

## **Pension Protection Fund Consultation: Guidance for the Bespoke Investment Risk Calculation**

### **1. Overview**

- 1.1. The Pension Protection Fund (PPF) charges eligible defined benefit pension schemes an annual pension protection levy, the main component of which is a risk-based levy. This currently reflects a scheme's underfunding risk, assessed with reference to its s179 deficit, and the insolvency risk of sponsoring employers.
- 1.2. This guidance is being published alongside the Policy Statement on the New Levy Framework that will be in effect from the 2012/13 levy year.<sup>1</sup> This New Levy Framework makes significant changes to the design of the risk-based levy, including the addition of investment risk as a risk factor in the funding calculation.

### **2. How we will measure investment risk**

- 2.1. There will be two approaches to measuring the investment risk of schemes' investment strategies:
  - The bespoke method, to which this consultation relates, will apply on a mandatory basis to the assets held by schemes with s179 liabilities of £1.5 billion or more, based on the annual scheme return for the 2012/13 levy year. It will be optional for other schemes.
  - The standard method will be applied by the PPF to the asset information submitted on Exchange through the scheme return. Details of the standard approach are discussed in the Policy Statement.

In both cases, the PPF will calculate the stressed liabilities based on relevant information submitted on Exchange.

- 2.2. We have chosen to assess investment risk by reference to the impact of stress scenarios on assets and liabilities. To do this, our advisors Redington analysed data on market movements and asset allocations to test the sensitivity of funding ratios across the PPF universe to changes in these factors.
- 2.3. As with the standard stresses, the asset and risk factor stresses to be applied under the bespoke approach reflect an immediate one standard deviation fall in funding (or asset value) calibrated over a one year period. The categories for which asset stresses are provided under the bespoke approach are the same as under the standard approach, although broken down into a greater number of subcategories. More information on the methodology by which the stresses were derived is available in the Policy Statement and the report by Redington.<sup>2</sup>

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<sup>1</sup> The Policy Statement, is available at:

[http://www.pensionprotectionfund.org.uk/DocumentLibrary/Documents/levy\\_policy\\_statement\\_May11.pdf](http://www.pensionprotectionfund.org.uk/DocumentLibrary/Documents/levy_policy_statement_May11.pdf)

<sup>2</sup> A discussion of methodology is available at chapter 3 of the Policy Statement. The Redington report is available at: [http://www.pensionprotectionfund.org.uk/levy/Documents/redington\\_investment\\_risk.pdf](http://www.pensionprotectionfund.org.uk/levy/Documents/redington_investment_risk.pdf)

- 2.4. The bespoke stress results will be used in the calculation of the risk-based levy as follows. Schemes using the bespoke approach will report both the stressed and unstressed values of total assets as at the effective date of the latest audited scheme accounts in Exchange. We will then use these to calculate a stress factor (equivalent to the stressed value divided by the unstressed value). We will then multiply the smoothed assets (calculated from the s179 valuation) by the stress factor.
- 2.5. The PPF will apply interest rate and inflation stresses, as appropriate, to reported liabilities on behalf of all schemes. An example of this treatment of liabilities is available in annex D of the combined annexes.<sup>3</sup>
- 2.6. The indicative values of the risk factor stresses are as follows:

Interest rates	Inflation
-67bps	+ 33bps

- 2.7. All stress values are indicative only. They are based on scheme data for the period March 2006 – March 2009; our intention is to update these with additional information so that data for the five years to March 2011 is reflected. The final stress values will be published in the levy determination to be released in late 2011.
- 2.8. We are also publishing the help file that will be available on Exchange as a supplementary guide for all schemes on how to apportion investments for the asset stresses. This identifies the risk characteristics of financial products and strategies that should be considered in deciding which asset class a particular investment should be placed in.
- 2.9. The Policy Statement referred to above sets out the Board's confirmed position on:
- the incorporation of investment risk as a risk factor in the pension protection levy;
  - the methodology by which the stresses were derived and the level of confidence at which they have been set; and
  - the standard approach to measurement of investment risk.

These issues are therefore out of scope of this consultation, which is exclusively concerned with the guidance for the bespoke calculation of investment risk.

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<sup>3</sup> The annexes are available at:  
[http://www.pensionprotectionfund.org.uk/DocumentLibrary/Documents/levy\\_policy\\_statement\\_May11\\_annexes.pdf](http://www.pensionprotectionfund.org.uk/DocumentLibrary/Documents/levy_policy_statement_May11_annexes.pdf)

### 3. Who should respond to this consultation?

- 3.1. This guidance is being published to provide stakeholders with details of calculations required of schemes undertaking the bespoke approach to investment risk. It includes an expanded list of asset stresses and the formulae necessary for common derivative strategies.
- 3.2. As noted above, the bespoke approach will be a requirement for schemes with protected liabilities of £1.5 billion or more. We expect therefore that the guidance will be of particular interest to larger schemes and those who advise them.
- 3.3. For other schemes, the bespoke approach will be an option. Schemes may find that using the extended list of asset stresses and risk factor stresses provides for recognition of risk-reducing investment strategies and consequently a reduction in their risk-based levy. Schemes that have pursued derisking strategies that are not recognised specifically in the standard approach, such as Liability Driven Investment (LDI) strategies, may therefore wish to comment on the guidance.
- 3.4. We expect that this guidance should fulfil two main objectives:
  - It should be accessible to trustees and scheme representatives in understanding why, how to and, if optional, whether to submit bespoke results.
  - It should contain the necessary formulae for trustees, scheme representatives and investment advisors to calculate a stressed asset value for submission in the annual scheme return.

### 4. Next steps

- 4.1. Following analysis of consultation responses, we will publish the next version of the guidance for investment risk with the draft levy determination in the autumn.

### 5. How to respond

The deadline for comments is **Friday 24<sup>th</sup> June, 5pm.**

Submissions may be emailed to [consultation@ppf.gsi.gov.uk](mailto:consultation@ppf.gsi.gov.uk), or sent to:

Catherine Mo  
Levy Policy Manager  
Pension Protection Fund  
Knollys House  
17 Addiscombe Road  
Croydon  
CR0 6SR

**We invite consideration of the following questions in particular:**

- A. Is the guidance clear and accessible for the intended audience of trustees, scheme representatives and investment advisors?
- B. Is there sufficient information on the definitions and formulae associated with the bespoke approach in the guidance?
- C. Does the Exchange help file provide sufficient clarity on how to allocate scheme assets?
- D. We will monitor whether the stresses we have identified continue to reflect the financial products and strategies to which schemes have significant exposure.
  - Are there any asset classes or derivative strategies in which schemes are currently invested which you think should be considered separately that are not identified in the guidance and help file?
- E. Does the guidance contain an appropriate balance of prescription and flexibility so that there are minimal opportunities for the bespoke calculation to produce different results for a given portfolio?
- F. The bespoke approach as detailed in the draft guidance is a two-stage process, in which bond and annuity investments are subject to an asset stress, based on the value of physical holdings, and then a separate risk factor stress to capture any derivative positions. An alternative way to stress these assets would be to have only one step, based on applying the risk factor stresses to portfolio PV01 and IE01.
  - Do you agree with the two-stage approach we have outlined?
  - What are the advantages or disadvantages if the alternative approach were available as an option?
- G. We expect that most LDI strategies will use derivatives and that applying the risk factor stresses offers the most appropriate way to recognise these. Do you agree with this treatment of LDI?
- H. We expect that schemes with swaptions should approach investment advisers to do this calculation. Do you agree that this is appropriate, given the complexity of the stress calculation for swaptions?
- I. Costs:
  - What costs are associated with completing a bespoke calculation, either in general, or with reference to particular schemes or strategies?
  - What advisory costs might be associated with assessing whether the bespoke approach should be undertaken, if optional?
  - Is the information that is required (e.g. PV01, IE01) widely available, either in-house or from investment managers?

