per cent over the next 10 years, from £11.2 billion in 2023 to £1.3 billion in 2033.



Source: TPR

The scheme funding regime

Figure 8.3 | Technical Provisions and recovery plan lengths (unweighted averages)

In Tranche 16, the average recovery period was 5.7 years, almost a year less than that of Tranche 13 (comparable given the three-year valuation cycle).

Tranche	Year of valuation	Number of recovery plans	Average length of recovery plan (years)	Assets as a percentage of Technical Provisions	Technical Provisions as a percentage of s179 liabilities	Technical Provisions as a percentage of buy-out liabilities
1	2005/06	2,127	8.1	79.8%	105.0%	66.9%
4	2008/09	2,048	9.7	71.3%	101.5%	71.9%
7	2011/12	1,770	8.5	78.4%	99.9%	70.7%
10	2014/15	1,403	7.5	88.6%	96.9%	68.9%
13	2017/18	1,112	6.5	93.5%	100.0%	73.5%
14	2018/19	1,181	6.2	91.6%	102.9%	75.8%
15	2019/20	1,287	6.3	89.0%	99.4%	76.4%
16	2020/21	1,050	5.7	93.7%	105.2%	79.3%

Source: 'Scheme funding analysis 2023 Annex', TPR, August 2023

Notes:

1 Valuation dates run from 22 September to 21 September.

2 70.6 per cent of schemes with Tranche 16 valuations reported valuations in respect of Tranches 13, 10, 7, 4 and 1.

Risk reduction continued

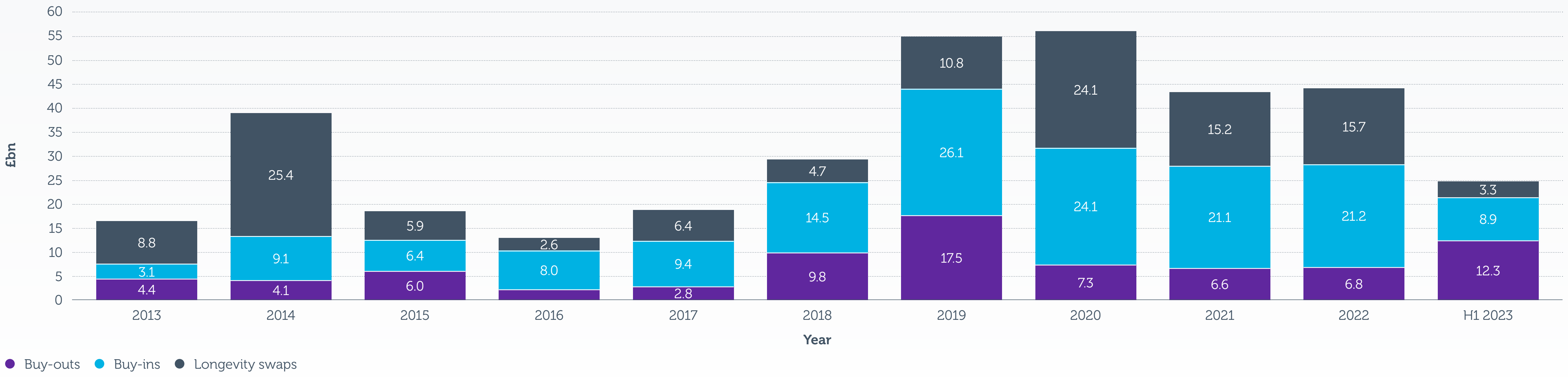
Buy-out, buy-in and longevity hedging

Buy-out and buy-in transactions provide schemes with the opportunity to remove risk relating to all or part of their liability. Under a buy-out deal, a scheme transfers its entire liability and scheme assets to an insurer in exchange for a premium. Insurers tend to require assets significantly in excess of Technical Provisions to compensate for the risk transferred. Buy-in deals result in an insurance policy as a scheme asset.

While both longevity swaps and buy-in/buy-out can mitigate the risk of greater than expected life expectancy, under longevity swaps there is no transfer of the underlying scheme assets to a counterparty. They instead entail the pension scheme exchanging fixed payments for cash flows that vary in accordance with the longevity experience of a reference population (either the named scheme members or a wider sample).

Figure 8.4 | Value of risk transfer deals since 2013

£43.7 billion of risk transfer deals were completed in 2022, a similar value to 2021.



Source: Hymans Robertson, 'Buy-outs, buy-ins and longevity hedging'

Figure 8.5 | Number of risk transfer deals since 2013

While the value of transactions was similar in 2022 compared to 2021, this was across a higher number of deals.

Year	Number of buy-ins/buy-outs	Number of longevity swaps
2013	219	10
2014	177	5
2015	176	4
2016	104	5
2017	132	5
2018	171	4
2019	157	3
2020	141	8
2021	156	4
2022	202	5
H1 2023	96	2

Source: Hymans Robertson, 'Buy-outs, buy-ins and longevity hedging'

09

PPF levy 2022/23

This chapter contains information on how much PPF levy was invoiced and how this was distributed between schemes and by employers.

9.1 Summary

Since 2006/07, the PPF has collected a total of £9.4 billion through levies, determined by the risk schemes pose to the PPF. This and other key statistics from this chapter are summarised in the following table:

Asset allocation year	2022/3[1]	2021/22
Total levy collected since 2006/07	**£9.4bn**	£9.1bn
Total levy invoiced in year	**£385m**	£476m
Proportion of total scheme assets	**0.02%**	0.03%
Number of schemes which contributed to this	**5,136**	5,220
Amount and proportion of total levy contributed by the top 100 levy payers (by size of levy)	**£238m** **62%**	£277m 58%
Proportion of schemes which paid no risk-based levy	**40%**	34%
Number of schemes with a capped risk-based levy	**134**	173
Proportion of total number of schemes	**2.6%**	3.3%
PPF levy band whose schemes made the largest contribution in the year	**1**	3
Levy contribution made by these schemes	**£79m**	£95m
Proportion of total levy contribution	**20%**	20%
Proportion of total liabilities accounted for by schemes in this category	**36%**	17%
Proportion of levy being paid by the three top D&B (Dun and Bradstreet) scorecards (as measured by levy paid)	**83%**	84%

1 Year from 1 April 2022 to 31 March 2023.

Note: the percentages may not match those calculated using financial amounts in the table because of rounding.

Assets and liabilities, and therefore funding ratios, in this chapter are on a smoothed, stressed basis unless otherwise stated and exclude Deficit-Reduction Contributions (DRCs). For more information on these and other terms and definitions used in this chapter, see the 2022/23 Levy Determination, and its associated appendices, available on our website.

9.2 Total levy by year

In this section we compare total levy by levy year, from levy year 2012/13 to 2022/23. We look at the distribution across schemes broken down by levy band, considering the risk-based levy and scheme-based levy separately.

Figure 9.1 | Total levy

The levy has varied between £385 million and £648 million, and has fallen as a percentage of assets, since 2012/13.

Levy year	Total levy (£m)[1]	Levy as a percentage of assets[2]	Number of capped schemes[3]
2012/13	648	0.08%	427
2013/14	577	0.06%	302
2014/15	579	0.06%	274
2015/16	560	0.05%	211
2016/17	563	0.05%	187
2017/18	541	0.04%	147
2018/19	564	0.04%	184
2019/20	564	0.04%	161
2020/21	630	0.04%	160
2021/22	476	0.03%	173
2022/23	385	0.02%	134

Source: PPF

Notes:

1 The figures quoted in this chapter are based on the total levy for the dataset of 5,136 schemes in 2022/23, or from prior years' *Purple Books*.

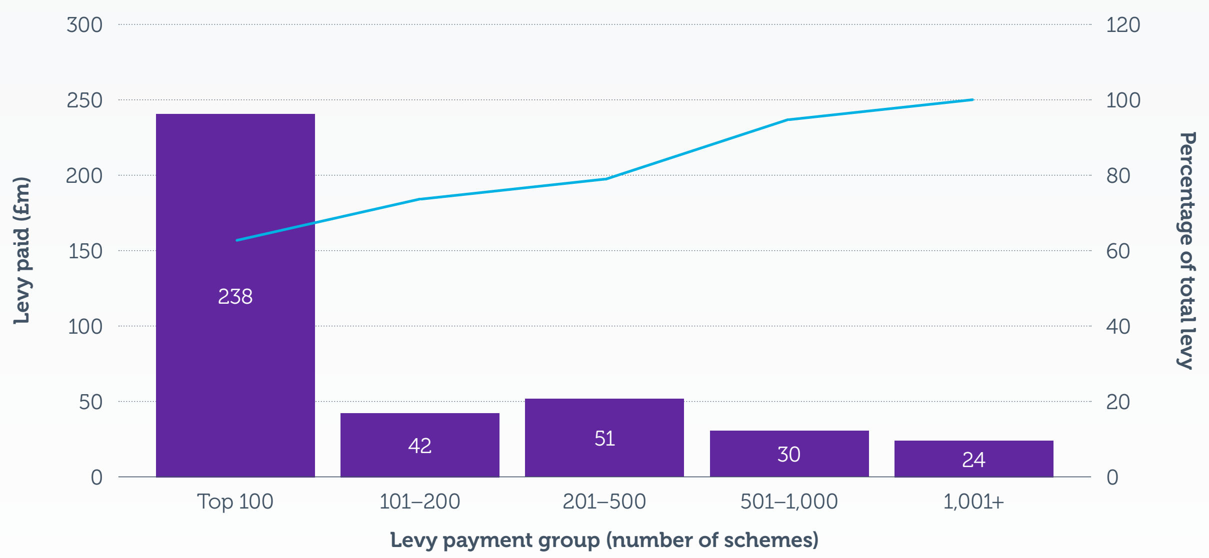
2 Total levy as a percentage of levy-paying schemes' total assets.

3 Refers to schemes to which the risk-based levy cap is applied.

PPF levy 2022/23 continued

Figure 9.2 | Distribution of levy by largest levy payers in 2022/23

In 2022/23, the top 100 levy payers accounted for £238 million, or 62 per cent, of the total levy.



Source: PPF

Notes:

The 1,001+ category accounts for a significant percentage of the total levy payers as it contains just over 4,130 schemes.

The components may not sum to the total levy because of rounding.

Figure 9.3 | Schemes with no risk-based levy by levy year

The proportion of schemes not invoiced with a risk-based levy is the highest since the introduction of the New Levy Framework in 2012/13.

Levy year	Number of schemes	Percentage of total schemes	s179 liabilities (£bn)[1]	s179 liabilities as percentage of total
2012/13	1,191	19%	199	19%
2013/14	1,056	17%	171	15%
2014/15	1,113	18%	206	17%
2015/16	985	17%	195	14%
2016/17	961	17%	239	16%
2017/18	1,011	18%	405	25%
2018/19	1,457	26%	560	35%
2019/20	1,509	28%	562	33%
2020/21	1,503	28%	624	34%
2021/22	1,766	34%	737	40%
2022/23	2,069	40%	850	48%

Source: PPF

1 Liabilities are stressed and smoothed.

Figure 9.4 | Number of schemes with capped risk-based levies by levy band

The proportion of schemes with a capped risk-based levy was 3 per cent for 2022/23.

