LONG FINANCE

Don't stop believing:
The state and future of UK occupational pensions

Con Keating

FINANCE SHORT 3–2011

EFFAS THE EUROPEAN FEDERATION OF FINANCIAL ANALYSTS SOCIETIES

About the author

Con Keating

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Finance Short 3–2011

Established in 2007 by Z/Yen Group in conjunction with Gresham College, the Long Finance initiative began with a conundrum – "when would we know our financial system is working?" Long Finance aims to "improve society's understanding and use of finance over the long-term", in contrast to the short-termism that defines today's financial and economic views. Long Finance is a community which can be explored and joined at **www.longfinance.net.**

Long Finance publishes occasional Finance Shorts in order to initiate discussion on a current topic in commerce viewed through a long-term lens. Finance Shorts allow authors to comment on current affairs or contemporary matters without feeling that intensive research or consensus is needed beforehand.

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Preface

There couldn't be a more pertinent publication for Long Finance than one on pensions. Con has now provided two. Long Finance aims to "improve society's understanding and use of finance over the long-term", challenging us to develop views of finance over periods of lifetimes, not nanoseconds. Pierre Simon de Laplace (1749-1827) stated, "The most important questions of life are, for the most part, really only problems of probability." The reader might expect a publication on pensions to focus on those problems of probability, and Con doesn't disappoint, but the bigger problems are regulatory. Defined benefit pensions have been slowly strangled by, often well-meaning, misguided regulation combined with a lack of either vision or commitment.

The real problem of probability is calculating the odds that, even with our backs to the wall, the UK moves forward with informed pension reforms. "Don't Stop Believing: The State And Future Of Occupational Pensions" challenges all of us, especially those in financial services, in government, in regulation or in company pension schemes as trustees or members, to stop for a second and consider what we may be losing. The UK occupational defined benefit pensions in the 1970's were "the envy of the world". Surely, given the vision Con paints for us, if the UK had they will to act, UK pensions could be the envy of the world again. Little stands between us today and the pensions world Con imagines, except complacency.

Professor Michael Mainelli
Executive Chairman, Z/Yen Group Limited

Abstract

Following on from the author's 2010 Long Finance paper, "Don't Stop Thinking About Tomorrow: The Future Of Pensions" (Finance Short 2-2010), this paper considers the status quo with UK occupational pensions in some detail. It discusses the reasons for the decline in funded defined benefit (DB) provision in the UK and, as collective DB is shown to be an efficient institutional design, proposes remedies that may resuscitate this ailing sector.

Acknowledgements

Far more people have contributed to the discussions surrounding this paper than could sensibly be cited and thanked. However, five do merit special mention for their contributions of time, thought and data: Lars Andersson, Phillip Best, Thomas Klepsch, Andrew Slater and Robert Spain. Responsibilities for errors and omissions, of course, remain with the author.

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Yes, there really is a pension indemnity insurance company!

Swedish PRI Pensionsgaranti has been guaranteeing pension liabilities since 1961. The guarantee, triggering on an insolvency event of the sponsor, secures pensions for about a third of all privately employed white collar workers in Sweden. The book reserve method is widely used among bigger listed international groups in Sweden.

By arranging a guarantee with PRI Pensionsgaranti, companies can retain pension capital within their operations without jeopardising employee pensions. Companies are free to use pension capital where best suited instead of having to make contributions into funding alternatives that might invest in shares of a competitor or any other inappropriate and undesirable form of instrument.

Members of PRI Pensionsgaranti enjoy a favourable financing tool. Pension capital replaces other long term credits at a very advantageous cost for the company. In fact, members have received higher bonus pay-backs than their premium payments have added up to during the last twenty year period. Since 1991 the insured volume has increased by 220 % and the consolidation grade of PRI Pensionsgaranti (measured as risk adjusted exposure in relation to own capital) has risen from around 5 % to circa 15 % at present.

A well proven and efficient credit operation in combination with a conservative investment strategy have been contributing factors to the strong foundation of PRI Pensionsgaranti. The company has never been exposed to a situation where taxpayer pockets have been in demand to secure the future of the company, unlike for a majority of the bigger Swedish banks where the Swedish Government have had to offer support on several occasions during the last twenty years.

Much too seldom one gets time to reflect over consistency and the comprehensive view on how pension systems influence and supply value to society. We, believe the analysis made by Con Keating not only represents an unique holistic assessment of the occupational pension system as it operates today in the western world but also to a great extent apply to the experience made by PRI Pensionsgaranti (mutual) for fifty years. Keating has put the pieces together, highlighting the shortfalls of the group thinking around financing of pension provisions.

The conclusions in the paper are in general aligned with the experience earned by PRI Pensionsgaranti. The system in Sweden with collectively agreed pension schemes is not comparable in its entirety to the theoretical model described in the paper. We do not believe that the unfunded system is a one-stop shop solution that can be used everywhere. Our view is that a strong pension system offers a variety of financing solutions simply because companies' conditions and situations differ.

A lot of effort and skill has been put into disclosing pension risks in balance sheets of companies. It is evident that much of the work is done disregarding the total cost effects, resulting in increased costs for stakeholders around a DB pension scheme. We still believe that the most cost-efficient way of financing comparable pension benefits is if handled in the book-reserve system. A prerequisite for success is a credit worthy sponsor which must have to be assessed continuously and qualify on its own merits.

Jan Ahlström
CEO, PRI Pensionsgaranti

Don't Stop…

It is not known how much David Chase knows about pensions. But, as the man who created The Sopranos, we do know that he knows a thing or two about quality television. Fans still debate what happened in the final scene. All David Chase has said is "watch it, it's all there".

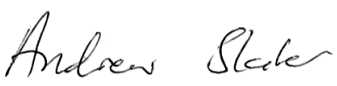
So it is with pensions. In his two "Don't Stop" papers Con Keating has "watched" pensions more closely than others and uncovered the grand narrative. The first paper considered pensions in general terms, providing critical arguments absent from the debate. The second – this paper – considers the specifics of the UK economic position and proposes explicit remedies. Both are a "must read" for policy makers, whether considering state pensions as a means of social welfare or occupational pensions as a means of deferred pay.

The first conclusion is that collective provision triumphs over individual provision. So the Don't Stop papers are a must read for employers too.

The second conclusion, and this is the crux of the argument, is that the UK embarked on its pensions adventure with the wrong choice of security mechanism. By being only a mitigation after the event of sponsor insolvency a (partially) funded pension scheme is inefficient and creates perverse behaviours. It is far better to tackle the risk head on by requiring all collective pension arrangements to be covered by indemnity insurance. The role of government becomes to enforce that such arrangements have pension indemnity insurance; the insurer is commercial.

There will be those who argue that the change of security mechanism is not feasible and cannot be made. Remember there were those who said petrol could not be unleaded, or fridges without chlorofluorocarbons. There will be those who argue that pension indemnity insurance is hypothetical and a dangerous step into the unknown. I suggest they take a trip to Sweden where a successfully operated pension indemnity insurance company has existed for many decades. The UK can change its security mechanism and bring substantial benefits for all: employees, employers and government.

This does not need to be the final scene for pensions. Rather we are at the series one cliff hanger. In the Don't Stop papers you have the storyboard for series two. It looks a good one; who wants to watch it?



Andrew Slater FIA

Foreword

In his influential work, "The structure of scientific revolution", Thomas Kuhn stated that an old system of scientific beliefs gets more and more fragile by encountering anomalies which cannot be explained by the universally accepted paradigm within which scientific progress has thereto been made. Empirical observations, often un-noticed or un-noticeable in the past, not only start to challenge some esoteric scientific findings, but the very foundation of science itself. The entire view of the world becomes fragile, and hence questionable. Old textbooks and journals no longer contain the correct answer. Scientists are then at risk of becoming apologists, while politicians and their advisors are risking the much harsher verdict of ideologists.

After his seminal work "Don't Stop Thinking About Tomorrow: The Future of Pensions", Con Keating has now challenged the economic mantra of the superiority of capital-based funded pension systems in this paper, "Don't Stop Believing: The State And Future Of UK Occupational Pensions". Both works are remarkable in more than one dimension; based, as they are, not on the presumptions of equilibrium economics, but instead replacing tautological conclusions by empirical evidence and sound rational judgment. His work does not support the fashionable social and political consensus of protecting pension payments by higher capital requirements; it is, in the best sense of the word, critical, showing that higher capital requirements and costs indeed threaten the very heart of efficient corporate and public pension provision.

It challenges, in argumentative and eloquent form, the current socio-economical trend to place ever more of the burden of old-age insurance on the shoulders of individuals. He also argues against the political ambition to deal with the cultural and medical achievements of longevity by simple increases of the normal pension age. His work highlights the social asymmetries embedded in such one size fits all politics. Within the best of an old, often-forgotten tradition, Keating's papers are truly enlightening.

Under this new light, the present remains of former solutions towards pension provisioning do not look at all antiquated. Pay-as-you go schemes, relying on realistic, experience-based economic growth assumptions and resisting blindly applied mathematical trend extrapolations, may not be poised to fail at all. Unfunded corporate pension promises, if appropriately insured, may deal with future uncertainties much better than the here-and-now of financial markets.

In the same light, the current trend towards defined contribution schemes looks rather strange and socially alarming. Closing and replacing DB schemes with "defined contribution schemes" on a large scale will endanger the retirement incomes of their participants. Keating refuses even to call those schemes politically correctly pension funds, using the much more precise description "tax advantaged saving schemes". Without annuitization, there really is no pension element present in individual DC funds.

From a German perspective, it is regrettable that Keating's work is based primarily on the UK and its system of funded pension provisioning and a pension compensation fund. A lot could have been said on the most recent modifications of the German system as well. The economic questionable form of a tax advantaged savings scheme called euphemistically "Riester-Rente" would have been debunked, while the much older form of mutual corporate pension insurance in Germany – "Pensionsicherungsverein (PSVag)" – would have had certainly earned some merits, and possibly modification to a true insurance scheme, in Keating's thought process. But this mutual association of pension schemes has allowed German corporations to spend their money on required capital goods, increasing their capacity and productivity. And according to Keating, this is what counts: future pension payments need to be made out of future production and not current savings.

Keating's papers carry the character of a message in the bottle. But this time, the sender is not lost on some small island, rather the intended receiver is seen in a desolate situation. The hope should be expressed that Keating's messages will find their way to the relevant decision makers to allow for the correction of past errors and to build the fundaments of a new and sustainable system for pension provisioning. But like all relevant scientific discoveries, it really does not matter who is listening. Sometimes, but maybe only sometimes, we need to be reminded by the poet Berthold Brecht: "Because things are the way they are, they will not stay the way they are." And this time it is not different.

Dr Thomas Klepsch
Vice Chairman, EFFAS – The European Federation of Financial Analysts Societies) – European Bond Commissionl

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Introduction

UK occupational pensions have declined into a lamentable state; now discussions of the traditional defined benefit (DB) scheme focus almost entirely upon minimising the cost of closure and the cessation of provision in this form. For reasons which will be discussed in this paper, inadequate defined contribution (DC) arrangements are offered as a poor substitute.

This paper will describe the status quo and identify many of its causes. It will offer ways in which defined benefit schemes may be effectively and efficiently structured, offering incentives and benefits to both employers and pension scheme members.

The idea has become prevalent that occupational defined benefit pension schemes are unaffordable and unsustainable. We find these beliefs unfounded.

The cult of financial risk management and its methods, which failed so badly during the banking crisis, is now the dominant framework for the analysis of DB pensions, which is surprising in that an occupational pension is part of a labour market contract. Analysis of the performance of pension funds suggests that its methods and techniques have been both costly and ineffective.

It was tempting to frame this paper in terms of robust control theory, the pursuit of the best outcome in the worst case scenario, as is widely applied in the engineering sciences. However, that brings with it a central issue in the current situation. For example, if our children see only the prospect of unemployment after graduation, they may act rationally and abandon their studies; that is far from ideal for society at large or indeed for them, if it turns out that employment requiring education is available in the future. Similarly, if pension scheme sponsors see only mounting, uncontrollable costs, they will cease provision.

In common with many of the studies and reports advocating investment for the long term, we might have adopted the view that thrift is a virtue in its own right; it is a positively reinforcing process. But that analysis rejoices in the prudent use of money and goods, while the interpretation applied by the Pensions Regulator to the word "prudent" is one of bias and excessive conservatism. This is a recurrent problem in financial risk management. Biased assumptions and model parameters render these risk management models and techniques unsuitable for use in commercial practice. The thrift literature also places an excessive and unrealisable emphasis upon individual self-sufficiency and, with that, over-reliance upon financial market performance, which is costly.

We choose instead an old English proverb: "You can't have your cake and eat it" as an appropriate introductory analogy. Perhaps the most important problem with funded occupational schemes is that they are time-inconsistent. To accept a deferred benefit and then to demand that it be fully funded today is time-inconsistent; this is eating the cake today that we have agreed to accept tomorrow.

To treat pension schemes and their funds as if the cake is being eaten today, as is the case with current regulation and accounting, will ensure that only crumbs remain for the future pensioner to consume. Only by making the cake so large and overly burdensome on the employer sponsor can this result in adequate pensions for members; the problem, though, is that this makes the cost of pension provision far higher than the current wage costs they replace. In this situation, it should come as no surprise that sponsors cease to offer defined benefit pensions or that they should seek to avoid the costs that have been imposed upon their legacy schemes progressively and retrospectively.

The idea has become prevalent that occupational defined benefit pension schemes are unaffordable and unsustainable. We find these beliefs unfounded.

This paper commences by examining the stylised facts of occupational pension provision in the UK, drawing attention to some misinterpretations of those facts. We then consider the suitability of DC arrangements for individual pension provision, and find them wanting.

Following this, we examine the current pension accounting standards, upon which so much regulation and management activity rests, and find them not fit for purpose. The proposed new IAS 19 standard simply heaps Ossa on Pelion. This balance sheet view, in essence, treats the cake as if it were being eaten; it is, among many failings, time-inconsistent in nature. The section titled *Consequences* examines a number of the issues which arise from the inadequacies and failings of the accounting standards. The next section, entitled *Other Issues*, deals with a number of other arguments that are sometimes advanced in support of the accounting standards in force; they are without merit.

As liquidity is a central issue, the section *Liquidity* considers the principal aspects of this that are relevant to pension schemes. The subsequent section, *Pay-as-you-go* and *Cash-flow Management*, examines some practical aspects of liquidity and scheme design. The section *Budget Constraints* considers aspects of generational accounting and scheme financing, which leads to a

section which discusses *Public Sector Pensions Discount Rates*.

This is followed by sections that discuss the role of *Working Capital* and *Defined Benefit Scheme Funding*. This latter section brings out and discusses the central problem for private sector DB schemes, which is sponsor insolvency and problems with the use of scheme funding in mitigation of this, which is the sole risk faced by DB schemes.

