

# Future Development of the Pension Protection Levy

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Supporting material from the Pension Protection Fund

March 2010

# 1. Introduction

- 1.1.1 This document is a companion piece to *Future Development of the Pension Protection Levy: Feedback from the Steering Group*, published simultaneously. To be fully informed of progress on the development of the levy — the reasons for change, the principles for decision making and the possible results — the reader should consider both documents together. This paper should not be read as implying that the Board of the PPF has approved a particular approach to developing the levy in future years.
- 1.1.2 The Steering Group's feedback document sets out proposed criteria for the success of a new levy formula. Those criteria were established through consideration of evidence and argument summarised in this supporting paper. Prior to being presented to the Steering Group, the evidence was discussed with the Technical Group.
- 1.1.3 After presenting the arguments that informed the Steering Group's work, this paper goes further, providing an analysis of how a levy formula based on the Steering Group's principles could in practice impact the distribution of the levy. The two chapters of this document therefore sit either side of the Steering Group's feedback document in terms of their place in the work that has taken place.
- 1.1.4 It should be noted that the impact analysis in Chapter 3 is indicative only, since the formula on which it is based is illustrative at this stage. It was designed to help the Steering Group understand what, in the PPF view, the likely implications of a shift to a levy based on the Steering Group principles might be.
- 1.1.5 The PPF has recently retained consultants to work with it on the options for developing the levy, including in particular calculating the levy parameters that might be used. That work, as well as consideration of feedback from the Steering Group, will inform the Board's thinking when it considers the options for the levy later in 2010.

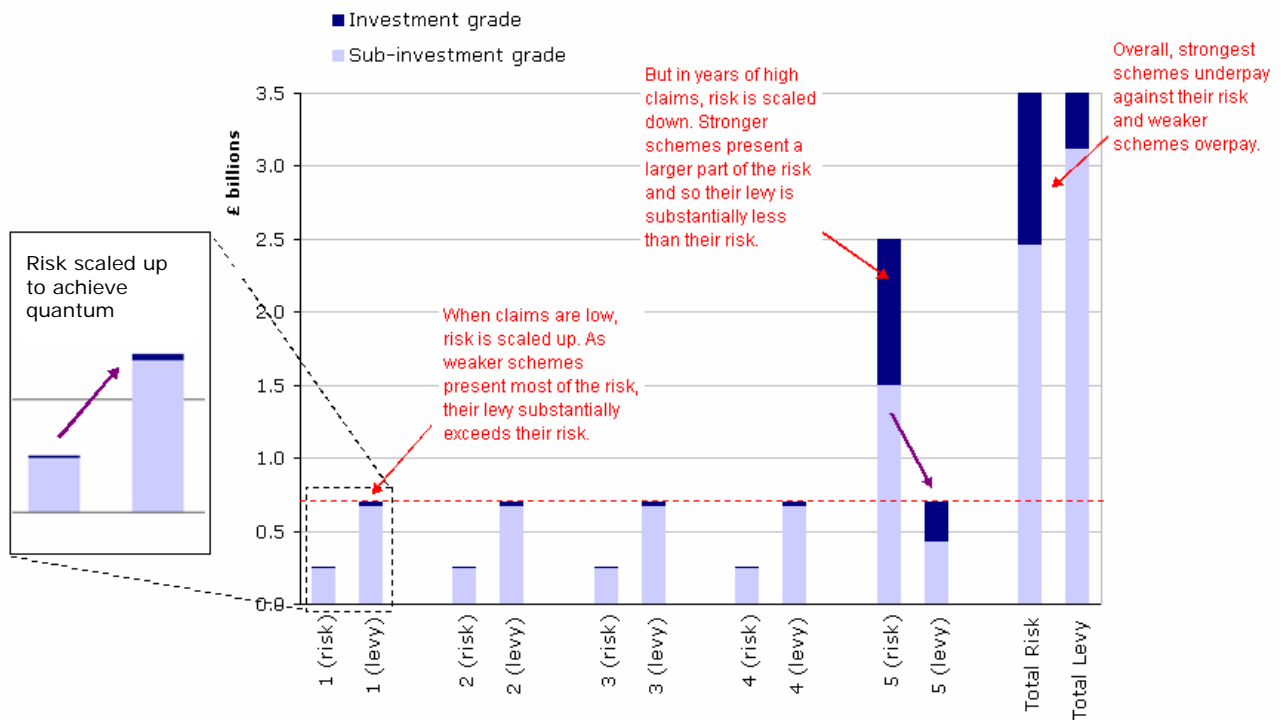
## **2. A summary of evidence provided by the PPF to the Steering Group**

### **2.1 Summary**

- 2.1.1 This chapter contains the PPF's argument for reforming the levy to charge accurately for claims on the PPF resulting from the failure of schemes which seem to represent little risk over the year ahead, but which may fail as a result of economic turbulence. The principal method of resolving this issue would be to measure risks over the economic cycle, taking into account how the position of schemes and employers with different characteristics will change with the economic climate.
- 2.1.2 With regard to insolvency risk, this could be achieved through a measurement system with fewer risk bands, reflecting the fact that over a five year period the full range of risk is actually narrower than the current range of insolvency probabilities implies.
- 2.1.3 Underfunding risk measurement could also be smoothed over a period, and include an investment risk factor to account for potential variation in funding positions when markets are low and claims on the PPF are high.
- 2.1.4 Smoothing risk measurement over a number of years would increase stability in the levy system, and allow a more predictable, bottom-up approach where final levy bills are much more closely related to individual scheme risk.

### **2.2 Why the levy is not fairly distributed**

- 2.2.1 The PPF has presented its case on why the levy is not as fairly distributed as it could be a number of times, principally in its 2008 consultation. Most recently, in a paper for the Steering Group, we summarised their previous arguments along the following lines.
- 2.2.2 The levy ceiling and the 25 per cent limit on any increase in the levy means that a significant increase in risk cannot be matched by a proportionate increase in levy. When setting its target levy estimate in a given year, the PPF therefore has to make an allowance for claims over the economic cycle.
- 2.2.3 Individual bills are, however, calculated according to short-term risk over one year, so the product of underfunding and insolvency risk must be scaled up or down to distribute the target amount.
- 2.2.4 As the chart below shows, the scaling up of bills when short-term risk is less than the aggregate levy, and the scaling down of bills when short-term risk is more than the aggregate levy, tends to benefit the strongest employers at the cost of the weakest.



2.2.5 If, in the year of high claims brought on by a recession, a number of the strongest schemes enter PPF assessment, but haven't paid for their claim in that year or any previous year, the cost of funding that claim will fall on the remaining schemes. This will be particularly burdensome for the very weakest schemes that manage to survive the recession.