Levy band	Levy rate	Total number of schemes	Number of capped schemes	Percentage of schemes in levy band which are capped
1	0.28%	1,459	0	0%
2	0.31%	341	0	0%
3	0.35%	434	0	0%
4	0.40%	455	0	0%
5	0.53%	516	0	0%
6	0.81%	671	1	0.1%
7	1.26%	560	10	1.8%
8	1.76%	248	21	8.5%
9	2.39%	274	57	20.8%
10	3.83%	178	45	25.3%
Total		**5,136**	**134**	**2.6%**

Source: PPF

Note: we calculate a scheme's risk-based levy by mapping the sponsoring employer's insolvency probability to one of the 10 levy rates above. For schemes with multiple employers, we calculate their insolvency probability as an average of the corresponding employers, mapped back to the nearest levy band. This is then multiplied by the amount of underfunding in the scheme and the levy scaling factor to give the risk-based levy. Further details of how we calculate the PPF levy can be found on our website. For more information see: https://www.ppf.co.uk/how-levy-calculated.

Figure 9.5 | Number of schemes with capped risk-based levies by funding ratio (on a stressed and smoothed basis)

Schemes with lower funding levels are more likely to have had a capped risk-based levy in 2022/23.

Funding ratio	Number of capped schemes	Percentage of schemes in funding bands which are capped	Total number of schemes
Less than 50%	50	17.9%	279
50%–75%	82	6.3%	1,299
75%–100%	2	0.1%	1,756
Over 100%	0	0.0%	1,802
Total	**134**	**2.6%**	**5,136**

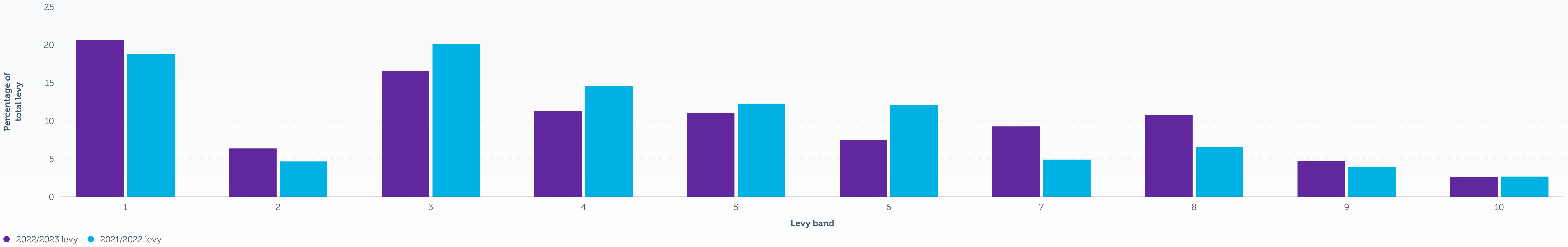
Source: PPF

Schemes with capped risk-based levies tend to have low funding ratios and sponsors with high insolvency risk.

PPF levy 2022/23 continued

Figure 9.6 | Levy distribution by levy band

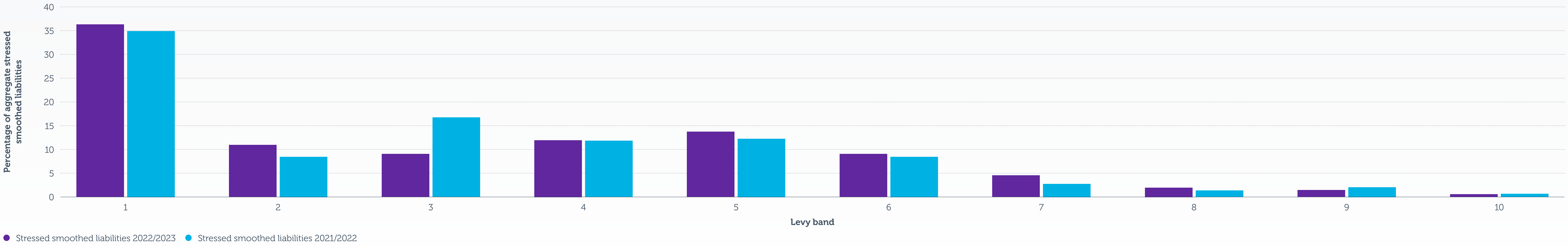
Schemes in levy bands 1 and 3 made the largest contribution to the total levy in 2022/23, being invoiced about 20 per cent each.



Source: PPF

Figure 9.7 | s179 aggregate stressed smoothed liabilities by levy band

Schemes in levy band 1 account for 36 per cent of the total liabilities in 2022/23.

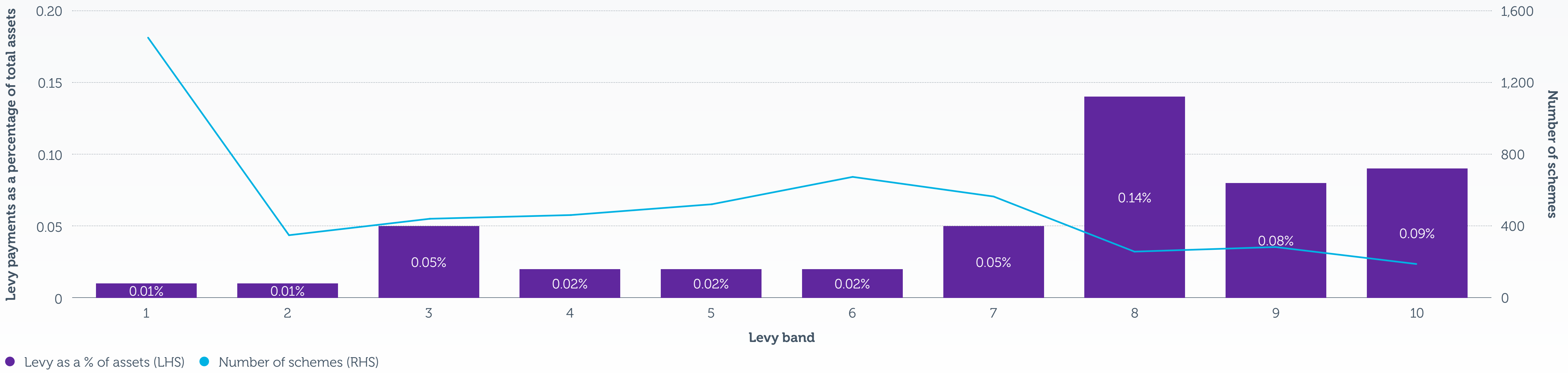


Source: PPF

PPF levy 2022/23 continued

Figure 9.8 | Levy as a proportion of assets by levy band

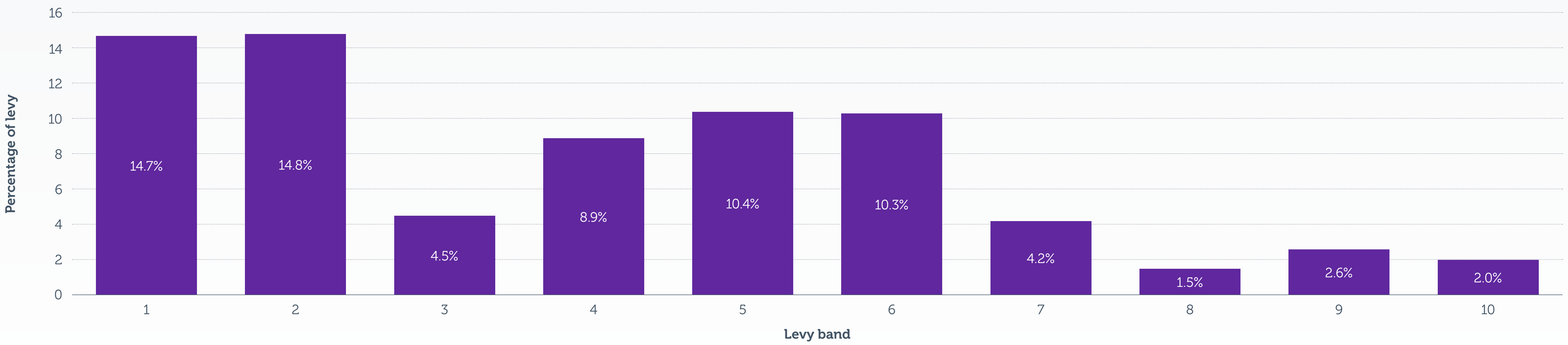
Schemes in levy bands 8 and 10 were invoiced a noticeably higher levy, expressed as a percentage of assets, than schemes in other bands. Levy rates go up with each band, so schemes in higher bands generally pay more levy as a proportion of assets. The band 8 average is particularly high because of some large band 8 schemes that are less well-funded and therefore pay more levy.



Source: PPF

Figure 9.9 | Percentage of total levy that is scheme-based[1] by levy band

The proportion of total levy that is scheme-based is highest for the lowest levy bands.



Source: PPF

1 For the definition of scheme-based levy, see the 2022/23 Levy Determination on our website.

Figure 9.10 | Percentage of total levy that is scheme-based by funding ratio (on a stressed and smoothed basis, excluding bespoke asset stress submissions)

For schemes that were over 100 per cent funded, the scheme-based levy constituted, on average, over 98 per cent of their total levy.

Funding level	Less than 50%	50%–75%	75%–100%	Over 100%
Percentage of levy that is scheme-based	1.8%	3.6%	9.8%	98.0%

Source: PPF

PPF levy 2022/23 continued

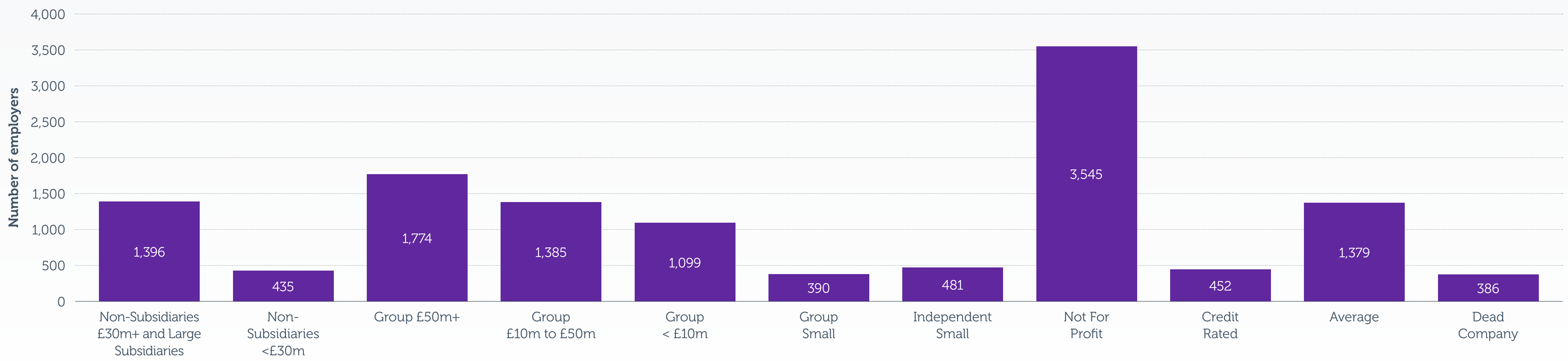
9.3 D&B scorecards

For the 2022/23 levy year, we used the PPF and Dun and Bradstreet's (D&B's) bespoke model for assessing insolvency risk of schemes in the PPF universe.

