

www.ICA2014.org



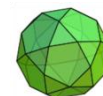
LEARN
INTERACT
GROW

Entity-wide Risk Management for Pension Funds

Malcolm Kemp
1 April 2013

- ERM: enhancing pension scheme disciplines
- Recent developments in EU (IORP II Directive proposal)
- Modelling exposure to sponsor credit risk

- Presentation based on paper by Kemp, M.H.D. and Patel, C.C. (2011): *Entity-wide risk management for pension funds*. British Actuarial Journal and on recent developments, see e.g. www.nematrian.com/PresentationLibrary.aspx, www.nematrian.com/EntityWideRiskManagementForPensionFunds.aspx and www.nematrian.com/WebServiceExampleSpreadsheets.aspx?s=PFProject



- ERM: enhancing pension scheme disciplines
- Recent developments in EU (IORP II Directive proposal)
- Modelling exposure to sponsor credit risk



Definitions of Enterprise Risk Management (ERM)

- Lam (2003) defines ERM as:
 - *“ERM is all about integration: ... an integrated risk organisation; ... the integration of risk transfer strategies; ... the integration of risk management into the business processes of a company”*

- Kemp and Patel (2011) define ERM as:
 - *A framework, using risk as the core building block, to enable key business decisions to be aligned with inherent risk. Involves holistic (‘enterprise’-wide, i.e. ‘entity’-wide) management of risk and (usually) management of business/portfolio as an ‘enterprise’*

- Sweeting (2011) indicates:
 - Key concept is *“the management of all risks on a holistic basis, not just individual management of each risk”*



Definition of ERM in flowchart form

- COSO (2004): “Enterprise risk management is a process, effected by an entity’s board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within the risk appetite, to provide reasonable assurance regarding achievement of entity objectives”



'Enterprise' versus 'Entity-Wide' Risk Management

- *Enterprise* in ERM has two potential connotations:
 - Holistic ('enterprise'-wide, i.e. 'entity'-wide) management of risk
 - Management of business/portfolio as an 'enterprise' (for profit)
- But not all entities are 'for profit'.
 - DB pension funds do not exist solely to make money for shareholders
 - Instead have a *special purpose*, to pay liabilities to beneficiaries as they fall due
- Kemp and Patel (2011) explore this issue
 - And argue that actuaries offer right blend of qualitative (governance) as well as quantitative (modelling) skills to help



Differentiators

- Considers all risks
- Applied across whole business
- Risk embedded into decision-making processes

Key enablers

- Commitment and leadership from the top
- Risk owned by business
- Supporting risk management function
- Effective communication to all stakeholders of how risk is managed



Three pillar structure of modern regulatory frameworks

- E.g. Basel II/III and Solvency II:

Pillar 1: Minimum (regulatory) capital requirements

Pillar 2: Supervisory review process, own risk assessment, governance disciplines. *Supervisors* review how *firms* themselves assess they have adequate capital

Pillar 3: Market discipline. Disclosure and transparency requirements on information relevant to third party assessment of capital base

- Pillars are deliberately holistic, i.e. ERM based, especially Pillar 2



- **Holistic** element highly relevant
- But (for profit) **enterprise** element of ERM needs some refining when entity (client) is fund in isolation
 - Which it sometimes needs to be when interests of different stakeholders diverge
- Requires effective management of funding, investment policy and sponsor covenant exposure **in tandem** (for a typical UK DB scheme)
- And **within a well crafted governance framework**, that includes, e.g.
 - Clarity / transparency
 - Joined up thinking



- Is it clear to everyone where the scheme is heading?
 - Is an ORSA (Own Risk and Solvency Assessment) or equivalent appropriate?
 - Living wills (Recovery and Resolution Plans). What would happen if the sponsor's business model fell apart?
 - What should be published: trading off flexibility vs. clarity?
 - Communicating with beneficiaries
- Is the balance sheet structure fully understood by all stakeholders?
- Should Investment Committees be Risk Committees?
 - Are funding, investment and risk policies typically joined up enough?