# Guidance for bespoke investment risk calculation

## Contents

Part 1	Terminology
Part 2	Purpose of this guidance
Part 3	Sources of information
Part 4	Standard asset stresses
Part 5	Risk factor stresses – general guidance
Part 6	Equity derivatives
Part 7	Interest rate derivatives
Part 8	Inflation derivatives
Part 9	Credit default swaps
Part 10	Calculation of a bespoke stress - example

# Part 1. Terminology

- 1.1 A **bespoke stress** is the PPF's terminology for the calculation of stressed asset values in accordance with our guidance. This calculation will be carried out by or on behalf of the scheme.
- 1.2 In order to use this in the levy calculation, schemes will need to supply the following information as at the effective date of the most recently available audited scheme accounts to the PPF via the Exchange system:
- a) Total asset value
  - b) Total stressed asset value

We will use these to calculate a stress factor (i.e. ratio of stressed value to unstressed asset value), which will be applied to the smoothed s179 value of assets.

- 1.3 A **standard stress** is a calculation carried out by the PPF based on information supplied by the scheme on Exchange in cases where a bespoke calculation is not necessary and has not been provided voluntarily.
- 1.4 **Exchange** is the Pensions Regulator's online scheme maintenance system, which schemes should use to notify us of their bespoke stress. Information would need to be submitted each year if it is to be taken into account in the PPF risk-based levy.

## Part 2. Purpose of this guidance

### The Board's objectives

- 2.1 The Board has the following objectives in respect of measuring investment risk:
- (a) to reflect the potential volatility of a scheme's investment strategy in the level of risk-based levy charged; and
  - (b) to give schemes that have adopted de-risking strategies the opportunity to obtain appropriate credit for these risk reduction measures.

### What this Guidance covers

- 2.2 This Guidance covers the calculation of a bespoke stress by schemes that either:
- Have protected liabilities of £1.5 billion or more at their most recent section 179 valuation and must carry out this calculation on a mandatory basis; or
  - Have opted to carry out a bespoke stress.
- 2.3 This guidance does not cover the calculation of the standard stress which will be carried out by the PPF on behalf of schemes that are not required to and do not opt to carry out a bespoke stress. Please see the Determination for more information.
- 2.4 Parts 1 – 3 of this guidance are aimed at all stakeholders, including trustees/managers as well as scheme professionals. Parts 4 – 10 are primarily aimed at investment professionals as they cover the mechanics of the calculation.
- 2.5 Guidance on the allocation of scheme investments between different asset categories is included in the "help file" accessible on Exchange (Asset Breakdown section of the Scheme Return). A copy of this help file is attached as an appendix to this guidance, although schemes are encouraged to refer to Exchange for the most up to date version.
- 2.6 Details on how the bespoke investment stress feeds into the levy calculation are covered in the Determination.

## **Why might you opt to carry out a bespoke stress?**

- 2.7 All schemes will be allowed to submit a bespoke stress if they choose to do so; however the Board requires that all schemes with section 179 liabilities of £1.5 billion or more will submit this bespoke stress.
- 2.8 The standard stresses have been calibrated such that in aggregate, the broad risk profile of the universe of pension schemes covered by the PPF is captured. They will be based on data submitted to Exchange. The “help file” to assist with submission of data has been updated to include a general description of the key characteristics of each asset category as well as some examples.
- 2.9 The standard and bespoke stresses have been set so as to provide comparable results. Schemes are advised that using the bespoke approach is unlikely to provide for a reduced levy unless risk-reducing derivative strategies are in place.
- 2.10 We request schemes with certain types of derivative exposure carry out a bespoke stress calculation in order that the levy more accurately reflects the investment exposure of the scheme. Please refer to Part 5 for further guidance.

## **What does carrying out a bespoke stress involve?**

- 2.11 The bespoke stress is a two stage process:
- For physical assets (i.e. non-derivative investments), a more refined set of asset stresses will be applied to calculate an “initial” stressed value. This step is explained in more detail in Part 4.
  - For derivative positions (held either on a segregated basis or through pooled funds), schemes will be required to calculate risk factor stresses on those derivative positions which will be in addition to the “initial” stressed value. This step is explained in more detail in Part 5.

## **What about the liability stress?**

- 2.12 Liability stresses will be calculated by the PPF for all schemes based on the data supplied in Exchange. This calculation will be carried out in accordance with the Determination and appendices.

## Part 3. Sources of information

### **What level of knowledge and expertise is required to carry out the bespoke stress?**

- 3.1 A clear understanding of the scheme's investment strategy and the current asset allocation is needed to carry out the refined asset stresses element of the bespoke stress, as described in Part 4.
- 3.2 Where derivative contracts are involved, schemes may prefer to take advice from their investment consultant and/or asset manager, although we have provided guidance to help schemes carry out the calculations themselves in Parts 5 to 10.

### **What information do you need to carry out the bespoke stress?**

- 3.3 Stresses should be based on the value of a scheme's assets at the latest audited scheme accounts date.
- 3.4 If the scheme accounts do not contain sufficiently detailed information on the asset categories, more detailed information, particularly for multi asset funds and derivative contracts, may need to be provided by asset managers.
- 3.5 Further information on a scheme's investment strategy can be found in that scheme's latest Statement of Investment Principles. This may contain information on investment benchmarks which may help map the scheme's investments to the appropriate refined asset stress; however, the asset allocation should be taken from the scheme accounts rather than from the Statement of Investment Principles.
- 3.6 For derivative positions, risk factor sensitivity information should be available from asset managers, either as part of regular reporting or on request. This information should be collected as at the same effective date as the asset valuation (i.e. latest audited scheme accounts date).

## Part 4. Asset stresses

- 4.1 The PPF recognises that schemes may have different investment benchmarks to the ones associated with the standard stresses.
- 4.2 The PPF is therefore providing a refined set of asset stresses that schemes can use to calculate and submit their own stressed valuation if they believe they provide a closer match to the investment benchmarks given to their investment managers. A refined set of asset stresses is provided for equities and bond investments. For all other asset classes it is not practical to divide the categories into greater granularity, so the asset stresses used under the bespoke approach are the same as under the standard approach.
- 4.3 The asset classes used in the bespoke stress calculation are a refinement of those used in Exchange. The help file in Exchange provides guidance on how scheme investments should be allocated between different asset categories, which remains relevant in the bespoke stress. A general description of the key characteristics of each asset category in Exchange has been provided. Where a scheme has assets that do not obviously fall into any of these categories, the pension scheme, perhaps in conjunction with their investment advisor or asset manager, can apply judgement as to which category best reflects that asset's characteristics – this may involve dividing the asset amongst more than one category.
- 4.4 For equities and bond investments, portfolios should be mapped to one or more of the refined asset stresses. Generally the scheme's investment consultant and/or asset manager should be able to apply professional judgment to advise how a portfolio should be broken down and which of the asset stresses are appropriate to each subset. Some general guidance is provided below.