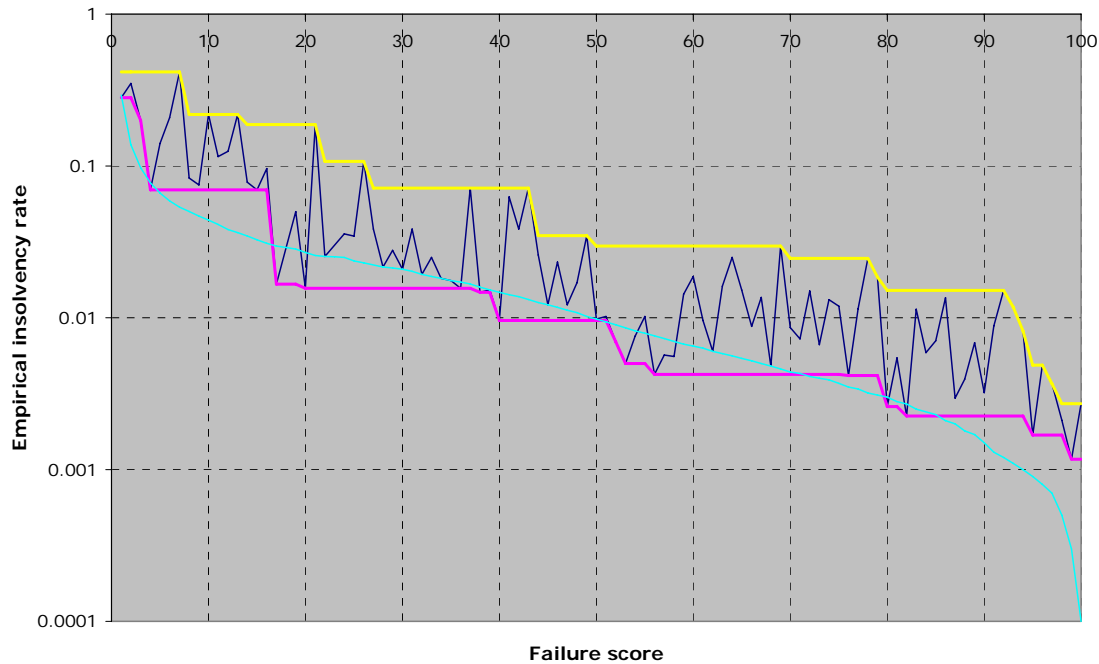
2.2.6 This was the PPF's experience over 2008/09. With individual bills based on short-term risk, it was difficult to identify the full risk of some of the PPF's largest claims before it crystallised. The schemes involved have been among those that were paying a relatively low levy relative to their share of the PPF's risk.

2.2.7 Without charging for this possibility in advance, therefore, risk of this kind cannot be charged for, or funded, fairly.

## 2.3 Insolvency risk

### The limitations of a granular measure

2.3.1 When consulting on the first risk-based levy, the PPF moved from initially proposing 10 insolvency risk groups to a more granular 1-100 scale. However, though failure scores are a broadly reasonable indication of insolvency risk, the PPF's actual experience does not support such fine distinctions. As the table below shows, empirical insolvency rates do not always decrease as failure scores increase:



- 2.3.2 This is unsurprising, as credit rating agencies, with vastly more to spend on a single evaluation, offer a much less granular assessment.
- 2.3.3 Including a component for unexpected and/or long-term risk (of the type outlined in the November 2008 consultation) will tend to narrow the range of insolvency risks between those with good credit quality and those with poor credit quality. Other things equal this will mean that those with good credit quality will pay a larger proportion of the levy – though their bills are likely to remain low in comparison to those with inferior insolvency risks.
- 2.3.4 To a lesser extent, a move to a less granular approach would also reduce spreads within each band (if one moved to 10 bands then those with scores 91-95 may benefit while those with 96-100 pay more). It would not necessarily imply any redistribution of levy between bands.

### Assessing risk fairly: benchmarking insolvency measures to market rates

- 2.3.5 Market economies typically experience an economic cycle with periods of average growth interspersed by periods of low growth or recession. The current recession has been a relatively severe one (and would have seen very large claims on the PPF but for the rescue of the banks) but is by no means unprecedented.
- 2.3.6 The analysis of the PPF has been that the pattern of insolvencies can be expected to change markedly when economic conditions deteriorate, and claims on the PPF are likely to be at their highest. In particular the insolvency risk of previously very secure business increases most sharply, albeit from the vanishingly small to the merely low. Real world evidence supports this proposition: for 2008, KVM Moody's reported an

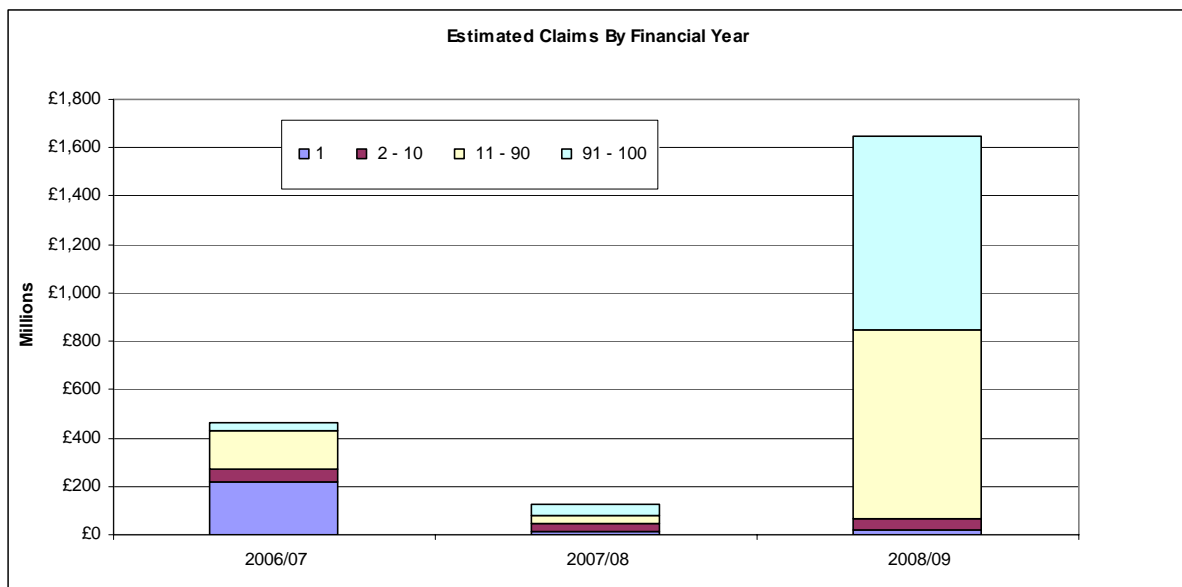
eight fold rise in the failure rate of AA rated businesses, compared to just a 25 per cent rise in failures among sub-investment grade firms.