Some say: ERM is for insurance, not pensions

Not true:

... As long as there is a purpose and objectives, which risks can derail

... ERM is about effective planning of delivery of these objectives

Similarities

- Planning to fulfil objectives in an effective way
- Managing discretions
- Managing conflicts
- Managing people interfaces

Differences

- Specific purpose
- Limited capital-raising ability
- Different stakeholder dynamics
- Different regulatory regime
- Greater 'social' element



Read across



Adaptations



- Vision and strategy is set by Board
- Risk owned by the business ... risk management (RM) an enabling process
- Governance framework appropriate to nature, scale and complexity of the business and its risks.
- Ideally:
 - Risk decisions integrated with decisions concerning business operations (to promote desired cultural and behavioural expectations)
 - All material risks addressed on enterprise-wide basis, consistently applied across the business and supported by well defined RM policy
 - Improved capture of upside opportunities and mitigation of downside risks



Typical ERM framework for large financial firm might include 13

- Risk Committee, separate from Audit Committee
 - Centralised oversight of risk
 - Risk policy sets risk management responsibility
 - Engagement with executive management and board
- CRO, reporting to risk committee, independent from business units
 - Organisation's risk champion with enterprise-wide oversight of RM activities
 - Guidance to risk owners
 - Challenges to business decisions on key risk areas
- Supporting Risk Management function



- Often less formal and more fragmented
- No CRO requirement
- CFO / Treasury / Audit Committees may have a greater role
- Sometimes ERM elements may fit around functional responsibilities
- ERM might be confined to major risks, or specific projects



Governance challenges for pension funds include

- Availability of skilled resources to manage and monitor risks holistically
 - Often greater use of external expertise, management of agency issues
- Need for clear mission and objectives and aligned management policies
 - Requires value propositions which are practical and acceptable to both members and sponsors
- *For pension fund in isolation*: need to manage interaction between sponsor covenant risk, investment strategy and contribution policy
 - Risk committees rather than just investment committees?
- *When definition expanded to include sponsor*: Wider array of risks, larger stakeholder base, more management interfaces and additional decision-making constraints
 - How to handle risks arising from 'social' element of pensions?



- ERM: enhancing pension scheme disciplines
- Recent developments in EU (IORP II Directive proposal)
- Modelling exposure to sponsor credit risk



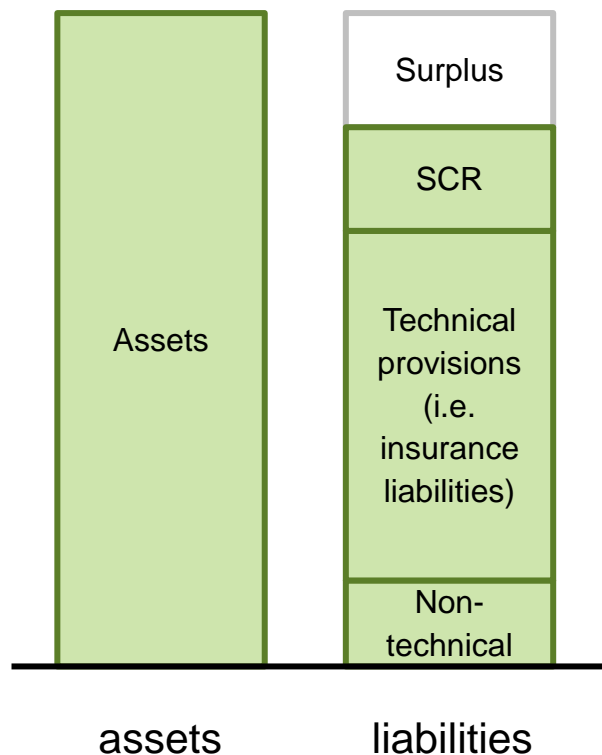
IORP II Directive Proposal

- EU Commission proposed a new EU IORP Directive, borrowing from Solvency II (perhaps because some IORPs are regulated like insurers)
- Initial proposals criticised by industry and by some influential governments
 - “If system isn’t broken then why fix it?” Social policy is reserved to member states
- Pillar 1 suggestions particularly contentious – both magnitude of impact and challenge of valuing important balance sheet elements like sponsor covenant
 - Pillar 1 proposals largely dropped for time being, but EU central bodies still enthusiastic for enhanced Pillar 2 disciplines (ORSA, ERM, ...)
- *Problem*: sponsor covenant still a very important risk for some IORPs
 - EIOPA consulted on sponsor support technical specifications in 2013 and is expecting to issue a further consultation paper at the end of Q3 2014