### Equities

- 4.5 For equity investments, there is an additional asset stress for Emerging Markets. Allocations to Emerging Market equities are normally separately identified within the Statement of Investment Principles and would normally be included in "Overseas equities" for Exchange purposes. For the bespoke stress analysis, trustees are required to strip out the allocation to Emerging Markets from the rest of the portfolio of overseas equities.

### Bonds

- 4.6 The main characteristic to identify the most appropriate stress for a bond portfolio (or subset) will be its "maturity". Maturity is a measure of the length of time until the bonds in the portfolio make their final payment. Fixed interest government bond, fixed interest non-government bond and inflation-linked bond

portfolios should be split into subsets based on maturity (as per the table below).

- 4.7 For fixed interest non-government bonds, portfolios should also be split into investment grade and sub-investment grade subsets. Sub-investment grade is often also called “high yield” and this category groups bonds rated BB+ or below by Standard & Poor’s or Fitch Ratings or rated Ba1 or below by Moody’s Investors Services. Emerging market debt, i.e. debt issued by government of sub-investment grade category, should be treated alongside sub-investment grade non-government bonds.

### **Currency Hedging**

- 4.8 Pension schemes adopt a wide range of currency hedging strategies, both within and across asset classes. The stresses have been derived assuming a certain level of currency hedging is adopted in all schemes.
- 4.9 Schemes are not expected, or able, to reflect their specific approach to currency hedging.

### **LDI Strategies**

- 4.10 If a scheme has adopted an LDI strategy consisting of a mixture of cash, bonds and swaps then there are two approaches that can be taken, depending on how much data is available from the asset manager. The second approach is likely to be the simpler method and we expect most asset managers should be able to provide the necessary information.
- Option 1: The strategy can be treated as a combination of physical assets and derivatives (with the asset stresses applied to the cash and bond components, and the risk stresses applied to the derivatives). This relies upon the asset manager being able to separately identify the components.
- Option 2: The asset manager may be able to provide interest rate (“PV01”) and inflation (“IE01”) sensitivities for the LDI strategy as a whole, in which case the whole LDI strategy can be treated as a derivative as set out in Parts 7 and 8 of this document.
- 4.11 Care should be taken not to double count the stress applied as a result of taking a mixed approach.

**Table 1 Asset stresses**

<b>Asset class</b>	<b>Asset class description</b>	<b>Maturity</b>	<b>Asset stress</b>
Equities	UK equities	N/A	-22%
Equities	Overseas developed market equities	N/A	-18%
Equities	Emerging market equities	N/A	-25%
Property	Property	N/A	-7%
Hedge funds	Hedge funds	N/A	-9%
Commodities	Commodities	N/A	-19%
Fixed interest government bonds	Short maturity	0 to 5 years	+2%
Fixed interest government bonds	Medium maturity	5 to 15 years	+5%
Fixed interest government bonds	Long maturity	Over 15 years	+10%
Inflation-linked bonds	Short maturity	0 to 5 years	+3%
Inflation-linked bonds	Medium maturity	5 to 15 years	+9%
Inflation-linked bonds	Very long maturity	Over 15 years	+21%
Fixed interest non-government bonds	UK investment grade	All maturities	+1%
Fixed interest non-government bonds	Overseas investment grade	All maturities	+1%
Fixed interest non-government bonds	UK long-dated investment grade	Over 10 years	+4%
Fixed interest non-government bonds	Overseas long-dated investment grade	Over 10 years	+3%
Fixed interest non-government bonds	Global sub-investment grade	All maturities	-11%
Cash		N/A	0%
Annuities		N/A	+12%
Other	Other	N/A	-22%

## Future developments in pension scheme investment strategies

- 4.12 The investment strategies adopted by pension schemes will be kept under review and further guidance may be issued if developments in strategies require additional clarification. Current trends being kept under review by the PPF include:
- 4.13 Trigger-based investment strategies
- 4.13.1 A recent trend in pension scheme investment strategies has been the development of trigger-based investment strategies whereby pension schemes set market or scheme funding levels at which they envisage making changes to strategic asset allocations.
- 4.13.2 Where such mechanisms are written into asset manager documentation, we would expect schemes to consider how they interact with our stress factors; however such strategies tend to target “de-risking” in situations where funding levels improve, which are opposite to the scenarios being assessed through stress analysis.
- 4.14 Special Purpose Vehicles
- 4.14.1 Some companies have provided investments to their pension schemes via Special Purpose Vehicles that provide security to the pension scheme over a future stream of income related to assets on the company’s balance sheet.
- 4.14.2 Such strategies are distinct from contingent assets as their payment is not purely contingent on a future insolvency event and also their value is likely to be reflected as an asset in the pension scheme’s report and accounts.
- 4.14.3 The impact of the stresses on such assets will depend ultimately on the way in which the value is determined and the unique nature of each solution makes it difficult for general guidance to be given. However, such valuations may include an element of discounted cashflow in which case it may be reasonable to use the interest rate, inflation and credit risk stress factors.
- 4.14.4 We expect schemes with such investments will ask their advisors to adopt an approach that reflects the spirit of this guidance.

## Part 5. Risk factor stresses – general guidance

### What are risk factor stresses for?

- 5.1 There are a range of derivatives that schemes may buy or sell that alter their risk exposure such that analysis limited to physical assets would not accurately reflect the risks in the investment strategy. The risk factors form the building blocks from which the asset stresses in Part 4 have been derived. This is accurate where the sensitivity to each risk factor is well defined as in the case of the physical asset categories; however, for derivative positions the sensitivity to each risk factor could vary widely so asset stresses are not provided.
- 5.2 Schemes that have derivatives in their portfolio will need to carry out additional analysis of the impact of risk factor stresses on their derivative positions after applying the refined asset stresses to all non-derivative investments.
- 5.3 The risk factor stresses (described below in the remainder of Part 5) are intended to be used where derivative strategies are put in place following a strategic decision by the trustees. The investment risk analysis is not intended to reflect short-term derivative positions that do not form an explicit part of the trustees' documented investment strategy. For example, where there is an expectation that a derivative position will be unwound within six months, no allowance should be made.
- 5.4 Some asset managers whose mandate principally covers the investment of physical assets may have some freedom to employ small short-term derivative strategies from time to time as part of their efficient portfolio management. In these cases, schemes can use the asset stress methodology described in Part 4 above, rather than using the risk factor stresses. Where a breakdown by asset class is required, this should reflect the effective economic exposures of the portfolio (as indicated in the manager's regular reporting).

### How do I determine whether my scheme has derivatives?

- 5.5 If the answer to any of the questions in this section is "Yes", then the scheme should be treated as having derivative strategies and will be required to carry out risk factor stress analysis (if carrying out the bespoke investment stress). Derivative positions can either be held on a segregated basis or through pooled funds.
- 5.6 The scheme's investment advisor and/or asset manager will be able to advise if such investments are held by the scheme. They may also be best placed to carry out the stress calculations on behalf of the scheme; however if the scheme

wishes to calculate the stresses themselves, we provide further guidance and some worked examples in Parts 6 to 10.