- 2.3.7 The PPF's November 2008 proposal was to tackle this using D&B failure scores in conjunction with the PPF's in-house long-term risk model, which would predict how those expected probabilities of failure would flex in stressed situations (like this recession). The result was a single stressed insolvency risk applied to any business with a given expected risk.
- 2.3.8 There was a range of criticism of this. Firstly, that it was based on a flawed expected risk methodology (D&B), so there was a concern over "castles built on sand". Secondly, it was complex and opaque: the stressed probabilities of insolvency were the product of a PPF model, as ultimately was the weighting between the expected and unexpected components. There was also a circularity of logic in testing the fairness of the result using the PPF model, whose key parameters had been set by the PPF.
- 2.3.9 The leading alternative options identified with the Technical Group and discussed with the Steering Group adopted the approaches set out for banking regulation by the Basel Committee on Banking Supervision. But it is also possible to benchmark to market practice, and this was seen by the Steering Group as preferable to use of a Basel-based approach.
- 2.3.10 The PPF can benchmark these options against market implied insolvency probabilities, which should reflect a fair value of a risk premium that could be added to expected risk to capture unexpected risk. In our own analysis, we have taken as the benchmark the default probabilities implied by the average five-year credit default swaps over the past five years.

#### **Distribution of claims and levy paid 2006/07 – 2008/09: the case for a through-the-cycle measure**

- 2.3.11 Claims on the PPF are likely to vary dramatically depending on economic conditions, because insolvency rates tend to be higher in a recession (and/or when growth is low) and the pension scheme deficits of those businesses that become insolvent will tend to be worse. This was predicted in the PPF's modelling of risk for the publication last year of its proposals on the development of the levy; the PPF termed periods when claims were well above typical levels, following the crystallisation of low-likelihood but high-impact, "unexpected risk". This is a technical term used by risk professionals and can cause confusion in that the risk is unexpected only in the sense that it has a relatively low probability of occurrence at any point in time and one does not know when it will occur.
- 2.3.12 The current recession has demonstrated this effect clearly, as can be seen in claims for 2008/09, where the PPF saw a near ten-fold increase in the level of claims from the level in 2007/08.

2.3.13 At the same time as claims rise, the nature of the businesses becoming insolvent changes: the businesses that fail seemed low risk previously. This phenomenon can be seen at a global level in the evidence reported by Moody's Investor Services for 2008: the rate of insolvency among AA rated businesses rose eightfold, while the insolvency rate for sub-investment grade business only rose by 25 per cent. PPF claims, when analysed by the insolvency risk of the sponsor 12 months ahead of insolvency, show the same picture:



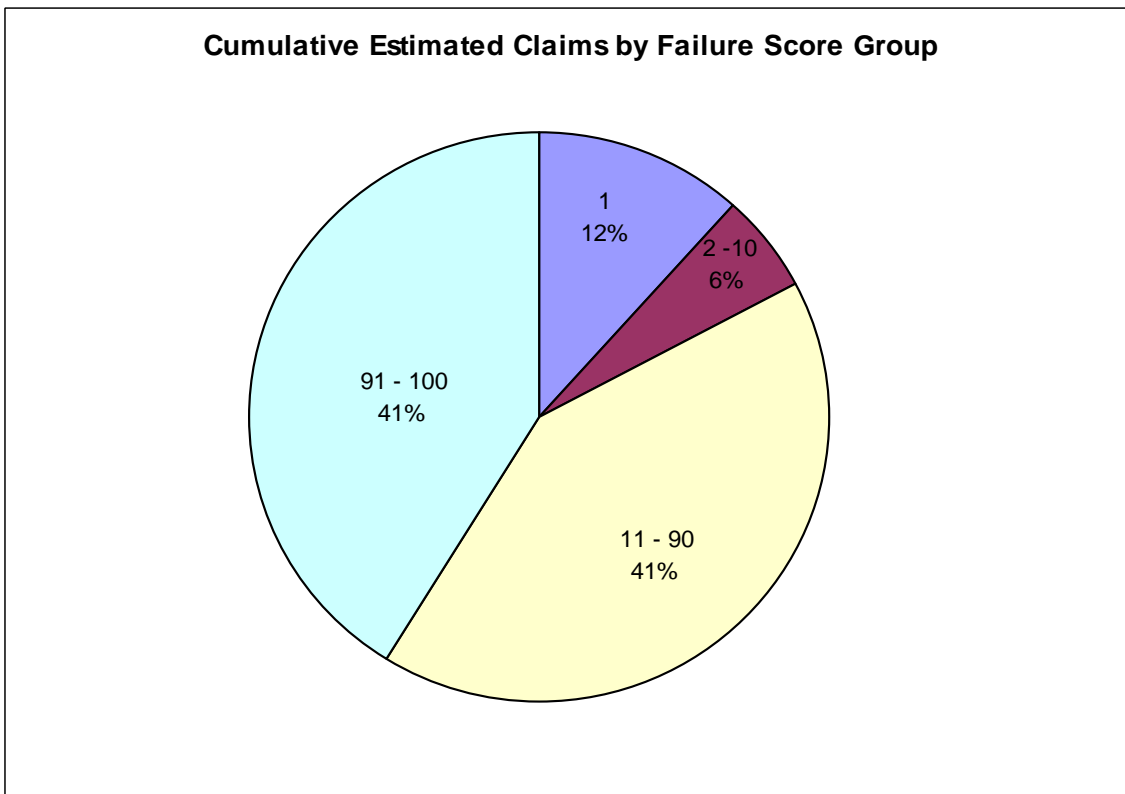
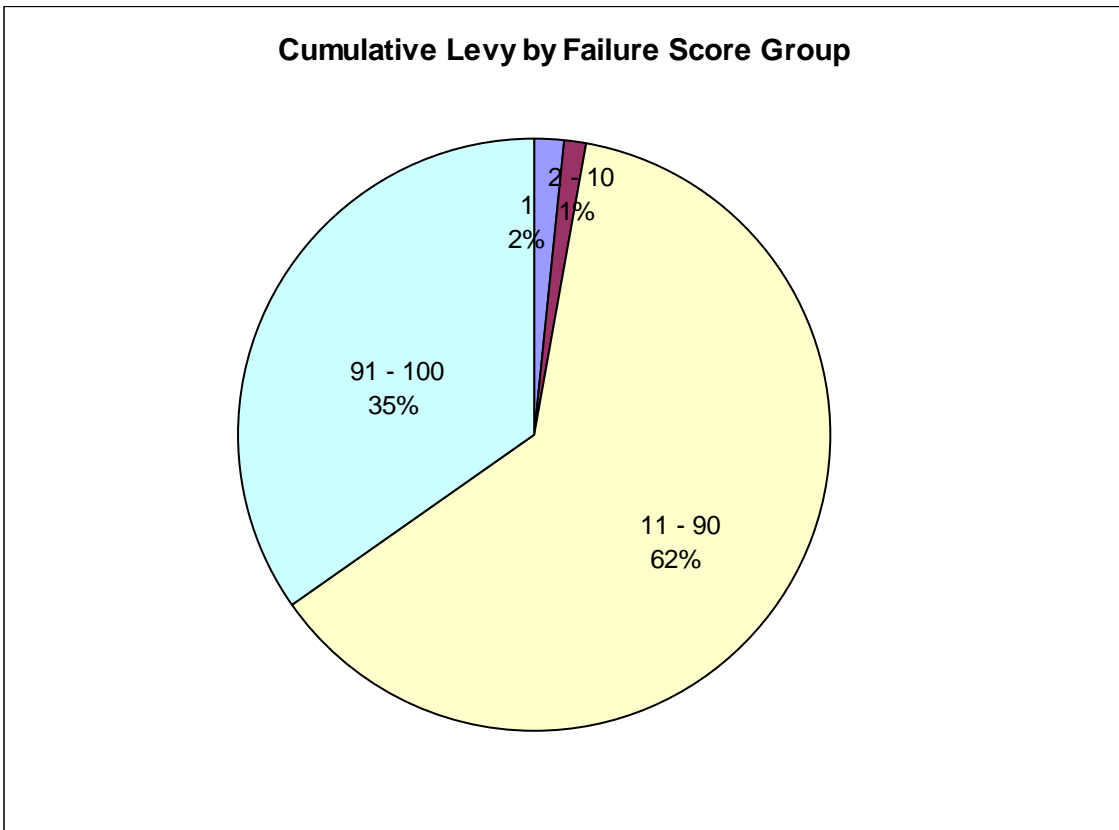
2.3.14 It can be seen that for 2008/09 the proportion of the PPF's estimated claims that were from businesses in the best ten D&B failure scores shot up — so that it made up almost half of claims.<sup>1</sup> Such a dramatic increase can be attributed to the inter-connectedness of risk to the PPF: at the same time as apparently stable business were failing, markets were causing scheme deficits to increase.