The paper then considers *Pension Scheme Investment* with a particular emphasis on the significance of the long-term capabilities of schemes. It touches briefly upon the long-term behaviour of global savings and investment and their consequences for financial markets in the subsequent section *Investment Prospects*. Following this, we discuss the actual asset allocation and performance of funded DB pension schemes in the section *Pension Fund Investment Management*. Contrary to expectations and notwithstanding the large revisions to asset allocation evident, we find that scheme performance is not closely related to liabilities and that the performance linkage to UK listed equities remains very strong. It appears that the much-debated risk management approach to pension fund management has had little practical effect in aggregate. We also find evidence that there is now greater disparity in views among fund trustees than previously. Perhaps the greatest surprise among these empirical findings is that schemes no longer appear to consider their basic income generation – though that may simply be a reflection that the accounting takes a balance sheet view rather than income and expense. The role of the change in 1997 to the advanced corporation tax credit also appears to have been material.

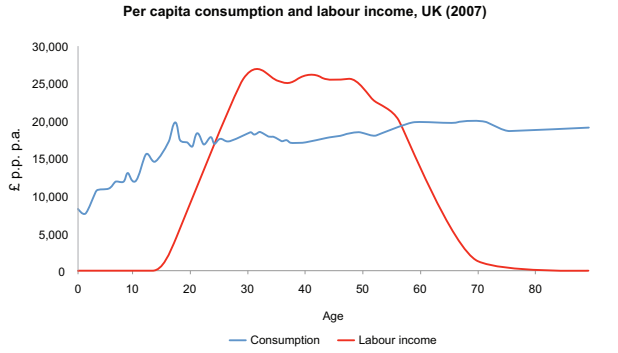
We then consider, in the section *Sponsor Insolvency*, the magnitude of the sole real risk faced by DB pension schemes. We illustrate how inefficient funding arrangements are relative to pension indemnity assurance and discuss the optimal design for these insurance contracts in the penultimate section "Pension Indemnity Assurance". We end with some concluding remarks.

As it is nearly always useful to begin by defining terms, a pension is an income for an individual in retirement. A pension provides income until death and in many cases provides also for any surviving dependents of the pensioner. Without conversion to an annuity providing an income for life, a DC 'pension' is merely a tax-advantaged savings scheme. An occupational scheme is an arrangement where part of the employee's wages, their compensation for supplying their skills and services to an employer, is deferred until the employee has retired.

Some Facts about UK Occupational Pensions

The distribution of labour income varies with an individual's age, as is illustrated in Chart 1. The need for a pension arises from the lack of coincidence in time, the asynchronicity of an individual's income and that individual's consumption.

Chart 1: Per capita consumption and labour income (2007) ONS (Following McCarthy & Sefton)



It is immediately obvious that there are two periods of dependency for an individual; in childhood and old age. Note that these income and consumption profiles are of individuals of different ages at a single point in time; they are not cohort values. The income or consumption of any individual is not expected to follow the profiles shown; typically the profile developed with ageing will lie above that shown as per capita GDP and standards of living increase. Similarly, the consumption of an elderly individual in 2007 would, in their childhood, have been lower than that illustrated here, in both nominal and real terms. Though the regularities of dependency and excess income persist, some caution is warranted in comparisons across different ages.

"...Economically a pension is a claim on future production"

Though not illustrated in this chart, the individual consumption profiles for other developed countries tend to show materially increasing per capita consumption from middle age through retirement, while developing nations tend to be static over age or decline very marginally from early ages (around 20). In relative terms, developing nations also show lower labour income in late middle age but higher labour income at ages above 65, which would normally be associated with retirement in the developed world. This perhaps throws some light on

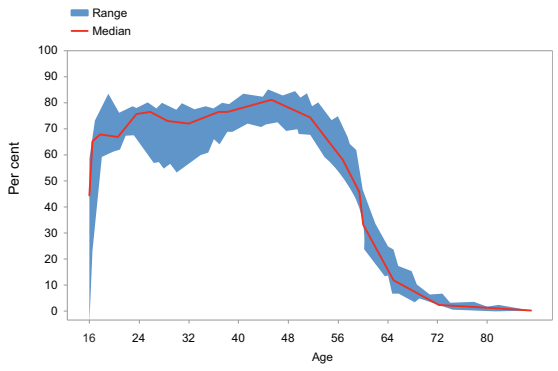
their differing cultural norms and the much-discussed role of the extended multi-generational family.

The profile of labour income varies over time for a wide variety of reasons. For example, since the early 1970s the proportion of women working has increased by approximately 12% while the proportion of men has declined by a similar amount. In addition, there is the recurrent problem of participation in the labour force and the consequence of non-participation for occupational pension entitlements. There are even recurrent seasonal variations in employment.

Chart 2 shows the participation rate at each age for females in the UK from 1984 to 2010. It should be noted that there is far higher variation over time in female participation rates than male. Male participation also tends to continue into older ages to a greater extent than female. In addition, there are sex specific effects such as non-participation in the labour force due to pregnancy and childcare, which are particularly noticeable from the age of 24 to around 40 in this diagram. Notably, the greatest variation over time in male participation rates occurs between the ages of 20 and 24. We shall revert later to some issues of labour force participation and the sustainability of pensions systems.

It is evident that a material proportion of women, circa 20%, do not participate at all in the labour force. The question of broken careers and non-participation, due to illness and unemployment, are material issues for public pension design and relevant also for men, though to a smaller degree. However, that is not the subject of this paper.

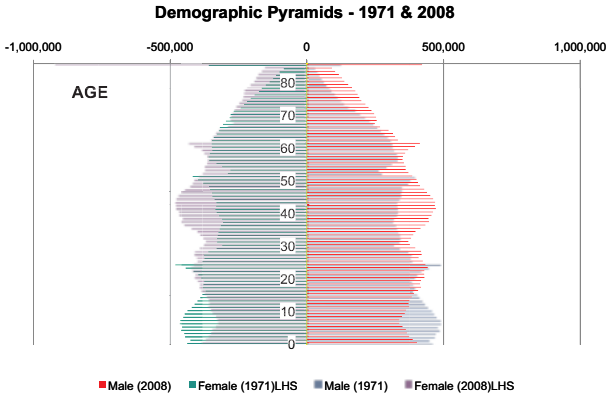
Chart 2: Female participation in the UK Labour Force, 1984 -2010 (Bank of England)



Economically a pension is a claim on future production; it is, practically, the wherewithal to finance consumption in retirement. It should be recognised that, in essence, all production is consumed by the current generation, since it cannot be stored for the time horizons necessary for pensions. Even with consumer durables, obsolescence is a real problem, and of course, many goods and services cannot be stored at any horizon. We will return later to some fallacies that arise from these simple facts in discussions of pensions.

The question of pension affordability and sustainability is inextricably bound to longevity in retirement. The debates over how to model the improvements in longevity observed, and how these will translate into future life expectations, have been long and surprisingly often acrimonious. For any individual, longevity is highly uncertain, though for a population much less so, as pooling of lives takes effect. The population pyramid for the UK in 1971 and 2008 is shown as Chart 3. These pyramids show clearly the increase in overall population size, the post-war baby-boom generation ageing and moving up through the pyramid, as well as the recent trend to a higher birth or fertility rate. In this chart all individuals aged 85+ are collected in a single bin, numbering nearly one million in 2008 for women and five hundred thousand for men.

Chart 3: Overlapped population pyramids 1971 & 2008 (Office for National Statistics)



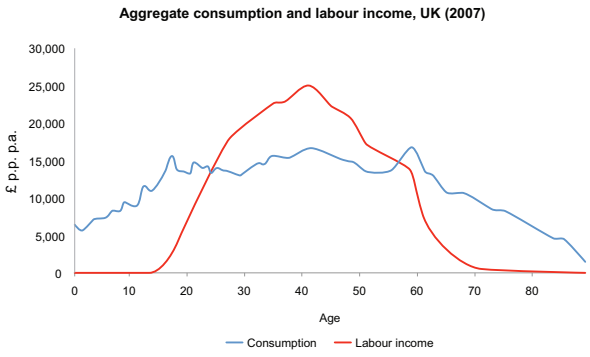
The product of this population pyramid and the per capita consumption shown in Chart 1 returns aggregate national labour income and consumption profiles by age which are shown as Chart 4. In this chart all aged over 90 are counted in a single bin which is evident as the upward spike at that age. If we sum or integrate the areas beneath these profiles to produce total consumption and total labour income, we will observe that total labour income is considerably lower than total consumption; the difference, of course, arises principally from savings investment income. We will therefore devote considerable space later to discussion of investment strategies and performance.

As we are concerned only with occupational pensions, there are many other issues relevant to transfers among

cohorts of the demographics, such as bequests and the role of the state, which we shall not discuss in any detail in this paper. One of the more intriguing and remarkable observations arising from that further analysis is that the structure and financing of education, in the developed nations, is broadly similar, while the structure and financing of retirement provision markedly more disparate[1].

Moving from the earlier per capita consumption and labour income profile to the aggregate UK national profile, several points become obvious. Firstly, that the age structure has only minor impact on childhood dependency costs, lowering them only slightly. By contrast, the effects on older age aggregate consumption costs are pronounced, declining rapidly, as individuals die, from around the age of 60. The spike in consumption evident around this age, which makes that cohort the largest consumers among all cohorts, can be attributed to the receipt of cash-commutations (lump sums) from pension schemes.

Chart 4: Aggregate consumption and labour income 2007 ONS (Following McCarthy & Sefton)



"...collective arrangements, which pool the uncertainties of longevity, are inherently superior to individual provision"

Some values associated with these charts seem appropriate. The 65+ age group currently (2010) accounts for 16.1% of the UK's population and is forecast to rise to 25.7% by 2030. This group contributes approximately £54 billion to Exchequer revenues with income tax and VAT approximately equal at £18 billion. At current prices this is projected to rise to approximately £98 billion in 2030. Some six million pensioners pay no income tax. Public spending on this age group is currently estimated to be £162 billion, of which pensions account for fifty percent. This is forecast to rise to £257 billion, of which pensions account for 52%. The public transfer is currently approximately 7.7% of GDP. Gross household expenditure by the 65+ age group is approximately £81 billion and expected to rise to £161 billion in 2030.

The problem for individuals is that they cannot, with precision, know their own longevity, the point at which their consumption will cease, which introduces the concept of pension arrangements as insurance[2]. This insurance eliminates the need to over-provide as precautionary saving against a long life, as the consequence of under-provision would be penury at some point in old age. Over-provision is not efficient[3]. This issue will be revisited later in the context of corporate life-expectancy and the application of over-capitalisation rules for pension schemes, such as Solvency 2. It is immediately obvious from a comparison of Charts 1 and 4 that the individual post-retirement income problem is greatly mitigated in aggregate. It follows that collective arrangements, which pool the uncertainties of longevity, are inherently superior to individual provision, though, of course, such collective arrangements remain exposed to unexpected increases in longevity in the population at large (systematic risk). Collective arrangements are not all about economies of scale, though these may be both present and material.

The effects of longevity increases are now predominantly located in the post-retirement ages; in prior periods much of increased longevity arose from decreasing pre-retirement age mortality. In fact, until the 1950s, increasing longevity improved the affordability of pensions precisely because it enhanced the size of the pre-retirement population.

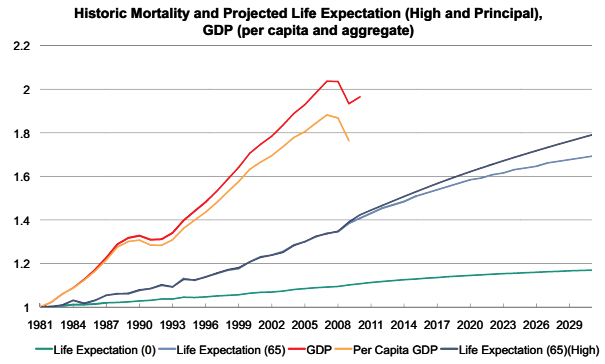
1 Even though there are further public policy aspects to be considered, such as redistribution and relief of poverty, as well as differing capacity and behavioural constraints, it is difficult to attribute all of this disparity to these causes. This analysis does though make it obvious that, with pensions, we are concerned with second best analyses (there is no single optimal design for all) and that differences should occur internationally and over time.

2 In economic theory there are several competing frameworks to account for savings and consumption; prominent among these are Friedman's Permanent Income Hypothesis where lifetime income, not current income, determines consumption, in contrast to Modigliani's Life Cycle Hypothesis where it is a partial determinant.

3 There are numerous dimensions to this inefficiency. For example, if some individuals over-provide for themselves they drive financial asset prices and investment returns lower. This may make self-provision infeasible for those who are income constrained and it may also result in those who expect higher returns to refrain from saving.

As increasing longevity is such a frequently-cited cause of the pensions 'crisis', some rudimentary mathematics is appropriate. A one year increase in longevity when life expectancy is 82 is an increase of 1.22% at birth but at retirement, say 60, it is an increase of 4.55% (1/22)[4]. Now if this improvement takes five years to occur these rates decline to 0.24% and 0.91% respectively. These are actually very low rates of growth; most importantly, these rates of increase in longevity in recent decades are far lower than the rates of growth in GDP over that period. Living standards have been increasing at all ages. The relation between GDP and longevity growth for UK males is shown as Chart 5.

Chart 5: Evolution of historic mortality, principal and high projected male life expectancy at birth and at age 65, together with aggregate and per capita GDP. (ONS)



Examining this chart, it is difficult to accept the often repeated assertion that pensions have become unaffordable because of increasing longevity and the ageing of society[5]. Over this period, and throughout the period since the industrial revolution, the ageing of society has been strongly associated with increasing productive output. Increasing longevity raises the real cost of pensions but it does so in simple proportion to the period spent in retirement.

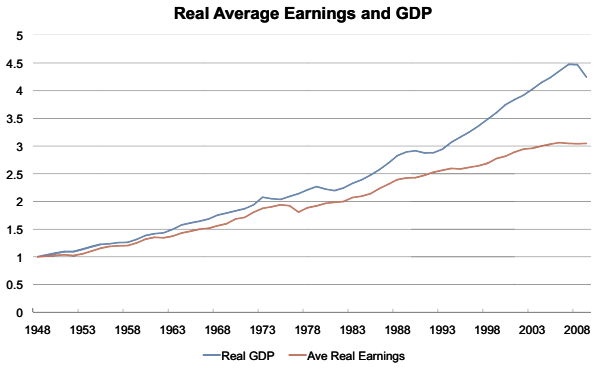
The key insight to be gained from increasing productive output is that as we become wealthier so our consumption preferences change. With UK output forecast by the Office for Budget Responsibility to rise over the coming fifty years by a multiple of between 2.5 and 4.0 times current levels, we should expect to see, by choice, material increases in our proportional spending on education, healthcare and retirement.

"Over this period, and throughout the period since the industrial revolution, the ageing of society has been strongly associated with increasing productive output."

The further element which needs to be considered in this aspect of affordability is the level of salary upon which the pension is based. Average earnings have been increasing steadily in the post-war period. In recent times, real average earnings have declined, which is an unusual occurrence in the post-war period, having previously only been seen briefly in the late 1970s. Recent estimates place the decline in real earnings at approximately 14% relative to the long-term trend, before any further effects of increased taxation. The relation between real average earnings and GDP for the post-war period is shown as Chart 6.