**1. Does your scheme have investment<sup>4</sup> in any of the following equity derivative strategies?**

*An equity derivative strategy is one where the scheme has entered into a contract with another party to pay or receive a series of payments (or one single payment) whose value is determined by the future movement of equity markets.*

*Equity derivative strategy*

Equity futures or forward contracts: These contracts promise to pay the holder the return on an equity index (e.g. FTSE 100, or S&P 500) or an individual share.

Equity total return swaps: These contracts promise to pay the holder the total return on an equity index (e.g. FTSE 100 or S&P 500) in return for a series of payments from the contract holder to the counterparty.

Equity options: These contracts give the buyer the right, but not the obligation, to buy (or sell) some equities at a particular strike price. These contracts are typically used to protect the scheme from equity markets falling below a certain level, in return for paying an upfront premium (e.g. a “put option” or “put spread”). In some cases, schemes may also have agreed to limit their gain from rising equity markets, in return for receiving an upfront premium (e.g. a “call option” or “call spread”). Most other commonly used option strategies are typically combinations of buying or selling put or call options (e.g. “put collar”).

**2. Does your scheme have any direct investment<sup>4</sup> in interest rate derivative strategies?**

*An interest rate derivative strategy is one where the scheme has entered into a contract with another party to pay or receive a series of payments (or one single payment) whose value is determined by the future movement of interest rates. They are a common component of “LDI” investment strategies. They typically consist of interest rate swaps and protect the scheme’s funding level volatility from interest rate movements. Some schemes may enter these contracts directly with counterparties, or they can be done through pooled funds – often called “LDI” pooled funds.*

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<sup>4</sup> “Investment” refers to the use of derivatives as an explicit part of the trustees’ investment strategy (e.g. as documented in the trustees’ Statement of Investment Principles or annual report and accounts). This can be either as a segregated holding or within pooled funds. It does not refer to derivative strategies used by asset managers for efficient management of their portfolios and therefore indirectly part of the investments.

If you have these strategies, you will need either to request the stress calculation from the asset manager/investment consultant or carry out the calculation yourself with some information from the asset manager. In the latter case you should ask your asset manager for the “PV01” (also known as “DV01”) of the portfolio, i.e. the sensitivity of the portfolio value to a one basis point (or 0.01%) change in interest rates at all durations.

### **3. Does your scheme have any direct investment<sup>4</sup> in inflation derivative strategies?**

*An inflation derivative strategy is one where the scheme has entered into a contract with another party to pay or receive a series of payments (or one single payment) whose value is determined by the future movement of inflation rates. They are a common component of “LDI” investment strategies. They typically include inflation swaps and protect the scheme’s funding level volatility from changes in inflation. Some schemes may enter these contracts directly with counterparties, or they can be done through pooled funds – often called “LDI” pooled funds.*

If you have these strategies, you will either need to request the stress calculation from the asset manager/investment consultant or carry out the calculation yourself with some information from the asset manager. In the latter case you should ask your asset manager for the “PV01” and “IE01” of the portfolio, i.e. the sensitivity of the portfolio value to a one basis point (or 0.01%) change in interest rates and inflation respectively<sup>5</sup>.

### **4. Does your scheme have any direct investment<sup>4</sup> in credit default swaps?**

*A credit default swap is where the scheme has agreed to make a series of payments to buy or sell protection against the default of a corporate bond or corporate loan. They are commonly used by pension schemes to manage sizeable exposures to corporate bond/loan issuers or to mitigate the risk of sponsor insolvency.*

If you have these strategies, you will either need to request the stress calculation from the asset manager/investment consultant or carry out the calculation yourself with some information from the asset manager. In the latter case you should ask your asset manager for the “CDD01” of the portfolio, i.e. the sensitivity of the portfolio value to a one basis point (or 0.01%) change in credit spreads.

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<sup>5</sup> Although the primary risk factor within inflation swaps will be inflation risk, the market value of the swaps contract will also have sensitivity to interest rates. On day 1, this sensitivity will be zero (for an unfunded swap).

## Risk factor stresses

5.7 The risk factor stresses are set out in the table below. It should be noted that the interest rate and inflation risk factor stresses are applicable to swaps rates as well as government bond yields.

**Table 2 Risk Factor Stresses**

Credit	Interest rates	Inflation	UK Equity	Non-UK Developed Equity	Emerging Market Equity
+46bps	-67bps	+33bps	-22%	-18%	-25%

## Applying risk factor stresses to derivative strategies

5.8 There are numerous derivative strategies that are available to schemes in both segregated and pooled format and it is not practical to provide an exhaustive list of strategies. As noted earlier, investment consultants or asset managers will be able to assist schemes in determining whether such strategies are in place. We expect that the examples in Parts 6 to 9 will cover most common strategies used by pension schemes:

- Equity futures
- Equity total return swaps
- Equity options
- Fixed income futures
- Gilt futures
- Gilt total return swaps
- Interest rate swaps (typical component of an "LDI" strategy)
- Inflation swaps (typical component of an "LDI" strategy)
- Interest rate swaptions
- Credit default swaps

5.9 The underlying principle to be applied is that the stress calculation should reflect only the change in intrinsic value<sup>6</sup> of any derivative contract. The examples below relate to some of the more common types of derivative contracts that are used by pension schemes in the UK. Should a scheme's specific approach to derivatives not be captured by the examples, that scheme should ask its investment consultant or asset manager to apply the risk factor stresses in a

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<sup>6</sup> The intrinsic value of an option is the value that would be realised if the option expired immediately. The market value also takes into account the time value of the option arising from potential changes in intrinsic value between the valuation date and actual future expiry date. The time value is primarily driven by the volatility of the underlying instrument. For the holder of an option, the intrinsic value is typically lower than the market value.

consistent way by considering the overall economic exposure of the pension scheme.

- 5.10 Where strategies are exposed to more than one risk factor, the impact should be assessed separately and aggregated.
- 5.11 The initial stressed value of assets (before adjusting for the derivative stress) should include the market value of the derivatives – which can be positive or negative – as well as taking into account all related liabilities e.g. any premiums due to be paid (the value should be as included in the most recently available audited scheme accounts). Risk factor stresses are applied to the derivative positions so no asset stresses should be applied to the market values when calculating the initial stressed value of assets. See the example in Part 10.

## Part 6. Equity derivatives

### Equity futures

The stress on an equity futures position is the notional exposure of the futures position, multiplied by the relevant equity risk factor stress. The calculation may need to be carried out more than once to reflect whether the position is capturing UK equity, non-UK developed markets (i.e. overseas markets) equity or emerging market equity risk.

#### *Input parameters*

Calculation date	<i>Effective date of the most recently available audited scheme accounts</i>
Notional exposure of futures position at the calculation date	<i>N</i>
Equity stress (note this is different for UK, non-UK developed and emerging markets)	<i>d_equity</i>

#### *Calculations*

The impact of the stress on the portfolio =  $N \times d\_equity$

If a scheme holds a long position, the total asset value should be reduced by this amount and vice versa.