2.3.15 Had it not been for the Government rescue of the banks, claims would have been dramatically higher and would have been overwhelmingly generated by employers who were judged "secure" months before. By comparison the schemes those employers sponsored paid a significantly lower proportion of the levy.

2.3.16 If we look at claims since the PPF was set up, this shows that schemes whose employers have less good insolvency scores have paid more than their share of the levy. Schemes with the very worst scores paid less — as one would expect since the cap on the levy is supposed to mean that levy bills don't tip them over the edge or mean that the pension scheme's funding is raided to pay the levy. What may be more surprising is that those with good scores have paid less than their share: schemes with employers whose D&B score was between 91 and 100

<sup>1</sup> The estimated claims are based on the s143 deficit at the time the scheme entered into the PPF assessment period, and are not the exact final claim made against the PPF. The final claim figure will differ as the value of the assets can move while the scheme is in assessment. For example, the 2008/09 estimated claims were £1.3 billion, lower than the £1.6 billion estimated here.

contributed as much to the PPF's costs as those with scores between 11 and 90, but paid only a little over half the levy of the middle group of schemes:



- 2.3.17 This is a key issue in terms of the fairness of the current levy. It arises because when claims by those with previously good insolvency risks rise, in a recession, overall claims are high so the scaling factor is reduced. The shortfall is made up in more benign economic conditions when business can afford it, but when those with poorer insolvency risks are paying a larger share and the levy is above the level of claims.
- 2.3.18 Were the PPF funded according to actual annual claims experience and the cost divided among survivor schemes in accordance with their exposure to the actual risks that have materialised the pattern of the levy would be very different. The PPF would effectively have a model very much like the Financial Services Compensation Scheme in the UK or the pay as you go pension compensation schemes in Sweden or Germany. Although the distribution of the levy costs may by one definition be fair, the PPF would have a "levy" that would (based on history to date) have varied between £160 million and close to £1.5 billion, with half of that shared among the schemes with a D&B score 91-100 as a charge this year. This seems a solution that is not only impossible to achieve under the current restrictions (levy ceiling and maximum increase) but in any case undesirable.
- 2.3.19 The solution to this problem could therefore be to measure insolvency risk through the economic cycle allowing for periods of high claims and low. This would reflect that the PPF's cover is long-term and avoid the negative impacts of highly variable insolvency scores (which contribute to the need to scale up and down the levy and to volatility of individual bills). It would be possible to create a through-the-cycle measure benchmarked to private-sector practice.

## 2.4 Investment risk

- 2.4.1 The funding position of a scheme, stressed to reflect the fact that most claims on the PPF occur when at the bottom of the economic cycle when markets are low, provides us a view of where, on average, the PPF might expect a scheme's funding to be when claims occur. To understand where in practice the particular scheme may be the PPF need also to consider factors which may affect the individual scheme's response to economic change. Two factors may be particularly significant:
- the investment risk the scheme takes on;
  - the control framework for the scheme, which provides a basis for assessing the likely actions of the scheme and its sponsor.
- 2.4.2 The measurement of investment risk was discussed initially with the Technical Group, which agreed that it was an important risk factor and that its introduction into the levy formula could improve fairness.
- 2.4.3 Following further consideration and Steering Group discussion, the basis used for initial impact assessment was a single stress test on all schemes, based on the model used by the Dutch Regulator. Further

work would be done on options including a single stress test applied to all schemes perhaps supplemented by an option for schemes to provide the results of more sophisticated stress test information, where that better reflects true scheme risks.

## 2.5 Managing volatility for a predictable levy

- 2.5.1 Currently the levy proceeds from a so-called top-down approach. The Board begins by setting an aggregate levy that they wish to raise and then allocates the aggregate amount to each pension scheme according to a measurement of their risk. A risk measure is calculated at the individual scheme level by the product of the scheme's employer insolvency probability and a measure of its level of underfunding. Individual levies are then scaled-up (or potentially down) by the levy scaling factor. As such the levy formula is an allocation mechanism rather than a charging mechanism.
- 2.5.2 A bottom-up levy would price risk at the individual scheme level and the Board would simply collect the sum of all individual levies. There would then be no need to regularly adjust a levy scaling factor (which might be renamed therefore), meaning individual levies are independent from movements in other schemes' risk; a scheme's individual levy reduces if its risk reduces and increases if its risk increases. From a technical point of view, this is fair because it reflects more closely the fair value of the PPF cover provided to each scheme.
- 2.5.3 Another advantage is the increased predictability of individual levy bills. With no discretionary scaling-factor, levy payers could potentially calculate their levy in advance, on a web-based application for example. Such functionality would improve understanding of the levy by stakeholders and in turn enhance transparency.
- 2.5.4 There are disadvantages to this though. In the absence of any adjustment to the measurement of scheme underfunding, a bottom-up levy would be pro-cyclical, i.e. very low when scheme funding is strong and very high when scheme funding is weak and many sponsors in financial difficulty. Pro-cyclicality is undesirable<sup>2</sup> from the levy payers' viewpoint, since a levy that increases dramatically when levy payers are in difficulty would be costly in times of financial distress. The variability in such a levy would also most probably be incompatible with legislation: the levy ceiling and restriction on the year-on-year increase.
- 2.5.5 More predictability for levy payers means less predictability of the aggregate levy for the Board, making financial planning of the PPF more difficult.
- 2.5.6 Stability could be attained by extending the through-the-cycle measurement of insolvency risk, discussed above, to the measurement of underfunding in a way something like the following:

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<sup>2</sup> Although from the point of view of the PPF it would provide a natural hedge against deterioration in scheme funding.

- a simple smoothing mechanism by taking an average funding level over a long-enough period (at least three years);
- an overall adjustment to the values of assets to fix the aggregate funding level (at 100 per cent for example);
- a pseudo book-value approach whereby pension schemes assets and liabilities would be re-valued or rolled-forward assuming predetermined values of interest rates and financial market indices; for example, nominal interest rates could be fixed at 4.5 per cent every year and stock market indices could be calculated assuming a 4.5 per cent total return every year.

2.5.7 The common result of these approaches would be to strip out most or all of the effect of financial market volatility. For example if the PPF applied the “pseudo book value” approach, only deficit reduction contributions (or other steps which reduce liabilities) could reduce significantly levels of underfunding. These approaches would better encourage employers to fund their schemes quickly with or without the help of financial markets.

2.5.8 It should be noted, though, that differences between smoothed and actual market values may quickly emerge, leading to underfunding measures used in the levy formula that are out of line with actual valuations.

## 3. Indicative Impact Analysis

### 3.1 Summary

- 3.1.1 This chapter provides an impact analysis on the potential effects of implementing a levy formula along the lines described in the Steering Group paper. It also provides examples of impacts on some representative schemes.
- 3.1.2 The most notable feature is an increase in levy for those schemes that are poorly funded, or pose most risk of poor funding. There are also changes to individual scheme levies as a result of the changes to the measurement of insolvency risk. An average-funded scheme sponsored by a weak employer benefits from a reduction in levy due to the recognition of risk through-the-cycle and the neutral effect of underfunding at this level.
- 3.1.3 This could be thought of as bringing a levy that has hitherto been primarily affected by insolvency risk back more into balance, and would have the benefit of focussing attention on those aspects of risk that schemes and employers can most directly affect.

### 3.2 The formula chosen as a working assumption

- 3.2.1 As set out in the steering group paper, we have developed an illustrative formula that could meet the Steering Group's agreed principles, and that incorporates the following characteristics:
- sponsors categorised by insolvency rating;
  - fewer categories than now, in line with standard credit rating systems;
  - levy rate (the assumed insolvency probability for each category) set by the PPF but benchmarked against external practice/market;
  - consistent with market practice, a levy rate (insolvency probability) which would include a margin for risk through the economic cycle;
  - levy rate (insolvency probability) multiplied by underfunding level, like in the current formula;
  - allowance for investment risk will be built into underfunding level, and measured by a stress test (based for now on information already available through Exchange);
  - levy stabilised to allow a bottom up approach, e.g. by adjusting underfunding to a common baseline;
  - discounts also available to reflect good control environment<sup>3</sup>;
  - to keep the levy affordable, a levy rate (insolvency probability) that is capped and an overall cap on the risk-based levy; and
  - the scheme-based levy used to spread the cost of capping.

It is important to note that this is an illustrative exercise, and it should not be assumed that particular choices on e.g. timescale, rates used etc;

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<sup>3</sup> As noted above, these discounts are not reflected in the illustrative formula, as we do not hold the necessary data, and are engaging consultancy support in this area.

would carry through into any subsequent proposal. Indeed the PPF expects to obtain expert advice in a number of areas to develop its thinking.

3.2.2 Individual Risk-Based Levies calculated using the formula:  $RBL = f \times p \times U$ , where

- $p$  is the levy rate (insolvency probability) applied to the level of underfunding),
- $U$  the underfunding measure, and
- $f$  the levy parameter, would be set and fixed for several years and change only occasionally for example in case of breach of the legal boundaries.

3.2.3 For this analysis, the levy parameter has been set so that if we apply the formula to scheme data at March 2009, the levy is £720 million, and so it is 0.68.<sup>4</sup> It is below 1 largely due to the diversification of risks (the risk to the PPF of all schemes combined is lower than the sum of the risks individually). Setting the levy parameter at this level is designed to make it easier to determine the distributional impacts of the change – as it simplifies comparison with the existing approach. The parameter might need to be reviewed if there were dramatic shifts in insolvency probabilities or changes in scheme behaviour, or to take account of Pensions Act constraints on the levy.

3.2.4 Underfunding was smoothed over a five year period to test whether even over an extended period such a process would be sufficiently effective to meet requirements, rather than because the PPF has a fixed view that this is the appropriate period to use. We expect that smoothing over five years will very significantly reduce the need for adjusting the scaling factor and that levy stability will be enhanced both at individual scheme and aggregate level. However, we have not been able to test stability of the levy as yet but will test it on past levy data in a forthcoming analysis.

3.2.5 This analysis has been done on two bases. Firstly, applying a cap on the maximum bill that to date the Board has considered is needed to protect the weakest of schemes from unaffordable levies. Secondly, excluding the cap on maximum bill to show how a more actuarially fair levy would allocate costs, to help make transparent the cross-subsidies that will remain. The scheme-based levy has been set to cover the costs of capping and so makes up less than 20 per cent of total levy (it is 10 per cent for the approach including a cap on maximum bill, and 4 per cent for the comparator).

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<sup>4</sup> This estimate of  $f$ , and the estimated distribution of levies, is dependent on the assumptions used in calculating the levies for this analysis (see Appendix 1). The addition of contingent assets, deficit reduction contributions, and grossing up the sample to the estimated universe size could lead to a change in the estimated levy distribution or  $f$ .

3.2.6 In this example  $p$  takes only six values and is capped at 4 per cent. Sponsor credit quality is classified in six categories corresponding to the Moody's rating categories: Aaa to Aa, A, Baa, Ba, B and Caa and below. The table below sets out the levy rates (insolvency probabilities) applied to each of these categories. They incorporate a risk premium or margin for risk through the cycle. The PPF is seeking advice from consultants about suitable rates to use. For now the margin calculated here has been set at 10 per cent of the Basel II standard capital charges. Market consistent levy rates would be expected to be of the same order of magnitude and show a similar relationship with the rating categories.

