

Pension risk

Risk management for pension schemes

Initial report of the Pension Risk Working Party

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1 Introduction

The events of the last year or so have highlighted the enormous risks taken by occupational defined benefit schemes. The traditional ways of managing these risks are no longer adequate and a new approach is needed.

In this paper we introduce the key concepts and methods of Enterprise Risk Management (ERM). ERM is widely used to manage the risk of businesses, including financial services companies which provide pension products. We see no reason to regard occupational pensions schemes as fundamentally different entities, although there are many practical difficulties in implementing the ERM approach.

We do not claim that ERM produces any magic bullets to solve the problems facing pension schemes, but we do believe that it provides a framework in which improved decision making is possible.

This paper has been prepared by the Pension Risk Working Party, namely:

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It is intended to start a debate and a programme of research rather than being the last word on the subject. To encourage this debate, we have included many personal views with which you may disagree. These are not necessarily the views of our employers or the Society's.

We look forward to your feedback and your suggestions for further research.

2 Executive summary

Section 3 sets out the main ideas of ERM. These are:

- having a clearly defined objective and a realistic plan to achieve it
- identifying and quantifying the risks of failure and deciding how to mitigate these risks
- regular monitoring of the project by a suitably resourced and empowered risk manager

Section 4 reviews the current risk management of occupational defined benefit pension schemes in Ireland and section 5 looks at how it can be improved by applying ERM techniques.

Our findings and recommendations are set out in Section 6. Briefly:

- current risk management methods are inadequate and need to be replaced by the ERM paradigm. ERM can be complex and comprehensive, but most schemes would benefit from at least an 'ERM-lite' approach;
- schemes are typically ambiguous about the responsibilities of the various parties involved in their management. These ambiguities need to be removed to enable schemes to function effectively;
- pension risk is generally best managed by the sponsoring company as part of their business rather than by the trustees considering it as a stand-alone entity. This presents some difficulties under the current trust based legal framework;
- investment risk and covenant risk are the most significant risks at the moment. They are inter-related and need to be managed in an integrated framework. However we need to consider all risks, not just those which are currently most pressing;
- defined contribution schemes can and should be reviewed in the same framework. We propose a further paper on this subject;
- it is not enough simply to do risk management – it has to be visible to scheme members. We urge better communication of strategy, financial status and key decisions to members in brief and non-technical language;

Section 7 provides suggestions for further reading, including links to internet sites.

3 Risk management principles

What is enterprise risk management?

The “Enterprise Risk Management-Integrated Framework” published in 2004 (see Section 7 for a link to the full document) defines ERM as :

“a process effected by an entity’s board of directors, management and other personnel, applied in a strategic setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives.”

Identifying, prioritizing and mitigating risks have been standard management activity for businesses for quite some time. However, ERM has introduced a holistic approach to the consideration of a wide variety of risks and has elevated risk management to a senior level of responsibility within an organization. In the ERM environment, risk budgets are considered alongside revenue targets, capital budgets and other more traditional performance metrics. Decisions about risk are taken explicitly, with the knowledge that risk can only be taken when capital is available – either by conventional means (e.g. equity issues) or non-conventional (e.g. insurance).

Previous custom and practice may have been to treat risks in silos which is generally inefficient and counter-productive particularly if natural hedges exist within the organization. The rate of progress has been different between industries and organizations, however it is clear that the move towards ERM is inexorable as a result of a number of reasons:

- greater recognition of the amount, variety and interaction of risks faced by organizations;
- pressures from regulators, rating agencies, institutional investors and other stakeholders on senior management to assume greater responsibility for managing risk on an enterprise wide scale;
- developments in finance and technology provide tools to understand and manage the interaction of various risks.

Basic concepts

We undertake many **projects** in both our business and our private lives. These range from the very simple e.g. go for a walk on a Sunday afternoon to the complex e.g. managing a pension scheme.

Any project has an **objective** and a **plan** to achieve it. The plan will specify the **resources** and **actions** needed. It will typically make some **assumptions** about the future. These assumptions may be implicit (e.g. an action delegated to a third party will be completed) or explicit (e.g. average investment returns over the next ten years will be greater than 10% p.a.). Because we can’t be sure that these assumptions will be borne out, there is a risk that the project will fail.

As a result, projects will need to be **managed** in order to be successful, i.e. progress against the plan will need to be monitored and corrective actions taken if the assumptions made in the plan are not realised in practice.

Risk management can be broken down into several phases:

- Understand the objective and how it will be achieved
- Identify and evaluate the risks which could lead the project to fail
- Decide on how to reduce or eliminate these risks
- Implement these measures and monitor residual risks

Risk manager

It may be stating the obvious, but the first stage in risk management is to appoint a person or team to be responsible for risk management and to agree their objectives, powers and reporting lines.

Objectives

A project needs a clear objective if it is to be managed effectively.

Complex projects may have multiple and possibly conflicting objectives, but it is necessary to refine and reconcile these before effective management can be implemented.

The objective(s) should be SMART. i.e:

Specific – there should be no ambiguity.

Measurable – we should be able to tell whether it has been achieved or not, and how far from success we are.

Attainable – we should expect to be able to achieve the objective unless very unlucky.

Relevant – the objective should correctly capture the intention of the project.

Timely – the objective should be achieved over a specific timescale.

Project plan

A project plan sets out the actions and resources required to meet the objective. It is possible to produce very detailed project plans, but even a sketchy plan is better than nothing: it will act as a framework for decisions during the term of the project and can be refined as the project proceeds.

The project plan is a key management tool. It helps us to check whether the required actions have been completed on schedule and what additional actions need to be taken if they have not.

If a project is subject to risk, the initial project plan needs to consider what actions would be taken depending on possible outcomes – i.e. it should specify contingent actions. **Risk management is best done in advance** rather than as a fire fighting exercise when something does go wrong.

There are a number of different ways of presenting project plans and we do not think that one way is better than any other. However, an effective plan will probably be short (i.e. it can be summarised on one sheet of A4 paper) and concentrate of the keys actions rather than the details.