Equity total return swaps can be valued in a similar way to equity futures.

### Equity option

The stress on the equity option is the change in the intrinsic value of the option. The calculation is set out below and should be carried out separately for each option that the scheme has.

#### *Input parameters*

Calculation date	<i>Effective date of the most recently available audited scheme accounts</i>
Strike price of option	<i>S</i>
Level of the underlying index at the calculation date	<i>P</i>
Notional option exposure at the calculation date	<i>E</i>
Equity stress (note this is different for UK, non-UK developed and emerging markets)	<i>d_equity</i>

Notional exposure is defined to be the economic exposure of the position at the date of inception, adjusted in line with the relevant equity index return from the date of inception to the calculation date.

*Intrinsic value calculations*

*A. Equity put option*

1. Calculate current intrinsic value  
$$\text{Value}_I = \max [0, E \times (S - P) \div P]$$
2. Calculate stressed level of index  
$$P_{\text{stress}} = P \times (1 + d_{\text{equity}})$$
3. Calculate stressed intrinsic value of option  
$$\text{Value}_S = \max [0, E \times (S - P_{\text{stress}}) \div P]$$
4. Calculate stress to apply  
$$\text{Equity}_{\text{stress}} = \text{Value}_S - \text{Value}_I$$

*B. Equity call option*

1. Calculate current intrinsic value option  
$$\text{Value}_I = \max [0, E \times (P - S) \div P]$$
2. Calculate stressed level of index  
$$P_{\text{stress}} = P \times (1 + d_{\text{equity}})$$
3. Calculate stressed intrinsic value of option  
$$\text{Value}_S = \max [0, E \times (P_{\text{stress}} - S) \div P]$$
4. Calculate stress to apply  
$$\text{Equity}_{\text{stress}} = \text{Value}_S - \text{Value}_I$$

*Adjustment to be applied to initial stressed asset value*

If the scheme has bought the option, the  $\text{Equity}_{\text{stress}}$  should be added to the overall asset value.

If the scheme has sold the option, the  $\text{Equity}_{\text{stress}}$  should be subtracted from the overall asset value.

So the impact on the overall stressed value of assets will be as follows:

- increase for put option bought
- decrease for put option sold
- decrease for call option bought
- increase for call option sold (We would expect this to be an unusual position for a pension scheme to take unless in combination with other equity options that are bought.)

The vast majority of equity option-based strategies can be deconstructed into a number of the above component parts. For example, a zero cost collar is made up of

buying a put option and selling a call option (at different strike prices). A put spread is a combination of buying a put option and selling another put option at a different strike price. Each element of these should be valued separately and the stresses added together.

### Example A

A pension fund has the following positions as at its latest audited scheme accounts date:

A) It holds an unexpired put option that it bought on the UK FTSE 100 Index with a strike price of 3,800 and notional value of £100m.

B) It has sold an unexpired call option on the US S&P 500 Index with a strike price of 550 and notional value of £75m.

At the latest audited scheme accounts date, the initial stressed value of the fund's assets (after applying the refined asset stresses to the fund's non-derivative investments and reflecting the market value of the options) is £500m and the levels of the UK FTSE 100 Index and US S&P 500 Index are 3,926 and 798 respectively. It has no other derivative strategies.

#### Calculations

A. Intrinsic value of put option on UK FTSE 100 Index

$$S = 3,800$$

$$P = 3,926$$

$$E = £100m$$

$$d_{equity} = -22\%$$

$$\begin{aligned} 1. \text{ Value}_I &= \max [0, E \times (S - P) \div P] \\ &= \max [0, £100m \times (3,800 - 3,926) \div 3,926] \\ &= £0m \end{aligned}$$

$$\begin{aligned} 2. \text{ P}_{stress} &= P \times (1 + d_{equity}) = 3,926 \times (1 - 22\%) \\ &= 3,062 \end{aligned}$$

$$\begin{aligned} 3. \text{ Value}_S &= \max [0, E \times (S - P_{stress}) \div P] \\ &= \max [0, £100m \times (3,800 - 3,062) \div 3,926] \\ &= £19m \end{aligned}$$

$$\begin{aligned} 4. \text{ Equity}_{stress} &= \text{Value}_S - \text{Value}_I \\ &= £19m - £0m = £19m \end{aligned}$$

B. Intrinsic value of call option on US S&P 500 Index

$$\begin{aligned} S &= 550 \\ P &= 798 \\ E &= \text{£}75\text{m} \\ d_{\text{equity}} &= -18\% \end{aligned}$$

$$\begin{aligned} 1. \text{ Value}_I &= \max [0, E \times (P - S) \div P] \\ &= \max [0, \text{£}75\text{m} \times (798 - 550) \div 798] \\ &= \text{£}23\text{m} \end{aligned}$$

$$\begin{aligned} 2. \text{ P}_{\text{stress}} &= P \times (1 + d_{\text{equity}}) \\ &= 798 \times (1 - 18\%) \\ &= 654 \end{aligned}$$

$$\begin{aligned} 3. \text{ Value}_S &= \max [0, E \times (P_{\text{stress}} - S) \div P] \\ &= \max [0, \text{£}75\text{m} \times (654 - 550) \div 798] \\ &= \text{£}10\text{m} \end{aligned}$$

$$\begin{aligned} 4. \text{ Equity}_{\text{stress}} &= \text{Value}_S - \text{Value}_I \\ &= \text{£}10\text{m} - \text{£}23\text{m} = -\text{£}13\text{m} \end{aligned}$$

C. Overall stressed asset value

$$\begin{aligned} &= \text{Initial Stressed value of assets} + \text{Equity}_{\text{stress}} (\text{put option bought}) - \text{Equity}_{\text{stress}} (\text{call option sold}) \\ &= \text{£}500\text{m} + \text{£}19\text{m} - (-\text{£}13\text{m}) \\ &= \text{£}532\text{m} \end{aligned}$$

## Part 7. Interest rate derivatives

The most common interest rate derivatives used by pension funds in the UK are swaps contracts. These can be held in either segregated or pooled format, the latter commonly described as “LDI”.

Some schemes may also use gilt futures, gilt total return swaps or interest rate swaption strategies, which will typically be on a segregated basis.

The stress calculation quantifies the change in the value of the derivative contract associated with the interest rate risk factor stress.

Swaps contracts are between two parties – one pays a floating interest rate, the other pays a fixed interest rate. It is most typical for pension funds (or pooled funds on their behalf) to enter into contracts where they are receiving a fixed interest rate from the counterparty (and hence paying the floating interest rate).

Interest rate swaptions are options to enter into a swaps contract at some defined point in the future. A pension fund can either be the buyer or seller of the option and can be either paying or receiving the fixed interest rate on the resulting swaps contract.

Interest rate swaptions are complex instruments and the intrinsic value of a swaption requires schemes both to have an assessment of the market’s expectation of the future evolution of interest rates as well as the ability to carry out a theoretical swap valuation. Both these pieces of information are difficult to define in generality. However, the number of schemes with swaptions strategies is currently anticipated to be extremely low and any such schemes would be expected to have the governance or ability to have specific stress analysis carried out by their asset manager or investment consultant. Such schemes should ask their asset manager or investment consultant to assist with the calculation.