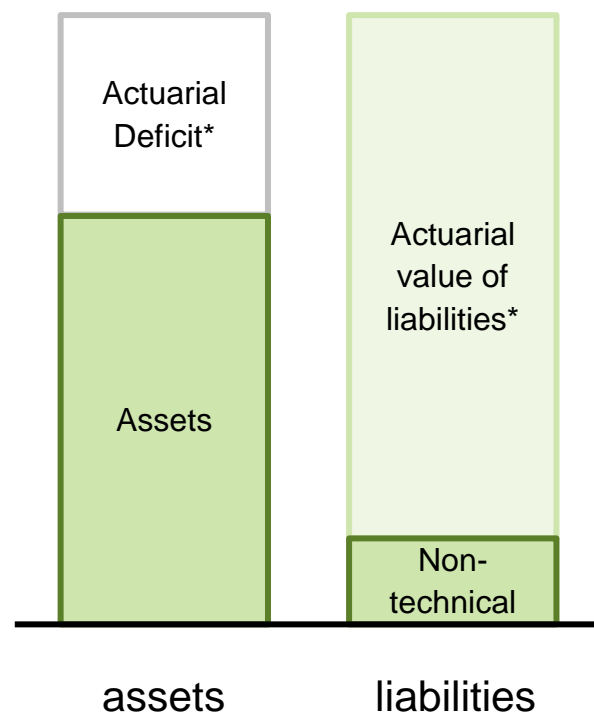


Typical balance sheet presentations

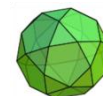
Insurance company (Solvency II)



Pension fund (IORP)



* N.B. Different pension fund valuations may be used for different purposes, e.g. ongoing (funding) and discontinuance. Likewise insurance valuations (e.g. accounting versus solvency)



- Pension funds (IORPs) may have a shortfall between tangible assets and liabilities including pension liabilities
- But is a pension promise then less secure than (say) an insurance promise if the insurer has a surplus versus SCR?
 - And is it appropriate to seek to make such a comparison anyway?
- IORPs have additional security mechanisms that vary by jurisdiction (see Appendix A of this presentation), e.g.:
 - *Tangible assets* (some schemes are unfunded)
 - *Sponsor covenants* (e.g. UK)
 - *Conditional benefits* (e.g. Netherlands)
 - *Pension protection schemes* (e.g. UK and Germany)

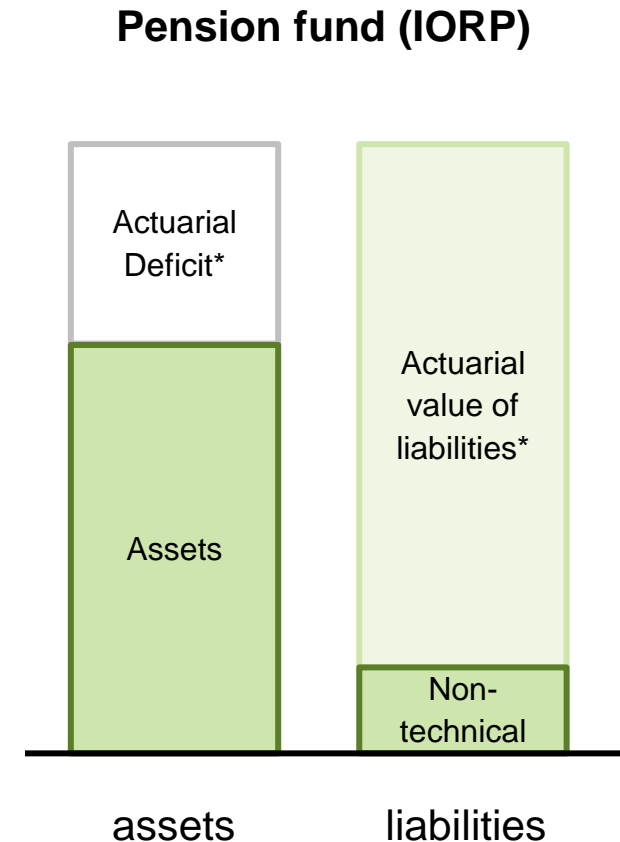


- ERM: enhancing pension scheme disciplines
- Recent developments in EU (IORP II Directive proposal)
- Modelling exposure to sponsor credit risk



Analysing the sponsor covenant: a first step

- Determine actuarial deficit (given a specified valuation methodology, e.g. a wind-up basis)
- Compare with net asset value of sponsor. Some issues if:
 - IORP has claim only on an ‘inappropriate’ part of a wider organisation (e.g. a lowly capitalised entity or one outside the legal reach of scheme/regulator)
 - Covenant is not legally enforceable
- But how relevant is this calculation to what might be the position if and when the sponsor does default or run into trouble?