Risk identification

Whilst the concept of risk is intuitively straightforward, it is hard to pin down precisely and this ambiguity can lead to problems. **We define a risk as an event leading to project failure.**

The project plan will describe how the objective can be achieved assuming that certain events happen (or don't happen). Each of these assumptions is therefore a source of risk that the project will fail.

The first step in risk management is to identify all the assumptions made in the project plan and the associated risks of failure.

It is helpful to classify risks in some way to organise our thinking. There are a many different and valid ways of doing this. For example, pension scheme risks may be classified as:

- Financial
- Operational
- Compliance

Even for relatively simple projects (such as the walk in the country referred to above) the number of risks is large and identifying all risks is unrealistic. Whilst we believe that the risk identification should be as thorough as possible, it cannot be exhaustive and should focus on the most serious risks.

Risk assessment

There are two dimensions to risk – the probability that the event will occur and the severity of the impact if it does occur. Risks need to be analysed in both dimensions. Whilst we might agree that we don't not need to spend a lot of time on low probability low impact risks, it is less straightforward to prioritise between high probability and high impact events.

If risk management resources are scarce (and they usually are) we need to be able to prioritise the various risks. To do this we need to come up with a one-dimensional risk measure. There are many ways of doing this, none of which are completely satisfactory. The most commonly used measure is

$$\text{Risk measure} = \text{probability of occurrence} \times \text{expected loss}$$

This could be calculated using explicit probability distributions but in many cases a simpler 'traffic light' approach is used to rank risks as red (high priority), amber or green. We believe that the application of the concept itself is of most benefit, with the actual mechanics of the calculation being less significant.

An additional complication arises when risks are not independent of each other. This is a 'third dimension' of risk and is a key issue in pension scheme management, where sponsor risk and

investment risk can be strongly correlated. Perhaps the simplest way of dealing with correlated risks is to consider compound risks (i.e. multiple events occurring simultaneously) as well as simple ones.

Risk mitigation

We have now identified, analysed and prioritised the risks. We now look at ways in which they can be managed.

There are essentially four different approaches:

- **Avoid** – do not undertake the project or modify the project so that it is not exposed to that particular risk.
- **Reduce** – find a different way of doing the project that reduces the exposure.
- **Transfer** - enter into agreement with a third party to assume the risk (in return for a premium).
- **Accept** – decide to retain the risk and accept the possible adverse consequence.

Whilst this classification is to some extent artificial, it is useful as a framework for deciding on how to approach each risk.

Each risk measure will have a cost associated with it. The total risk management package agreed will need to meet a **risk budget** which has been agreed by the sponsor of the project. This risk budget should reflect the resources (not necessarily just financial) available, which may change over the course of the project.

Residual risk

It is unlikely that all risks will have been eliminated by this process. Residual risks will need to be assessed to see how serious the consequences could be and the project will need to be monitored and corrective action taken if problems arise as a result.

Risk register

The results of this risk analysis can be conveniently summarised in a **risk register**. This is usually presented as a table showing:

- Description of risk event
- Probability
- Consequences
- Priority
- Mitigation
- Residual risk
- Risk 'owner', i.e. the person or party responsible

This document is another key management tool. There is a temptation to make it exhaustive. As with the project plan, we suggest that a short (one sheet of A4 paper) document which is actually used is more valuable than a long and infrequently reviewed one.

Reviews

The key risk management decisions should have been taken at the project design stage. However, circumstances change and there are usually residual and even new risks to be considered during the life of the project, so risk management needs to be considered regularly and the strategy changed if necessary.

Advantages and limitations of the ERM approach

The main advantage of the ERM approach is the holistic view which allows for correlation across all identified risks. This integrated approach should result in a better and more efficient decision making framework.

The main limitations are the difficulties in dealing with non-quantifiable risks (such as the loss of experience arising from the retirement of a key manager or reputational risk in the event of project failure) and the need to avoid an overdependence on the results of a particular model.

Further reading

Section 7 provides suggestions for further reading, including links to internet sites. There is nothing particularly complicated about the key ideas of ERM and they should be familiar to most actuaries.

4 Current Practice

Pension schemes and their finances have become more topical over the last few years and indeed more and more companies are appreciating the degree of risk inherent in a defined benefit (DB) pension scheme. The last decade brought much turmoil for DB schemes with significant changes including accounting standards and the recognition of pension scheme assets and liabilities on the corporate balance sheet.

In this paper we will specifically look at Irish schemes, under current pension legislation. The main features of such schemes relevant to our discussion are:

- they are usually established as trusts. Management of the scheme is split between the trustees (usually responsible for investment strategy) and the employer (usually responsible for setting benefit and contribution levels and appointing trustees);
- trustees are appointed from management and employees. There is no professional qualification requirement and meetings are often infrequent (less than quarterly). There is no requirement for independent and/or professional trustees;
- there are typically many 'embedded options' within the design of the scheme such as discretionary pension increases, the option to exchange part of the pension for cash at retirement and, crucially, the employer's right to terminate the scheme without additional funding at any time;
- most of the schemes activities are outsourced to third parties (administrators, investment managers, insurers, bankers, custodians, accountants, legal advisers and various management consultants including actuaries) under contract;
- most schemes are small (under €100 million) and have limited resources;
- most schemes have adopted aggressive, equity based investment strategies and, at the time of writing, are poorly funded on virtually any measure. Relative to other traditional DB countries the experience of 2008 has been more severe for Irish schemes due to the higher equity content of typical investment strategies;
- there is a legal requirement to reach full funding on a statutory basis within a specified but flexible timescale;

We acknowledge that this is a crude summary and there will be exceptions on every one of these points. Nevertheless, we believe it correctly reflects the aggregate situation at the time of writing

Recent changes to typical DB custom and practice

Roughly 10 years ago a significant change was made to how companies account for DB pension schemes in their annual accounts. The change from cashflow based SSAP24 to obligation based accounting standards such as FRS17, IAS19 means that a deficit in a pension scheme is effectively

treated as a corporate debt – therefore the underfunding in pension schemes we have seen of late has had a direct impact on the levels of debt in companies in the eyes of corporate analysts.