It is perhaps surprising, particularly given the reinstatement of the earnings link for state basic pensions, that the arguments and disputes over the metric change from retail price inflation to consumer price inflation indexation of pensions has not raised this point: that the socially equitable basis for pension indexation is average real earnings rather than inflation. In fact, if the cost of living is the true issue, the metric should more appropriately be a COLA (cost of living allowance) rather than an inflation index as this takes into account taxation effects.

Chart 6: Real GDP and average earnings in the post-war period, 1948 – 2009 (ONS)



In order to consider this joint aspect of real wage growth and longevity, we construct indices of affordability of new pensions cost at retirement. For a two-thirds final salary pension we use average earnings in that year as the

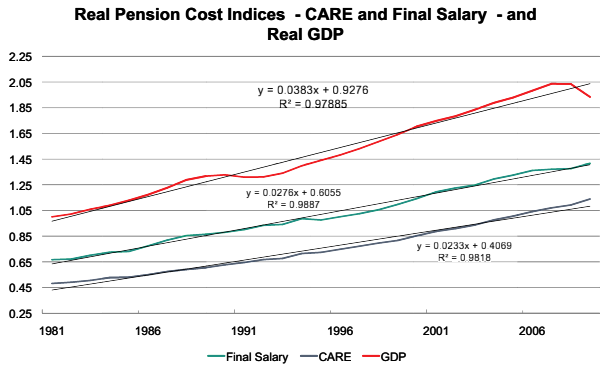
4 This simple calculation assumes there is no mortality prior to age 60.

5 The distinction between longevity and the ageing of society is the distinction between individuals experiencing longer life-spans and the average age of a society increasing, which may come about from increasing longevity or other effects such as lower fertility rates, which result in a smaller part of the population in childhood.

measure of final salary, and for career-average re-valued earnings (CARE) we use two thirds of the simple average of the prior 35 years average earnings. These are multiplied by the expectation of time in retirement. Chart 7 shows these cost indices for the period since 1981.

Obviously there are some potential biases in these simple cost indices. For example, they do not consider the fact that pensions in payment are subject only to limited price inflation indexation rather than the retail price index deflation of the earnings figures, or GDP deflator of the GDP series; this tends to lower the experienced cost. It should also be borne in mind that the longevity estimates may be subject to upward revision, and that the room for this varies with the age value of the estimate; upward revision raises the experienced cost of the pension.

Chart 7: Real cost indices for CARE and final salary arrangements together with real GDP. (ONS, Author's calculations)



"...pensions are in fact more affordable than at any previous point in time."

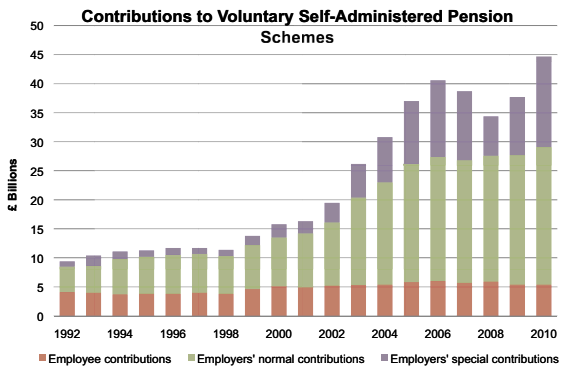
It is apparent from this cost index that the expected cost of DB schemes has been increasing at a slower rate than that at which GDP has been increasing. This carries the consequence that, at the national level, pensions are in fact more affordable than at any previous point in time. The slope of a linear regression on real GDP is 0.038, which is materially higher than the 0.028 of final salary DB or the 0.023 of CARE schemes. The most recent release of longevity data has reported an increase of 44 days in life expectancy in 2010, a rate of 1.2 years per decade; this is far below the often cited recent increases of one year per year applied in scheme assumptions. When combined with average earnings rising at just 2% and inflation running at greater than 4%, the real cost of final salary pensions has actually declined in the past few years.

If pensions are now unaffordable, we need to look elsewhere for the cause – and regulation is a prime suspect. This is not to say that occupational DB scheme arrangements were by any means perfect and not in need of further interventions during their 1970's hey-day; indeed there were many problems, particularly those surrounding early leavers. It was not uncommon for scheme rules to return just the member's contributions for those leaving within ten years, and for those leaving after, say, twenty years to receive a pension of one third of their leaving salary, with no adjustment for subsequent inflation. These early leavers subsidised the cost of provision for those remaining. These characteristics also undoubtedly had effects upon labour mobility and productivity. However, in the post-Maxwell era, the nature of regulation has changed; from enhancement of pension benefits for members to protection of their perceived security.

There should be no doubt that pensions have been costing their sponsors much more in recent times; the total cost to employers has grown eightfold since the early 1990s. Even regular contributions have increased more than fivefold. This is illustrated in Chart 8, using ONS data. This is, most surprising inasmuch as occupational DB schemes have declined in number and engaged in numerous strategies, such as closing to new members, intended to reduce total pension cost.

"...the total risk management benefits of a collective DB scheme relative to individual DC are very substantial.."

Chart 8: Contributions to voluntary self-administered occupational DB schemes (ONS)



These contribution amounts are large in absolute terms, and very large by comparison with firms' net cash position, where even in the cash-heavy post-recession period, they amount to around 6% of balances. This increase in cost is pronounced when measured as a proportion of private sector salaries and wages, or as a proportion of the aggregate private sector's gross

Table 1: Contribution rates (% salary) for open and closed DB schemes (ONS)

	Member		Employee		Total	
	Open	Closed	Open	Closed	Open	Closed
2008	5.1	4.8	14.6	18.1	19.7	22.9
2009	5.4	5.1	14.9	18.0	20.3	23.1

operating result (Illustrated as Chart 9); these values are significant in terms of operating efficiency and cost competitiveness for many of the companies involved. These costs are sufficient to warrant the closure and cost limitation behaviour of many company sponsors that we have observed most strongly over the post-Millennium period.

The ONS publishes statistics for the contribution costs of open versus closed DB schemes for the years 2008 and 2009.

The majority of UK DB schemes have closed to new members and many have closed to future accrual; these changes are widely portrayed as elementary liability risk management. They do limit the further growth of liabilities. However, they also reduce the temporal diversity and risk-sharing properties of the collective defined benefit structure. This means that they increase the costs of providing the existing stock of benefits outstanding at the time of closure.

We should recall that this temporal diversity and pooling is just one facet of the risk enhancement offered by a collective DB arrangement; the others are among members and operate through the constant accrual rate and salary level. In other words, the total risk management benefits of a collective DB scheme relative to individual DC are very substantial.

This difference in contribution cost is a direct measure of the relative efficiency of the two arrangements. Keeping a scheme open is some 20% to 25% superior to closing it. It is interesting that members are paying more of the total cost in closed schemes than open. It is also evident that these liability management manoeuvres will take a long time to be fully reflected in sponsor costs. These are rather ineffective forms of risk management, at least in the short-term. It also means that for the sponsor to be better off after closure, any scheme which replaces the now-closed DB must be at least 20% – 25% inferior to it.

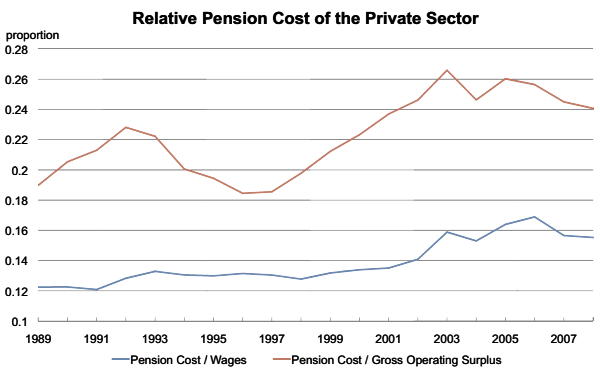
The trend, reported in numerous surveys, towards increasing use of financial risk management techniques is also relevant as this management practice itself introduces costs to a scheme; these techniques are concerned with the reduction of the variability of a scheme's funding position, and are inevitably costly. The trend may be considered as no more than the rational and predictable reaction to regulation focused upon security. It is not at all obvious that these costs have been fully evaluated in the deliberations leading to the implementation of such strategies.

Only very recently have we begun to hear cautions concerning the effects of derivative collateral support calls upon pension fund liquidity; these cautions have focused upon the possibility of these calls inducing a severe form of path dependency, the sale of assets in adverse market conditions. As yet, none has warned that the effect is actually to make the costs of hedging using derivatives unknowable in advance.

"...the membership of defined benefit pension schemes differs materially from the population at large..."

We shall return later to the question of pension fund contributions as demands upon the working capital requirements of the private sector, and confine ourselves to noting here that unlike ordinary working capital operations, these payments are irreversible other than through the lengthy process of making lower contributions in future years as financial market developments and valuations might permit.

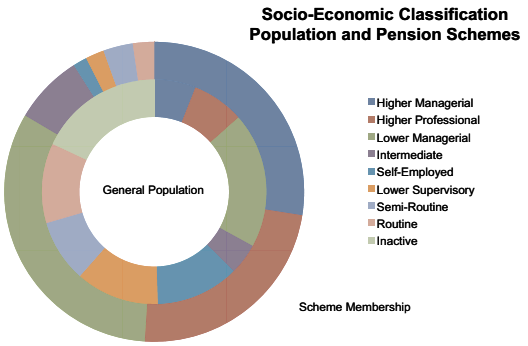
Chart 9: Pension cost as a proportion of private sector salaries and wages, and pension cost as a proportion of private sector gross operating surplus. (ONS)



Of course, the membership of defined benefit pension schemes differs materially from the population at large, as may be seen from Chart 10, which shows the general population and the population of occupational scheme membership by socio-economic class weighted by pension entitlement amount. These differences can be expected to affect real pension cost as longevity varies greatly among socio-economic class. There is much research underway to analyse the linkages between socio-economic class and mortality[6], for which socio-economic class is the currently available proxy in analysis and projection.

This chart makes clear one fundamental problem of hedging scheme-specific liabilities with population indices. There are two distinct sources of error and cost to be considered with longevity hedges: the difference in membership by socio-economic class with their differing life expectancies and the differing levels of pension entitlement of these different socio-economic groups. The resultant basis or residual risk when a scheme is hedged using a population index can be very substantial.

Chart 10: Socio-economic class of the UK population and members of occupational pension schemes weighted by pension entitlement. (Club Vita)



The variation in longevity among the population is far from completely captured by socio-economic class. There is, for example, considerable geographic or regional variation in mortality and longevity as may be seen from Chart 11. This illustrates the variation, from region to region within England and Wales for males in the 25-64 age cohort using data from 2001-3, in age-standardised mortality rates. The variations are stark, with a pronounced trend evident almost everywhere for increasing mortality with declining socio-economic class. Moreover, the variation among regions varies with socio-economic class, from 20% or so for professional employees to almost 80% for routine workers. The lowest mortality is just 26% of the highest. The sad truth is, that in spite of much research, bio-medical and other, we really know very little about the determinants of a long life for any individual. Nor is it evident that the assumptions of longevity used in scheme valuations are well-founded.

"...we really know very little about the determinants of a long life for any individual.."

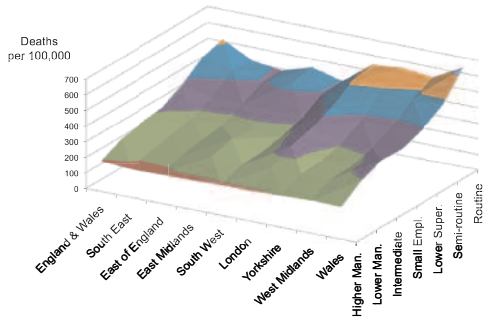
The Achilles heel of simple remedies for the raised costs of increasing longevity, such as increasing the normal retirement age, is made evident by Chart 11. A general increase of one year in the retirement age is proportionately far more important for the lower socio-economic classes than for the higher; this increase exacerbates inequality within society.

The consequence of these complexities for any method of longevity hedging or risk management is that this should take the form of indemnity, experienced cost, rather than some parametrically determined coverage for the risk hedge or transfer to be fully effective. The insurance or longevity derivative must pay the actual pensions amounts that are due to pensioners.

Ordinarily, it might be possible to justify parametric coverage on the ground that this leaves a basis risk or effective deductible with the purchaser of the insurance, which serves to limit the well-known insurance problems of adverse selection and moral hazard. However, in the case of pensions and longevity, adverse selection or moral hazard is outside of the control of the scheme sponsor. Unlike, say, a fire risk where the insured may cease to take adequate precautions once insured, thus raising the likelihood and perhaps amount of a claim, the sponsor can do little to influence the longevity experienced by its pension scheme. It is whimsical to consider scenarios where moral hazard and adverse selection might arise, such as recruitment from longer-lived higher socio-economic classes than necessary, as these also have higher wage costs.

6 See, for example, Case and Paxson, "Causes and consequences of early-life health" Demography 47 (Supplement) 2010.

Chart 11: Variation in age-standardised male mortality (25-64) by socio-economic class and geographic region, 2001-3 (ONS)



Age Standardised Deaths (100,000) Ages 25 - 64 by Region and Socio-Economic Class - All causes of death 2001 -2003

The market practice of regarding increasing longevity solely from the perspective of its increased cost to pension schemes is short-sighted. Pensioners are also a source of material amounts of consumption demand for the output or production of the private sector; the truth is that increasing longevity brings with it both costs for DB pension schemes and profits for their private sector corporate sponsors. Discussion of a related issue, the multiplier effect of pensioner consumption, is almost non-existent.

"...groupthink has become wedded to financial market approaches."

Given these now-evident costs and uncertainties, it is frequently asserted that if we were starting afresh with a tabula rasa we would not design a defined benefit pension plan; we contend that this is false. Rather, we would create the benefit structure of DB. In fact, we would have no choice as an occupational pension is a labour contract, whereas DC is merely a financial contract. But, what we would not create are funding as the security mechanism, the accounting standards in place or the regulations based upon them. The groupthink has become wedded to financial market approaches; perhaps, the recognition now of this groupthink and its subsequent challenge is the silver lining of the financial crisis.

"...the burden of pensions is perfectly affordable and sustainable at the level of the UK national economy."

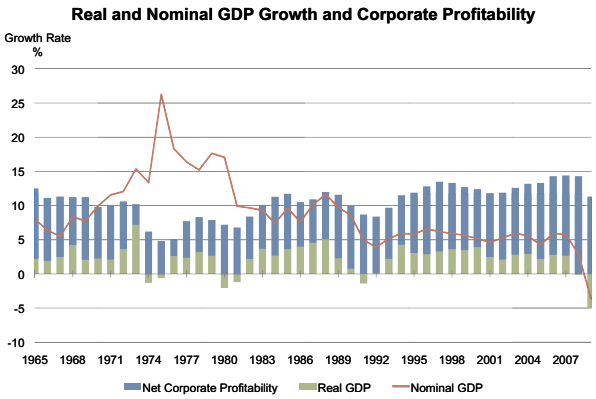
It is tempting to attribute the existence of occupational pensions to a desire to compensate for the observed behavioural trait that, otherwise, we tend to save from what's-left-over of our disposable income; that this is often insufficient as a result of the other competing demands[7] upon our disposable income. But, there is a more fundamental economic reason. This is rather more than a diversion of labour income 'at source'. These employers are the producers in an economy, and producers can make credible promises with respect to their future production. It is most efficient for the pension promise to be made by the employer, recording the existence of the promise in its books and records. In fact, such promises are precisely the basis upon which company employers issue equity and debt securities, which are then traded in financial markets. The argument for scheme funding must be complex in result as the direct unfunded claim is economically indistinguishable from the equity claim acquired in a financial market, though the price of the traded claim is subject to the 'animal spirits' of financial markets rather than the negotiation of wage compensation. The differences are matters of the detail of the forms of the claims, but lie principally in the tradability of listed securities and their value as collateral; in general terms, liquidity.