### **Swaps contracts**

Typically, pension funds (or pooled funds on their behalf) will be receiving the fixed leg of an interest rate swap, in which case the absolute value of the stress impact should be added to the overall asset value.

If the fund (or pooled fund on its behalf) is paying the fixed leg of an interest rate swap, the absolute value of the stress impact should be deducted from the overall asset value.

**Scheme/Pooled fund position**

Receive fixed, pay floating  
Receive floating, pay fixed

**Effect on overall stressed asset value**

Add absolute value of interest rate stress  
Deduct absolute value of interest rate stress

*Input parameters*

Calculation date	<i>Effective date of the most recently available audited scheme accounts</i>
PV01 of the portfolio at the calculation date	<i>PV01</i>
This can be obtained from the asset manager. This is the sensitivity of the portfolio value to a one basis point (or 0.01%) change in interest rates.	
Interest rate risk factor stress	<i>d_rates (basis points)</i>

*Calculations*

The impact of the interest rate stress on portfolio is  $PV01 \times d\_rates$

**Gilt futures/Gilt total return swaps**

Pension schemes may hold these instruments to give them synthetic exposure to the underlying gilts. The calculation of the stress is similar to that for swaps. We would expect pension schemes to be the holders of these instruments, rather than the seller. Where the synthetic exposure is a long position in gilts, the stress calculation would have the effect of increasing the overall stressed asset value.

*Input parameters*

Calculation date	<i>Effective date of the most recently available audited scheme accounts</i>
PV01 of the portfolio at the calculation date	<i>PV01</i>
This can be obtained from the asset manager. This is the sensitivity of the portfolio value to a one basis point (or 0.01%) change in interest rates.	
Interest rate risk factor stress	<i>d_rates (basis points)</i>

### Calculations

The impact of the interest rate stress on portfolio is  $PV01 \times d\_rates$

### Swaptions contracts

As mentioned above, we propose that schemes with interest rate swaptions strategies should have the stress valuation calculated by their asset manager or investment consultant.

Asset managers and investment consultants should note that:

- The interest rate risk factor is a parallel shift in the spot rate curve. For swaption calculations, in theory the equivalent impact on the forward rates would need to be assessed. But applying the same parallel shift to the forward rate curve is a reasonable approximation.
- Non-zero intrinsic values will only occur when the swaption is in-the-money.<sup>7</sup> The intrinsic value in these cases will be the value of the swap contract assuming the swaption expires immediately and that the swap rate is the forward rate.

### Example B

A pension fund has £5m notional of interest rate swaps, in which it is paying floating rate and receiving fixed rate. The total initial stressed value of the pension fund's assets (after applying the refined asset stresses to the fund's non-derivative investments and including the market value of the swaps) at the latest audited scheme accounts date is £25m. The fund has no other derivative contracts.

The asset manager has provided the following information on the contract as at the latest audited scheme accounts date:

Market value = £265,204  
PV01 = -£14,761

The risk factor stress from Table 2 is:

d\_rates = -67bps

### Calculations

Impact of the interest rate stress (IRSV) =  $PV01 \times d\_rates$   
=  $-£14,761 \times -67$   
= £988,987

The absolute value of this stress is added to the initial stressed asset value as the fund is receiving fixed rate payments.

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<sup>7</sup> A receiver-swaption is in-the-money if the forward rate of the underlying swap at the maturity of the option is lower than the strike-rate of the swaption. A payer-swaption is in-the-money if the forward rate of the underlying swap at the maturity of the option is greater than the strike-rate of the swaption.

$$\begin{aligned}\text{Overall stressed asset value} &= \text{Initial stressed value} + \text{absolute value of IRSV} \\ &= \text{£25m} + \text{£988,987} \\ &= \text{£25,988,987}\end{aligned}$$

## Part 8. Inflation derivatives

The stress calculation quantifies the change in the value of the derivative associated with the inflation risk factor stress.

In addition, although the primary sensitivity of the derivative will be to inflation, over time the derivative will increase or decrease in value, such that its market value on any particular day will not be zero. To the extent the market value is non-zero, inflation derivatives will also have sensitivity to interest rate risk.

The inflation risk factor and interest rate risk factor stresses will be applied independently of each other. A more accurate calculation could be considered by applying the inflation risk factor stress first and then applying the interest rate risk factor stress to the stressed value of the derivative contract. We are not proposing this more complex approach because the PV01 and IE01 data provided by the asset manager will only reflect the market conditions at the specific date.

### *Input parameters*

Calculation date	<i>Effective date of the most recently available audited scheme accounts</i>
IE01 of the portfolio at the calculation date This can be obtained from the asset manager. This is the sensitivity of the portfolio value to a one basis point (or 0.01%) change in inflation.	<i>IE01</i>
PV01 of the portfolio at the calculation date This can be obtained from the asset manager. This is the sensitivity of the portfolio value to a one basis point (or 0.01%) change in interest rates.	<i>PV01</i>
Market value of inflation swaps contract	<i>Value</i>
Inflation risk factor stress	<i>d_inf (basis points)</i>
Interest risk factor stress	<i>d_rates (basis points)</i>

*Calculations*

The impact of inflation stress (ISV) is  $IE01 \times d\_inf$

The impact of interest rate stress (IRSV) is  $PV01 \times d\_rates$

*Step 1: Applying the inflation stress*

Typically, pension funds (or pooled funds on their behalf) will enter inflation swaps as the receiver of the inflation linked payments. In this case, the absolute value of the inflation stress should be **added** to the overall stressed asset value.

If the fund (or pooled fund on its behalf) is paying inflation-linked payments, the absolute value of the inflation stress impact should be **deducted** from the overall stressed asset value.

*Step 2: Applying the interest rate stress*

If the market value of the inflation swaps contract is positive, the absolute value of the interest rate stress impact should be **added** to the overall stressed asset value.

If the market value of the inflation swaps contract is negative, the absolute value of the interest rate stress impact should be **deducted** from the overall stressed asset value.

<b>Scheme or pooled fund position</b>	<b>Market value of inflation swap</b>	<b>Effect on overall stressed asset value</b>
Receive inflation, pay fixed	Negative	1) Add absolute value of ISV 2) Deduct absolute value of IRSV
Receive inflation, pay fixed	Positive	1) Add absolute value of ISV 2) Add absolute value of IRSV
Receive fixed, pay inflation	Negative	1) Deduct absolute value of ISV 2) Deduct absolute value of IRSV
Receive fixed, pay inflation	Positive	1) Deduct absolute value of ISV 2) Add absolute value of IRSV

## Example C

A pension fund has £5m notional of inflation swaps in a pooled fund. On behalf of the pension fund, the pooled fund manager is paying fixed rate and receiving inflation. The total initial stressed value of the pension fund's assets (after applying the refined asset stresses to the fund's non-derivative investments and including the market value of the swaps) at the latest audited scheme accounts date is £13m. The fund has no other derivative contracts.