The charts in this section show how many sponsoring employers in the PPF universe are assigned to each scorecard, and how much of the total 2022/23 PPF levy was invoiced in respect of schemes sponsored by the employers in these categories.[1]

Figure 9.11 | Number of sponsoring employers in each D&B scorecard

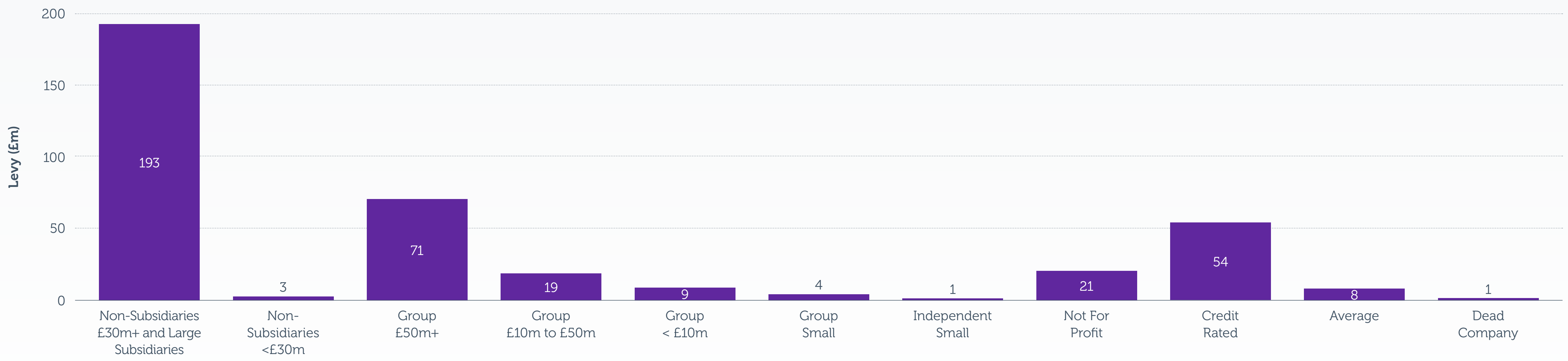
Not-for-profit organisations make up the greatest number of sponsoring employers in the PPF universe. Many of these are participants in multi-employer schemes.



Source: PPF

Figure 9.12 | Levy invoiced in respect of schemes with sponsoring employers in each D&B scorecard

Schemes on three of the 12 D&B scorecards were invoiced 83 per cent of the total levy.



Source: PPF

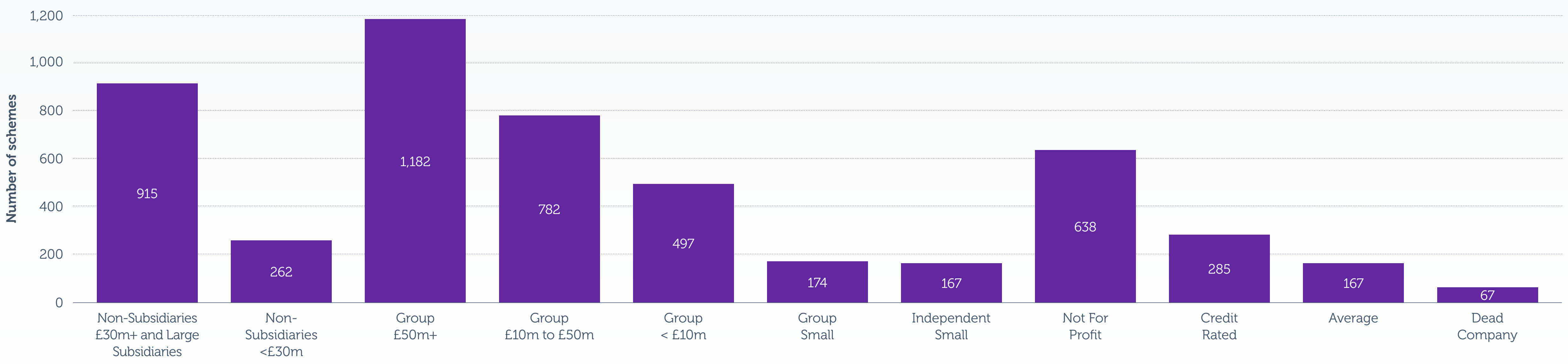
Note: the components may not sum to the total levy because of rounding.

1 For multi-employer schemes with employers on different scorecards, the levy was split proportionately by membership numbers.

PPF levy 2022/23 continued

Figure 9.13 | Number of schemes with sponsoring employers in each D&B scorecard

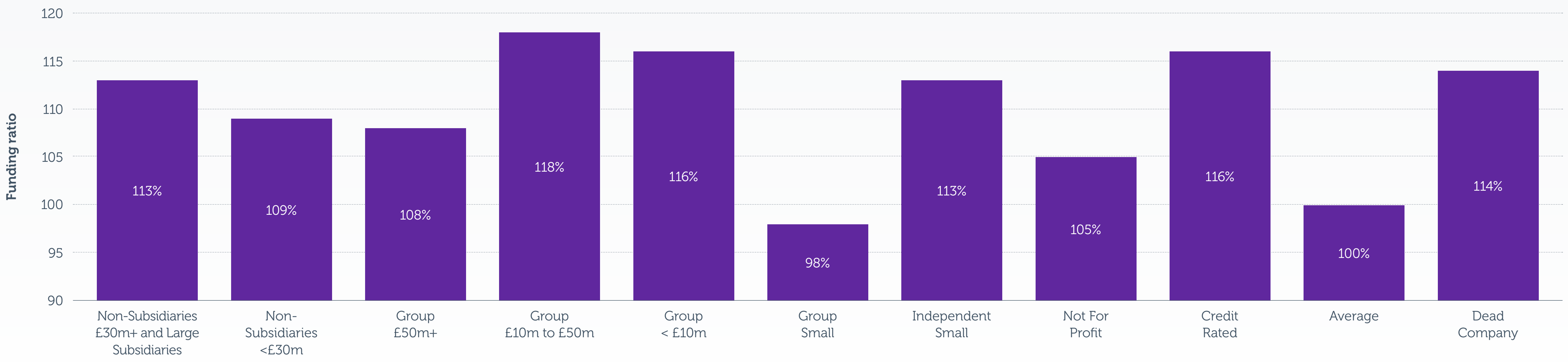
41 per cent of schemes had sponsoring employers categorised as 'Non-Subsidiaries £30 million+ and Large Subsidiaries' or 'Group £50 million+'.



Source: PPF

Figure 9.14 | Aggregate funding ratio (unstressed and unsmoothed) of schemes with sponsoring employers in each D&B scorecard

Funding ratios varied by around 20 percentage points (excluding dead companies) across the scorecards used to assess the insolvency risk of employers of schemes.



Source: PPF

10

Claims and schemes in assessment

This chapter looks at characteristics of schemes that were in a PPF assessment period as at 31 March 2023. Once schemes have made a claim, they must go through an assessment period to determine their ability to pay PPF levels of compensation, before they are able to enter the PPF.

Summary

- The changes over the year since 31 March 2022 reflect new schemes entering (and then remaining) in assessment, schemes transferring into the PPF, and schemes being rescued, rejected, or withdrawn.
- The following table sets out some of the statistics about schemes in PPF assessment[1] as at 31 March 2023, including comparisons with both the previous year and schemes in the universe.

		31 March 2023	31 March 2022
Schemes in assessment[2]	Number of schemes	**60**	63
	Number of records in respect of all members[3]	**67,000**	75,000
	Total assets (£bn)	**4.0**	5.9
	Total PPF liabilities (£bn)	**4.1**	6.4
	Funding ratio	**97%**	93%
Schemes in universe	Funding ratio	**134%**	113%

Notes:

1 For the purpose of this chapter we treat separate sections and segregated parts of the same scheme as one single scheme. We also include overfunded schemes that we do not expect to transfer to us. This is different from the approach in our Annual Report and Accounts (ARA) where we treat all segregated parts of schemes as separate schemes, and generally exclude overfunded schemes.

2 These figures differ from those in the ARA because of the inclusion of overfunded schemes, the exclusion, in *The Purple Book*, of expected reapplications, and the use of a different set of actuarial assumptions.

3 Some members may have more than one record in the data.

Schemes entering assessment

Figure 10.1 | Total s179 claims for schemes entering an assessment period

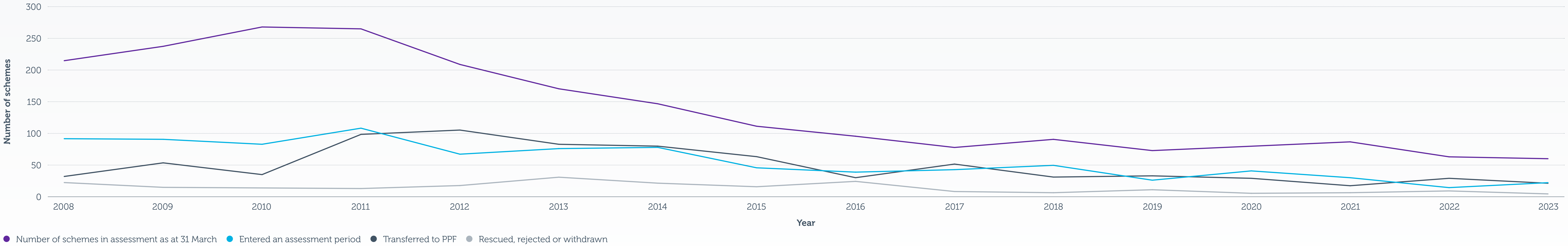
The total s179 deficit of the 20 schemes that entered assessment in the year to 31 March 2023 was £10 million, the lowest annual total since the PPF's inception.

Source: PPF

Claims and schemes in assessment continued

Figure 10.2 | Number of schemes in assessment each year, as at 31 March

60 schemes were in PPF assessment at 31 March 2023, down from 63 last year.



Note: the figures in the chart exclude those schemes that came into assessment and were subsequently rescued, rejected or withdrawn in the same year.

Source: PPF

Figure 10.3 | Funding statistics for schemes in assessment each year, as at 31 March

The funding ratio of schemes in assessment at 31 March 2023 has increased to its highest ever level of 97 per cent, up from the previous record set last year of 93 per cent. The funding ratio of all PPF-eligible schemes increased from 113 per cent to 134 per cent over the same period.

Year	Assets (£bn)	Liabilities (£bn)	Net funding position (£bn)	Funding ratio	Universe funding ratio
2007	4.0	4.7	-0.7	85%	109%
2011	9.5	10.9	-1.4	87%	100%
2016	5.0	7.4	-2.4	68%	86%
2017	5.6	6.6	-1.0	85%	91%
2018	6.9	9.3	-2.4	74%	96%
2019	7.7	11.2	-3.5	69%	99%
2020	10.3	13.6	-3.3	76%	95%
2021	8.6	9.4	-0.8	91%	103%
2022	5.9	6.4	-0.4	93%	113%
2023	4.0	4.1	-0.1	97%	134%

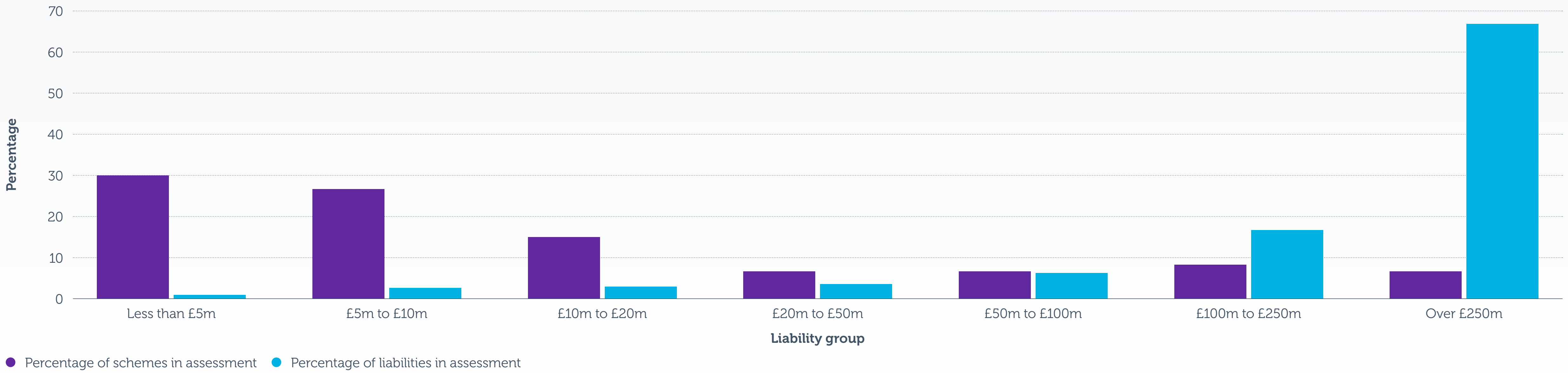
Note: the components may not sum to the total because of rounding. Also the ratios of the components may not equal the aggregate ratios because of rounding.