	Aaa & Aa	A	Baa	Ba	B	Caa & below
Failure score band	100 to 97	96 to 90	89 to 69	68 to 42	41 to 6	5 to 1
Levy rate	0.2%	0.5%	1.1%	1.6%	4.0%	4.0% <sup>5</sup>

3.2.7 The underfunding measure,  $U$ , is the difference between the smoothed value of scheme liabilities increased by a margin for investment risk and the smoothed value of assets. In this formula there is no taper to ensure a levy is still charged on overfunded schemes, unlike the current approach. Therefore, for a scheme in surplus and if the margin for investment risk is nil, there is no RBL.  $U = \text{Max}(0, (1+m) \times \bar{L} - \bar{A})$  where  $\bar{L}$  and  $\bar{A}$  are the smoothed values of scheme liabilities and assets respectively and  $m$  a margin for investment risk.

3.2.8 The method we use to smooth the values of schemes' assets and liabilities is to roll forward assets and liabilities using indices that are smoothed rather than the point-in-time values currently used. Schemes supply asset and liability information at a valuation date which could be as much as 3 years different to that supplied by other schemes. So, at present, to charge an equivalent levy, every scheme's assets and liabilities must be rolled forward to a common date, the "measurement date", and the levy charged on that. This is done by taking the assets and liabilities at the valuation date and changing them to reflect the relative movement between that date and the measurement date for an appropriate published index. So, for example, if share prices for the FTSE all share index have risen 20% between the valuation and measurement dates, then the equity portion of a scheme's assets is increased by 20%. An approach which sought to smooth changes in funding would value a scheme's assets and liabilities using an average figure derived from the same index. So the equity portion of a portfolio would be revalued relative to the FTSE average for the five (or three or

<sup>5</sup> In the absence of the cap, the levy rate would be 14 per cent. A levy rate this high would weaken incentives to improve funding if bills are capped overall, as improving funding is unlikely to make a difference to the levy, which is dominated by the insolvency risk.

other choice) years to the measurement date<sup>6</sup>. The same approach can be used with other components of a scheme's assets, and the value of its liabilities.

- 3.2.9 This is a good approximation to smoothing the levies, gives full credit to deficit reduction contributions and can deal with block transfers just as in the current formula. And it provides a good match with a through-the-cycle measure of underfunding risk, since it is an estimate of value over a period rather than at a single point in time.
- 3.2.10 In this example, assets and liabilities are smoothed by using a five-year moving average of the indices used to roll them forward. To calculate the margin for investment risk we apply a stress test so that effectively  $U$  is the scheme deficit after smoothing assets and liabilities and after the stress test.
- 3.2.11 We propose to obtain expert advice on the design of a stress test, before any proposals are made. In the interim, to provide an indication of the sort of result such a test might lead to, we have applied a modified version of an existing test used overseas - a stress test used by the Dutch Regulator. Appendix 2 briefly describes the Dutch Regulator's stress test, how we modified it, and shows the impact on schemes' assets and liabilities as at 31 March 2009.
- 3.2.12 Because we currently hold no data on the quality of schemes' risk management, we have not been able to quantify the impact of introducing a discount to reflect good control environment. But introduction of such a discount is likely to advantage large schemes over small ones and could have an effect similar to that of a reduction in the SBL.

### 3.3 Preliminary impact analysis

- 3.3.1 The impact assessment shows the following broad patterns:
- The influence of funding level is likely to increase significantly, so that poorly funded schemes pay more than at present;
  - Investment risk will be included, which will tend to reinforce the importance of choices over funding and investment strategy
  - Insolvency risks for a given Failure Score would be higher, and would be over a narrower range. This will tend to shift the balance of the

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<sup>6</sup> So, for a scheme which has a valuation dated 31/03/08 the 2012/13 levy would revalue the assets from that date to their average value (based on published indices for the period) at the end of each month, or even every working day, in the 5 years to March 2012, rather than valuing the assets at their 31/03/11 value as the current methodology does. This would prevent the swings in the value of equity (and other risk asset) portfolios and in pension liabilities – that have seen aggregate pension scheme funding move from a deficit of over £200 billion to £15 billion in less than a year.

levy towards schemes with stronger sponsors. But top-rated schemes with strong funding levels still see their levies fall because the insolvency effect is outweighed by the benefit from the new approach to funding.

- The reduction in granularity will result in winners and losers within each insolvency group (those at the bottom of a group gain), but these effects are small in relation to other effects since the through-the-cycle adjustment reduces this impact especially for the top-rated schemes;
- The changes are neutral in relation to size of scheme; the reduction in scaling factor will tend to benefit larger schemes proportionately more, and larger schemes tend to gain due to better funding and lower investment risk, but will lose from the change to insolvency risk.

## Impact

3.3.2 We estimate that between £100 million and £120 million of levy out of £720 million would be reallocated as a result of such a change in the levy formula. This preliminary impact analysis suggests that well-funded schemes would benefit from the change to the levy formula at the expense of poorly-funded schemes: more than 60 per cent of the reallocation corresponds to reductions in levies of schemes with strong or very strong funding levels. For any rating category pension schemes gain from the reform as long as they are well or very well-funded.

3.3.3 Detail on the impacts, in monetary terms, is in Appendix 1, Tables 1 and 2. It can be seen from Table 1 that the illustrative approach charges more to:

- schemes with poor or average funding that have a strong covenant (reflecting the risk those schemes pose should covenant deteriorate). So schemes with poor or average funding and AAA to A ratings pay around £40 million more and those with Baa ratings pay around £60 million more.

3.3.4 By contrast the gainers are:

- Schemes with both strong funding and strong covenant, which pose little risk to the PPF in any scenario, and save around £40 million;
- Schemes with strong funding and weak covenant, which save around £40 million.
- Schemes with both weak funding and weak covenant gain, but by less than £10 million.

3.3.5 Looking at table 2 shows how that picture would change based on a more actuarially fair levy, i.e. one without a cap on size of bill. It makes clear that generally the same schemes gain and lose, so that the proposed formula is improving fairness. The exception to this is

schemes that have both weak funding and weak covenant. These schemes see a small fall in levy on the proposed approach (less than £10 million) but would see a rise in levy instead with the actuarially fair approach. For this group the issue is the affordability of an actuarially fair levy.