The pooled fund manager has provided the following information on the inflation swaps contract as at the latest audited scheme accounts date:

Market value	= -£250,908
IE01	= £12,643
PV01	= £908

The risk factor stresses from table 2 are:

$$d\_inf = +33\text{bps}$$

$$d\_rates = -67\text{bps}$$

### Calculations

$$\begin{aligned} \text{Calculate Inflation stressed value (ISV)} &= \text{IE01} \times d\_inf \\ &= £12,643 \times 33 \\ &= £417,219 \end{aligned}$$

$$\begin{aligned} \text{Calculate Interest rate stressed value (IRSV)} &= \text{PV01} \times d\_rates \\ &= £908 \times -67 \\ &= -£60,836 \end{aligned}$$

### Step 1: Applying the inflation stress

The absolute value of ISV is added to the overall stressed asset value as the fund is receiving inflation-linked payments.

### Step 2: Applying the interest rate stress

As the market value of the swap is negative, the absolute value of IRSV is deducted from the overall stressed asset value.

$$\begin{aligned} \text{Overall stressed asset value} &= \text{Initial stressed assets} + \text{absolute value of ISV} - \text{absolute value of IRSV} \\ &= £13\text{m} + £417,219 - (£60,836) \\ &= £13,356,383 \end{aligned}$$

## Part 9. Credit default swaps

The stress calculation quantifies the change in the value of a derivative associated with the credit risk factor stress.

### *Input parameters*

Calculation date	<i>Effective date of the most recently available audited scheme accounts</i>
CDD01 of the portfolio at the calculation date	<i>CDD01</i>
This can be obtained from the asset manager. This is the sensitivity of the portfolio value to a one basis point change in credit spreads.	
Credit risk factor stress	<i>d_credit (basis points)</i> e.g. +46 from Table 2

### *Calculations*

The impact of credit stress on the portfolio  $CDD01 \times d\_credit$

If the scheme has bought credit protection, the impact of the stress should be added to the asset value.

If the scheme has sold credit protection, the impact of the stress should be subtracted from the asset value.

## Part 10. Calculation of a bespoke stress - Example

### Example D

A pension fund has £1,230m of assets broken down as follows as at its latest audited scheme accounts date:

UK equities	£200m
Emerging market equities	£100m
Overseas investment grade corporate bonds	£200m
UK long-dated investment grade corporate bonds	£100m
Medium maturity index-linked gilts	£200m
Very long maturity index-linked gilts	£300m
Cash	£100m
Interest rate swaps contract (market value)	£30m
Equity derivative contracts (market values)	£0m

The fund holds an unexpired put option that it bought on the UK FTSE 100 Index with a strike price of 3,800. The level of the UK FTSE 100 Index as at the latest audited scheme accounts date is 3,926. It also holds a long position in overseas developed equity futures.

The notional exposures of the equity derivative contracts as at the latest audited scheme accounts date are as follows:

UK (FTSE 100) equity put option (bought)	£100m
Overseas developed equity futures (long position)	£100m

The notional exposure of the interest rate swaps contract is £100m and its PV01 is - £200,000 as at the latest audited scheme accounts date. The scheme is receiving the fixed leg of the swap and paying the floating leg.

### Step 1 – Calculate the initial stressed value of the assets based on the refined asset stresses for non-derivative investments

Applying the refined asset stresses, the initial stressed value of the assets (before allowing for the derivative investments) is £1,248m, calculated as follows:

<i>Asset</i>	<i>(A) Amount (£m)</i>	<i>(B) Refined asset stress</i>	<i>(A) × [1 + (B)] Stressed value (£m)</i>
UK equities	200	-22%	156
Emerging market equities	100	-25%	75
Overseas investment grade corporate bonds	200	+1%	202
UK long-dated investment grade corporate bonds	100	+4%	104
Medium maturity index-linked gilts	200	+9%	218
Very long maturity index-linked gilts	300	+21%	363
Cash	100	0%	100
Market value of swaps	30	0% (stress analysis carried out in Step 2)	30
Market value of equity futures	0	0% (stress analysis carried out in Step 2)	0
<b>Total</b>	<b>1,230</b>	<b>N/A</b>	<b>1,248</b>

In the absence of a bespoke stress calculation the stressed asset value would have been calculated by the PPF as £1,250m under the standard approach. This compares to the initial stressed asset value of £1,248m calculated above.

## **Step 2 – Risk factor stress on derivative investments**

### *Equity options*

The stress in respect of the equity options is the difference between the stressed and unstressed intrinsic values:

The equity stress on the UK FTSE 100 Index put option is +£19m (see Example A in Part 6 for more details of this calculation). This acts to increase the overall stressed value of assets as the fund has bought the put option.

### *Equity futures*

The stress of the equity futures is the notional exposure multiplied by the risk factor stress:

The equity stress on the overseas developed equities futures is -£18m, calculated as £100m × (-18%).

### *Interest rate swap*

$$\begin{aligned} &\text{Interest Rate Stress Value (IRSV)} \\ &= \text{PV01} \times \text{Interest Rate risk factor stress} \\ &= -£200,000 \times -67 \\ &= £13.4\text{m} \end{aligned}$$

This overall stressed asset value is increased by the absolute value of IRSV because the scheme is receiving the fixed leg of the swap and paying the floating leg.

### **Step 3 – Combine all the calculations**

$$\begin{aligned} &\text{Overall stressed asset value} \\ &= \text{Initial stressed value} + \text{Equity options stress} + \text{Equity futures stress} + \text{absolute value of IRSV} \\ &= £1,248\text{m} + £19\text{m} - £18\text{m} + £13.4\text{m} \\ &= £1,262,400,000 \end{aligned}$$

### **Illustration of how the asset stress will be used in the levy bill**

The scheme's s179 valuation is rolled forward to the levy calculation date by the PPF, with the following results:

- smoothed and stressed liabilities of £1,500m
- smoothed assets of £1,200m

$$\begin{aligned} \text{Underfunding} &= \text{Liabilities (on a smooth and stressed basis)} \\ &\quad - \text{Assets (on a smooth and stressed basis)} \\ &= £1,500\text{m} - £1,200\text{m} \times (\text{£1,262m} \div \text{£1,230m}) \\ &= £269\text{m} \end{aligned}$$

$$\text{Risk based levy} = \text{Underfunding} \times \text{insolvency probability} \times \text{scaling factor}$$

## Appendix: Exchange Help File

### *Help for submitting asset breakdown on Exchange*

Please note that the asset breakdown submitted here is used in the calculation of the Pension Protection Levy – it affects the roll-forward, smoothing and investment risk stressing of the s179 asset value, which feeds into the calculation of the risk-based levy.

This information should be taken from the scheme's most recently audited accounts.

If the breakdown of equities and bonds into their constituent components is not available, then there are two options available.

Firstly, you could obtain the split at the accounting date from the scheme's investment manager(s). Alternatively, where such a split would be disproportionately costly to obtain, you could obtain the split from the investment manager's report nearest to the accounting date. For example, if your accounting date is 5 April and you have the split as at 31 March from your regular monitoring of investments, you should enter the split as at 31 March as a proxy for the split at 5 April.

Some investments do not obviously fall into any of the categories available on Exchange. A general description of the key characteristics of each asset category has been provided so that, likely in conjunction with the investment advisor or asset manager, schemes can apply judgement as to which category best reflects that investment's characteristics.

For multi-asset funds schemes are encouraged to obtain a detailed breakdown between asset classes and divide the investment amongst more than one category. For example, this could include Managed/Balanced Funds, Insurance Funds, Diversified Growth Funds or Global Aggregate Bond portfolios.