In the UK, a pension is the inalienable property of the individual; it has no value as collateral as it cannot be pledged credibly because this is not enforceable in bankruptcy.

The indications offered thus far have suggested that the burden of pensions is perfectly affordable and sustainable at the level of the UK national economy. Notwithstanding this, the costs to private sector scheme sponsors have multiplied manifold. Two questions arise from these observations: can these costs be sustained by the private sector, and where do these costs arise? To consider the first, it is necessary to examine the returns on capital employed of the private sector, since this accounts for the majority of production within the economy. This is illustrated together with real and nominal GDP growth in Chart 12.

7 Chart 1 shows an increase in consumption centred around the age of thirty associated with household formation and child-rearing.

Chart 12: Net private non-financial companies (PNFC) profitability, nominal and real GDP growth, 1965 – 2009 (ONS)



The UK corporate sector is actually very well-positioned to deliver pensions to its employees. The reported profitability of UK private non-financial corporations, net of depreciation and amortisation, has averaged 12.7% annually since 1965. Adjusted for their riskiness, the variability from year to year of these corporate earnings, the long-term rate of return on capital employed is almost unchanged. The total capital employed by the corporate sector exceeds the value of pensions by a considerable margin; capacity is not a problem. The net non-financial assets of the private non-financial sector, the financial sector and non-profit institutions serving households (NPISH) were reported by the ONS at £1.4 trillion in 2009 and constitute 19.8% of the National Wealth. The variability or riskiness of collective corporate sector profitability is actually lower than the variability of the economy in aggregate. It should be noted that these profitability figures are reported after deduction of the present costs of pension provision, which are material and low-bias the results published. Chart 12 indicates that it is the periods of high inflation that may prove hazardous, rather than the low-inflation, low-return environment of recent times which has been perceived as so problematic.

"...provision even at these high costs is not a problem of ability in aggregate for the private sector."

We will revert later to the relation between these returns and those of pension schemes and financial markets.

These earnings statistics exclude the banking and financial sector. The profitability of banks has been dichotomous in the post-war period – prior to the early 1970s, the banks experienced returns on capital averaging 7% but were low-risk with volatility of earnings at just 2%, in the period 1972-2007, the banks experienced earnings of 20.4% p.a. but had a risk or volatility of 6.9%. This phenomenon is also evident in the performance of dividend and price indices of financial markets. The banking debate now taking place is precisely about which of these regimes we should wish to have apply in future, as a society.

As these simple statistics show, pension provision even at these high costs is not a problem of ability in aggregate for the private sector; it may be a problem of willingness. It is therefore surprising that the Pension Protection Fund should have expressed concerns about multi-employer schemes, such as last-man standing arrangements. However, it is clear that the private sector is more than capable of managing such risks by pooling. Mutual indemnity insurance and even private specialty commercial insurance vehicles would be viable. Incidentally, such arrangements would be far cheaper and much more efficient than the Pension Protection Fund, which is a compensation fund rather than indemnity insurer. This latter assertion is justified later in discussion of pension indemnity assurance.

The question of willingness is not one of willingness to meet pension liabilities already incurred, even though these are much higher now than originally envisaged, as the 2003 Debt on the Employer legislation removes any doubt as to the enforceability of these claims. The infamous 'pension put' analysis due to William Sharpe is not possible under UK law. The question is one of incentives for employers to continue to offer pensions in their employment compensation packages. It appears that regulation and much more has removed all financial incentives and made this form of compensation inefficient relative to the payment of simple cash compensation.

The principal problem of pension design and structure is that these private sector aggregates cover a broad distribution of differing corporate performances. Some companies will fail and, of course, the sole risk faced by a pension beneficiary under a DB arrangement is sponsor insolvency. We examine insolvency likelihoods in greater detail later.

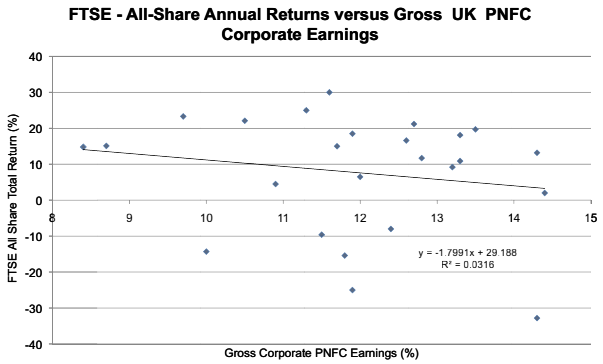
Pension schemes are hedging many 'risks' other than sponsor insolvency, which is costly to them. As sponsor risk is the sole risk they in fact bear, it is difficult to see how this could possibly be interpreted as being in the best interests of their members. These risks, such as longevity and inflation, are of concern to the sponsor but not the scheme, as the scheme is the beneficiary of the balance of cost underwriting of the sponsor covenant.

In the post-war period, the variability or riskiness of realised corporate earnings is most interesting in that it is comparable to or better than the variability of the gilt

index returns, the financial market's favourite 'risk-free' measure. It is also evident that the earnings of the UK PNFC sector are largely unrelated to the returns from traded equities; this is illustrated in Chart 13.

This chart also shows a linear regression of these returns. Note that the explanatory power is negligible at 3% and that the relation is negative rather than the expected positive. Returns in financial markets simply do not reflect the economic performance of companies in their business activity. It is also notable that the variability of financial market returns is an order of magnitude larger than the variability of actual corporate earnings. The 'animal spirits' of financial markets magnify the apparent risks of UK companies to an inexplicable degree. This is true in both time series and cross-sectionally.

Chart 13: Gross annual UK private non-financial corporate earnings and FTSE-All Share annual returns. (ONS, FTSE)



This absence of the expected relation is not a matter of leads or lags. The FTSE total returns series exhibits no significant autocorrelation at any lead or lag; the PNFC series is highly (statistically significantly) auto-correlated at lag one (0.79). The correlation between the two series has a maximum value of +0.20 when financial market returns lead corporate earnings by nine years; it has a minimum value of -0.33 when corporate earnings lag financial markets by six years.

"...it is clear that the UK corporate sector collectively and many firms in particular can, sustainably and affordably, offer defined benefit pensions to their employees."

The position of corporate sponsors as the balance of cost underwriter of such DB schemes is not predicated or dependent in any way on the performance of markets for financial assets. Introducing spurious dependence through misconceived accounting standards and regulation only serves to obscure this. In fact, the central economic argument which supports the provision of occupational pensions is precisely that employers in the state and private sectors can contract to deliver pensions claims on their future production directly to employees, without recourse to financial markets.

However, it is clear that the UK corporate sector collectively and many firms in particular can, sustainably and affordably, offer defined benefit pensions to their employees. The real conundrum is how the costs of such provision can possibly have reached the levels we observe.

Chart 14: Primary Income and Expenditure of Self-Administered Schemes (ONS)

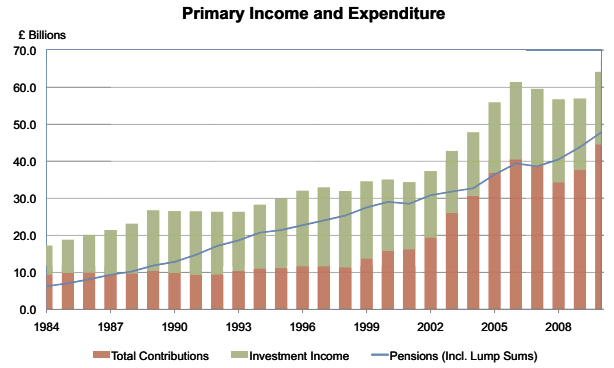
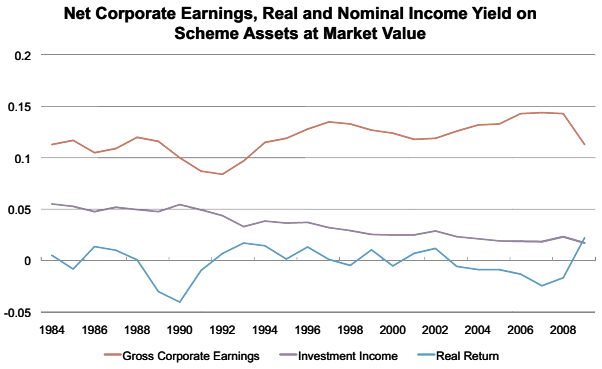


Chart 14 shows the total pensions paid by schemes, including lump sum commutations, together with investment income and total contributions. There is a primary surplus, which incidentally persists into post-administration cost expenditure. Without the special contributions that have been made, schemes would have been very close to cash-flow deficit; in the absence of further special contributions or other changes to contributions beyond those of wage inflation or investment income, they are projected to be in cash-flow deficit within five years. At this point they will need to realise investments in order to meet pension payments.

Though the assets, at market value, of pension funds have grown from £142 billion in 1984 to £1,124 billion in 2009, the income generated by these assets has only increased from £7.8 billion to £19.2 billion. This real and nominal income yield on the market value of assets is illustrated in Chart 15, together with net corporate earnings.

Chart 15: Net corporate earnings and income yield on scheme assets at market prices. (ONS)



"The real returns from these portfolio assets has oscillated about zero."

It is evident that the nominal investment yield of portfolio assets has been declining consistently since the early 1980s; from rates in excess of 5.5% to around 2.0% in recent times. The real returns from these portfolio assets has oscillated about zero. One pound invested in this real portfolio in 1984 would have declined to just £0.96 if held to 2009[8].

These realised investment yields are deeply problematic. They are much lower than the 2% plus by which real GDP has been growing over this period; they are also far lower than the yields on bond market investments. They are completely unrelated to the 12% returns to capital of the private non-financial company sector. We shall return to this issue in depth later.

The general administrative expenses of these pension schemes have also grown from £0.5 billion in 1984 to £4.8 billion in 2010; this is a fourfold real increase. These expenses have risen from 6% of investment income to 25% in 2010. These expenses do not include investment management fees paid or any costs which are paid directly by the sponsor, which may be substantial. The Pension Protection Fund levies and associated costs account for approximately £1 billion of this £4.8 billion.

It is evident that these schemes are heavily dependent upon special contributions which have risen from £0.9 billion, 10% of total contributions in 1992, to £15.6 billion in 2010, 35% of total contributions. Of course, pension funding regulation drives the majority of these special contributions. It is as well that the UK corporate sector has experienced returns to equity that could easily support these special contributions. This behaviour, diverting funds into assets offering far lower income yields than may be achieved within the business, may offer greater security to scheme members but it brings with it explicit and very substantial opportunity costs to the UK private sector and to the social welfare more generally. When investment returns are as low as was evident in the last decade, negative in real terms, and expected to remain low, it is irrational to increase funding contributions, but additional special contributions, which are largely determined by pension regulation, have reached all-time record high levels. The direct opportunity cost of these special contributions to the private sector is very substantial; the simple[9] cumulative total opportunity cost of these special contributions, made over the 2000-2009 period, and incurred in the year 2009 was £32 billion; this is some 2.3% of GDP.

In order to assert that these DB schemes will become unsustainable and not to have this assertion dependent upon the poor investment returns and inappropriate and costly regulation, it is necessary to propose some form of radical change to the economy. Many contend that the worsening demographic dependency or support ratio (or its inverse) is evidence of such an impending change. This standard practitioner belief has its roots in a conjecture, due to Paul Samuelson[10], that dependency rates may become so extreme that they harm growth and the social welfare. Obviously there is some level of dependency which does result in lower growth, but the open question is what this level is.

The (inverse) demographic dependency ratios are illustrated for the UK, Sweden and Spain in Chart 16. There are numerous difficulties with these simple ratios. Firstly, there is an assumption within these simple ratios that all people are equally important from the standpoint of their production and consumption. It may be reasonable to assume that all people are born equal, but it would be folly, economically, to believe that they remain so. Obviously the socio-economic profile of the age cohorts varies with their age. Moreover, we should expect the older cohorts and those participating in the labour force to vary from the population average; two effects can be expected to have impact: disability and ill-health

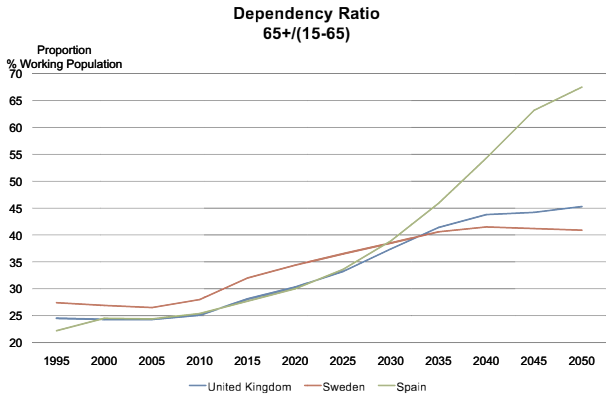
8 This calculation assumes no fees or other costs.

9 This is calculated as the difference between investment returns achieved by pension funds and the returns earned by the UK private non-financial sector. Obviously, this measure is far from complete.

10 P. Samuelson, 'The optimum growth rate for population', International Economic Review (1975) and 'The optimum growth rate for population: Agreement and evaluations', International Economic Review (1976).

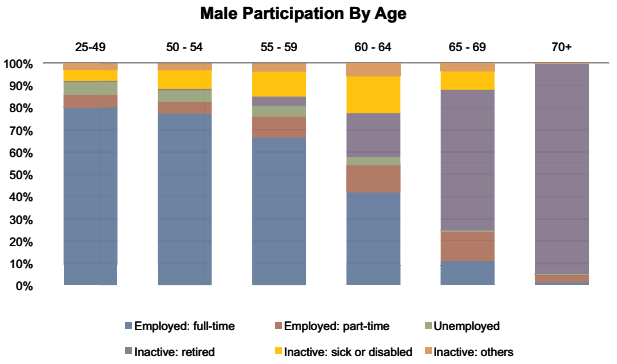
among the lower classes and higher presence of higher socio-economic classes due to their greater longevity. Also, these ratios are incomplete measures of total dependency upon the working age population as they omit to consider the dependence of children and the unemployed, inactive and disabled. There are some 13.3 million dependent children in the UK, a figure which has been static for the past decade. As can be seen from Chart 1 earlier, this childhood dependency is substantial; at the age of 17 the consumption of a child surpasses that of an adult, and their labour income does not exceed their consumption until the age of 23. Of course, much of this childhood consumption is misclassified in the sense that it is actually investment in the education and skills of this younger generation.