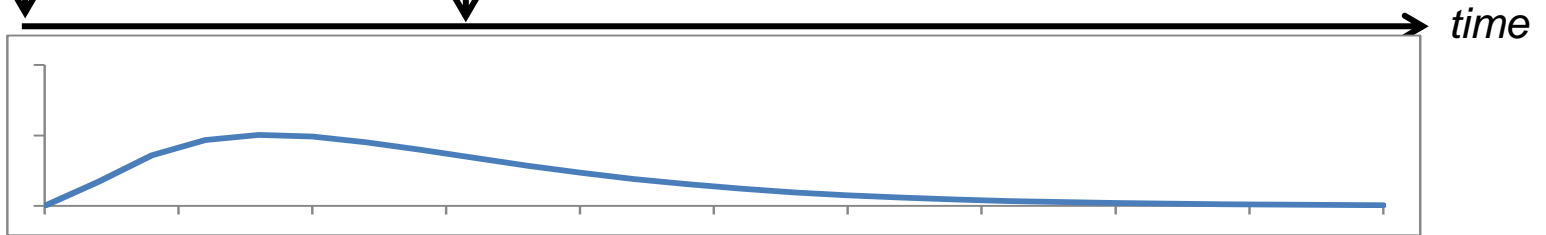
Ideally need a forward-looking analysis

Now, i.e. time 0

Sponsor defaults at some time t

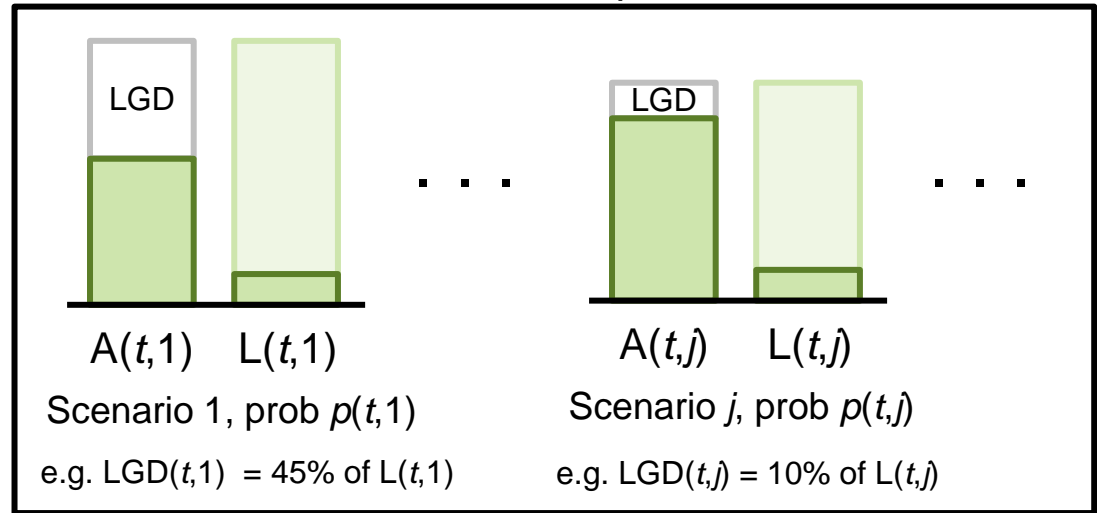
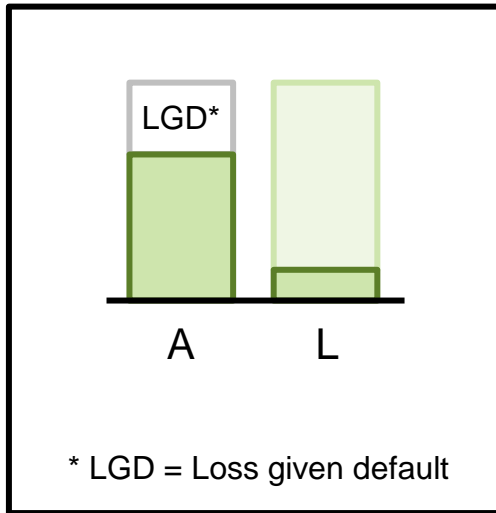
Conceptually akin to a credit rating assessment