Source: PPF

Scheme demographics

Figure 10.4 | Percentage of schemes and percentage of s179 liabilities grouped by size of liabilities, for schemes in assessment as at 31 March 2023

Schemes in PPF assessment that have liabilities of over £250 million represent around seven per cent of schemes and 67 per cent of liabilities.

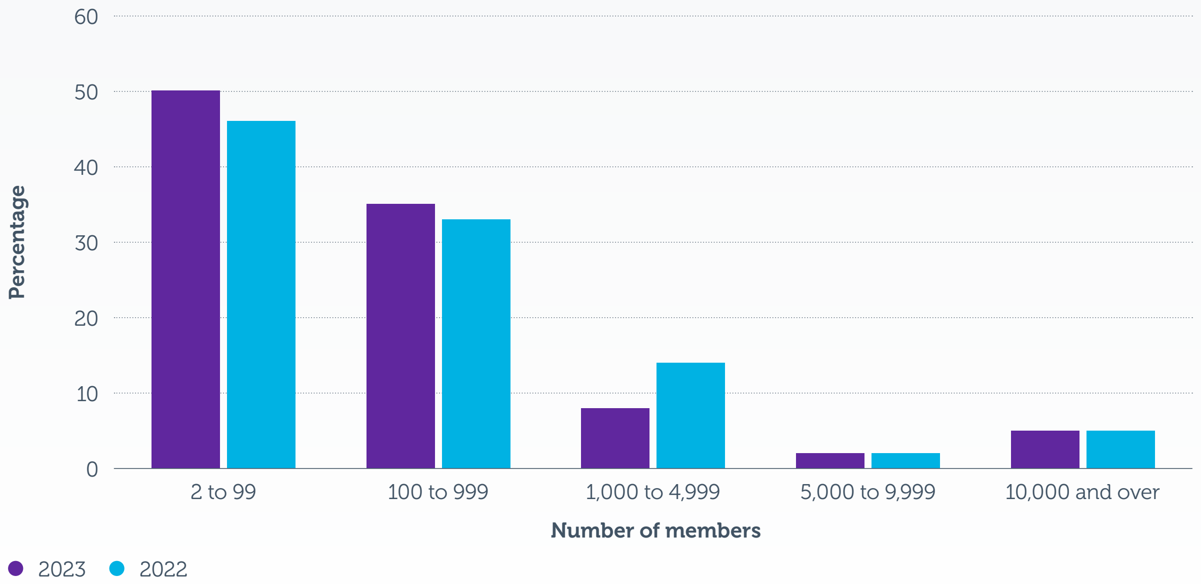


Source: PPF

Claims and schemes in assessment continued

Figure 10.5 | Proportion of schemes in assessment by membership size

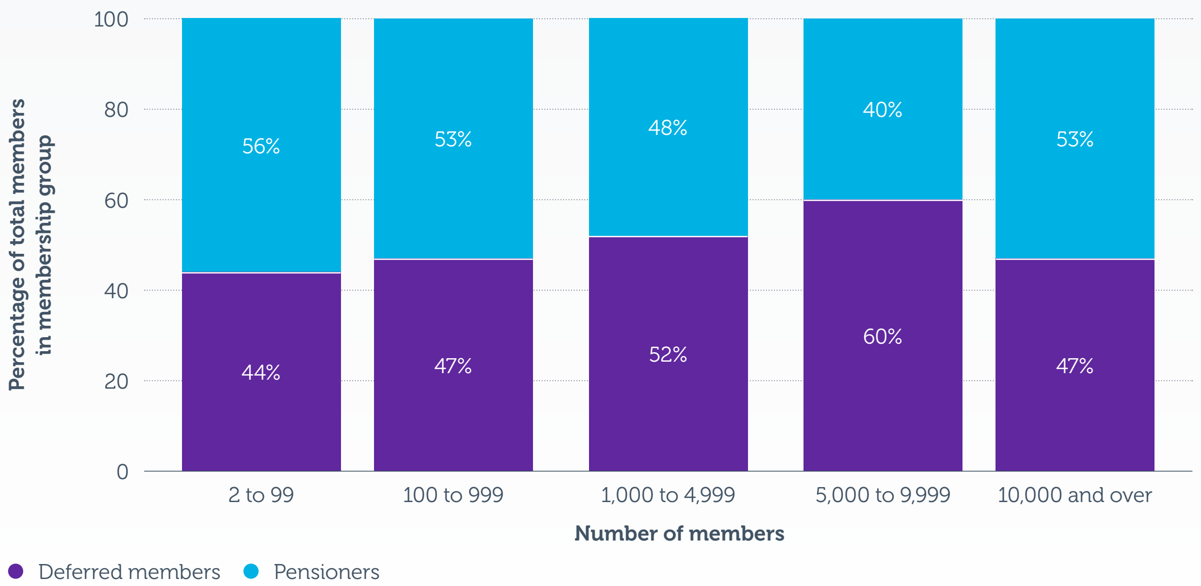
Around 85 per cent of schemes in assessment have fewer than 1,000 members.



Source: PPF

Figure 10.6 | Maturity of schemes in assessment by membership size

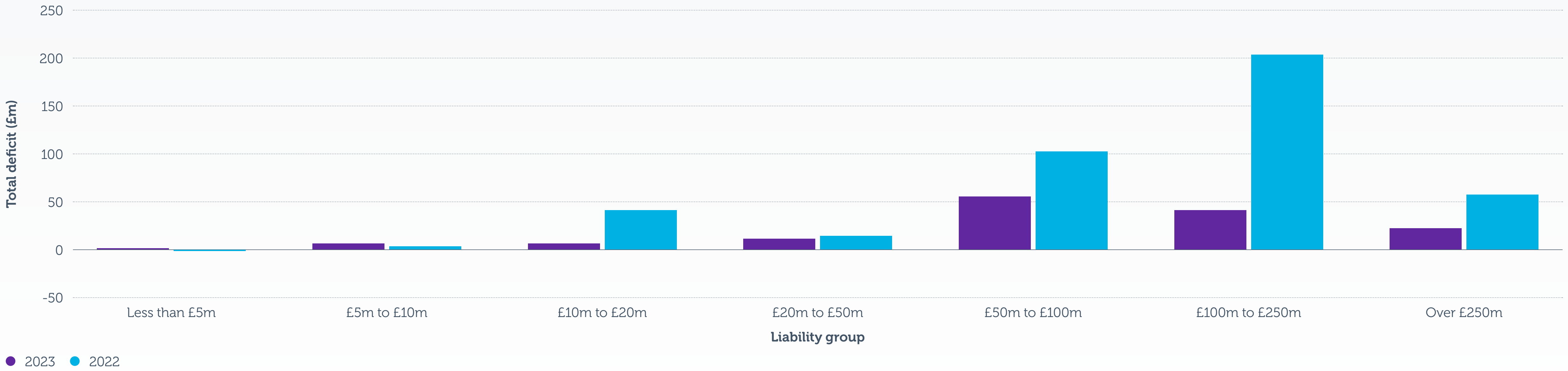
With the exception of the largest schemes, the proportion of members that are deferred increases with scheme size for schemes in assessment.



Source: PPF

Figure 10.7 | Total s179 deficit of schemes in assessment by liability size

45 per cent of the deficit from schemes in assessment relates to schemes with liabilities of more than £100 million, down from 62 per cent last year.



Source: PPF

Note: the total deficit for schemes with liabilities less than £5m is around -£1m, i.e. a £1m surplus. This is due to a scheme in this group which had a deficit at its assessment date, but a surplus as at 31 March 2023.

11

PPF compensation 2022/23

This chapter looks at our membership, including the compensation we paid to PPF members in 2022/23, and some demographic characteristics.

Summary

When a scheme transfers into the PPF, we generally pay compensation of 90 per cent of the scheme pension (no longer subject to a compensation cap[1]) to members who have not reached their Normal Pension Age (NPA) at the date the scheme entered assessment. We will generally pay a starting level of compensation equivalent to 100 per cent of the scheme pension to those members who are over their NPA at the start of the assessment period.

Here are some of the key statistics featured in this chapter:

	31 March 2023	31 March 2022
PPF compensation paid in the year	**£1,217m**	£1,115m
Number of records in respect of members receiving compensation	**199,895**	193,983
Average annual amount paid to members and dependants	**£4,882**	£4,825
Number of records in respect of deferred members*	**106,977**	111,995
Average annual compensation accrued by deferred members	**£3,548**	£3,309

* Members with compensation not yet in payment.

Total compensation and other member statistics

Figure 11.1 | Total compensation and number of member records

Total compensation paid in the year to 31 March 2023 was £1,217 million, nine per cent more than the amount paid in the previous year.

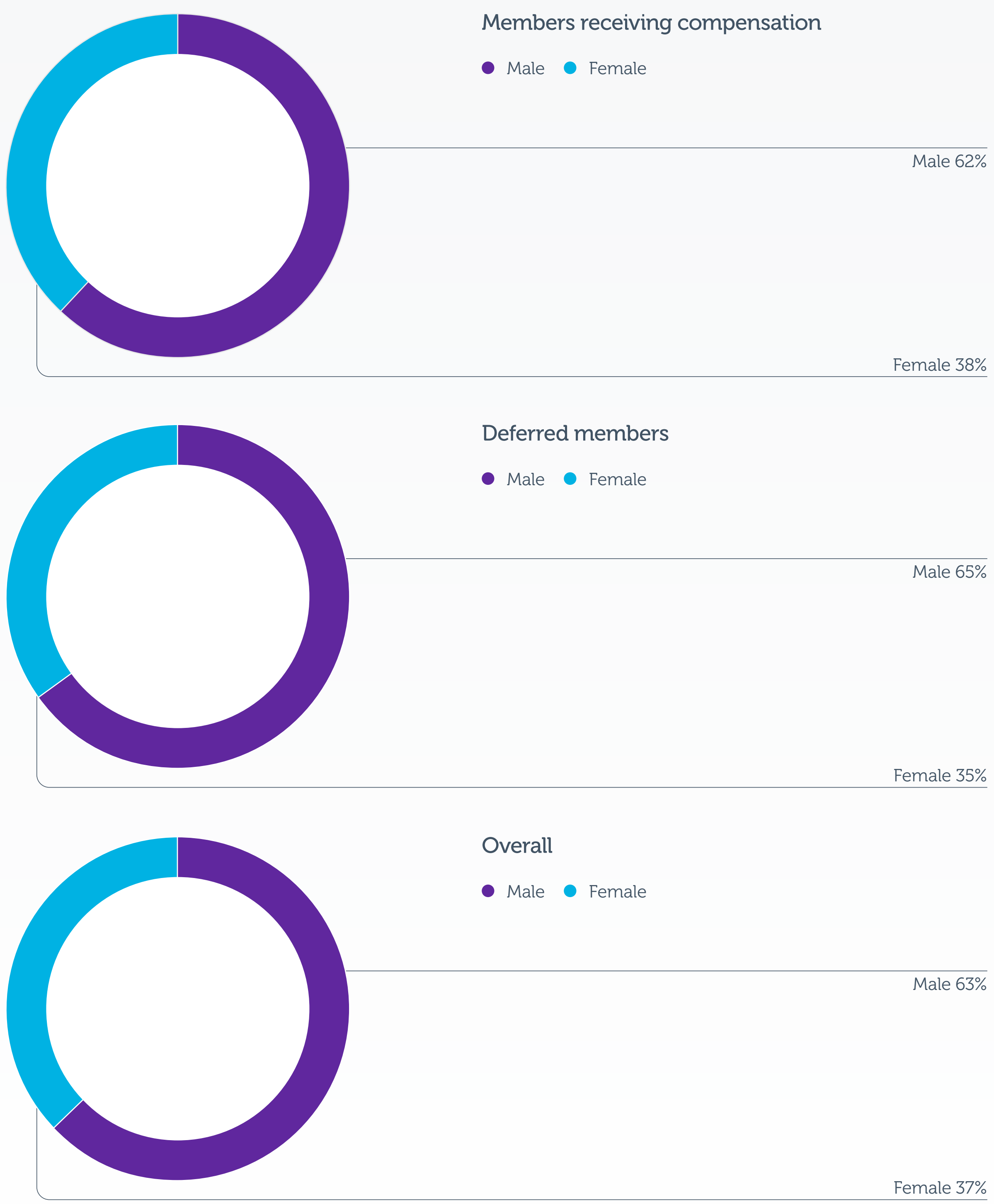
		Number of member records*		
Year	Total compensation paid	Members receiving compensation	Deferred members	Total
2007	1.4	1,457	5,621	7,078
2011	119.5	33,069	42,063	75,132
2016	616.0	121,059	109,143	230,202
2017	661.3	129,661	110,478	240,139
2018	724.5	135,377	107,759	243,136
2019	775.1	148,005	109,567	257,572
2020	859.7	169,861	116,461	286,322
2021	1,006.4	184,844	113,902	298,746
2022	1,114.9	193,983	111,995	305,978
2023	1,217.0	199,895	106,977	306,872