- 3.3.6 Tables 3 and 4 show the impact of the new formula relative to the liabilities of schemes. They show that the levy increases for those with strong covenant and poor funding are low relative to the size of scheme, as is the shift favouring strongly funded schemes with strong sponsors. But the gain for strongly-funded schemes with weak sponsors is relatively substantial.
- 3.3.7 In the case where bills are uncapped the maximum levy rises from 0.5 per cent to an average of 1.3 per cent (and in some case to close to 2 per cent of liabilities). The concern would be that this would simply mean that the pension schemes affected would become less and less well funded, and so enter the PPF with larger deficits. This would transfer costs to surviving schemes.

### Health warning

- 3.3.8 As noted above this is an initial analysis, and a worked up proposal would use parameters suggested following further work by consultants. It is also worth noting that we have used the most recent available data, at 31 March 2009. This was a date at which pension scheme funding was poor. If funding improves the impact on the distribution of the levy under the new formula should be limited. But it is hard to estimate what might happen to the existing levy, which is much more volatile at scheme level. Depending on the assumptions about what the PPF did in response, that could affect the comparison of who gains and loses.

### Case study

- 3.3.9 In this section we look at three examples. The size of the schemes we chose as examples was random: size is not a significant factor in determining winners and losers. Table 5 of Appendix 1 summarises the results for these three schemes in terms of levy and inputs to the levy.
- 3.3.10 Scheme A has liabilities of £16.9 million, and is very poorly funded with a funding ratio of only 52 per cent. However the current levy is not very high at £21,000 (0.13 per cent of the scheme's liabilities) owing to a low insolvency probability of 0.17 per cent. The stressed underfunding measure is not substantially different from the current measure of underfunding and is even slightly smaller: £11.4 million against £11.6 million under the current formula. But under the new formula the levy rate jumps to 1.1 per cent. This increase is only partially offset by a fall in the scaling factor from 1.17 under the current formula to 0.68. For scheme A the new formula would lead to a RBL 2.7 times greater, and a total levy 2.4 times greater, than under the current formula.

- 3.3.11 With a failure score of 89, scheme A is on the cusp of the Baa and A category but is still in the former category. It is the typical example of a scheme losing because it is badly funded and has the highest failure score of one risk band.
- 3.3.12 Scheme B is a relatively large, well funded pension scheme with £1.1 billion of liabilities and a funding level of 115 per cent at the end of March 2009 with low investment risk. Even after the stress test the scheme is fully funded at 111 per cent. However, under the current formula it would pay £211,000. This is because at present we inflate liabilities by 21 per cent when measuring underfunding. Under the new formula though, the investment risk margin for scheme B would be 3 per cent, its measure of underfunding would be nil and the scheme would not be charged a RBL. As a result the levy would be two and a half times smaller, at £80,000, exclusively made-up of SBL, instead of £210,000 (with a SBL of £167,000) under the current formula.
- 2.3.13 Scheme C has £4 million of liabilities. For it the new formula makes little difference. Its funding level is average (69 per cent) but its investment strategy is aggressive with a margin for investment risk of 18 per cent. This is close to the margin of 21 per cent currently used. Besides, the increase in the levy rate from 0.39 per cent to 1.10 per cent is partially offset by the decrease of the scaling factor from 1.17 to 0.68. Scheme C would be charged a RBL of £8,670 instead of £8,140 under the current formula but this (small) increase in RBL is offset by the reduction in SBL, leading to a total levy of £9,000 instead of £8,800.

## Appendix 1

# Appendix 1: Assumptions & Impact Analysis

## Assumptions

- A1.1 A number of approximations have been made in this paper owing to a lack of data or the complexity of the calculations.
- A1.2 The figures in this paper have been based on a sample of 5,700 schemes that were eligible for entry to the PPF at 31 March 2009 (this being the deadline for submitting data for levy year 2010/11). The total number of eligible schemes is closer to 7,000. The reason for this difference is, first, that some schemes will cease to be eligible schemes between now and the start of the 2010/11 levy year and, secondly, that schemes whose data was incomplete or questionable have been excluded from this analysis.
- A1.3 For the purpose of this paper we have ignored the existence of contingent assets and deficit-reduction certificates. These are voluntary certificates that (under the current levy formula) schemes are able to submit which will result in a reduction in levy.
- A1.4 The figures in this paper are based upon Probabilities of Insolvency, as provided by Dun & Bradstreet, as at 31 March 2009. These will be used in calculating the 2010/11 pension protection levy. In practice, some of this data will change between now and the issuance of the final invoices. No attempt has been made in this paper to assess this impact.
- A1.5 The smoothed asset values have been calculated using the five year history of the relevant total return indices. Were this formula to be implemented, we would carry out the smoothing using price rather than total return indices.
- A1.6 The net result of the above is that the scaling factors used for this paper are lower than those that would, in practice, be adopted both for the current and proposed formulae.

## Appendix 1

### Impact Analysis

A1.7 Tables 1, 2, 3 and 4 below show the changes in levies by scheme funding category (very poor to very strong) and insolvency rating category (Aaa to Caa and below). A negative value (in green) indicates a reduction in the levy for a particular group, and red indicates an increase in levy. The sum of changes across all groups is nil.

A1.8 The tables, and following charts, illustrate that the change in levy is dependent on scheme funding and insolvency rating category. Poorly-funded schemes will pay more levy, even those in higher rating categories. The presence of the cap on RBL reduces the levy paid by schemes with poor funding and in weaker rating categories – the figures in the top right hand side of Table 1 shift from negative with the cap to positive without it in Table 2. This effect is offset by those schemes which are better funded in stronger rating categories seeing a larger decrease in levy.

A1.9 Tables 3 and 4 show a similar distribution effect with and without the cap on the RBL, but here the change in levy is a proportion of liabilities.

**Table 1: change in levy (cap at 0.5% of liabilities)**

	Aaa & Aa	A	Baa	Ba	B	Caa & below	Total
Very poor funding	£1.9m	£3.1m	£8.3m	-£0.7m	-£1.0m	-£0.1m	£11.5m
Poor funding	£6.4m	£17.8m	£33.5m	-£1.3m	-£4.4m	-£0.8m	£51.2m
Average funding	£6.5m	£7.0m	£17.1m	-£6.0m	-£1.8m	-£0.2m	£22.6m
Strong funding	-£5.1m	-£13.8m	-12.3m	-£19.2m	-£21.0m	-£0.3m	-£71.7m
Very strong funding	-£2.6m	-£0.6m	-£8.5m	-£1.1m	-£1.0m	-£0.2m	-£13.6m
Total	£7.4m	£13.5m	£38.1m	-£28.2m	-£29.2m	-£1.6m	£0.0m
Total current levy	£141m	£142m	£218m	£161m	£50m	£8m	£720m
Total new levy	£149m	£156m	£257m	£133m	£20m	£6m	£720m

Funding groups are 20% bands by funding ratio. So very poor funding is the 20% of schemes with the worst funding ratio.