Cash flows rec'd by members



Current

Possible future positions



- LGD (to members) = $A(t,j) - L(t,j)$ in scenario j if sponsor defaults at time t



- Same basic formula as for bond pricing, i.e.

$$PV(\text{risky bond}) = PV(\text{riskless bond}) - PV\left(\sum \text{probability of default} \times LGD\right)$$

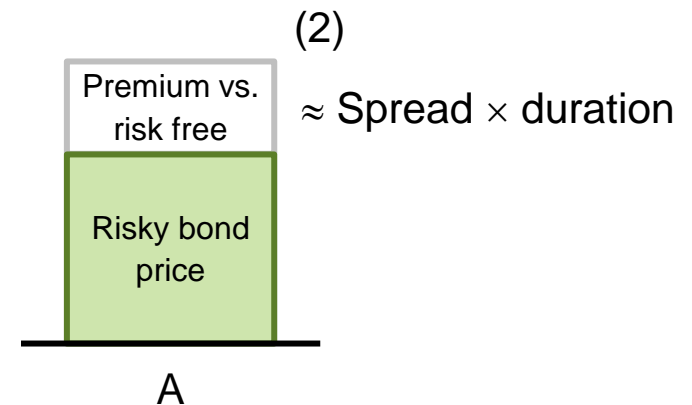
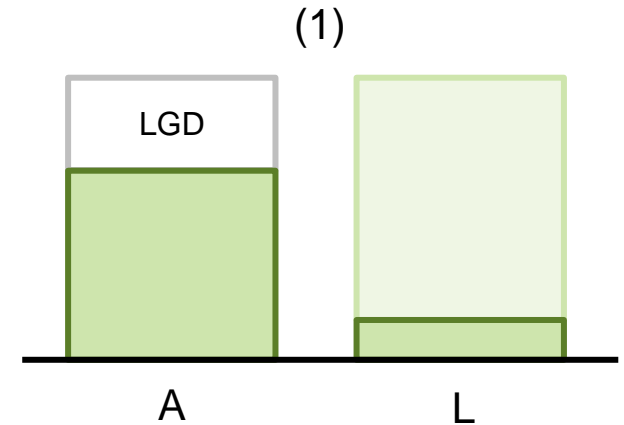
- But with a variable 'recovery' rate, hence variable Loss Given Default (LGD):
 - a) Tangible assets provide some underpin and may be some recovery from sponsor
 - b) But assets, liabilities and LGD may vary through time
- Valuation (from the perspective of members) perhaps more akin to a specialised (potentially path dependent) structured credit instrument exposure
 - Needing two (or more?) dimensional model, probability-weighting different economic scenarios and different times when sponsor might default
 - See e.g. Appendix B of this presentation and Nematrian online toolkit, e.g. www.nematrian.com/WebServiceExampleSpreadsheets.aspx?s=PFProject



- Additional challenge
 - If scheme heavily in deficit and sponsor small compared to scheme then more challenging for sponsor to make good any deficit, i.e. there is correlation between sponsor default and level of underfundedness
 - In EIOPA consultation this (loosely) corresponds to the *maximum available sponsor support*
- Perhaps can be handled by refining (or simplifying?) pricing model
 - See e.g. material presented to IFoA sessional research meeting on 25 January 2013, i.e. IFoA (2013), Barrie and Hibbert (2013) and PWC (2013)



- Presentation potentially challenging
 - Risky versus riskless bond pricing doesn't look like a traditional balance sheet as per (1) (with or without an SCR)
 - Instead it looks like a value decline as per (2)
- May be multiple stakeholders with different interests and claims on the structure
 - Unit increase in the tangible asset pool does not necessarily create unit improvement to the quantum and/or security of the pension promise (as per a DC arrangement). The value increase might primarily accrue to the sponsor.