Source: PPF

* Some members have more than one record in the data.

Figure 11.2 | Sex of members in the PPF

The majority of our members are male.



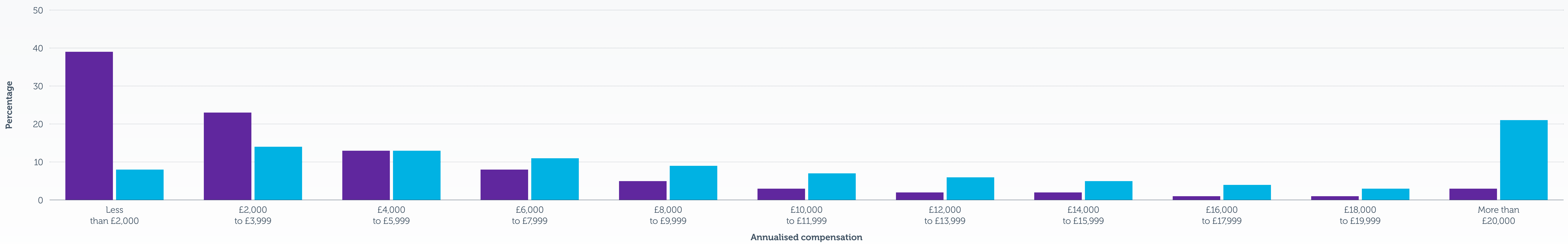
Source: PPF

1 In June 2020 the Administrative Court ruled in the case of *Hughes v Board of the Pension Protection Fund 2020 EWHC 1598* that this cap is unlawful. The Court of Appeal upheld this ruling in August 2021. We are currently in the process of uplifting compensation for members who were previously capped, but the compensation in payment shown in the table above has not yet been adjusted to disapply the compensation cap for every member.

PPF compensation 2022/23 continued

Figure 11.3 | Distribution of members receiving compensation by annualised compensation level

Around 90 per cent of members receiving compensation are paid less than £10,000 a year. However, this compensation makes up around 55 per cent of the total paid out.

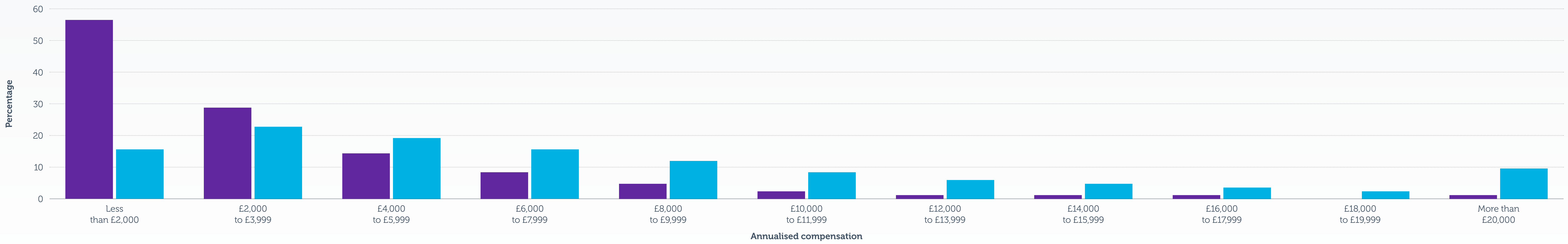


● Percentage of members receiving compensation ● Percentage of total compensation

Source: PPF

Figure 11.4 | Distribution of deferred members by annualised compensation level

Around 95 per cent of deferred members have annualised compensation of less than £10,000. This compensation makes up around 70 per cent of the total annual deferred compensation.



● Percentage of deferred members ● Percentage of total deferred compensation

Source: PPF

PPF compensation 2022/23 continued

Figure 11.5 | Status of members receiving compensation

	Number of records	Percentage of total population	Annualised compensation (£m)	Percentage of total annualised compensation
Members	166,003	83%	865	89%
Dependants	33,892	17%	111	11%
Total	**199,895**	**100%**	**976**	**100%**

Source: PPF

Note: annualised compensation is less than compensation paid in the year to 31 March 2023 as the latter includes cash sums taken upon retirement, and takes account of member movements (e.g. deaths or retirements) over the year.

Figure 11.6 | Distribution of members and compensation accrual type by Normal Pension Age (NPA)

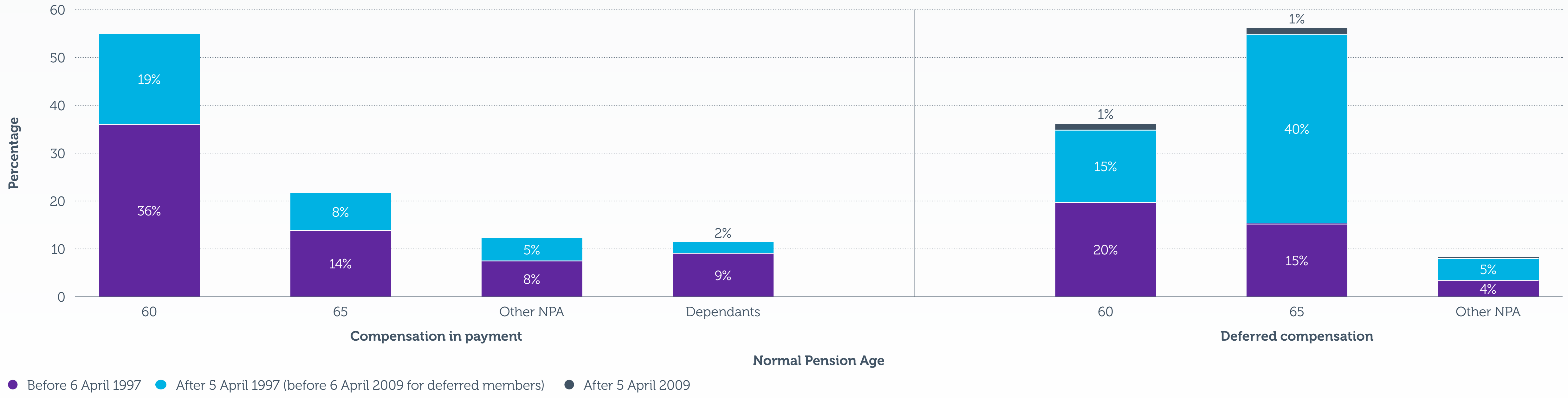
For members receiving compensation, the majority of compensation was payable from an NPA of 60, whereas for deferred members the majority is payable from 65. Around two thirds of compensation in payment was accrued before 6 April 1997.

The PPF pays increases in payment to compensation accrued after 5 April 1997. This is based on the Consumer Prices Index (CPI) and is capped at 2.5 per cent a year. Compensation increases in deferment also in line with CPI – capped at 5 per cent a year for compensation accrued before 6 April 2009 and at 2.5 per cent a year for compensation accrued after 5 April 2009.

	NPA						
	Compensation in payment				Deferred compensation		
Compensation accrual period	60	65	Other NPA	Dependants	60	65	Other NPA
Before 6 April 1997	36.1%	14.0%	7.6%	9.2%	19.8%	15.3%	3.5%
After 5 April 1997*	18.8%	7.6%	4.6%	2.2%	15.1%	39.6%	4.6%
After 5 April 2009					0.5%	1.2%	0.3%
Total	**54.8%**	**21.6%**	**12.2%**	**11.4%**	**35.4%**	**56.2%**	**8.4%**

* Before 6 April 2009 for deferred members.

Note: the component figures may not sum to the totals because of rounding.

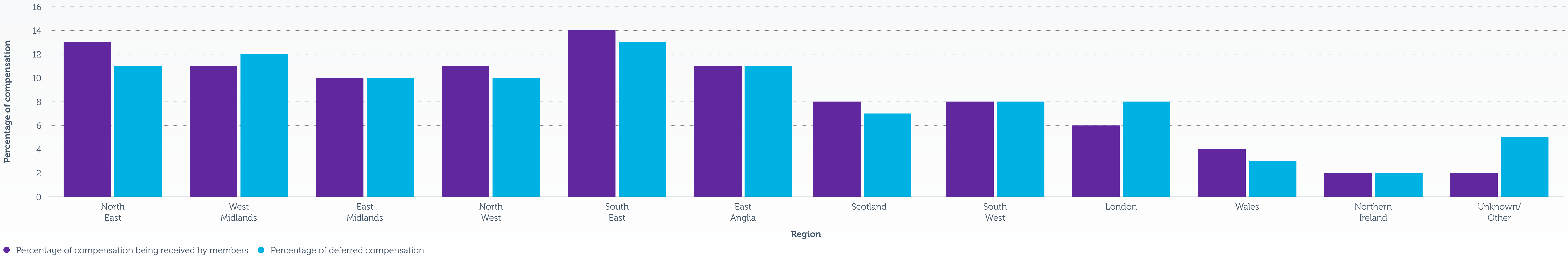


Source: PPF

PPF compensation 2022/23 continued

Figure 11.7 | Annualised compensation by UK region

The largest shares of compensation go to members in the North East and South East of England.



Source: PPF

12

PPF risk developments

This chapter looks at the risks to our funding position and to our ability to deliver on our mission.

Summary

This chapter contains information on our approach to funding and how we manage the risks that could have a material impact on our future funding levels.

Our Funding Strategy Review 2022[1] sets out our approach to financial risk management. In the first ('growth') phase of the PPF's journey, we had a strategic objective to build our financial strength by growing our reserves. Our position is now sufficiently strong to allow us to move into our second ('maturing') phase, where our objective has shifted to 'Maintaining our Financial Resilience'. To meet this objective, we have a set of funding priorities, and the strategic decisions we take are guided by how our reserves compare to these priorities.