Allied to this, in Ireland, we have seen the introduction of an annual solvency test on the Minimum Funding Standard basis. Despite the original intention of the test being the “minimum” hurdle that DB schemes should jump with ease, the MFS test has instead become quite onerous with over 90% of schemes reputed to fail the test at time of writing.

The test is constructed to be a market based test for pensioners in that their liability is assessed on an annuity buy out basis. On the other hand, for active and deferred members the MFS reserves on a transfer value basis that assumes an investment return in excess of bonds is achieved in the period to retirement. However, this target investment return cannot be achieved with any certainty and requires a significant degree of risk taking. The market value of the pension scheme assets typically bears no resemblance to the assessment of the MFS liabilities with the natural consequence therefore of significant volatility of funding levels on a short term annual basis.

Long term versus short term

Therefore, for stakeholders of pension schemes the often repeated mantra of pensions being a “long term investment vehicle” has been effectively turned on its head in recent years with the introduction of significant short term measures. These short term measures have highlighted the volatility of typical investment strategies versus fair value assessment of liabilities. Indeed as the last year has shown an unmatched investment policy can lead to the situation of cash calls on the company to fund the pension scheme at a time when the company is facing difficulties itself. It is tempting to wonder what the reaction of members of a company that have lost their jobs and pension benefits due to company bankruptcy would make of the scheme actuary’s “long term” assessment of the liabilities of their pension scheme.

Allied to this assets have grown to be a significant size over recent years with one estimate suggesting pension scheme assets (as a proportion of GDP) grew from less than 10% in the early 1970s to over 130% at end 2007 (see Pension Insecurity in Ireland by M. Moloney and S. Whelan). Finally then, consider the fact that many schemes are either closed or are contemplating closing the scheme to new entrants and it is clear to see that the investment time horizon is shortening.

A combination of all these factors has highlighted to companies and trustees the need to consider the risks inherent in their DB pension scheme and in particular for companies how these risks sit within their overall enterprise risks. This has been recognised by market participants through the deluge of products that have become available over the last few years to help companies manage the risk exposures within their pension scheme. Some of the largest UK pension schemes typically use market instruments such as swaps, forwards, futures, options etc to manage the volatility of the finances of the pension scheme to a preferred level.

Legislative framework

The current legislative framework in Ireland involves a risk management process with regular valuations and experience monitoring required.

Section 56 of the Pensions Act 1990 requires that each defined benefits scheme completes a valuation at least every three years. The valuation and report are required to be prepared in accordance with the actuarial guidance contained in “Actuarial Standard of Practice PEN-1: Funding Defined Benefits – Actuarial Reports” issued by the Society of Actuaries in Ireland. ASP PEN 1 has numerous requirements including the following:

- A valuation of the scheme on an ongoing basis and on the statutory minimum funding standard basis.
- A recommended contribution rate.
- An analysis of how actual experience has differed from that assumed at the previous valuation.
- The sensitivity of the results to the chosen assumptions.
- A summary of the investment strategy that the scheme is pursuing.
- An analysis of the scheme’s exposure to investment risk and the sensitivity of the funding position to future investment market changes.
- A bond based investment strategy contribution rate.
- A statement of the scheme’s funding objectives.

Section 44 of the Pensions Act 1990 requires Actuarial Funding Certificates to be submitted to the Pensions Board. The Scheme Actuary is required to make an annual statement about the schemes current statutory minimum funding standard position. If the scheme does not satisfy the standard a funding proposal is required to be put in place. The funding proposal has to be agreed between the Employer and the Trustees. The Scheme Actuary certifies based on a number of assumptions that the funding proposal will give the scheme a reasonable prospect of satisfying the funding standard at the end of the term of the proposal. Actuarial guidance indicates a range of acceptable assumptions for the funding proposal. If a funding proposal involves a Section 49 (a) application (apply for an extension) and / or a Section 50 application (apply for a reduction of benefits) then there are additional requirements, including an investment strategy, a funding strategy and an analysis of the employer’s covenant.

Most schemes are required to have a statement of Investment Principles. This normally sets out the scheme’s return objectives, diversification objectives and risk objectives. Most schemes are reviewed on an annual basis under FRS17 and IAS19.

All of the above items result in the scheme’s liability and investment profile being examined on a regular basis.

Typical approach to funding DB liabilities

The traditional approach of taking of credit in advance for any equity outperformance (by discounting liabilities at a higher equity based discount rate) leads to the peculiar situation where greater risk taking results in lower premiums/contributions. The main reason for using this approach has been to keep the “cost” of pensions at a manageable level for the company by funding for this “cost” assuming outperformance from equities. By extension therefore equity investment should lead to higher values of the sponsoring company as pension cashflows are kept low. Of course this fails to consider that in fact equity investment in the pension fund adds to the overall risk for the

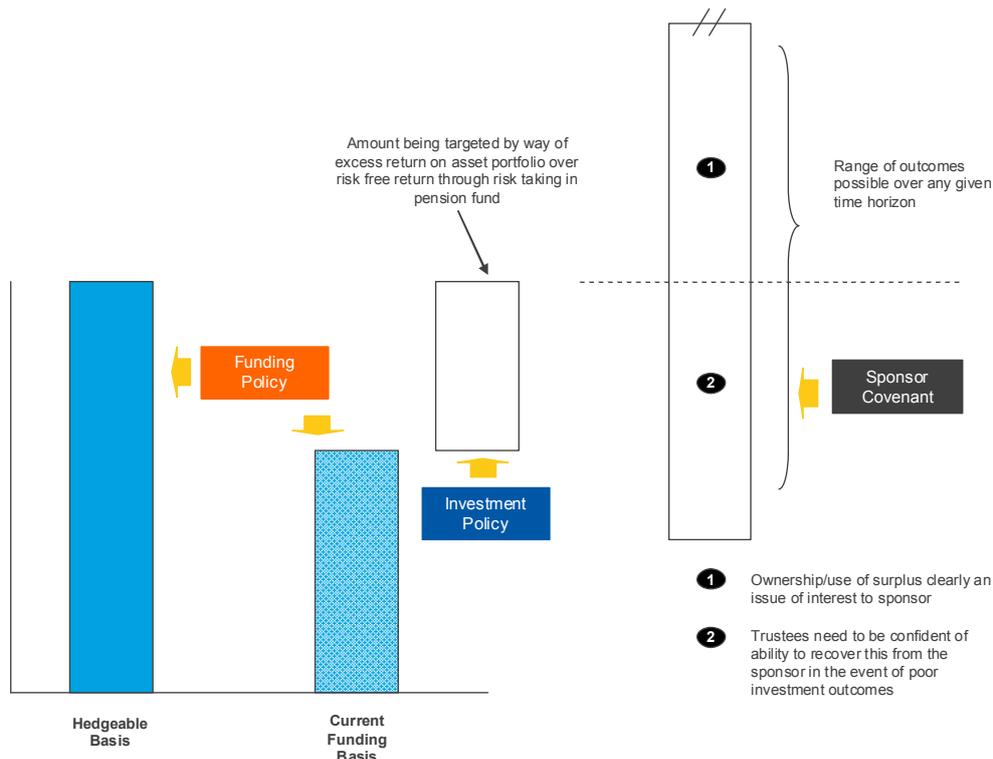
company (most particularly for companies with large pension schemes) and therefore on a risk adjusted basis the value of the company would not be higher.