Pension protection schemes (PPS)

- If present then these add a further overlay to earlier security mechanisms.
- Can in principle be modelled by a similar approach
 - Except that the 'default' process is now a two stage process
 - Sponsor defaults: benefits potentially depleted on transfer to protection arrangement
 - At a later time PPS defaults: benefits potentially further depleted
- Complications
 - Premium transfers through time from scheme / sponsor to PPS may deplete future scheme/sponsor resources
 - In effect 'insurance' against sponsor default – but in what circumstances might the PPS itself default?
 - Moral hazard



- Manage funding and investment policy and sponsor covenant risk in tandem
 - Within a well crafted governance framework
- Holistic approach inherent in ERM highly relevant to pension schemes
 - Approaches elsewhere provide benchmarks, especially in relation to ‘governance’
 - Pension fund risk management is not just about investment risk
- However, ‘enterprise’ aspects of traditional ERM approaches may need some modification
 - Depending on perspective and choice of ‘entity’ in question (the pension fund, sponsor and/or the two combined)
 - Many modelling challenges arise when addressing questions where stakeholder perspectives differ, e.g. sponsor covenant valuation



- Tangible assets
- Sponsor covenant
- Conditional benefit structures
- Pension protection schemes (PPSs)



- Most obvious and most basic form of security
- Protects members in event that party otherwise meeting cost of benefits defaults
- Not all IORPs (or other pension arrangements) are funded
 - E.g. PAYG social security systems
- Unfunded pension arrangements (currently) largely excluded from discussions around possible new EU IORP Directive



- A scheme may be in deficit (now or at some stage in the future)
- However, the benefits that it has promised may still be secure if it can rely on its sponsor to make good any shortfalls. This is known as the **sponsor covenant**
- Sponsor covenant strengths can vary:
 - *One end of spectrum*: might only involve a loose intent of the sponsor to top up the scheme over a long period of time, but with sponsor able to walk away even if the scheme was in deficit and the sponsor cash-rich, or sponsor might be a poor credit
 - *Other end of spectrum*: Legally binding commitment to make good deficits as they arise (perhaps coupled with requirements to keep tangible asset base high in meantime) without ability to walk away from scheme deficit, involving a sponsor with credit rating highly likely to remain strong for long period of time



- Liabilities may not have been fully ‘promised’, may be only provided on a ‘best endeavours basis’
 - Benefits reduced, or not increased as much, if insufficient assets available to meet targeted benefits in full
 - E.g. conditional indexation, where level of inflation increases awarded depends on available assets
- To avoid misrepresenting position to members there may be:
 - Constraints on how benefit structures may be communicated to members
 - Requirements for ‘continuity’ analyses designed to show a reasonable likelihood of delivering targeted benefit
- C.f. collective DC schemes



- Last resort benefit reductions
 - If there is no-one else able and willing to meet shortfalls then any scheme winding up (or being forced by regulators or courts to wind-up) with a deficit will necessarily reduce some 'promised' benefits to reflect lack of assets to pay them in full
 - This type of last resort benefit reduction would usually be excluded from consideration of conditional benefit structures in a HBS
 - Aim is never to have recourse to this legal back-stop
- However, identifying boundaries between conditional benefits and constructive obligations may be challenging in some instances



- Very important security mechanism in some EU member states
 - Sometimes covers all benefits, sometimes only up to specific limits
 - May cover only some types of (DB) pension scheme
 - Premiums paid may include elements of cross-subsidy between schemes (and between generations)

- Comparison with corresponding protection schemes for insurance indicates (possible) issues with:
 - Moral hazard
 - Cross-subsidies
 - Social / labour aspects of IORPs versus insurance



- Model structure
- Including asset volatility in model
- Quantifying value split between sponsor and members



- Illustrative DB Final Salary Scheme, closed to new accrual, no discretionary benefit increases, target funding level of 100%, deficits/surpluses versus target amortised 20% each year
- Funding ‘valuation’ includes discount rate 1.2% pa higher than wind up valuation (equity risk premium – asset strategy 60% equities)
 - See www.nematrian.com/EntityWideRiskManagementForPensionFunds.aspx and www.nematrian.com/WebServiceExampleSpreadsheets.aspx?s=PFProject

	<i>Priority on wind up</i>	Benefit value on wind up basis, assuming actual recovery (if sponsor defaults) is 100%			
Market implied default rate:		2% pa	4% pa	6% pa	8% pa
Active*	<i>2 (to deferred on wind up)</i>	6619	6365	6163	6001
Deferred	2	18013			
Pensioner / spouse	1	34259			