To help us understand how our future funding may evolve, we use a stochastic model which considers how our own funding, and that in the universe we protect, may change over time. This modelling is then used to help inform our future investment and levy strategy.

Over the last year, we have seen an increase in the likelihood of us meeting our funding objective of 'Maintaining our Financial Resilience'. The main reason behind this has been the significant improvement in scheme funding, driven by increased gilt yields. However, unless schemes have hedged to 'lock-in' these gains, they may be reversed by falling yields in the future.

Although the general economic environment remains volatile, our modelling indicates that we are well placed to cope with the uncertainty. Our sensitivity testing shows that our Financial Resilience Test is expected to be met even under stressed input assumptions. Our funding framework will help guide our strategic decisions as our funding, and that of the schemes we protect, evolves.

Our approach to risk management

Like other financial institutions, we assess our risks using a comprehensive enterprise risk management framework, so we focus on the risks that could have the greatest impact. We seek to understand our financial risks by using modelling, including sensitivity testing, to help us understand the potential impact from changes to those risks in the future.

We consider our risk under three broad headings – Strategic and Funding, External Environment, and Operational. In *The Purple Book* we focus our attention on the components of those risk types with material financial implications for us. Therefore, we do not cover here operational risks to which we are exposed.

Strategic and Funding: risk from our existing assets and liabilities

These risks are similar to those faced by other financial institutions, including pension funds and insurance companies. They include the risks of managing our own investment portfolio, and demographic risks.

We will accept risk where it adds value to do so or where the costs of hedging are disproportionate. We hedge our liabilities closely for changes in inflation and interest rates. We also use a bespoke investment strategy which seeks to protect and prudently build reserves to provide cover for future risks – in particular, the risks of increased life expectancy and future claims. The non-hedging part of the portfolio is designed such that there is a very low risk that it will produce a negative cumulative return over a five-year horizon. We accept short-term volatility of our funding level and our response to such volatility is consistent with our long-term funding strategy.

We are willing to accept life expectancy risk and other demographic risks. However, we would consider transferring these risks to a third party if they are significant and hedging costs are reasonable. Reflecting the importance of life expectancy in our future cashflows, we use granular estimates of life expectancy based on socio-economic and geographical factors.

Both investment and demographic risks are potentially impacted in the long term by climate change. Therefore, this is an important consideration in our Responsible Investment strategy, and we are developing approaches to incorporate climate risk into our modelling and improve our understanding of the potential impact on our risk exposure.

1 https://www.ppf.co.uk/-/media/PPF-Website/Public/Years/2022-09/Funding_Strategy_Review_2022.pdf.

External Environment: risk from the schemes we protect

This is the risk that we exist to protect – schemes being underfunded when their sponsors fail, possibly resulting in claims. We cannot control this risk so we must accept it. But we monitor this risk to understand any financial implications it may have for us.

TPR monitors scheme funding and sets guidance for DB pension schemes to reduce the risk of underfunding. We liaise with TPR regularly to gain a shared understanding of developments that may change the risk of claims on us. In addition, we monitor key information about employers who sponsor the schemes we protect including, where available, public credit ratings. When monitoring claims risk, we consider both the potential size of a claim and the likelihood of it occurring.

The Purple Book shows that risk in the universe has reduced over time and that claims on us have been decreasing. That said, some schemes remain very underfunded and therefore the risk of further claims on us remains.

Our funding strategy

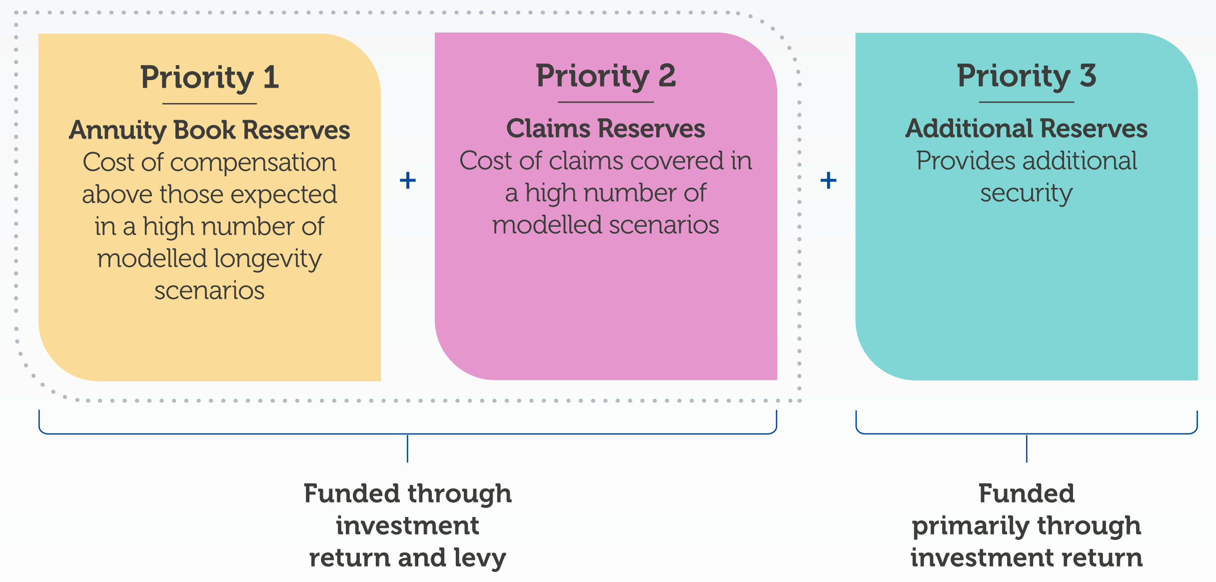
We published our current Funding Strategy Review in September 2022. We plan to carry out a detailed review of our strategy every three years, with annual checkpoints in intervening years to assess where we are relative to projections.

Recognising our own financial strength and the changing profile in the universe of schemes we protect, we have entered what we have called the maturing phase of our funding journey. During this phase our central expectation is that we will see fewer claims than we have seen historically, and that those that do occur will have less impact on our funding.

During this phase, our funding objective is 'Maintaining our Financial Resilience'. We define Financial Resilience as having a high level of confidence of being able to pay compensation to both our current and future members in full, with no support required from investment returns and levy. When taking strategic decisions, the Board considers how our reserves compare with the level required to meet the Financial Resilience Test.

To help us achieve our objective we have three main funding priorities, as illustrated in the diagram below. The investment and levy decisions we take are guided by how our reserves compare to these priorities.

Target reserves during the PPF maturing phase



The Annuity Book Reserves and Claims Reserves are designed to cover all but the worst longevity and claim scenarios. These reserves will be funded through both investment return and levy. Any Additional Reserves built up will be funded primarily through investment return.

PPF risk developments continued

We consider ourselves Financially Resilient when we have sufficient reserves to cover both Priority 1 and Priority 2 reserves, i.e. longevity reserves for our current members (Priority 1) and reserves for future claims (Priority 2). However, our aim is to achieve Priority 3 reserves, i.e. additional reserves above those needed to meet the Financial Resilience Test, to provide better protection for both our current and future members. As the universe we protect matures and gets smaller, it will be difficult to raise a material levy. By building additional reserves through our investment returns our aim is to reduce the risk of having to go back to ask levy payers to contribute more in the future.

Summary of modelling

To understand the level of protection afforded by our reserves and how likely we are to meet our Financial Resilience Test in the future we use our Long-Term Risk Model (LTRM), a Monte Carlo simulation model. This model runs a million different scenarios to project what the future may look like, allowing for future claims, levies, investment returns, and changes in economic conditions. Like any complex modelling exercise, the projections are subject to significant uncertainty and our success ultimately depends on some factors outside of our control.

No model can perfectly predict the future, and the LTRM is no exception. The base case projections are based on a series of assumptions, which we continually refine to reflect how experience and expectations develop over time. We assume that our broad approach to levy will not change. Our investment strategy is assumed to remain unchanged. Schemes are assumed to transition gradually to a low-risk investment strategy, and to keep receiving deficit-reduction contributions (DRCs) if they are underfunded.

The fan chart in figure 12.1 below shows the recent history of our reserves up to 2023, followed by LTRM projections of how they might develop in the future. Projections are shown for the period up to 2035, which is the earliest we expect to move from our current maturing phase to our run-off phase. The chart shows that, based on our current strategy, in most scenarios our reserves are expected to rise as investment returns exceed claims. Only in the most extreme scenarios (which are beyond the range of this chart), do the reserves fall below the amount currently estimated as needed to cover our Priority 1 reserves.

Figure 12.1 | Projections of our funding level

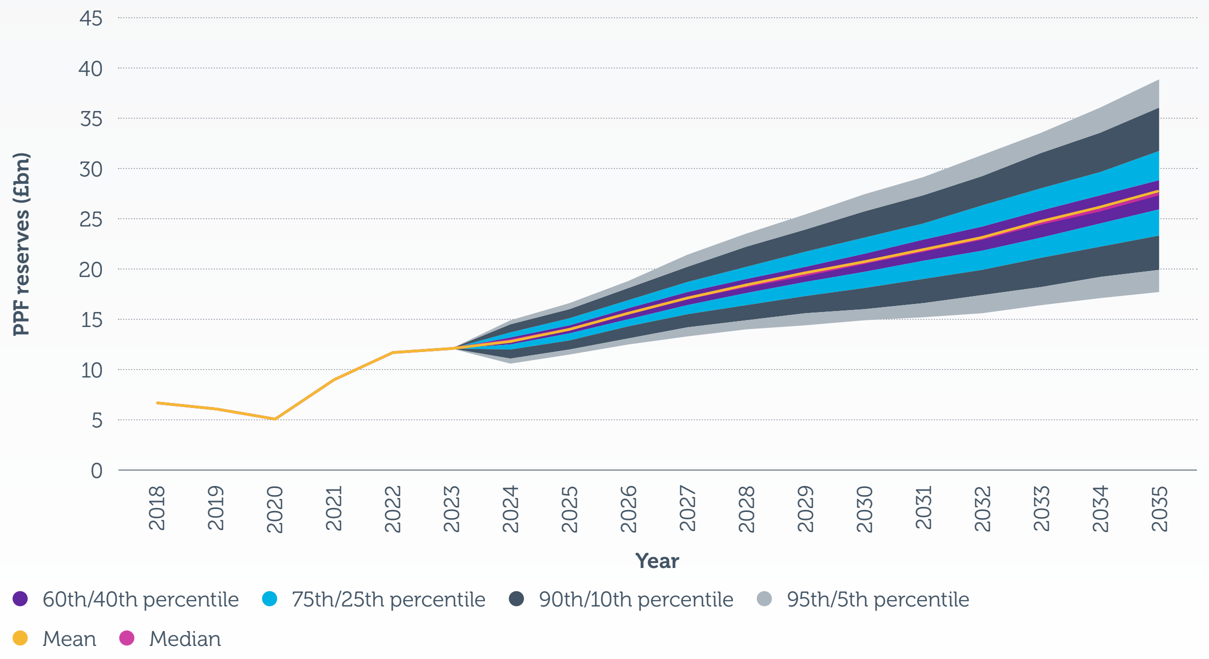
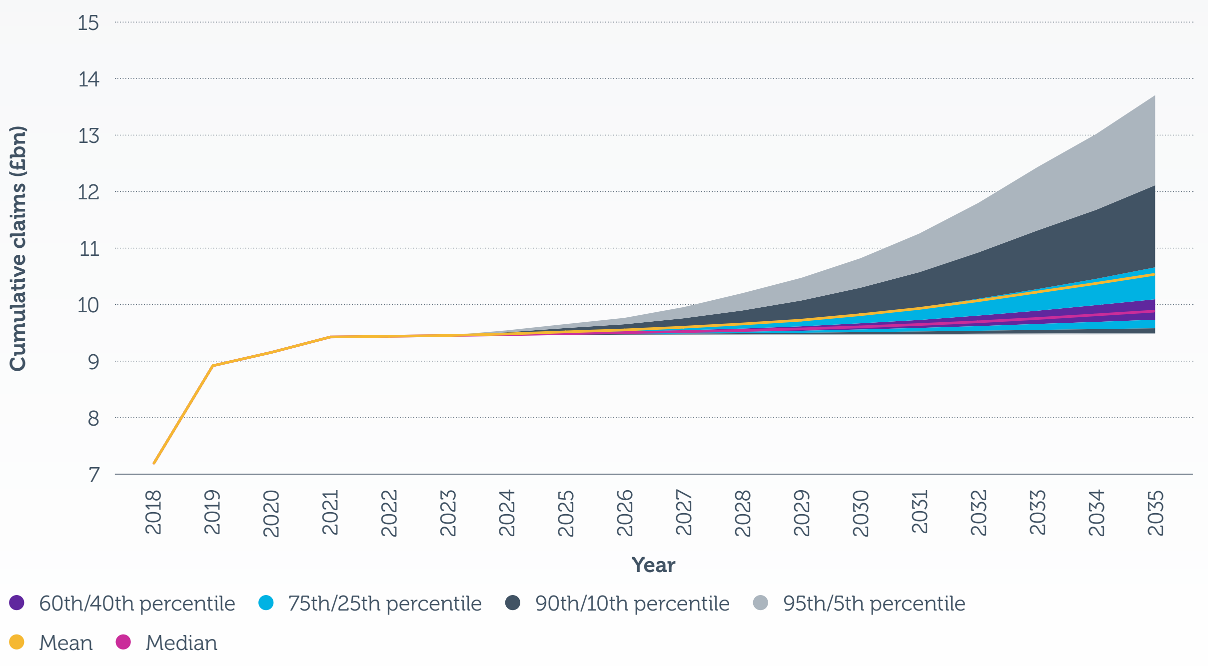