Chart 16: Past and projected inverse dependency ratios (EC Projections)



There is a further elementary difficulty with such ratios in that the projections assume constant relations between working and retired ages. In fact childhood dependency has been increasing as children spend longer in education, and the age of retirement has been increasing. In 1995 the average age of retirement from the labour force in the UK was 63.1 years, it is now 64.5 years. Moreover, retirement is slowly becoming more a process of gradual withdrawal from the labour markets rather than the cliff-edge event suggested by these dependency ratio calculations. In fact the labour participation rate in the 50+ age group, which is in part determined by these dependency ratios, has also been increasing since 1995 – from 33% to 40%. If this rate of increase were to continue it would, alone, fully offset the dependency ratio effects. Chart 17 shows the most recent statistics on economic activity of males by age, from which it is evident that this participation rate trend is unconstrained by capacity.

Chart 17: Male labour force participation by age. (ONS 2009)



The European Policy Centre has developed a variant to these simple old-age dependency ratios which takes labour market participation rates into account – the labour market adjusted dependency ratio (LMADR). The differences from simple dependency ratios are pronounced. For the countries shown in Chart 16, Sweden, in 2010, ranks 24th out of the 27 EU members by the simple ratio, but 4th by the LMADR, the UK 14th by the simple ratio but 6th by the LMADR, and Spain, 13th by the simple ratio and 24th by the LMADR. By 2030, by the simple measure Spain ranks 8th but 24th by the LMADR, Sweden 16th and 2nd, and the UK 6th and 5th. By 2050 Spain is ranked 25th by both measures, Sweden 6th and 2nd and the UK 6th and 5th. It is evident that as time progresses the ratios tend to converge. The EU average in 2010 was 25.9% by the simple measure but 47.7% by the LMADR, in 2030 38.0% by the simple and 52.7% by the LMADR, and in 2050, 50.4% by the simple measure and 56.3% by the LMADR. The growth over the period by this LMADR measure is just 18%, while by the simple measure it almost doubles at 95% growth. It really is necessary to consider demographics and labour market participation jointly in the analysis of the effects of population ageing.

There are then questions as to the quality and productivity of the working age cohorts. Clearly these younger cohorts are better educated than at any prior time and this trend seems unlikely to reverse; this implies a higher quality of labour. Moreover, as succeeding cohorts become smaller, the capital per capita employed by that working age cohort increases. The relation between per capita productivity and capital employed is strongly positive. In fact, though there has been no material degradation of the dependency ratio in the period, since 1980 per capita capital employed has doubled.

Finally, there is the question of the distribution of productive output between capital and labour. Though there has been a substantial trend globally since the mid-

1980s towards an increasing share of production accruing to capital rather than labour, this has not held true in a number of European states including the UK[11], where it has continued to oscillate between 20% and 30% of GDP at factor cost.

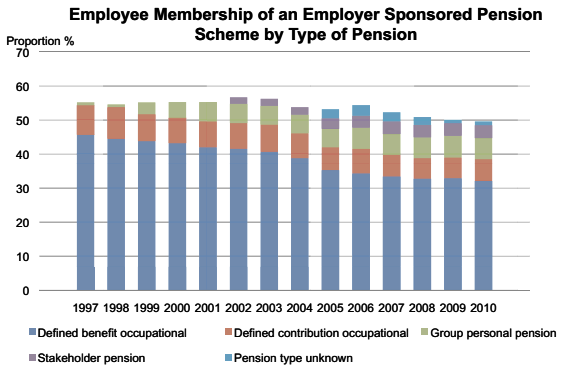
"...rather than being a radical change to the economy, these demographic issues are headwinds which may feasibly and plausibly be surmounted."

It is interesting that the current ONS forecast of the simple dependency ratio is much less dire than that of many market commentators: " In 2008, there were 3.2 people of working age for every person of state pensionable age. This ratio is projected to fall to 2.8 by 2033, taking into account the future changes to state pension age." This is similar in magnitude to changes that have been seen previously without any consequent decline in output. In fact, the increase in the inverse dependency ratio is from 31% to 36%, rather than the 40% shown in the earlier Chart 16, which is based on EC projections. To fully offset this deterioration, an increase in productivity of just 0.5% p.a. is all that is necessary. In fact, one of the few economic statistics of which the UK should be proud is its rate of growth of productivity in recent times; between 1991 and 2009, by the GDP per hour worked measure, this increased by 44%, the highest of any G7 country.

It appears that, rather than being a radical change to the economy, these demographic issues are headwinds which may feasibly and plausibly be surmounted, particularly as state pension age rises. Indeed, it appears that the population has responded in anticipation of this trend. The solution to what demographic problem exists lies in supplying the education and capital resources necessary for that future working age population to increase production sufficiently, and this does require the current generation to invest in their children's education and to provide adequate capital resources.

It can hardly be surprising that, against this background of negative commentary, massively rising costs and uncertainty, the response by the private sector has been to cut back to the extent possible on their provision of DB pensions. Chart 18 illustrates the changing profile of pension provision.

Chart 18: Employee membership of employer sponsored pension schemes by type of scheme. (2009 ONS)



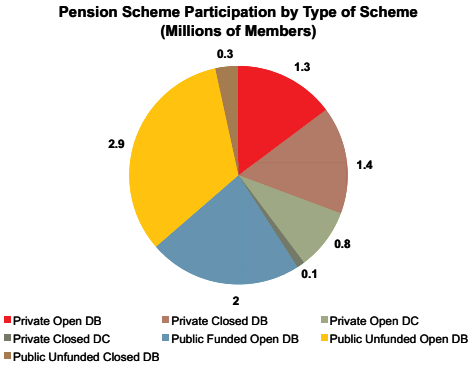
The decline of private sector DB provision in recent times is masked to a degree in Chart 18, which covers both public and private schemes. This decline is better reflected in Chart 19, which shows pensions scheme membership by open and closed status in 2007 in public and private sectors, since when many more private sector schemes have closed. A recent (2011) National Association of Pension Funds Survey suggested that only 23% of private sector schemes (by number of schemes) are now open to new members.

"Globally there has been a strong movement from defined benefit (DB) toward purely individual defined contribution (DC) systems."

The decline of DB provision by the private sector is believed by many to be terminal. Certainly it is an unintended consequence of costs now faced by corporate sponsors. These costs arise principally as consequences of incorrect accounting standards and misguided regulation, and of course, these may be reversed. It is alarming to see that the ideologues, who drove so much of this change, have now turned their attention to public sector defined benefit schemes.

11 In the UK this may in part be due to the increasing role of self-employment and the statistical method used to allocate output between labour and capital.

Chart 19: Membership of public and private sector pension schemes by current status (2007 ONS)



Many companies have moved to offering defined contribution 'pensions' and group schemes as they have a final defined cost on award. It is notable that, in addition to the desire to avoid special contributions, companies are motivated by the practice, which has developed, of making lower contributions under DC than would be made under DB. In 2007, the average employer contribution was 6.5% under DC (employee 2.7%) by comparison with 15.6% under DB (employee 4.9%).

As DC is now becoming so popular as a form of provision, if not necessarily by choice, it is appropriate, here, to consider DC 'pensions' in some detail.

DC 'Pensions'

Globally there has been a strong movement from defined benefit (DB) toward purely individual defined contribution (DC) systems; this has been evident in both public and private sectors. From the sponsor's perspective, moving to a personal pension system seems to solve the main shortcoming of DB, the ongoing contingent cost exposure, because the contributions under individual DC are fixed and final.

"Under DC there are no incentives for the company."

The new state sponsored NEST scheme is a defined contribution arrangement; there are no guarantees. The outcomes for members depend upon the performance of markets for investments and annuities. It is compulsory for employers, which resolves the absence of any incentive for employer provision when the pension is DC in form, but could easily lead to a culture of grudging compliance and low employer contributions.

Under DC there are no incentives for the company; a DC contribution is no different from salary or wages paid. It is a direct current cost, a call on working capital. There is also evidence that employees undervalue contributions made to pension schemes by the sponsor, suggesting that offering DC may be inefficient from the standpoint of total employee compensation negotiation. There is evidence that members value DB schemes differently from DC. For example, in times of financial crisis DC scheme members respond by trying to increase their labour income to a greater extent than DB members. This may be achieved by a variety of methods, such as working over-time if available or taking supplementary part-time employment.

"Personal pensions, in which employees bear all of the risk, have even more serious shortcomings than DB."

Perhaps the provision of DC pensions has signalling value to an employee as to the quality of the employer, but there is no survey evidence to support or refute such a hypothesis. Any signal value would be rather odd; here is an employer that cares for staff but not so much that it offers DB. The advent of compulsion on companies with the introduction of NEST would tend to reduce any such signalling value. Compulsion can also be expected to result in a culture of compliance, leading to minimal mandated contributions from employers. In a recent survey, 64% of respondents expected employer contributions to be managed down under NEST. It may be argued that compulsion is a negative development in that sponsors will lose pensions as an important compensation tool, a development that might especially be detrimental in an ageing society where workers are increasingly becoming scarce.

Personal pensions, in which employees bear all of the risk, have even more serious shortcomings than DB. Firstly, these are individual arrangements, which means that the individual faces more risk than a member of a collective scheme; the benefits of risk pooling and the flexibility of a collective scheme's longer lifespan are lost. DC is an arrangement which is completely dependent upon financial market performance. Secondly, the individual faces particularly acute point-in-time dependencies; for example, on the market value of the savings 'pot' at retirement. At this point, the individual is faced by the uncertain cost of annuitisation or riskiness of income drawdown. Absent annuitisation the DC 'pension' is merely a tax advantaged savings scheme.

The tax position of pensions is often misunderstood. The contributions made are deductible from the taxable earnings of both the individual and the sponsor employer.

Investment income is also not subject to taxation. On retirement, the individual pays income taxes on the income received. This is no more than tax deferral. Only "lump-sum" cash commutations are income tax free in the hands of the individual.

There is little doubt that most individuals are unable and even unwilling to carry out pension management on their own account; there are volumes of academic research which document the cognitive and behavioural failings of individual investors. The experience of the Swedish state (notional) DC system over the past decade is particularly illuminating. At inception of this pension system, 33% of scheme members made no investment choice, so the rules allocated them to the default investment fund, which has returned 1.7% p.a; 40% made a choice on entry to the scheme in the year 2000, and have made no changes to this choice. The performance of these investors has been 0.4% p.a. The remaining 30% have made numerous changes to their allocation – those making 2-5 changes have experienced a return of 2.2%. The small numbers who have made more changes (6-20) have achieved returns of 6.2%. However, in recent times, the proportion making no investment choice has risen to more than 98%; there is, perhaps, a lesson here for NEST. The disparities between the values of individual pension savings 'pots' at retirement will be enormous under exercised choice. The problem with no decision dominance is the concentrated exposure to those default fund strategies and performance. The disparities in pensions arising will prove stark.

The individual is also fully exposed to financial market price volatility, even if the investment route is the recurrent purchase of units in mutual funds. Transfers into and out of these vehicles take place at net asset value, calculated from market prices. Volatility of market prices is rather more than the possibility that the fund may decline immediately prior to retirement leading to terrible annuity income or drawdown; it lowers the realised compound return achieved by an investment portfolio. The individual has no possibility of lowering or smoothing market price variation.

"If a collective DB scheme can deliver a two thirds final salary pension at a contribution cost of 20% p.a., then an individual DC scheme requires contributions of at least 30%."

This makes individual DC provision is far less efficient than collective arrangements. There are a number of risk-pooling and risk-sharing arrangements which deliver this relative efficiency. The pooling of lives lowering longevity uncertainty, the convexity of the resultant pool and intra-member age related transfers arising from the simple accrual rate applied to service for all members are among these advantages. There may also be further benefits from economies of scale and scope.

If a collective DB scheme can deliver a two thirds final salary pension at a contribution cost of 20% p.a., then an individual DC scheme requires contributions of at least 30%. This inefficiency is sufficiently large that the tax concession cost of saving at the higher rates required for adequate provision becomes questionable as to its equity and affordability. It is clear, though, that with contributions at the levels we currently observe, these 'pensions' will be grossly inadequate as anything other than a minor supplement to pension income. It is as well not to forget that inadequate pensions are as unsustainable as the unaffordable.

These problems have been widely recognised in various countries overseas and attempts made to resolve these issues. They are apparently not yet recognised in the UK pension community; a recent MallowStreet survey reported that more than 50% believed that DC could substitute for DB.

The DC 'solutions' promoted usually involve complex structures such as collective DC or hybrid DB; they adopt aspects of the standard DB model. These structures serve to reallocate the risks of pension provision. In these arrangements, risk is transferred to some other party. It should be borne in mind that there are only three possible primary parties to bear the risks of occupational pension provision; the individual, the employer and the state.

This question of risk distribution within any society is central to it. Of course, it is true that all risk within a society is ultimately borne by individuals in that society, but this is usually in proportion to their wealth, risk bearing capacity and preferences. It is interesting to note that a recent Bank of England study[12] indicated that those with a DB scheme are less likely to experience a financial shock than those with DC. In fact, the introduction of employers into the pension process is itself the introduction of a risk-bearing party to the problem. Many private sector solutions to these problems of risk distribution or risk management for pensions can generically be seen as attempts to introduce further parties into the risk distribution mechanism. Even the provision of mutual funds for individual DC pension saving can be seen as a risk-pooling device, a form of insurance; the collective investment structure exhibits the diversification benefits of large-scale financial investment. However, as this risk pooling is simply achieved, and the systemic risk of the investments remains with the

12 Benito & Salaheen, "Labour supply as a buffer: evidence from UK households." Bank of England working paper 426, 2011.

individual investor, it does not merit much as a premium or management fee.

Inevitably, risk estimation and management are concerned with the here and now, which places a premium on the quality of our estimation of the status quo, and in turn the meaning of this position for the future. This takes us to basic questions of accounting and valuation of assets and liabilities, which we next consider for occupational DB schemes.

Accounting for Pensions

Of course, there is no explicit pension liability created with individual DC; these are merely savings that may later be converted to provide an income in retirement, but that income is not settled. With DB, there is an explicit promise of an income, albeit parametrically determined. Many have taken this, wrongly, to mean that a pension is 'bond-like', when the pension liability introduced by a sponsor employer into its books displaces other shareholders' funds.

"Many have taken this, wrongly, to mean that a pension is 'bond-like'..."

It is worth comparing the treatment of some other liability introduced into the balance sheet of the sponsor employer, such as a nominal bond. Here the company promises, in documentary form, some stream of future cash-flows, and today receives the market price value of those cash-flows. In other words, the company's assets are increased by this amount. The liability cash-flows are known. The nominal debt liability and cash received for it are initially recognised and recorded at this 'book value' under standard accounting practices, but for pensions, the accounting standards-setters think (incorrectly) otherwise.

The company will only undertake this borrowing voluntarily if it expects to earn more on the assets, now deployed within its business, than they cost to service under the bond's terms. If we are to record the value of equity and this debt instrument correctly in the books of the sponsor, then the cash-flows due under the bond contract should be discounted at the company's expected net of borrowing cost return on the augmented assets. Recall that equity is derived simply as the difference between assets and liabilities, and so, such an action will usually result in a higher value for equity. The value of the debt liability recorded under this valuation arrangement reflects its security from the standpoint of the sponsor.