Essentially, we wish to distinguish between the approach by which the Actuaries have measured liabilities in the past, which we will call the 'Funding Basis', and the value the market would determine for those liabilities, which we will call the 'Hedgeable Basis'.

The Funding Basis is an estimate, made by the Scheme Actuary, of the assets needed at any particular time to make provision for benefits already accrued under the scheme net of future expected outperformance of assets relative to liabilities. As such, being fully funded on the Funding Basis means that assets will be sufficient to provide benefit cashflows in the future provided the current investment policy is maintained and provided assets outperform liabilities to the extent assumed. Fully funded on this basis, therefore, does not allow conclusions to be drawn about the ability or otherwise of the Fund to move to operating a low risk approach to benefit delivery.

The Hedgeable Basis, on the other hand, seeks to establish the market value of a portfolio of assets designed to match, as closely as possible, the financial characteristics of the liabilities themselves. The result of this calculation is the amount of assets the Fund would need to hold if it was to seek to reduce investment risk to the greatest extent possible. Building funding policy on the foundation of Hedgeable Basis, therefore, allows one to separate the consequences of funding and investment policy decisions explicitly. It is then possible to openly recognise and discuss the extent to which asset outperformance is expected and the degree to which the Fund is exposed to the sponsor covenant if assets fail to perform as expected.

The diagram below illustrates this by showing the market consistent measure of the liabilities ('Hedgeable basis') against the funding basis. This illustrates the amount that is expected to be delivered through a combination of market returns and contributions. Clearly however these returns are not guaranteed and the position can be better or worse than expected leading to either a surplus or a deficit (shown as outcomes 1 or 2 in the diagram).



Therefore, it is critical to consider the risk tolerance of the stakeholders of the pension scheme (taking into account the strength of any sponsor covenant) in determining an integrated funding and investment strategy for the scheme. The stakeholders of the pension scheme should consider what impact any downside events would have on the finances of their scheme and whether they are capable of withstanding that level of volatility. In effect risk taking of any description should be consistent with the ability to withstand any volatility of the proposed strategy. This may often lead to the conclusion that benefits are unaffordable at current levels due to the overdependence on risky assets to deliver those benefits.

Discounting the liabilities at a rate dependant on the asset mix of the scheme with the intention of smoothing out any volatility over time is not a viable risk management strategy and is contrary to the worldwide move to mark to market accounting for liabilities and the introduction of a fair value basis i.e. the price that a willing buyer and seller would agree on if they both possessed all relevant information.

In effect the value of the liability depends on the markets best estimate of benefit promise rather than the asset mix designed to deliver that promise. Instead, many companies in traditional DB geographies such as UK, US, Netherlands are moving to recognising liabilities on a market related basis and using market instruments to hedge these liabilities to the greatest extent possible.

Indeed the Society of Actuaries in Ireland has already recognised the dangers of this approach:

“ the current regulatory system places a lot of faith in the ability of equity markets to deliver on benefit expectations. Arguably, the current regime encourages companies and trustees to take extra risk in order to restore a scheme to solvency without any material consideration of the risks. In particular, the contribution requirement is generally reduced by making higher allocations to equity and property and taking advance credit for the expectation of higher return on these asset classes, without reference to risk and employer covenant.”

Source: Submission to the Department of Social and Family Affairs on the Green Paper on Pensions

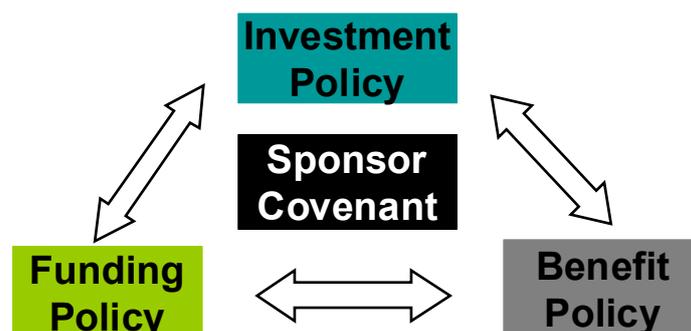
Benchmarking funding and investment strategy against the fair value assessment of the liabilities represents the natural starting point for any measurement of risks in a DB pension scheme and we recommend its adoption for risk management.

5 ERM approach

In this section, we apply the principles outlined in Section 3 to the management of occupational defined benefit pension schemes.

Policy levers

Stakeholders of DB pension schemes have 3 policy levers at their disposal to manage risk as illustrated in the diagram below.



- Funding policy i.e. the pace of cashflow contributions to the scheme which is determined through regular actuarial valuations
- Benefit policy i.e. what benefits are to be paid from the scheme and whether they are guaranteed or discretionary
- Investment policy i.e. how the assets of the scheme are invested

Central to this framework is the realisation that risk taking in any of the policy levers is dependant on it being consistent with the tolerance for risk of the ultimate backer of the scheme, the company sponsor.