Figure 12.2 below shows the history of claims as well as the distribution of modelled claims on the fund beyond 2023. This is the risk our Priority 2 reserves are designed to protect against. As at 31 March 2023, we had sufficient reserves to meet our Financial Resilience Test and we have a high likelihood of this also being true at the time of our next planned detailed review in 2025. The chart also shows that in many of our modelled scenarios we can expect the growth in our cumulative claims to be modest, which is a defining feature of the maturing phase. We do, though, still have some scenarios where significant claims occur.

Figure 12.2 | Projections of cumulative claims



Risks not allowed for in our modelling and possible future changes in the risk landscape

Like all financial services institutions, we are exposed to possible changes in the external environment, which could have an impact on our finances but over which we have no or limited influence. At this stage it would not be appropriate to incorporate all such factors into our 'base case' modelling and our funding targets, but they are considered as part of our sensitivity and stress-test analysis. The following paragraphs discuss some of the most material risks we are currently monitoring.

Climate risk: We consider climate change as a systemic risk, which can affect the value of our investments across the short, medium and long terms. We have engaged with the Paris Aligned Investment Initiative (PAII) and other initiatives to further best practice in management and disclosure of these risks. As a supporter of the Task Force on Climate-related Financial Disclosures (TCFD), we commit to reporting on our climate-related governance, strategy, risk management, and metrics and targets. Our dedicated TCFD Climate Change Report[1] shares this information in depth. Climate change could, over the medium to long term, have a significant impact on the level of claims we receive. This is due to impacts on the value of scheme asset portfolios and on sponsor insolvency risk. Increased requirements on pension schemes for disclosure are likely to drive changes in approach to investment. Also, life expectancy risk is potentially affected by climate change, which could impact the reserves we need to meet our Financial Resilience Test. We continue to review and develop approaches to help us understand the potential impact of climate change in our risk exposure.

1 https://www.ppf.co.uk/-/media/PPF-Website/Files/Reports/PPF_Climate_Change_Report_2023.pdf.

Macro-economic changes to the economy: The current macro-economic environment remains volatile. There are a number of contributing factors which have led to both short-term and structural changes. The ultimate extent of the structural changes is still somewhat uncertain at this stage. Changes to working preferences are affecting the demand for certain types of goods and services. The current high inflation environment has been created by supply-demand imbalances, particularly in the energy and food sectors; the medium-term outlook for inflation is still uncertain. The LDI crisis in Autumn 2022 may have impacted schemes' funding levels and future investment strategies; we will not know the full impact until schemes submit new s179 valuations via their scheme returns. These issues may adversely impact the viability of sponsoring employers and/or the funding levels of schemes, which affects our claims risk. The value of our financial assets may also be affected. The impact of this may, however, be muted to some extent as the high interest environment has acted to improve funding for many schemes. This means that even if insolvency rates do rise, we would expect a low proportion of schemes to ultimately transfer to us.

Buy-out pricing: A material deterioration in buy-out pricing, either through supply issues or changes to underlying regulation, could see the aggregate deficit in the universe we protect increase, hence increasing claims risk. Conversely, increased competition or regulatory change could see pricing become cheaper, which might lead to a faster shrinking of the DB universe.

Commercial consolidators: Interest in consolidator vehicles continues to advance. However, the shape and size of the market are relatively unclear. So, at this stage, we have made no specific adjustments in our financial modelling. In August 2023, TPR updated its guidance for consolidators and guidance for prospective ceding trustees and employers. Based on these, we expect that the risk these new models pose to our ability to meet our funding objectives will be limited. One consolidator has recently completed its first transaction. At the time of writing, there are no longer any other prospective consolidators actively seeking authorisation from TPR, adding to the uncertainty around long-term market impact.

Legislative and regulatory changes: TPR delivered its second consultation on its draft code of practice on funding in December 2022. Some important details are still to be resolved, with the final code and regulatory framework expected to be launched in April 2024. Its aim will be to increase the security of the benefits that have been promised to members of DB schemes, which also has the impact of reducing the likelihood and scale of claims on us. On the other hand, there is the possibility that future legislative or regulatory changes could increase the risk to us. For example, potential changes to the remit of the PPF, or regulatory change designed to encourage, or which has the effect of encouraging, the re-risking of schemes in the universe.

Sensitivities

The LTRM output has been tested for sensitivity to a range of modelling assumptions. The sensitivity tests aim to provide an insight into how the model outputs might be affected if future experience is not as expected relative to the base case, best-estimate, assumptions.

A selection of the more significant sensitivity scenarios tested this year is summarised in the table below. Under each of these scenarios, we are comfortable that our current strategic decisions would be unchanged.

The largest impact was from the scenario in which we modelled a deterioration in scheme funding by 10 percentage points. In this scenario, we still expect our Financial Resilience Test to be met.

Worsened funding levels for the schemes we protect	Scheme s179 funding levels deteriorate by 10 percentage points as a result of a decrease in asset values, with DRCs left unchanged from the base case
Increased insolvency risk	Transition probabilities for all credit rating downgrades are increased by 10 per cent at all future times
Higher inflation	Annual inflation increased by one percentage point above the base case rates at all future times, with yields left unchanged
Lower returns on growth assets	Growth asset returns are one percentage point a year lower (than in the base case) at all future times

Appendix

Note on historical datasets.

Sources of data

The information used in Chapters 3 to 7 and Chapter 12 of this publication comes from three primary sources, as described below.

1. **Scheme returns provided to TPR***

   Most of the analysis in this year's publication is based on new scheme returns issued in December 2022 and January 2023 and returned by 31 March 2023.

2. **Voluntary form reporting**

   Electronic forms are available on TPR's website so pension schemes can provide data regarding contingent assets valuation results on an s179 basis, DRCs and the s179 valuation results following block transfers. More information on DRCs and contingent assets is given in Chapter 8 (Risk reduction).

3. **Sponsor failure scores**

   From the levy year 2021/22, D&B have provided us with scores for calculating the PPF levy using the PPF-specific model. This is a statistical model, developed using observed insolvencies among employers and guarantors of DB pension schemes. More detail on the model can be found on our website[1].

   The starting point in establishing the insolvency risk element of the risk-based levy is normally the annual average of a scheme's D&B monthly scores. This average score is then matched to one of 10 levy bands and the corresponding levy rate is used.

* For around 100 schemes in asset tier 3, it was apparent that schemes' LDI exposure had been removed from the bond splits and included in the risk factor stresses. For these schemes, we concluded that the bond splits in the previous year's scheme returns would be a better reflection of the economic characteristics of their assets. In those instances, we used those prior bond splits in our data and analysis instead of those from the latest scheme returns.

For around 350 other schemes in asset tier 3, we wrote to them to request additional information on what their LDI exposure would look like if they fully incorporated it within their bond proportion. We updated the data for over 90 schemes based on the responses received.

The data used in Chapters 9 (PPF levy 2022/23), 10 (Claims and schemes in assessment) and 11 (PPF compensation 2022/23) are derived from the PPF's business operations. The data from Chapter 8 is mostly taken from a variety of public sources, as noted underneath each figure.

The PPF-eligible DB universe and *The Purple Book 2023* dataset

The PPF covers certain DB occupational schemes and DB elements of hybrid schemes. Some DB schemes will be exempt from the PPF, including[2]:

- unfunded public sector schemes;
- some funded public sector schemes, for example, those providing pensions to local government employees;
- schemes to which a Minister of the Crown has given a guarantee;
- schemes with fewer than two members; and
- schemes which began to wind-up, or were completely wound-up, before 6 April 2005.

Scheme funding

As in previous *Purple Books*, the bulk of our analysis uses funding estimates on an s179 basis. This is, broadly speaking, what would have to be paid to an insurance company to take on PPF levels of compensation, and estimates of this are what we use in the calculation of scheme-based levies. The analysis in Chapter 4 (Scheme funding) uses s179 data submitted by schemes on TPR's Exchange system by 31 March 2023 and we roll these asset and s179 liability values forward to 31 March 2023 in the following way:

- The asset values are rolled forward using the asset split information submitted on Exchange by schemes and the change in benchmark asset indices over the period. This roll-forward methodology will only allow for unfunded LDI arrangements such as interest rate swaps to the extent that the exposure is reflected in the asset split information submitted. DRCs that have been submitted by schemes for levy purposes[3] have been added to the asset values submitted in s179 valuations. These DRCs represent the contributions made by the sponsoring employer between the s179 valuation date and 31 March 2023 after allowing for deductions for items such as additional benefit accrual and benefit augmentations. No allowance is made for benefits paid out over the period, or for DRCs since those certified in the scheme return.
- The s179 liability values are rolled forward to 31 March 2023 using the s179 data submitted by schemes and converted to version A10 of the s179 assumptions that came into effect on 1 May 2021. No allowance is made for membership movements over the period, for benefits paid out or the cost of new benefit accrual.

As in previous years, PPF actuaries have also produced full buy-out estimates (i.e. based on original scheme levels of compensation) of the funding position for *The Purple Book 2023* dataset. These estimates are calculated in the same way as described above except an approximate allowance is made for the difference between the compensation we would pay members and the benefit levels paid by schemes based on the scheme benefits data submitted on Exchange.

Historical datasets

A dataset is collated for each edition of *The Purple Book*, including all appropriate schemes where scheme return information has been processed and cleaned. In subsequent months, more scheme returns are processed and cleaned and in 2006 and 2007 these were incorporated into the existing dataset to produce an 'extended' dataset. For 2006 and 2007, the increased coverage produced significantly different results to the original datasets. However, since then, datasets have been much larger and the increased coverage made only a small difference. Accordingly, comparisons are made with previous publications as follows:

- *Purple Books* 2006 and 2007 – extended dataset; and
- *Purple Books* 2008 to 2022 – original dataset.