For some investment classes, the most appropriate Exchange category may vary between schemes depending on the way that the pension scheme has invested. For example, investment in "infrastructure" is widely accessed via private equity-type vehicles and should in those circumstances be classified as "private equity" investments. In some circumstances, however, the exposure to "infrastructure" may be within the debt structure of the asset, which means that the characteristics would be more like that of a corporate bond, so the investment should be classified accordingly.

The classification of some investments may depend on financial market conditions, and in such cases schemes should consult their asset manager or investment advisor. For example, it may either be appropriate to classify a portfolio of convertible bonds along with equity investments or along with non-government bond investments. If the conversion option represents a high proportion of the overall asset value (generally when the underlying share price is high), then the convertibles are likely to be highly sensitive to the value of the underlying shares – so equity classification is likely to be most appropriate. On the other hand, if the conversion option represents a small proportion of the overall asset value (generally when the underlying share price is low), then the convertibles are likely to behave more like debt instruments – so classification along with non-government bonds is likely to be most appropriate.

The asset categories on Exchange are:

#### *Fixed interest government bonds*

This category covers investments issued by a sovereign body that provide a series of known income at pre-determined points in time. There is, however, a risk that some or all of these payments may not be made should the sovereign body default on its obligation. The values of such investments are sensitive to changes in interest rates and will typically have no sensitivity to credit spreads.

For most schemes, the majority of these will be UK government bonds (i.e. “gilts”). Overseas government bonds (e.g. US Treasury bonds, German bunds) and bonds issued by supranational organisations may also be included here if they are issued by governments of countries within the Organisation for Economic Co-operation and Development (OECD). Otherwise they should be classified along with the fixed interest non-government bonds.

Include relevant components of multi asset funds and insurance funds.

#### *Fixed interest non-government bonds*

This category covers investments issued by a corporate body that provide a series of known income at pre-determined points in time. There is however a risk that some or all of these payments may not be received due to the corporate body defaulting on its obligation. The values of such investments are sensitive to changes in interest rates and credit spreads.

Include UK and overseas corporate bonds, mortgage-backed securities, asset-backed securities. Investment managers may also refer to these as “credit” mandates. Include all levels of credit rating and debt-like

investments i.e. investment grade corporate bonds, asset-backed securities (ABS) and mortgage-backed securities (MBS) and alternative credit, which includes: sub-investment grade (also known as high yield bonds), distressed debt, subordinated debt, senior debt, mezzanine debt, leveraged loans, asset-backed securities and convertible bonds where they are classified as debt-like. Overseas government bonds and bonds issued by supranational organisations should also be included here if they are issued by non-OECD governments – such investments may be known as emerging market debt.

Include relevant components of multi asset funds and insurance funds.

#### *Inflation-linked bonds*

This category covers investments that provide a series of inflation-linked income at pre-determined points in time. There is a risk that some or all of these payments may not be received due to the issuer defaulting on its obligations. The values of such investments are sensitive to changes in interest rates and inflation and will typically have minimal or no sensitivity to credit spreads.

Include UK and overseas inflation/index linked government bonds and inflation/index linked corporate bonds. For most schemes, the majority of such bonds will be UK government bonds (i.e. “index-linked gilts”) but may also be issued by overseas governments and supranational organisations. Schemes should also reflect holdings in inflation-linked corporate bonds in this category.

Include relevant components of multi asset funds and insurance funds.

#### *UK quoted equities*

Include all shares listed/quoted on the London Stock Exchange or AIM. This category may also include convertible bonds where they are classified as equity-like. Include relevant components of multi asset funds and insurance funds.

#### *Overseas quoted equities*

Include all shares listed/quoted on any overseas stock exchange. This category may also include convertible bonds where they are classified as equity-like. Include relevant components of multi asset funds and insurance funds.

### *Unquoted equities / private equity*

Represents investment in the equity capital of an unlisted company or investment structure whereby the investor is exposed to the first loss on that capital.

Include all UK and overseas unquoted shares, private equity, venture capital and leveraged buy-outs.

Include relevant components of multi asset funds and insurance funds.

### *Property*

Include all UK and overseas land or property (commercial, residential and industrial). Include any land or property owned by the pension scheme that is occupied by a scheme sponsor. Listed property funds (e.g. REITs) may be included here where the holding is explicitly intended to provide exposure to the property sector. Otherwise they should be included as quoted equities. Include relevant components of multi asset funds and insurance funds.

### *Insurance funds*

For insurance fund investments, schemes are encouraged to obtain a detailed breakdown between asset categories as at (or near to) the relevant scheme accounts date. Each component should be included within the relevant other categories. In the few instances where this breakdown is not available, the amount should be included in this category. Include deposit administration contracts, with profits contracts or similar.

### *Deferred or immediate fully insured annuities*

Insured annuities are contracts through which payments in respect of a portion of the scheme's liabilities are met by a third party insurance company. Typically such contracts will be written in the name of the pension scheme trustees.

Include the proportion of total assets invested in annuities where the audited accounts reflect a value for these assets. These annuities generally relate to a particular group of members and/or dependants of the scheme.

### *Hedge funds*

A hedge fund may invest in a diverse range of assets and may employ a variety of investment strategies to maintain a hedged portfolio intended to protect investors from downturns in the market while maximizing returns on

market upswings. Generally hedge fund strategies would aim to limit volatility relative to equities and tend to have a cash based performance benchmark, e.g. LIBOR+x%. A typical feature of hedge funds will be their ability to use derivatives, long/short positions and leverage to gain significant long/short exposure to certain markets or opportunities.

This is a particularly difficult area of investment to define, given the variety of asset classes and strategies that are used in practice. General descriptions of the types of strategies that might be considered include: "global macro", "event-driven", "relative value" or "multi strategy". Absolute-return funds and Global Tactical Asset Allocation (GTAA) strategies should be classified with hedge funds.

Where currency explicitly forms part of a pension scheme's investment strategy, this is typically done through a leveraged vehicle, so such funds should be included with hedge funds. Examples of fund types to include here are: FX carry and emerging market currency funds.

### *Commodities*

Commodities are goods that are generally used as primary goods in the manufacturing of other products. Examples include oil, metals and agricultural goods.

Pension schemes will typically not have direct exposure to commodities but will access the returns on them via commodity indices. Timber and forestry products can be considered as commodities. Funds that are designed to provide long-only exposure to commodity markets should be classified as commodities.

### *Cash and net current assets*

Include cash in any currency or denomination, cash held in money market funds, savings accounts, bank accounts etc. Note that active currency strategies should be included with hedge funds. Include net current assets.

### *Other*

Some assets do not obviously fall into any of the above categories. A general description of the key characteristics of each asset category has been provided so that in such circumstances, the pension scheme, likely in conjunction with their investment advisor or asset manager, can apply judgement as to which category best reflects that assets characteristics – this may involve dividing the asset amongst more than one category.

If assets cannot be assigned in this way, they should be recorded in this category.

The market value of any derivative exposures (e.g. repo portfolios, LDI arrangements, equity futures) should be included in this category. Schemes that have such instruments should consider carrying out a bespoke stress calculation. Please see the PPF's 'guidance for bespoke investment risk calculation'.