Whose risk?

A pension scheme is primarily an agreement between the owners of a business and its employees. These two parties are the **principals** to the agreement. Businesses are run by managers and schemes are usually set up as trusts which are administered by trustees and third party service providers . These are all intermediaries acting as **agents** for the principals. Whilst these agents will need to undertake their own risk management processes, we will focus on the principals and in particular we will look at the issues from the corporate perspective rather than those of the employee.

Further research could and perhaps should be undertaken on risk management from the perspective of the other parties listed above.

Risk manager

The use of trust vehicles and the lack of precision in many trust documents means that the risk management function is split between the trustees, the employer and sometimes third parties such as the actuary.

Clearly, any ambiguities need to be removed and control of the scheme should be placed where it is most appropriate. Since the scheme is a vehicle to deliver benefits promised by the employer to the employees, we believe that control of the scheme should primarily be vested in the employer. If there is a corporate risk manager, he or she should also be responsible for pension scheme risk. This may be difficult in practice because of the responsibilities of trustees under trust law.

At the very least, we recommend that the business plan identifies a specific individual/group with overall responsibility for each of the actions required to meet the stated objectives. These parties constitute the management group. This group should meet regularly – we recommend quarterly meetings. These may be organised around trustee meetings but their business is not exclusively trustee based.

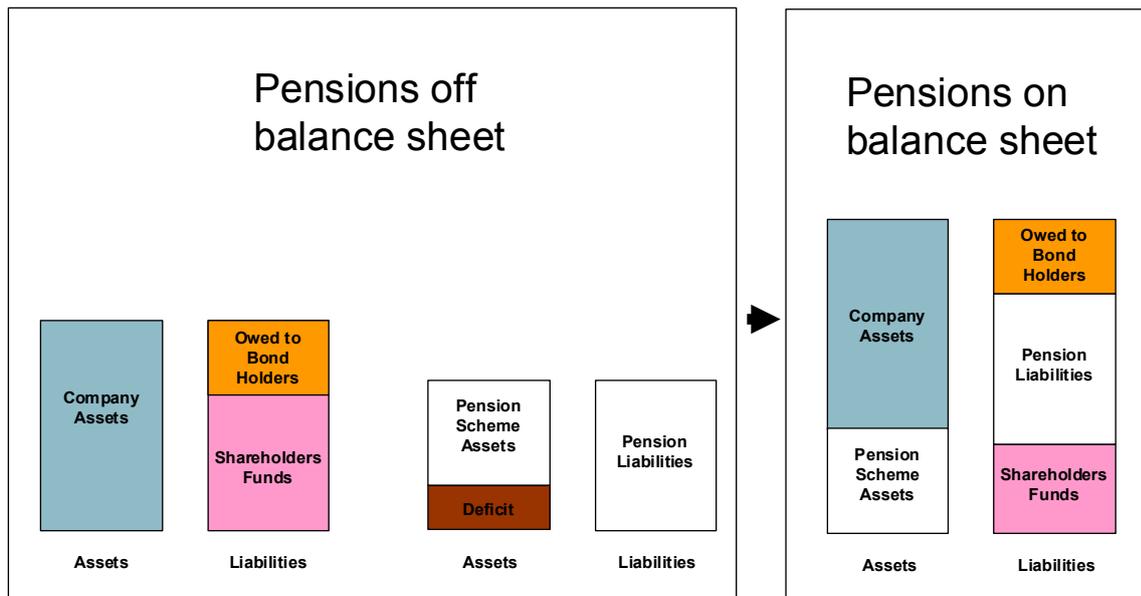
For many schemes, most tasks will be carried out by third parties. We recommend that all such parties have agreed terms of business and SMART performance targets (consistent with the schemes targets) against which they are regularly assessed.

Whether such a structure is optimal can be debated and different schemes may reach different conclusions. What is important is that the structure is clear and is driven by the objectives set and the resources available.

Objectives

Having established that we are looking at risk management from the employer's perspective, we can consider setting some sensible objectives. It goes without saying the scheme will wish to provide the benefits promised, to comply with legal requirements in its operation and to operate cost effectively. The difficult questions relate to the financing of the benefits.

In the past, pension schemes appeared to be separate entities from the employer who set them up. This was partly as a result of the use of trust vehicles to implement the schemes and partly as a result of 'off balance sheet' accounting for corporate pension liabilities, but this is now changing: pension schemes and their finances have become more topical over the last few years and indeed more and more companies are appreciating the degree of risk inherent in a defined benefit (DB) pension schemes.

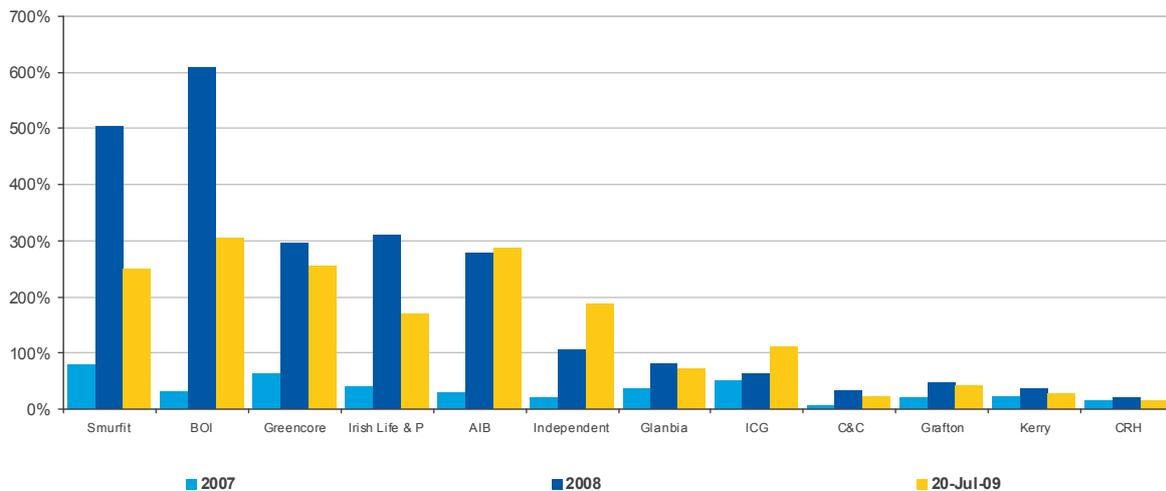


Companies exist to generate a return to providers of capital. Value is added by investing in projects whose expected return exceeds the cost of capital. Companies are therefore typically considered to be “pass through” entities - all value passes to shareholders after meeting higher priority claims of liability holders. Looking at pension schemes from this perspective:

- a pension scheme is used by capital providers to compensate employees for their services. Therefore, pension schemes should be analysed and considered in the context of the enterprise as a whole
- benefit payments to participants are a form of corporate debt with assets held in trust as collateral. As pensions are a form of deferred compensation the deficit in an underfunded pension plan could be considered to be a form of corporate borrowing from scheme members (notwithstanding the fact that there is no legal obligation on Irish companies to pay back this debt)
- the value of these benefit payments are unrelated to the assets held in trust
- pension schemes should be managed on a similar time horizon to that of the capital providers.

Including net pension liabilities on the balance sheet can have quite a large and volatile impact as the diagram below illustrates – for many companies, pensions are THE dominant risk issue and indeed this paper is motivated by precisely this observation.

Accounting Deficit as a proportion of market capitalisation



The question therefore becomes how does the asset mix of a pension scheme impact on shareholder value and in particular does equity investment add any value for shareholders. Shareholders have access to the same investments as the pension scheme. Therefore they can adjust their portfolio to counteract any changes to the pension scheme's investments. Where in the capital structure of the corporation should risk be taken? We suggest that the company should concentrate on its core capabilities to provide shareholder value (i.e. widget manufacturers should concentrate on manufacturing widgets as efficiently as possible) rather than remaining exposed to the volatilities of equity markets within its pension scheme with the consequential impact on shareholder value depending on the size of the scheme relative to the company.

This simple argument suggests that most companies would best serve their shareholders (and their employees) by fully funding their pension schemes (to maximize tax relief and employee security) and holding investments which match the liabilities as closely as possible – namely sovereign bonds of appropriate duration and currency with appropriate additional reserves for liabilities which cannot be matched. It is perhaps surprising the extent to which actual pension scheme policy diverges from this position, but with many defined benefit schemes now being phased out it is a question of how and when, rather than if, this policy will be implemented.

We recommend that schemes' business plans should recognize that their target is to fully fund on a bond matched basis at some point in the near future. Until this objective is reached, there will likely be significant risks to be managed.

The reader will note that we have rejected both the traditional actuarial and the current accounting approaches to assessing pension liabilities. There are theoretical reasons for doing so, but on a practical note, the endgame for most pension schemes will be to secure the liabilities with annuity contracts or to match as closely as possible with highly rated bonds rather than continuing to take investment risk, so we believe that a bond matching target is sensible.

We provide a very simple example of a business plan and objectives below. In practice, plans will be longer than this, but we recommend that they are kept as short as possible and should fit on a single

sheet of A4. We recommend that this document should be tabled at every management/ trustee meeting and used to structure the business of these meetings. Too often, business plans are prepared and forgotten. It is not the responsibility of the risk manager to set the objectives and business plan, but it is their responsibility to ensure that someone does so and that the scheme is then run accordingly.

Objective	Action	Owner
Full funding on a bond matching basis by 2020	Employer contributions of €10m p.a. Investment return 3% p.a higher than long dated € sovereign bonds	Finance Director Investment Committee
Benefits paid correctly	Accurate administration	Trustees/third party administrator
Compliance with law	Correct management Monitoring legal changes	Trustees/ Company Secretary

Risk identification

The table below outlines some of the key risks within a pension scheme that companies (and Trustees) need to take into consideration. Whether the scheme is open, closed to new entrants, closed to future accrual or even in wind up; many, if not all, of these risks will apply. Many examples of risk registers are available on the internet and the UK Pension Regulator provides useful guidance and a template which are also suitable for Irish schemes – a link is provided in Section 7.

Risks	Description
(a) Financial Risks - Investment Return - Covenant	<p>Schemes hold risky assets in order to try and achieve a higher return but these assets do not necessarily best match the nature of the liabilities</p> <p>The risk that the employer will be unable or unwilling to pay the contributions required to fund the benefits.</p>

<ul style="list-style-type: none"> - Inflationary - Salary - Currency - Cashflow and Liquidity 	<p>Potential mismatch of the inflation exposure of the investment portfolio compared to the index-linked liabilities</p> <p>Unknown future salary (general and promotional) increases impact on the cost of meeting final salary benefits</p> <p>Assets and Liabilities are not necessarily matched by currency (for diversification reasons)</p> <p>Are there sufficient contributions and/or marketable assets to pay benefits?</p>
<p>(b) Assumption Risk</p> <ul style="list-style-type: none"> - Longevity - Assumption risk 	<p>What is the mortality experience of the Scheme and what allowance is made for future improvements? How long will members actually live for?</p> <p>Risk that assumptions used to calculate DB liability materially understated or overstated.</p>
<p>(c) Operational Risks</p> <ul style="list-style-type: none"> - Regulations - Culture - Board composition - Record keeping 	<p>Risk of changing legislative environment and its implications on DB costs (e.g. accounting standards; minimum funding requirements; compulsory pension provision)</p> <p>Differing expectations between the Trustees, members and Company?</p> <p>Who is represented on the Board and do they have conflicting interests?</p> <p>Risk of incorrect data/benefit calculations</p>
<p>(d) Strategic Risks</p> <ul style="list-style-type: none"> - Competitor/Industry changes - Merger and Acquisition 	<p>Is the pension provision suitable to attract and retain employees?</p> <p>Terms on which pensions are brought into a new Company may understate the true cost and risk</p>

This is a generic list. Remember that risk is defined relative to the stated objectives. For example, the following key risks might be identified given the business plan above:

Objective	Action	Risk
<i>Full funding on a bond matching basis by 2020</i>	<i>Employer contributions of €10m p.a. Investment return 3% p.a higher than long dated € sovereign bonds</i>	Employer default Lower than expected investment return Unexpected increase in liabilities Theft of assets
<i>Benefits paid correctly</i>	<i>Accurate administration</i>	Maladministration
<i>Compliance with law</i>	<i>Correct management Monitoring legal changes</i>	Mismanagement

For an entity as complex as a pension scheme, there are many other risks which could and should be identified, and some of the risks shown above can be analysed further.