The owner of the debt security is free to value it as he or she will, including at market prices. The idea has somehow become prevalent that the value (read cost) of a liability to its obligor is identical to its value to its owner as their asset. It is true that, within the books of a company, an asset and its corresponding liability are equal; this is the basic accounting identity of double entry book-keeping. However, there is absolutely no reason for this to hold true externally at any time other than the point of initial recognition when the debt security was sold in a market for a price consideration. This idea of valuation of liabilities at the prices at which they trade in markets as assets leads to such nonsense as we observed during the recent crisis; banks and investment banks took credit for the decline in the market prices of their debt securities, when these were simply reflections of their investor owner concerns over the credit standing of these companies. Given the uncertainty surrounding their assets and their earnings capacity at this time, the value (read cost) of such debt liabilities in the books and records of these banks should have increased, not declined.

"...the only time that a market price is relevant for a liability is when there is a market transaction"

Perverse, counter-intuitive dynamics, such as these, are indicators of time-inconsistency.

For the avoidance of any doubt, we shall re-iterate: the only time that a market price is relevant for a liability is when there is a market transaction, such as when it is the consideration of the issuance of such claims, on initial recognition. Obviously, the market or transaction price is also relevant on the redemption of a liability[13], but that is its discharge, meaning that there is nothing further to be recognised.

An occupational pension liability differs in that it is part of a labour contract and there is no explicit consideration received or paid. This is the source of the accounting problem. Neither the ultimate value, the pension payable, nor the current cost of that obligation is known or knowable with certainty. The question is how much of this liability should be recognised as a current expense and how much should be recognised over the time leading up to pension payments.

13 Regarding redemption prior to maturity, two circumstances come to mind: call under such options - they occur at prices lower than market. Purchase in the open market - the company should only do this if the market price is lower than their return on equity. Put another way, Barclays and Goldman Sachs could and should have recognised the gain arising from depressed market prices for their debt if they had actually purchased them, but that would also have required them to sell some assets.

Box 1: Time inconsistency

The objective of pension schemes is to provide incomes for its members in retirement; they have many long-term cash-flow commitments. The problem of time-inconsistency arises because the long-term objective may not be optimally achieved as a sequence of short-term actions, even if these are themselves optimal. Indeed the long-term objective may cease to be obtainable as a result of the short-term actions. St Augustine's prayer, "Oh God, make me chaste, but not yet" summarises well the nature of problems of time inconsistency. Economics and finance are replete with such problems, as is human behaviour. In the game theoretical literature these problems are known as dynamic inconsistency.

As an illustration, think of a cartel which agrees to hold prices high for, say, their natural resource commodity by withholding some current production. This strategy will generate the maximum income for all from their endowment of the resource; it is optimal. Collectively, the members stand to gain much. However, all are aware that with high prices, they and other members of the cartel have an incentive to cheat and over-produce, in the hope of maximising their own immediate income, while depleting their endowment at a faster rate. The effect of such current over-production is to depress the current price. The cheating member receives less in total over the life of the resource than would be the case if it had stuck with the time-consistent cartel agreement.

When the agreement to withhold production is not credible and lacks a commitment mechanism, the cartel will be unlikely to achieve high prices as consumers will realise that individual producers will tend to cheat; pursuit of the short-term makes the long-term optimal unobtainable.

The change of behavioural focus from the long-term to the short-term does not arise from the arrival of new information; it is a question of the desire to maximise utility in the short term while disregarding the cost of this in the long-term.

Funding of pension schemes is itself time-inconsistent. Here the employee accepts deferred compensation from the employer but immediately demands funding of this deferred payment. This is a case of having one's cake and eating it. Regulation which requires action based upon the immediate balance sheet, such as minimum funding requirements or solvency ratios, is similarly time-inconsistent and costly.

The temptation for the scheme is to engage in strategies that reduce the immediate variability of scheme assets relative to liabilities (hedging), rather than maximise the security of the long-term objective of paying pensions. In terms of investment management, this is the difference between speculation and investment. The definition here is simple: investment is concerned principally with the productive returns, the income generated, while speculation is concerned principally with the change in price over the holding period. Hedging is a form of speculation; it is time-inconsistent and costly in the long-term.

Such short-term inconsistencies are widely evident in finance – the paradoxical Black Scholes option replication strategy of buying as prices rise and selling as prices decline is one of the more obvious examples. It can also be shown that many common risk metrics, such as Value at Risk are time inconsistent. The now widely-discussed problem of pro-cyclicality in banking is an example of time-inconsistency induced by regulation.

There is a behavioural aspect to time-inconsistency; it is self-reinforcing. The hedging of risks in pension funds, a form of speculation itself, leads to increased allocations to other speculative instruments, notably hedge funds. This is an attempt to compensate for the long-term costs incurred in the hedging of current volatility.

It really is important to realise that the long-term return of investment management is dominated by the interim investment income and its reinvestment, rather than interim prices and valuations.

"...the award of deferred compensation lowers the sponsor company's need for working capital to be disbursed as wages."

As the liability is parametrically determined under the terms of the pension award, we may estimate actuarially its ultimate value as a stream of pension payments to the retired employee. This may then be discounted to provide both a current value and future accretions of that value over the time leading up to payment. The current or present value may also be known as the employer's contribution; certainly this is the value which should be compared to a current wage cost. From the standpoint of employer incentives, it is important that this current pension contribution cost should be lower than the equivalent cash wage cost.

In fact, the award of deferred compensation lowers the sponsor company's need for working capital to be disbursed as wages. In this situation, the liability displaces some part of shareholders' funds as there is no associated increase in assets.

Many seem to believe that it is necessary for the discount rate used to derive a present value for pension liabilities to be consistent with the assumptions used to project the future values of those liabilities; this is a fallacious belief. The discount rate should reflect the company's ability to generate returns at the rate used but the assumptions used in the projection of pension liability values should be independent of the company's condition. These projection assumptions should be best estimates as unbiased projections of future values are required.

Another strange idea has become prevalent: that if we discount these future cash-flows at some market observable rate, say gilts or AA corporate bond yields, that in some way the attributes of these traded securities are transferred to the pension obligation. If we discount a liability at a low rate we obtain a high present value and lower future accretions than we would obtain under a higher rate. This tells us little or nothing about the security of the liability, the ability of the obligor to meet these commitments. If we want accurate balance sheets and income and expense statements, the correct discount rate to apply to these liabilities is the company's rate of return on equity. This rate is endogenous to the company sponsor.

The situation described here is one of an unfunded book-entry pension system, but these principles extend beyond this most elementary case. Abstracting from members' contributions, and considering the pension scheme to be consolidated in the sponsor's accounts, the initial recognition of the liability is the notional contribution made. In subsequent years, the accretion on past liabilities, and any new awards made in that year are recognised. The notional contribution for new awards and accretions on past awards are recognised in income and expense, and, where this is entirely a book-entry arrangement, there are no entries crossing cash accounts.

"The correct discount rate is the rate of return on the total assets of the firm, including those segregated."

Such book-entry arrangements are not unknown; they were the prevalent form of provision in the German corporate sector until recently (Direktzusage). Of course, the disadvantage of such book-entry arrangements is that the company sponsor may fail with the consequence that the pension beneficiary may lose his retirement income, and for current employees the situation is compound, as the employee loses both employment and pension. Germany had the correct solution to this problem: protecting the scheme against insolvency. The efficient form of such protection is pension indemnity assurance, to which we shall return later in detail.

However, the practice has emerged of "funding" the scheme; in essence this is the taking of collateral against the promised payments. Some argue that the creation of a segregated fund invested in assets outside of the firm is the creation of financing for the pension promise; that the fund supports the employer's promises. However, the fact is that the employer sponsor is the obligor to the pension promise. Segregated assets may defray an employer's cost of pension provision, but it is incorrect analysis to apply the expected rate of return on these assets to the valuation of liabilities. The correct discount rate is the rate of return on the total assets of the firm, including those segregated.

"Funding is inefficient by comparison with a purely unfunded scheme."

Actuarial practice for scheme valuation currently discounts pension liabilities at the expected rate of return on scheme segregated assets. This is a financing view of the fund. Only if the discount rate on these fund assets is equal to the sponsor firm's rate of return on capital is the valuation deficit or surplus accurate. In all other cases, this valuation figure is incorrect. As with all attribution analysis, the sequence in which operations are applied matters. Discounting liabilities first at the rate of return of segregated fund assets will return a deficit or surplus which was discounted at that rate, but that does not, in general, coincide with the rate of return of firm capital.

Box 2: Liability Transfer Nuances

As with so much, there are shades of grey to be considered. The issue of leveraged buy-out is pertinent in this context. Here the shareholders have changed and the incoming shareholder pursues a policy of issuing more, and often superior or senior, debt, weakening the credit standing of the company's other liability obligations, lowering their value to their debt-holder owners. It is usual, in consequence, for debt contracts to contain covenants which limit the ability of the obligor company to weaken the status and security of its debt-holders. It is, of course, possible to structure liabilities so that they may be freely traded as assets as the existence of capital markets confirms. In fact today's currency is fiat in nature and no more than a government liability; one which is designed to be freely negotiable by exchange. However, as a matter of social policy, we should not wish pensions to be freely negotiable as this holds the potential that the beneficiaries may sell their pension rights and squander the proceeds, leaving them indigent and dependent upon the state. This problem is particularly acute post-retirement.

However, there is a form of pension provision which can allow early access to any funding – the provident fund. Given the high importance of early years' contributions to final pensions receivable and the tendency for contributions to be 'crowded out' by competing demands on our disposable income early in our adult lives, this form of provision allows access to the fund for qualifying purposes such as house purchase.

Funding is inefficient by comparison with a purely unfunded scheme. It is time-inconsistent (See Box 1) – the employee is, through the scheme, now demanding that the sponsor pay cash equivalent to the contribution to the scheme immediately. This places a demand for cash upon the sponsor, raising its need for working capital, which negates their motivation for voluntarily offering deferred compensation. If the discount rate applied to the liability initially is lower than the rate of return on sponsor equity, this cash funding call will exceed the cost of the liability to the sponsor. It may also make the current cash cost higher than the current wages foregone by the employee.

This cash funding contribution is invested by the scheme. When the return on these investments lies below the company sponsor's rate of return on equity, there is a further issue. Where this investment return rate is used for discounting the liabilities, the company will be disadvantaged since this capitalises the difference of rates over the term of the liabilities.

When the rate used to discount pension liabilities is the company sponsor's prospective rate of earnings, a natural level for scheme funding occurs; when the expected rate of return on assets traded in markets is above the prospective earnings of the company, it becomes efficient for the sponsor company to make contributions, funding benefits awarded by purchases of those traded assets. Everywhere else funding is inefficient and time-inconsistent.

"The current accounting standards are mixed attribute..."

We should note an important difference between assets discounted to a present value and liabilities similarly discounted. The present value of an asset represents a value at which we may unconditionally sell the asset finally; there is no recourse at any later date to the seller from the buyer. However, when we value the liability, the present value is of future cash-flows emanating from the obligor; as these are the property of their owners as assets, these cannot be discharged finally without their consent. It is obvious that IBM cannot substitute Hewlett Packard as the obligor of its equity shares or debt securities even with Hewlett Packard's agreement without the approval and consent of these equity or debt-holders. (See also Box 2)

The current accounting standards are mixed attribute in the sense that liabilities are valued as discounted present values and assets at their market prices. The attributes of market prices and bond yields are different. This accounting standard is a balance sheet accounting approach, rather than income and expense. The principal differences between these two approaches to accounting are discussed in Box 3: Insolvency and Accounting.

As deficits or surpluses are the principal issue for the security of pension promises, essentially the difference

Box 3: Insolvency and Accounting

Formally, insolvency is the inability to pay one's debts in full as they come due, but in practice may be characterised in a number of ways. The failure to meet obligations as they fall due is known as equitable insolvency, while the condition that liabilities exceed assets is known as balance sheet insolvency. The circumstance may also arise that due debts cannot be met as available assets cannot be sold at prices which maintain either or both equitable or balance sheet solvency.

There are important differences between these – notably with respect to future income and expense. The equitable balance sheet of a pension scheme includes the present values of future expenses and future contributions and is sometimes referred to as the comprehensive balance sheet; this is the inter-temporal budget constraint. The ordinary balance sheet approach does not include these items; this is the conventional financial balance sheet of the institution.

The current accounting and regulatory regimes are problematic in that they are of the ordinary balance sheet type rather than the comprehensive, equitable, income and expense form.

However, it can be seen that schemes regularly continue to operate while in a state of deficit. In other words, they are reliant upon the existence, but not the exercise, of the balance of cost guarantee, the provision of future contributions by the sponsor. The relevant form of insolvency for a UK pension scheme is equitable insolvency.

Prior to sponsor insolvency, though the scheme only benefits from future contributions when they are made, it may operate soundly while in deficit. Whether a scheme which is in deficit is insolvent prior to formal sponsor insolvency depends upon the answer to the question: can the sponsor be expected to make payments sufficient to repair this deficit prior to the sponsor's insolvency? This is a standard guarantee evaluation.

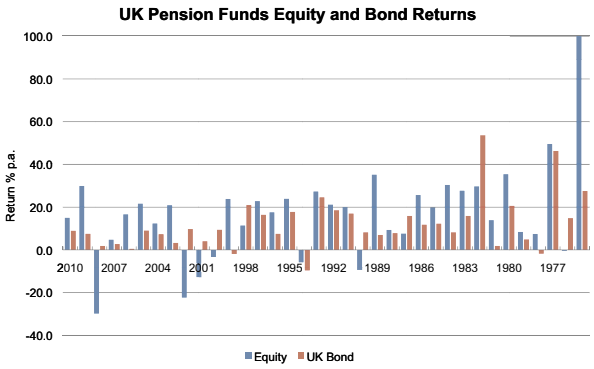
This raises the issue of when a guarantee can and should be called upon. With a standard conditional guarantee it is necessary for the trigger event to have occurred for any call under the guarantee to be enforceable. In this pensions case that would imply that the scheme should be unable to make the next payments to pensioners. The pension sponsor balance of cost guarantee may be called upon recurrently by the scheme, which eliminates some potential complications as to timing.

Calls under the pension guarantee can only weaken the sponsor's financial condition. This implies that Trustees should evaluate the position of the scheme with and without the call. It is notable that the Pensions Regulator bases its deficit repair calls on the sponsor upon the premature balance sheet deficit. Indeed, European regulation, in setting a 100% funding objective at all times, is taking these calls to their extreme and most expensive limit.