Scheme status

Scheme status in this *Purple Book* is split between:

- open schemes, where new members can join the DB section of the scheme and accrue new benefits;
- schemes closed to new members, in which existing members continue to accrue new benefits;
- schemes closed to new benefit accrual, where existing members can no longer accrue new years of service; and
- schemes that are winding up.

Because many larger employers have adopted the strategy of migrating their pension provision towards defined contribution (DC) by opening a DC section in an existing defined benefit (DB) scheme, many hybrid schemes may accept new members but no longer allow new (or existing) members to accrue defined benefits.

This has been handled differently across different editions of *The Purple Book*. In *The Purple Book 2006,* 40 per cent of members were in the open category and 25 per cent were categorised as 'part open'. The 'part open' category included a significant number of hybrids for which the DB element was closed. In *The Purple Book 2007,* the 'part open' category was removed and the percentage of schemes classified as open increased compared to *The Purple Book 2006*. Many hybrid schemes which had previously identified themselves as 'part open' now identified themselves as 'open'. In *The Purple Books 2008* and *2009*, we analysed the largest 100 schemes (by membership) in the hybrid category separately, so we could adjust the information provided in the scheme returns and remove potential misinterpretation caused by hybrid schemes with closed DB sections declaring themselves as open.

Improved levels of information on hybrid schemes are now available from the scheme returns and since *The Purple Book 2010* we have been able to adjust hybrid statuses to 'closed' where DB provision is not available to new members. Since 2013, those hybrids which no longer admit new DB accruing members are categorised as 'closed to new members'. In addition, where those schemes have no active DB membership it is assumed that the scheme is closed to new benefit accrual. For pure (i.e. non-hybrid) DB schemes, we simply take the scheme status as stated in the scheme returns. The changes to the information available and consequent developing approach across the various editions of *The Purple Book* should be taken into account when comparing figures from different editions.

1 https://www.ppf.co.uk/levy-payers.

2 For a more comprehensive list see 'eligible schemes' on our website.

3 For more information see the 2022/23 DRC appendix and guidance on our website: https://www.ppf.co.uk/levy-payers/levy-2022-23.

Glossary

Active member
In relation to an occupational pension scheme, a person who is in pensionable service under the scheme.

Annuity
Contract through which payments of a portion of a scheme's liabilities are met by a third-party insurance company.

Assessment period
The time when a scheme is being assessed to see if the PPF can assume responsibility for it.

Buy-out basis
The level of coverage a scheme's current assets will provide if all benefits were to be bought out in the name of the individual member with an insurance company. See also: full buy-out.

Cash balance pension scheme
The scheme provides a cash lump sum upon retirement, rather than a pension for life.

Claims (on the PPF)
When an employer of a DB pension scheme becomes insolvent and the pension scheme does not have sufficient assets to buy out the liabilities with an insurance company. The DB scheme members then become members of the PPF.

Closed (to new members)
The scheme does not admit new members. Existing members can continue to accrue new pensionable service/benefits.

Closed (to new benefit accrual)
The scheme does not admit new members. Existing members no longer accrue new pensionable service/benefits.

Commercial consolidators and superfunds
Pension vehicles established to consolidate the DB assets and liabilities of unconnected employers, with no link to the original employer.

COVID-19 pandemic
The spread of COVID-19 viral infections across the globe. When discussing this we are referring to the wide-ranging impacts, particularly including the impact of restrictions imposed due to the pandemic on financial markets as well as employer operations and financial strength.

Dead company
A company that is dissolved.

Deferred member
In relation to an occupational pension scheme, a person (other than an active or pensioner member) who has accrued rights under the scheme but is not currently accruing or being paid benefits under the scheme.

Deficit
A shortfall between what is assessed as needed to pay a scheme's benefits as they fall due (this is the scheme's 'liabilities') and the actual level of assets held by the scheme.

Deficit-reduction contribution (DRC)
A one-off (or irregular) contribution made by a scheme sponsor to a pension scheme to reduce the level of deficit.

Defined benefit (DB)
Benefits are worked out using a formula that is usually related to the members' pensionable earnings and/or length of service. These schemes are sometimes also referred to as final salary or salary-related pension schemes.

Defined contribution (DC)
Benefits are based on the amount of contributions paid, the investment returns earned and the amount of pension this money will buy when a member retires. These schemes are also referred to as money purchase pension schemes.

Demographic risk
This is a financial risk to the PPF that members, on average, have different population-based factors than expected, for example the proportion married or age difference between members and their spouses.

Dun and Bradstreet (D&B)
A provider of company insolvency scores used by us for PPF levy calculations. D&B categorise companies according to a system of scorecards. More information is available in the levy rules on the PPF website.

Enterprise risk management framework
The process of identifying and documenting particular events or circumstances relevant to an organisation's objectives (threats and opportunities), assessing them in terms of likelihood and magnitude of impact, determining a response strategy, and monitoring process.

Glossary continued

Financial Resilience
Defined by us to mean having a high level of confidence of being able to pay compensation to both our current and future members in full, with no support required from investment returns and levy.

Full buy-out
The cost of insuring a pension scheme in the private market. The discount rate applied to liabilities may generally be more prudent than the discount rate applied to section 179 valuations. The benefit assumed in private insurance is not subject to reduction for members under normal pension age and thus could be greater than PPF coverage.

Gilt yield
The yield, if held to maturity, of a government-issued bond.

Growth assets
Assets that are expected to give a return in excess of the gilt yields, but have more risk of underperformance, for example equities or property.

Hedging asset
An investment that is made with the intention of reducing the risk of deterioration in a scheme's funding level.

Hybrid scheme or partial DB scheme
A scheme that can provide DB and DC benefits. An example of a hybrid scheme would be a scheme providing benefits on a DC basis but that is or was contracted out of the state scheme on either a Guaranteed Minimum Pension or Reference Scheme Test basis.

Insolvency risk
The risk that a borrower will have to close business due to its inability to service either the principal or interest of its debt.

Insurance company
Insurance companies provide a range of services to pension schemes, including:

- asset investment;
- asset management;
- buy-in and buy-out;
- investment advice and expertise;
- custodian facilities; and
- scheme administration services.

Insurance policy
Investment class: a pooled fund provided by, or a deposit administration contract purchased from, an insurance company.

Investment strategy
The set of rules, behaviours and procedures, designed to guide the selection of an investment portfolio after considering goals, risk tolerance, and future needs for capital.

Liability Driven Investment (LDI)
Investment in assets so that changes in the value of the assets, in response to changes in expectations for future interest rates and inflation, match changes in the value of liabilities. Some LDI funds use leverage. This means greater exposure to changes in interest rates and inflation than would be possible with unleveraged assets such as physical gilts alone.

Longevity risk
A financial risk that pension scheme members, on average, live for longer than expected, and therefore more funds are required to pay pensions, or PPF compensation, for longer.

LTRM
Long-Term Risk Model.

Maturing phase
This is the second stage in the PPF's journey, following the growth phase. Once we have reached a certain size, the impact of new claims reduces and our liabilities stabilise.

Net funding position
Sum of assets less sum of liabilities or sum of scheme funding positions. In a pool of schemes where schemes in surplus outweigh schemes in deficit there is an aggregate surplus.

ONS
Office for National Statistics.

Open scheme
The scheme continues to accept new members, and new benefits continue to accrue.

Pensioner member
A person who is currently receiving a pension from their scheme or from an annuity bought in the scheme trustee's name.

The Pension Protection Fund (PPF)
A statutory corporation run by the Board of the Pension Protection Fund, established under the Pensions Act 2004.

The Pensions Regulator (TPR)
The UK regulator of work-based pension schemes; an executive non-departmental public body established under the Pensions Act 2004.

PP
Percentage point.

PPF levy
This is the annual amount that a pension scheme is charged by the PPF. It is composed of a scheme-based levy and a risk-based levy. It is similar to an insurance premium.

Protected liabilities
The estimated cost of securing members' benefits through buying annuities from an insurance company in an amount equal to the compensation that the PPF would pay under Schedule 7 to the Pensions Act 2004.

Reapplication
An application for entry to the PPF, having previously exited PPF assessment.

Repurchase agreement (repo)
The sale of a security combined with an agreement to repurchase the same security at a higher price at a future date.

Responsible investment
An investment strategy that incorporates environmental, social and governance factors in investment decisions and asset ownership.

Risk-based levy
See PPF levy. Calculated on the basis of a pension scheme's deficit and insolvency risk of the sponsoring employer.

Roll-forward
The concept of estimating the value of assets and liabilities at a date later than that of their initial valuation, without doing a full new valuation. This is generally based on movements in various reference market yields and indices over the period in between the initial valuation and the later estimate, and can ignore several factors over a period of time; for example, member movements, benefits paid out from a scheme, or new benefits accrued.

Run-off phase
This will be the final stage of the PPF's journey. This will be the phase in which our liabilities fall as our membership matures.

Glossary continued

Scheme-based levy

See PPF levy. Calculated on the basis of section 179 liabilities and the number of members in the pension scheme.

Scheme funding position

The difference between the assets and liabilities of a pension scheme – scheme deficit if negative, scheme surplus if positive.

Scheme member

In relation to an occupational pension scheme, a scheme member is any person who:

- is an active member;
- is a deferred member;
- is a pensioner member;
- has rights due to transfer credits under the scheme; or
- has pension credit rights under the scheme.

This includes scheme members whose only entitlements are equivalent pension benefits (EPBs), as those rights were earned through pensionable employment. Members (for occupational and personal schemes) do not include dependants of members. Those whose only entitlements are lump sum benefits payable upon death are also not included.

Section 179 (s179) valuation

To calculate the risk-based pension protection levy the Board of the Pension Protection Fund must take account of scheme underfunding. To achieve consistency in determining underfunding, schemes can complete a PPF valuation (section 179). This valuation will be based on the level of the scheme's assets and liabilities. The liabilities will be based on the scheme benefits taking into account key features of the levels of compensation paid by the Board of the Pension Protection Fund as set out in Schedule 7 of the Pensions Act 2004.

Stress scenario in the LTRM

Changes simultaneously applied to a number of assumptions in the LTRM on asset returns, bond yields and insolvency experience.

Stochastic model

Distributions of potential outcomes are derived from a large number of simulations (stochastic projections) which reflect the random variation in the inputs.

Stressing and smoothing

Transformations applied to assets and liabilities. Details of these are available in the levy rules and transformation appendix on the PPF's website.

Swap

Investment: a contract calling for the exchange of payments over time. Often one payment is fixed in advance and the other is floating, based on the realisation of a price or interest rate.

Technical Provisions (TPs)

The TPs are a calculation made by a scheme's actuary of the assets needed for the scheme to meet the statutory funding objective. These include pensions in payment (including those payable to survivors of former members) and benefits accrued by other members and beneficiaries, which will become payable in the future.

Trustee

A person or company, acting separately from a scheme's employer, who holds assets in trust for the beneficiaries of the scheme. Trustees are responsible for making sure that the pension scheme is run properly and that members' benefits are secure.

Winding up/wound-up

After the wind-up is complete – the scheme is wound-up – there will be no assets or liabilities left in the scheme, and the scheme will cease to exist as a legal entity. Winding-up describes the process of reaching wind-up from the normal ongoing status. To make sure that members will still receive benefits, there are several options:

- transferring pension values to another pension arrangement;
- buying immediate or deferred annuities; or
- transferring the assets and liabilities of the scheme to another pension scheme.

A scheme must be wound-up in accordance with the scheme rules and any relevant legislation.

Charts and tables

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Charts and tables continued

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