Risk assessment

Having identified the risks, we need to assess their impact, both in terms of probability and potential impact. We also need to provide a combined measure in order to prioritise them.

There are a number of ways in which we might approach this – some mathematically sophisticated and others simple and intuitive.

For the smaller risks and the risks which are difficult to quantify, we suggest a simple traffic light approach such as:

Probability rating	Description	Indicators
High	Might occur each year	Has occurred in the last three years
Medium	Might occur once in project lifetime	Has occurred at least once
Low	Not likely to occur	Has not occurred

Impact rating	Assessment*
High	Financial impact > €100 million
Medium	Financial impact between € 10 million and €100 million
Low	Financial impact < €10 million

*These are illustrative figures.

Traffic light	Probability/Impact rating
Red	At least one High
Amber	Not Red or Green
Green	Both Low

This scoring system is adapted from the Risk Management Standard produced by the Institute of Risk Management and other allied organisations – see section 7 for a link to the full document.

For the most significant risks – namely investment risk and covenant risk, more sophisticated risk measures are warranted. There are three basic approaches for analysing these risks:

(a) Scenario testing

Risks are assessed by looking at the impact of a range of adverse scenarios. For example, investment risk might consider the effect of a 20% fall in share prices and/or a 1% fall in interest rates. There are limitations to this approach as only a finite number of scenarios can be chosen and no assessment of the likelihood is provided. However, it can be useful to model extreme events where the impact is likely to be severe and the probability is low and/or hard to assess and it is easy to implement and explain.

(b) Stochastic modelling

In contrast to a deterministic model, a stochastic model treats the key parameters as random variables with a defined probability distribution. These probability distributions are often based on past and present values of the variable itself. It is often seen as a more objective approach than deterministic modelling and is arguably the most appropriate way of allowing for the volatility and uncertainty underlying the variables of interest. The downside is selecting the correct probability distribution which can reflect the future uncertainty.

Examples of risk analysis using a stochastic approach include:

Value at Risk - this is usually defined as the level of loss which might occur with 5% probability over the next year, although other confidence levels and time periods can be used. VaR has several known shortcomings: it is a loss threshold rather than a measure of expected loss, it does not capture diversification benefits correctly (for the technically minded, it is not a 'coherent' risk

measure) and it is only as reliable as the underlying model, but it is relatively intuitive, easy to calculate and is widely used in the investment community. It is less often used to assess covenant risk and liability risk, but there is no reason in principle why it should not.

Conditional Value at Risk – this extends the VaR calculation by measuring the expected loss incurred in the most extreme scenarios. Whilst this removes some of the shortcomings of VaR, it is even more sensitive to the model of extreme outcomes which is used.

(c) Hedging cost – many investment risks including the risk of company failure can be insured in capital markets using derivatives. A natural measure of these risks would be the cost of this insurance. Even if the risks we face are not directly insurable, we can estimate the cost of doing so from the cost of similar risks. In principle this is the best approach but it has yet to be widely adopted.

It is clearly best if a uniform approach is adopted across all the material risks. Whilst it is flawed, we recommend on balance that the Value at Risk approach should be used wherever possible. For ease of reference, the final results can be translated into a traffic light system as discussed above.

Covenant assessment

The most striking aspect of current practice is the virtual absence of any attempt to quantify the risk of corporate default. Given low levels of funding (probably below 75% on a bond matching basis on average) this is the largest single risk faced by most schemes. It needs to be managed and it needs to be correctly assessed in order to do so. This neglect may be because it is considered taboo to discuss the failure of the company or its wilful default on pension obligations, but these are simply not good reasons for ignoring the issue.

It is a requirement for Trustees in the UK to assess the covenant of the sponsor – effectively to assess the willingness and ability of the sponsor to support the scheme into the future. The UK Regulator has not specified how Trustees should do this, but the key to a successful covenant assessment is information, bearing in mind that the aim of any employer covenant assessment by the trustees will be to answer the following questions:

1. What is the current financial strength of the employer?
2. What level of contributions can the company support and how this may change in difficult trading conditions?
3. What are the future trading prospects for the employer?
4. What would the outcome be for the Fund, in the event of the employer's insolvency and where would the scheme stand relative to other creditors?

The trustees should also consider using commercially available services or other sources of information such as:

- a) Group structure
- b) Current details of the Group finance structure including details of principal terms of loans, including interest, covenant tests and repayment terms
- c) Any published credit ratings
- d) The most recent financial statements

- e) Any business plans, incorporating trading projections, projected cash flows and balance sheets.
- f) Details of management's own key accounting ratios (e.g. gearing, interest cover etc.)

We recommend that Trustees analyse the strength of the sponsor covenant and review this on a regular basis (at least the same frequency as investment performance measurement) to ensure they are kept abreast of any changes in outlook for the sponsor.

Risk mitigation

We have now identified, analysed and prioritised the risks. We now look at ways in which they can be managed.

To recap from Section 3, the four ways of mitigating risk are:

- **Avoid**
- **Reduce**
- **Transfer**
- **Accept**

As a general principle, if you do not expect to be rewarded for taking a risk, and the risk can be removed, you should do so. For example, depending on your beliefs about capital markets, you may take the view the exchange rate, inflation and duration risk are unrewarded and you would seek to remove them by hedging. There are other risks which you expect to be rewarded for, and indeed may have to take as part of the business plan – e.g. equity market risk. In such cases you will seek to minimize the amount of risk which you have to take to get the required level of expected reward, primarily by diversification.

Readers may be disappointed to find that we are not going to offer ready made control procedures for all the risks we have discussed. These will be scheme specific and a number of different approaches may be perfectly valid.