While these balance sheet and equitable insolvencies are necessary conditions, they are not usually sufficient for a scheme to begin insolvency action against its sponsor. There may be further issues to be considered, such as whether the situation after recoveries from the sponsor's insolvent estate is better than may be achieved by the scheme exercising forbearance. The concern here is that allowing the firm to continue may result in higher recoveries for the scheme than liquidation, with all of its attendant costs. In other words, it may even be in a scheme's best interests to allow the sponsor to cure equitable insolvencies as they arise, rather than recapitalise the scheme. In the case that the insolvency arises from an inability to realise assets even though the scheme may be in balance sheet surplus, it is clearly usually in the interests of all to show forbearance.

between two large numbers, it is critical that the valuation of both assets and liabilities be accurate and consistent. The usual, and valid, criticism of this mixed attribute arrangement is that it introduces an arbitrary volatility into the balance sheet in circumstances where the assets held are not those from which the discount rate used for liabilities was derived. This is undoubtedly a valid criticism and may be material. It can be demonstrated by illustration of the relation (or lack of it) between returns in bond or debt markets and equity markets. Chart 20 illustrates this relation using the returns performance of pension funds holdings of equity and long-term bonds over the period 1975-2010. The problem may also be illustrated in numerous other ways, such as the comparison of the returns of bond and equity indices, or of the returns of the private sector and traded equity returns as in Chart 13 earlier.

Chart 20: Equity and bond realised fund returns 1975 – 2010. (WM – State Street)



At no point are bond and equity returns equal. Of course, the holdings of bonds by funds tend to be shorter in duration than the pension liabilities[14], which means that the apparent cost variation of the present values of liabilities will tend to be greater than shown in this diagram. It is notable that there are a number of occasions usually associated with recessions where bonds and equities move in opposite directions; the dynamics are inconsistent. It is these situations where equity values have declined contemporaneously with bond yields declining, which have added impetus to asset and liability matching strategies. This hedging is costly.

However, the more important issue is the inherent time-inconsistency. This also lies at the heart of the debate over the use of a liquidity premium in the valuation of insurance liabilities in Solvency 2[15]. The discount rate of the future cash-flows of an asset implicit in market prices contains far more information and influences than is required for its use as the discount rate for pension liabilities. In the case that a market derived rate is used, it will contain a reflection of both systemic and specific liquidity. The issue of liquidity is discussed in Box 3.

"...hedging is costly."

The discount rate on bonds is observable; that on equities is implicit. It is evident that they are not equal. Of course, we may model or estimate the future cash-flows arising from an asset portfolio and arrive at a discounted present value of those estimated cash flows, as is the practice with a dividend discount model. The problems with such model approaches are well-known; it is far from uncommon to see values arising under this type of model which far exceed market observed prices, when bond yields are used as the discount rate. Another way of stating this is that the implied discount rate in asset market prices often appears to be very high or that market participants have only very short-term interests. Haldane and Davies, in their 2011 speech, "The short long", offer further evidence of such myopic discounting of cash-flows by participants in capital markets.

Moreover, even if we were to use the same discount rate applied to cash-flow projections of both assets and liabilities, we would not eliminate the cash-flow timing differences between these assets and liabilities. The potential consequences of these differences can be material. Absent these effects, the use of a common (arbitrary) discount rate for projected asset and liability cash-flows in a pension scheme would render the estimates of their values, and the deficit or surplus difference between them, unbiased.

However, it is arguable that such a procedure is preferable and more accurate than the current mixed attribute standard of discounted present value for liabilities and market prices for assets, that introduces not just arbitrary volatility but also a bias which overstates scheme deficits materially. This bias is usually material – in recent times, of the order of 30% of liabilities.

"...the current mixed attribute standard...introduces not just arbitrary volatility but also a bias..."

14 Recent survey work suggests that this duration mismatch is still substantial – of the order of 8 years with liability duration being around 22 years and bond portfolios around 14 years.

15 See: http://www.voxeu.org/index.php?q=node/6237

Consequences

Ordinarily, of course, the accounting standards in force should have no consequence since, in the fullness of time, reality will prevail. They are, however, the basis of transfers into and out of schemes. More unfortunately, this indifference is not the case for pension schemes since these valuations influence actions prior to the materialisation of the ultimate reality; many of these actions are involuntary, the result of pension regulation. It really is surprising that there has been little or no discussion of the costs and effects of actions based upon scheme valuations which are biased and spuriously volatile.

There are some serious public policy issues associated with the time-inconsistent actions which are induced. One notable episode of concern was the presence at the height of the crisis of pension funds in financial markets as takers of liquidity, sellers of assets, when their natural position is the converse. More generally, of course, the concern is the short-termism which is induced, when it is long-term investment that benefits the economy most.

Two quotations[16] from Haldane are appropriate: "An efficient capital market transfers savings today into investment tomorrow and growth the day after. In that way, it boosts welfare. Short-termism in capital markets could interrupt this transfer. If promised returns tomorrow fail to induce saving today, there will be no investment tomorrow. If so, long-term growth and welfare would be the casualty", and " ...capital accumulation by firms, growth theory suggests, is then the prime driver of future output. Countless empirical studies, across time and countries, have confirmed that theory."

Numerous studies and surveys have reported that company finance directors are exercised by the volatility of pension deficits and surpluses and the costs of special contributions. These valuations have led to many paradoxical responses and actions by pension schemes. Notable among these is the hedging of "interest rate risk".

The amounts payable under pension contracts do not include interest rates as a determinant of their ultimate amount; these determinants are such things as length of service, longevity, inflation (in limited price form perhaps), earnings levels and growth. Interest rates only become of interest to the extent that the scheme holds bonds in its asset portfolio and of course, it is an interest rate which reduces those future pension cash-flows to a present value. As market rates are volatile, this introduces volatility into pension scheme valuations, which is simply not present in the pension benefits themselves.

Technically the discount rate is performing the role of a measure; it happens that this measure is time variant. The variability of the present values of liabilities stems predominantly from this source. Scheme deficits or surpluses arise as the difference between this value and the market price of assets, and market prices are another form of measure with pronounced but different time variability. The variability of the market price measure for assets in general and interest rates derived from the market prices of certain bonds is not the same. Indeed, this lack of coincidence is the foundation of cross-asset diversification in investment management asset allocation. The result of this mixed attribute standard is that the estimates of deficits or surpluses of pension funds are wholly unreliable. Basing regulation upon them can be seen as pure folly.

"The result of this mixed attribute standard is that the estimates of deficits or surpluses of pension funds are wholly unreliable. Basing regulation upon them can be seen as pure folly.."

Hedging is inevitably costly. The hedging of the interest rate volatility arising from the discounting of liabilities alone clearly must be inefficient and costly. This is true whether the hedge takes the form of increased bond allocations or an interest rate derivative contract. Even if we estimate econometrically the common factors driving interest rates and assets prices, there is a problem. Hedges based upon such factors will limit the future flexibility of the fund with respect to its asset allocation. It also assumes that these factors will remain stationary, their effects stable over time, when the reality is that markets are constantly in a state of change in this regard. The solution advanced by some is to engage in dynamic hedging strategies, but these invariably incur transactions costs and will be frustrated by the perverse dynamics evident in Chart 20. In the absence of perfect foresight, such strategies will, at the least, prove costly and at the worst fail completely.

Other Issues

The idea is sometimes advanced in support of the current accounting standards that they are in some way "objective" since the parameters they specify can be observed. They are actually 'objective' only in the sense that they can be verified by many observers. It is far more important that they should be relevant. We can observe the phases of the moon but that does not mean that we

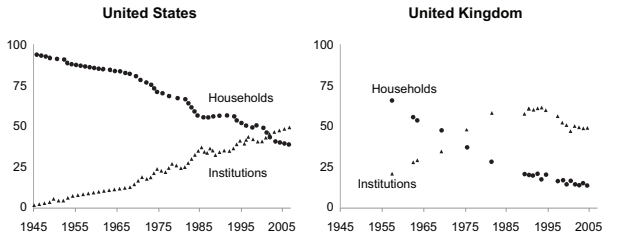
16 "The Short Long" and "Patience and Finance" respectively.

should use them in pension valuation. These mixed attribute measures are apparently exogenous to the scheme and fund, but the story does not end there.

A short diversion into forms of risk and variability is necessary at this point. Risk or variability can be considered to come in two flavours: exogenous and endogenous. Exogenous risks are typically games against nature. Here we may mitigate the consequence of a potential event, but cannot influence its likelihood of occurrence. We carry umbrellas against the possible harm of rain but this action does not influence the likelihood of rain occurring. Recall that risk is the product of the likelihood and consequence of an event[17]. With endogenous risk, by contrast, we may mitigate the consequence of an event and/or influence its likelihood of occurrence. Man-made disasters are a prime illustration of endogenous risk; Homer Simpson's surveillance of Springfield's nuclear power plant comes immediately to mind. With endogenous risk, the actions and inactions of participants within the system matter; complex feed-back and feed-forward relations may develop and surprising emergent behaviour become evident, particularly when the system complexity grows large. Financial markets are mixed risk systems; they are partly games against nature but predominantly games against others. Our actions influence prices and the reactions of others and the market becomes similar to the competition described by Keynes as a newspaper beauty contest in which we must select the photograph most likely to be chosen by others as most attractive rather than our personal preference.

In a situation where regulations are based upon the accounting valuations, then the apparently innocuous free-riding on the use of market prices as 'objective' measures ceases as these measures now determine actions. At the level of a single pension fund, the asset allocation chosen may have little effect upon the market price, but collectively the accounting standard and related regulation has resulted in far higher holdings of bonds by pension schemes and lower holdings of listed equity. Chart 21 shows the holdings of domestic equities by institutions in the US and UK; it is evident that the pronounced difference of the UK is closely related in time to changes in pension accounting standards and regulation. At this aggregate level, interest rates have also been driven lower than might otherwise have prevailed, exacerbating the apparent funding difficulties of pension schemes. The analytically correct response is that to eliminate or mitigate such effects, schemes should hold more bonds as assets. These increased holdings of bonds, as scheme assets, lowers their yield and raises the real cost of provision of pension benefits. The use of market prices fails even the test of 'objectivity' when we take that to mean outside of the influence of the entities to which it is being applied.

Chart 21: Institutional and household holdings of listed equities in US and UK. (Rydqvist, Spizman & Strebulaev, 2010)



Some have attempted to justify the current accounting standards by asserting that the figures reported are comparable across companies; this is simply untrue. However, the figures reported using the projected rate of corporate earnings would be comparable across companies in the sense that they have the same meaning – this is the cost to the company of the liability that they have and this is true for all companies. In addition, the reported value of their equity is correct.

The comparability that arises from the use of a common discount rate for liabilities and assets is in any case spurious. It is true that if we value two alternate asset propositions using a common discount rate, we get an unbiased estimate of their relative value. It is also true that these assets are someone else's liability, but there's no accounting identity, that asset equals liability, to consider. That accounting identity does not apply exogenously. In fact, this notion of comparability under the current standard is easily falsified by example: if we use a common discount rate for the liabilities of two different companies – company 1 is high-quality, with lots and lots of equity and a great business making strong and sustainable profits, company 2 is low-quality, with almost no equity and it makes spare parts for mundane and pedestrian cars that we stopped selling ten years or more ago. Both have borrowed the same amount of money (on the same terms for simplicity) should we really have the same value for each debt?

The further problem with the accounting standard is that of relevance, and time-inconsistency in particular.

17 An aside on stress-testing or scenario analysis is appropriate. Stress-testing can be seen as examination of the consequence of events and as such, is incomplete as it fails to consider the likelihood of these events. It can, of course, give insight into causality. The challenge for risk managers is to estimate the likelihood of such scenarios and devise methods to aggregate these into a complete likelihood function.

Consider the effect of the central bank raising interest rates in order to cool an overheating economy. This lowers the present value of pension liabilities, making them appear less onerous for the scheme and sponsor to bear. But at this time the sponsor's prospects are diminished since the economy may be expected to slow, meaning that the ability of the sponsor to bear these liabilities has deteriorated, not improved. The good news, of course, is that the scheme will demand less by way of funding contribution, which increases the sponsor's ability to withstand the economic slowdown. However, when the economy has slowed down, the central bank will lower rates to stimulate the economy, usually to levels below those that prevailed before its intervention. The result is that the levels of the present value of liabilities increase, implying that the pension liabilities have become more onerous and costly to the company. The reality, of course, is that the sponsor's prospects have improved and the security of the benefits increased. The dynamics are wrong in direction.

The only rate which reflects the company sponsor's prospects and the security of the pension liabilities correctly, and also has the correct dynamics, is the rate of prospective earnings of the company. This is true regardless of the company's objective; if the sponsor operates on a not-for-profit basis, it is the returns on their assets which determine the funds available for charitable or other purposes[18].

Even the use of the sponsor's prospective rate of return on equity does not, however, entirely eliminate the time-inconsistency problem. Firstly there is the issue that corporate earnings are not necessarily all cash or that the free cash-flows may not occur coincidently with or prior to pension cash-flow outgoings[19]. Secondly, and most importantly, there is the question of interim accretions in the future values of liabilities. These are recurrent instances of the inherent time-inconsistency of demanding funding today as security for payments expected only in the, often far, future.

It also shows that regulation which requires full funding at prevailing discounted present values as intrinsically time-inconsistent and costly. Such regulation requires the management process to be adaptive and in common with all adaptive processes induces path dependency into the evolution of the pension scheme. Path dependent processes are in general inefficient.

In common with the taking of collateral security against a bank loan advanced, this time-inconsistency has effect through its demands upon liquidity. In the case of pension schemes and funds the effect is directly upon the cash resources of the sponsor employer; it increases the required working capital of the sponsor. In addition, as the sponsor is the balance of cost underwriter of the scheme in standard defined benefit scheme form, there are the future accretions to be considered to the extent that the value of assets held by the scheme falls short of these future accreted values.

Liquidity

Liquidity is a term much used in finance. Box 4 explains some aspects if liquidity not widely understood. We think of the liquidity of an asset simply as the degree of substitutability of that asset for cash.

"...if liquidity did not have a cost, all assets would be liquid."

Some deny the existence of a liquidity premium; many believe that a liquidity premium is added to an illiquid asset. Dealing with these points in order: if liquidity did not have a cost, all assets would be liquid. The liquidity premium is embedded in the price of a negotiable asset; it is realised on exercise of the sale of that asset, the call on liquidity from the market. It is clear from option pricing theory that this option on market liquidity is valuable. An American put, which may be exercised at any point in its tenor, is more expensive than a European put which may be exercised only at maturity. And in the theoretical pricing models for these options, market liquidity is always perfect and costless.

To emphasise these points: in financial markets liquidity has a cost – if it did not all such assets would be liquid. The cost of liquidity is embedded in the fact that liquid assets yield less than illiquid; the cost is realised on exercise of the implicit option on liquidity, its sale in the market. The longer we hold the asset, the lower this liquidity premium is relative to the income we have received over the holding term. If we hold the asset in permanence, all of the value of the asset is sourced in received income. The elementary dividend discount model can be seen as valuation in this circumstance.

Corporate treasurers and finance directors spend much time and effort monitoring current and forecast cash positions, their liquidity. Typically, they do not wait until

18 Note however that non-profit institutions serving households, such as charities, religious organisations, trade unions, some higher education institutions and friendly societies are properly classified within the national accounts as part of the household sector.

19 However such effects are usually quite small other than for some specialised companies, notably early-stage internet operations, which are dependent upon the development of intangibles such as intellectual property.