## Appendix 1

**Table 2: change in levy, actuarially fair levy (no cap)**

	Aaa & Aa	A	Baa	Ba	B	Caa & below	Total
Very poor funding	£1.4m	£2.9m	£8.1m	£1.4m	£6.3m	£0.9m	£20.9m
Poor funding	£4.8m	£14.9m	£31.3m	-£1.0m	£12.8m	£4.2m	£66.9m
Average funding	£2.2m	£5.3m	£15.1m	-£6.7m	£1.0m	£0.4m	£17.3m
Strong funding	-£12.4m	-£20.0m	-£16.0m	-£20.0m	-£20.7m	£0.1m	-£88.9m
Very strong funding	-£3.2m	-£0.8m	-£9.9m	-£1.2m	-£1.0m	-£0.2m	-£16.2m
Total	-£7.1m	£2.8m	£28.6m	-£27.4m	-£1.7m	£5.4m	£0.0m
Total current levy	£141m	£142m	£218m	£161m	£50m	£8m	£720m
Total new levy	£134m	£145m	£247m	£133m	£48m	£13m	£720m

**Table 3: change in levy (cap at 0.5% of liability) in % of liabilities**

	Aaa & Aa	A	Baa	Ba	B	Caa & below	Total
Very poor funding	0.02%	0.05%	0.12%	-0.02%	-0.09%	-0.09%	0.04%
Poor funding	0.02%	0.03%	0.06%	-0.01%	-0.08%	-0.09%	0.03%
Average funding	0.01%	0.02%	0.04%	-0.04%	-0.07%	-0.09%	0.01%
Strong funding	-0.00%	-0.01%	-0.01%	-0.10%	-0.27%	-0.11%	-0.02%
Very strong funding	-0.01%	-0.01%	-0.02%	-0.04%	-0.14%	-0.02%	-0.02%
Total	0.00%	0.01%	0.02%	-0.05%	-0.16%	-0.07%	0.00%

## Appendix 1

**Table 4: change in levy (no cap) in % of liabilities**

	Aaa & Aa	A	Baa	Ba	B	Caa & below	Total
Very poor funding	0.01%	0.05%	0.12%	-0.04%	0.60%	0.80%	0.07%
Poor funding	0.01%	0.02%	0.06%	-0.01%	0.23%	0.46%	0.04%
Average funding	0.00%	0.01%	0.03%	-0.04%	0.04%	0.20%	0.01%
Strong funding	-0.00%	-0.01%	-0.02%	-0.10%	-0.26%	0.04%	-0.02%
Very strong funding	-0.02%	-0.02%	-0.03%	-0.04%	-0.14%	-0.03%	-0.03%
Total	0.00%	0.00%	0.01%	-0.05%	-0.01%	0.25%	0.00%

## Case Studies: data

**Table 5: levy and inputs to the levy for schemes A, B and C**

	Scheme A	Scheme B	Scheme C
Current Levy Scaling Factor	1.17	1.17	1.17
New LSF	0.68	0.68	0.68
Current levy rate	0.17%	0.08%	0.39%
New levy rate	1.10%	0.45%	1.10%
Current investment risk margin	21%	21%	21%
New investment risk margin	20%	3%	18%
Current underfunding	£11,400,000	£58,500,000	£2,220,000
New underfunding	£11,600,000	£0	£2,100,000
Current RBL	£18,400	£44,000	£8,140
New RBL	£48,900	£0	£8,670
Current SBL	£2,700	£167,000	£680
New SBL	£1,200	£80,000	£320
Total levy (current)	£21,000	£211,000	£8,820
Total levy (new)	£50,000	£80,000	£9,000

## Appendix 2

### Appendix 2: Stress test imposed by the Dutch Regulator and stress test applied in this analysis

A2.1 The Dutch Regulator, De Nederlandsche Bank (DNB), uses stress-tests in its work with pension schemes. Whilst the context in which the Dutch Regulator is working differs from the UK, their stress-test is a useful starting point for understanding potential impacts, and we've used it for illustrative purposes. Their standard test is set out in the table below:

**Table 6: stress tests**

Risk measured	Scenario applied
Interest rate	Downward shift of the term structure of interest rates by multiplying interest rates at all terms by 0.77
Equity risk	Mature markets (-25%), private equity (-30%), emerging markets (-35%), real estate (-15%)
Currency risk	A 20% shock of all currencies against the euro
Commodity risk	A price depreciation of commodities by 30%
Credit risk	A general increase of credit spreads by 40%
Actuarial risk	One-year increase in longevity

A2.2 We adapted this stress test to our case in several ways:

- to account for inflation, real interest rates like nominal rates were multiplied by 0.77 (unlike UK DB pension schemes, Dutch schemes are not subject to inflation risk because indexation to inflation is, to a certain extent, discretionary in the Netherlands);
- it was assumed that all equity portfolios were invested in mature market equities, since we have no data on investments in emerging markets equities;
- currency risk was ignored due to lack of data;
- life expectancy was not stressed.

A2.3 These alterations make the stress test that we applied for this analysis weaker than the Dutch stress test. However, the margins that we obtained come close to the investment risk factors we calculated for the November 2008 consultation. Therefore, we think that this calculation is a reasonable approximation of the investment risk factor that might be applied in a levy formula.

A2.4 To simplify the process we have applied the stress-test based on data at a point in time, rather than applying it after smoothing of funding levels. This will tend to lessen the impact of investment risk when markets are low (since portfolios then have a lower proportion of risk-seeking assets) and increase the impact of investment risk when markets are high. It would be preferable, in a real measure, to apply any stress-test after smoothing asset and liabilities.

## Appendix 2

**Table 7: effect of smoothing and stress test on schemes' funding**

	Aaa & Aa	A	Baa	Ba	B	Caa & below	Total
Assets as at 31/03/09	£265b	£205b	£179b	£41b	£14b	£2b	£706b
liabilities as at 31/03/09	£344b	£268b	£225b	£56b	£18b	£2b	£913b
Smoothed assets	£270b	£206b	£178b	£42b	£14b	£2b	£712b
Smoothed liabilities	£289b	£226b	£191b	£48b	£15b	£2b	£770b
Stressed assets	£242b	£190b	£167b	£38b	£13b	£2b	£652b
Stressed liabilities	£374b	£292b	£244b	£61b	£19b	£2b	£993b
Current underfunding	£152b	£119b	£95b	£27b	£8b	£1b	£401b
New underfunding	£135b	£102b	£79b	£24b	£7b	£1b	£348b

A2.5 This table shows an aggregate measure of underfunding under the current formula as at 31 March 2009 that is greater than underfunding measured according to the new method. This is because at that date scheme funding was particularly low. Had we chosen the 31 March 2008 instead, we would have found the underfunding level under the new formula would have been greater than that under the current formula.