We will suppose that the management group has decided on following controls for the main risks which they have identified:

Risk	Rating (H/M/L)	Control	Residual
Employer default	H	Eliminate deficit over 3 years.	Monitor share price and credit rating
Investment losses	H	Maximum 50% equity, well diversified.	Monitor investment performance
Theft of assets	L	Assets with custodian	Annual review of controls

Maladministration	L	External administrator	Insurance
Change in law	L	Legal adviser	Nil

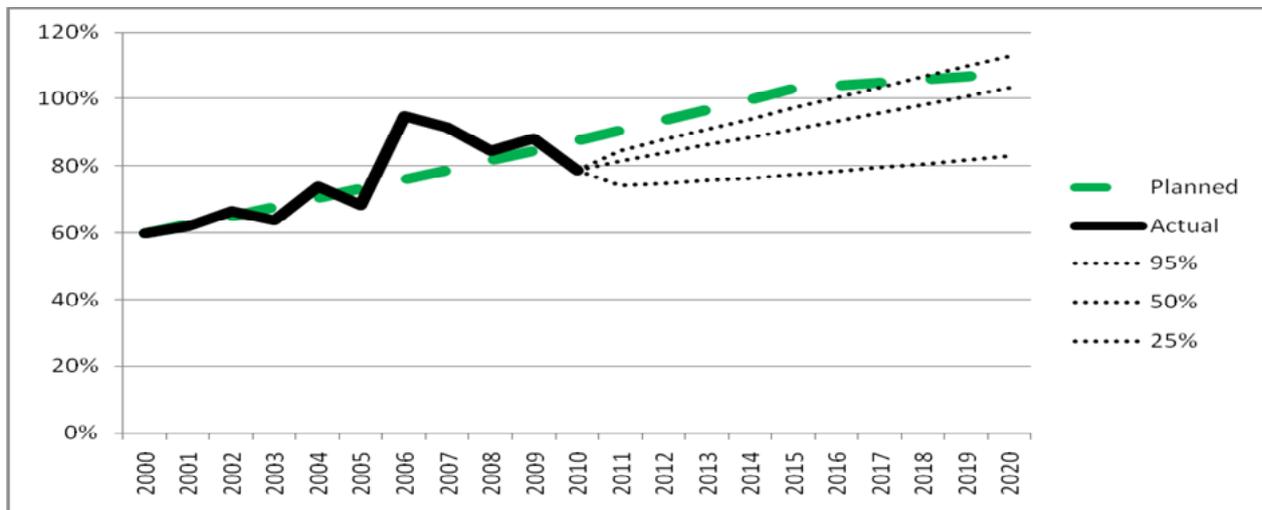
Monitoring

The management group need to periodically:

- check the progress of the scheme against the objectives
- check that the plan and the control procedures have been properly implemented
- decide if any corrective action is required and initiate it.

All this information can be summarised in brief status report, for example:

Objective	Target	Actual	Risk
<i>Full funding on a bond matching basis by 2020</i>	<i>Funding level</i>		
	80%	75%	Still achievable (see fan chart)
	<i>Employer contributions</i>		
	€20m	€20m	Employer credit rating A (A)
	<i>Investment return over liabilities</i>		VaR €20m (€30m)
	+6%	+1%	
<i>Benefits paid correctly</i>	<i>No exceptions reported</i>		Unchanged (Green)
<i>Compliance with law</i>	<i>No exceptions reported</i>		Mismanagement
	<i>No legal changes</i>		



6 Recommendations

This section summarises our recommendations:

- current risk management methods are inadequate and need to be replaced by the ERM paradigm;
 - having a clearly defined ‘SMART’ objective and a realistic plan to achieve it
 - identifying and quantifying the risks of failure and deciding how to mitigate these risks.
 - regular monitoring of the project by a suitably resourced and empowered risk manager
- ERM can be complex and comprehensive, but most schemes would benefit from at least an ‘ERM-lite’ approach;
 - a business plan and a risk register should be prepared.
 - we recommend quarterly management meetings. These may be organised around trustee meetings but their business is not exclusively trustee based. A status report showing progress against the agreed objectives should be tabled at each meeting .
 - we believe that most schemes should be aiming to achieve full funding on a bond matching basis as some point in the future and that liabilities should be measured on this based for risk management purposes
 - we recommend that the ‘value at risk’ approach is used to measure risks whenever possible – however, a less formal traffic light system might be satisfactory
- schemes are typically ambiguous about the benefits to be provided and the responsibilities of various parties. These ambiguities need to be removed to enable schemes to function effectively;
 - the scheme’s business plan should identify specific parties with overall responsibility for the actions required to achieve the objectives
 - third parties should have agreed terms of business and SMART performance objectives against which they are regularly assessed
- pension risk is best managed by the sponsoring company as part of their business rather than by the trustees considering it as a stand-alone entity;
- investment risk and covenant risk are the most significant risks at the moment. They are inter-related and need to be managed in an integrated framework;

- covenant risk should be reviewed regularly and with at least the same frequency as investment risk
 - funding and investment strategies should be reviewed at the same time
- defined contribution schemes can and should be reviewed in the same framework. We propose a further paper on this subject;
- it is not enough simply to do risk management – it has to be visible to scheme members. We urge better communication of strategy, financial status and key decisions to members in brief and non-technical language.

7 Further reading

In this Section we provide links to useful material available on the internet.

Risk management

Enterprise risk management framework produced by COSO

http://www.coso.org/documents/COSO_ERM_ExecutiveSummary.pdf

A risk management standard produced by the IRM

http://www.theirm.org/publications/documents/Risk_Management_Standard_030820.pdf

RAMP - a risk management guide produced by the actuarial and civil engineering professions

<http://www.ramprisk.com>

Pension schemes

Guidance from the UK Pensions Regulator

<http://www.thepensionsregulator.gov.uk/pdf/InternalControlsGuidance.pdf>

The Financial Theory of Defined Benefit Pension Schemes

<http://www.ingentaconnect.com/content/fia/baj/1997/00000003/00000004/03040835>

Pension Insecurity in Ireland by M. Moloney and S. Whelan

<http://www.ssis.ie/Moloney&Whelan2009.pdf>