* Active members benefit from salary inflation above price inflation, and hence receive higher eventual benefits the longer the scheme does not wind up

Source: Nematrian Limited



Including asset volatility in model

	Equity volatility (%pa)	Revised benefit value on wind up basis, now assuming only 50% recovery			
		Market implied spread on sponsor obligations			
		1% pa	2% pa	3% pa	4% pa
Active	0	96.2%	93.5%	91.5%	90.1%
Deferred	0	98.2%	96.7%	95.5%	94.5%
Pensioner / spouse	0	100.0%	100.0%	100.0%	100.0%
Active	20	93.8%	89.8%	87.2%	85.6%
Deferred	20	97.5%	95.5%	94.1%	92.9%
Pensioner / spouse	20	100.0%	100.0%	100.0%	100.0%

Source: Nematrian Limited, 1000 simulations for 20% equity volatility



Quantifying value split between sponsor and members

- **Question:** What proportion of asset returns accrue to beneficiaries?
 - Initial funding level increased by 1% but otherwise example unchanged (e.g. trustees' target funding level remains 100%)
- **Answer:** Depends on riskiness of sponsor covenant, but often not much
 - Consistent with insight that assets within pension fund can be thought of as akin to 'collateral' backing a bond-like liability (issued by sponsor to beneficiaries)
- N.B. Importance of assumed recovery rates, correlations, discretionary benefits etc.

	Change in benefit value if initial funding level is 101%			
	Market implied spread on sponsor obligations			
	1% pa	2% pa	3% pa	4% pa
Active	0.09%	0.19%	0.28%	0.36%
Deferred	0.07%	0.13%	0.19%	0.25%
Pensioner / spouse	0.00%	0.00%	0.00%	0.00%

Source: Nematrian Limited



Important Information

Material copyright (c) [Nematrian](#) Limited, 2011-2013 unless otherwise stated.

All contents of this presentation are based on the opinions of the relevant Nematrian employee or agent and should not be relied upon to represent factually accurate statements without further verification by third parties. Any opinions expressed are made as at the date of publication but are subject to change without notice.

Any investment material contained in this presentation is for Investment Professionals use only, not to be relied upon by private investors. Past performance is not a guide to future returns. The value of investments is not guaranteed and may fall as well as rise, and may be affected by exchange rate fluctuations. Performance figures relating to a fund or representative account may differ from that of other separately managed accounts due to differences such as cash flows, charges, applicable taxes and differences in investment strategy and restrictions. Investment research and analysis included in this document has been produced by Nematrian for its own purposes and any investment ideas or opinions it contains may have been acted upon prior to publication and is made available here incidentally. The mention of any fund (or investment) does not constitute an offer or invitation to subscribe to shares in that fund (or to increase or reduce exposure to that investment). References to target or expected returns are not guaranteed in any way and may be affected by client constraints as well as external factors and management.

The information contained in this document is confidential and copyrighted and should not be disclosed to third parties. It is provided on the basis that the recipient will maintain its confidence, unless it is required to disclose it by applicable law or regulations. Certain information contained in this document may amount to a trade secret, and could, if disclosed, prejudice the commercial interests of Nematrian or its employees or agents. If you intend to disclose any of the information contained in this document for any reason, including, but not limited to, in response to a request under the Freedom of Information Act or similar legislation, you agree to notify and consult with Nematrian prior to making any such disclosure, so that Nematrian can ensure that its rights and the rights of its employees or agents are protected. Any entity or person with access to this information shall be subject to this confidentiality statement.

Information obtained from external sources is believed to be reliable but its accuracy or completeness cannot be guaranteed.

Any Nematrian software referred to in this presentation is copyrighted and confidential and is provided “as is”, with all faults and without any warranty of any kind, and Nematrian hereby disclaims all warranties with respect to such software, either express, implied or statutory, including, but not limited to, the implied warranties and/or conditions of merchantability, of satisfactory quality, or fitness for a particular purpose, of accuracy, of quiet enjoyment, and non-infringement of third party rights. Nematrian does not warrant against interference with your enjoyment of the software, that the functions contained in the software will meet your requirements, that the operation of the software will be uninterrupted or error-free, or that defects in the software will be corrected. For fuller details, see license terms on www.nematrian.com. Title to the software and all associated intellectual property rights is retained by Nematrian and/or its licensors.