Box 4: Liquidity and markets

It is useful to distinguish between different forms of financial market: markets for liquidity and markets for speculation. Of course, this is a simplification in that most markets lie on a spectrum between these extremes. The London unsecured deposit market is a prime example of a market for liquidity and, indeed, government securities markets are predominantly markets for liquidity.

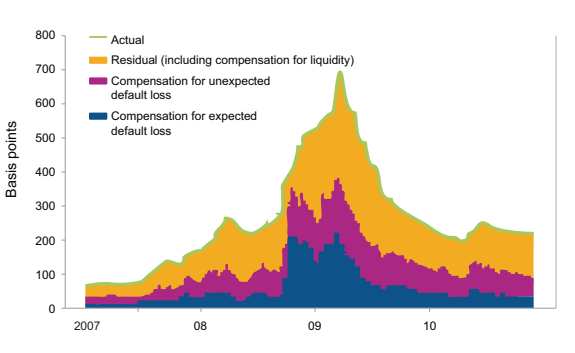


Figure 1: Decomposition of corporate bond yield spreads. (Bank of England)

By contrast, some other markets may have little or no value to, or participation in, by institutions hoarding liquidity. The derivatives markets are almost entirely markets for speculation; indeed the absence of a role as a liquidity store is evident from the fact that a fairly priced derivative such as an interest rate swap will have no exchange of money or liquidity at contract inception. Note that hedging is a form of speculation; the contract serves its purpose by change of price rather than any inherent productive return. It is an inside contract; this is a zero-sum game between participants in the private sector. It is concerned only with the distribution of risk and return within private sector participants.

Equity markets are mixed in nature: long-term investors buy assets in these markets to harvest their productive returns rather than with gain in market price in mind. For this investor class of participant, which of course includes pension funds, volatility of market price is unconditionally bad. By contrast, there is the speculative class of market participant, such as a hedger, where the security is purchased for its price potential, and for these speculator participants, volatility is welcome since its enlarges their opportunity set. This conflict between speculators and investors lies at the heart of the debate over high-frequency trading.

In markets for liquidity information asymmetry is extremely harmful, as is any substantial sensitivity of prices to information. Some other markets, such as those for speculation, may thrive upon information uncertainty.

The decomposition of the liquidity term from other influences in market prices is a non-trivial exercise. The nature of this problem may be illustrated by an analysis of nominal corporate bond yield spreads, which is recurrently published by the Bank of England.

In the case of equities, the problem is compounded as both the implicit discount rate and future dividend cash-flows are not observable. As pension funds move to a balance sheet and financial risk management view of the world, they will inevitably come to increase their exposures to markets for speculation, rather than investment, and that will have negative consequences for their long-term investment performance.

the till is empty to take action; they act pre-emptively to ensure that the cash constraint does not bind. This would be futile action if liquidity was always perfect, that they could pledge all future income.

We have already highlighted the time-inconsistency of liquidity demands from a scheme upon a firm's cash and working capital requirements. This is one aspect of contributions made by members and sponsors which often passes without comment; their consequence for scheme liquidity. These payments are used to pay the pensions of those retired and currently receiving payments. In addition to contributions, investment income may be used to pay pensions before any assets need to be liquidated. Reliance upon financial markets, with their spurious 'animal spirits', for liquidity is costly. Collective arrangements, which reduce or eliminate dependence upon financial markets, are more efficient than arrangements which depend upon them. In fact, many pension schemes, such as the local government scheme, are actually in cash flow surplus; contributions exceed pensions in payment. These schemes are well-positioned to capture the long-term liquidity premium in market prices and avoid financial transactions costs, as well as other market price gyrations. The value of this is evident in the higher sponsor contributions necessary to

support schemes that have closed to new members. Closure of a scheme to new members or future accrual may limit the total exposure of the scheme, but it raises the cost of providing existing benefits.

The increasing use of derivatives to "hedge" risks also brings with it a consequence for the liquidity management of a pension scheme. Derivatives contracts usually contain credit support annexes that require the posting of collateral against the current mark-to-market value of the derivatives contract. The scheme must therefore have the ability to model these movements in current value and a process for agreeing the collateral movements to and from the counterparty. There is currently an open debate as to whether these derivatives contracts will require to be centrally cleared and subject to the margin requirement regime of the clearing house. Most derivatives collateral is posted as cash; the better derivatives counterparties will offer pension schemes the ability to post securities as collateral rather than cash. However, this raises issues concerning the segregation of these securities within the books of the counterparty; it also highlights the fact that the collateral value of a security is its value as liquidity. These arrangements do not alter the fact that, where a derivative credit support annexe is used, the cost of hedging using a derivative is not knowable in advance.

The removal of advanced corporation tax (ACT) and the abolition of the 'contracting-out' rebate should also be viewed in this liquidity context. For a number of collective DB schemes the end of ACT meant the end of cashflow surplus and a new-found reliance on asset sales in financial markets; the abolition of the 'contracting-out' rebate will doubtless mean this for more and of course, a general increase in reliance upon markets for many. In other words, the cost of these changes extends beyond the absence of these 'contributions' from the income statement and balance sheet.

Obviously in addition to these cash issues, the liquidity premium or spread in prices is also time-variant, reflecting, among other things, economic circumstances. The collective nature of DB schemes makes these cash and liquidity aspects highly valuable relative to individual self-provision of pensions, which can only be executed in financial markets at the time of contributions and draw-downs. This, of course, adds an intense sensitivity in the case of DC to the value of the pension savings at a single point in time, retirement. At this point, the value of the pension pot alone does not determine the amount of pension receivable as that depends also on the price of annuities at that point in time. The dependence upon markets is total and very costly. Income drawdown is only superior if the administration and transaction costs of these small sales do not exceed the cost of realisation at retirement and purchase of an annuity.

Pay-as-you-go and cash-flow management

There are some common misconceptions and confusions surrounding pay-as-you-go, and funded and unfunded schemes. In fact, even the basic state pension in the UK is funded after a fashion, by National Insurance contributions. The contributions received may be applied to the payment of current pensions rather than accumulated for the future, but the entitlements of employees are determined by their contributions and recorded in the books and records of the state pension system. The pensions receivable by the individual contributor exceed the contributions made into the system; this difference, a form of investment accretion, can only come from the state, which made the promise as to amount of pension. Note that with state pensions there is an annual inflow of cash contributions; which popularly are believed to be applied to pensions in payment. This is not a purely unfunded arrangement. We will revert later to government finances, but will note here one point that these discussions of generational transfers usually fail to recognise: that scheme funding, which increases saving, redistributes resources from the current generation of employees and pensioners to subsequent generations.

It is perhaps simplest to think of an unfunded arrangement as direct and total dependence upon the maker of the pension promise, while funded schemes hold assets which reduce and perhaps eliminate this direct dependence through their investment income and value as collateral security. These assets will usually be insufficient for the scheme to stand alone – see pension indemnity assurance later.

Many regard pay-as-you-go systems as inherently bad. There is a belief that these transfer pensions costs to the future. Other than for the initial generation, the fact is that pensioners have made contributions to their pensions throughout their working lifetimes. Moreover, the contributions which these second and later cohorts made earlier reduced the need for taxes to pay the pensions of the initial preceding cohort that did not contribute to their pensions. If there is, or was, any inequity or transfer here, it was simply that the initial generation of state pensioners had not contributed to them.

Pay-as-you-go is often viewed as some form of misapplication of cash receipts. In fact, for occupational schemes, all of the cash emanates from the employer. The wages of the employee paid into pensions and the contributions of the employer are charges upon the employer's expense statements. In a funded arrangement, if these are applied to the payment of current pensions, they serve to reduce dependence upon financial markets for the sale of assets to meet these pensions. This is

economically and financially efficient, given that the scheme is funded. In an unfunded arrangement, the notional contributions are received by the sponsor and the sponsor must meet from its resources the pensions currently payable. The sponsor has had the use of the notional and real contributions over the term between contribution and pension payment, which can be seen as a lowering of their working capital requirement.

Budget constraints

The question at the heart of the state pensions debate is how these pensions will be paid for. We are, of course, all familiar with the idea that we must, as individuals, budget for the consumption we wish to undertake. This is sometimes referred to as a cash-in-advance constraint. Unless we expect to die in debt (which few creditors should be expected to risk permitting), this is a question of the life-time smoothing, saving, of our income from labour and investment to finance retirement consumption. Abstracting from bequests received and state transfers, in general we may not consume more than our employment and investment income; in the jargon of economics we are subject to this budget constraint. Clearly, to finance any consumption we need first to have acquired the necessary funds. Early in our lifetime, we may borrow against some portion of our expected future lifetime labour income to finance consumption, but in retirement, when we have no labour income, this ceases to be feasible – creditors should not be expected to make advances that cannot credibly be repaid.

"...it is a serious mistake to consider the state as if it were a household or even a company."

The collective corporate DB scheme is in a broadly similar position. It needs to finance its payments of pensions to members. In an unfunded book-entry arrangement, the sponsor makes these payments as they fall due. The sponsor may meet these payments from its current liquid assets or it may borrow to finance them. With funded schemes, the options are wider. In addition to any possible direct payment by the sponsor, the scheme may make payment from the contributions received from the sponsor and members, investment income from the fund assets and sale of assets in markets. It may also, in theory, borrow to make current payments. We say in theory here, as the 2003 European Pensions Directive prohibits schemes from borrowing other than for very restricted purposes. As a collective corporate scheme has a lifespan that may encompass many generations, it is subject to an inter-generational budget constraint rather than the single specific lifetime of the individual. This implies that the equitable inter-temporal accounting approach rather than conventional financial balance sheet approach should be used for corporate schemes (See Box 3). One way of viewing the balance sheet approach is that it effectively applies this budget constraint at each accounting date.

However, it is a serious mistake to consider the state as if it were a household or even a company; an unending series of papers, reports and studies makes this mistake. For example, it lies at the heart of Michael Johnson's paper[20] "Self-sufficiency is the key". This is the issue at the centre of generational accounting.

A government may do things that markets, consumers and firms cannot. Notable among these is the provision of liquidity, which can take many forms from the creation of fiat money to bank bail-outs. Of course, the result of such government action is frequently a transfer of income among firms and consumers, and, it is argued, from future generations to the current; this latter point is the focus of dispute, where the counter-argument may be described as the 'we owe it to ourselves' view. Paul Samuelson made the point that the current generation bears the cost, rather well: "To fight a war now, we must hurl present day munitions at the enemy; not dollar bills, and not future goods and services."

The seminal paper on this view is Abba Lerner's 1948 paper "The Burden of the National Debt", where it is argued that the national debt and the deficits creating that debt had no macroeconomic effect, though these may have effects in the distribution of resources within the economy or through the incentive effects of taxes. The question under debate is not whether a national debt is a burden on an economy, which is clearly accepted by all economists, but rather who bears it and when.

In this view the first point to note is that a state can always pay for its expenditures since it can create the currency to do so. It has no need for tax receipts from which to pay for any expenditure. Of course, if it prints money to excess this may result in inflation and the decline in the value of this money on the foreign exchanges. The government can create demand for its money by raising taxes. In fact, the government needs to have spent first for there to be any money in circulation with which to pay our taxes. In an exchange-based economy, money is our principal risk management tool reducing the uncertainties of the double coincidence of wants in barter trade; it is desirable to have an adequate supply and distribution mechanism – and that was the rationale for the bail-out of the banks.

20 www.cps.org.uk/cps_catalog/self-sufficiency%20is%20the%20key.pdf

Note that the government deficit, in sum, equals the money in circulation held by the private sector, their savings; this is an accounting identity.

"...we consume what we produce."

The role for taxes is in management of the economy. For an economy which is operating below its productive capacity, lowering taxes can provide the stimulus to allow it to close this output gap, without any inflationary consequence. Raising taxes serves to reduce economic activity. It is interesting to note that the few times we have observed governments running surpluses have been followed rapidly by recessions in economic activity. It can be argued that the role of government is precisely to ensure that the economy operates at its productive capacity, since that is associated with the highest standards of living for the population.

The idea has become prevalent in markets that by running deficits we are leaving a debt burden that our children will have to repay, through higher taxes. This is also incorrect.

As was noted earlier, we consume what we produce. This is true of the current generation and will be true of future generations; our children will consume what they can produce. The amount of government debt outstanding is immaterial to their ability to work, produce and consume. Only if the government debt 'crowds out' the capital resources necessary for the future generation's optimal production will their consumption be constrained by supply deficiencies.

There will not be some apocalyptic day of reckoning when this debt comes due and the world implodes. On that day all that actually happens is that the central bank credits the current (reserve) accounts of the bond-holders in its books while debiting the account of government. Those former bondholders are now free to spend those balances as they will; trade between willing buyers and sellers. For international holders, this may involve selling the currency on the foreign exchange markets or buying produced goods for export to them. Both of these actions tend to lower the standard of living of the domestic population. It only becomes advisable to raise taxes if the economy is running at a higher level of productive output than sustainable under full employment. It should be remembered that pensions are domestic in nature; we really do owe them to ourselves.

The inter-temporal budget constraint of generational accounting can be seen as merely a market-clearing condition on the foreign exchange value of the currency; a question predominantly of inflation and relative purchasing power. It is, though, deeply worrying that so many politicians and pensions market observers believe that the inter-temporal budget constraint should, naturally, be binding, and that pensions and welfare programmes are "unaffordable" as a result.

In 1974, Robert Barro produced his influential paper "Are Government Bonds Net Wealth?", in which he argued that there is an equivalent theorem (known widely as Ricardian Equivalence[21]) to the Modigliani Miller theorem of corporate finance that the value of the firm is independent of the way in which it is financed and that if consumers were concerned by inequity among generations, this could be corrected through the mechanism of bequests. On this note, it is interesting that bequests in the UK are in fact far smaller than might be expected from examination of estimates of national wealth, let alone as a compensation device operating in this manner, unless, of course, the estimates of this inequity are seriously over-exaggerated.

Recently, in response to a short article which argued that pensions, broadly as we knew them, were affordable and sustainable, a letter was published which exhibited many of the misconceptions we have discussed. It opened: "Con Keating may be right in saying that defined benefit pension schemes are affordable. Most things are if you have enough money."

As should be obvious by now, money is not the true problem; that true problem is whether or not the future generation can produce as much as is necessary to provide. Consider the nonsensical situation that we may have one worker and seventy million retired, that one worker will be producing everything. Then it really doesn't matter how much money the retired population possesses, if that worker does not produce enough for all, there will be shortages and lower standards of living for many. This is also true of savings invested in outside assets such as equity and government bonds, the claim they represent on future production is limited by what that future production amounts to. Relative wealth, in the retired population and the working population, will matter, since the rich will be better positioned than the poor to buy these scarce goods.

The ideology expressed in this letter is precisely that which its acolytes are using to argue that state sector employee pensions are excessive and unaffordable. It is interesting that these acolytes often descend into the demagoguery of the argument that, as the private sector now finds this defined benefit form of pension provision overly

21 A historian friend of mine tells me that this was not in fact David Ricardo's view – he believed that tax-payers would not be indifferent, preferring debt to current taxes.

expensive to continue providing, the public sector must also. This is nonsense. Again there is a valuation and accounting issue.

Public sector discount rates

HM Treasury has recently consulted on the selection of an appropriate discount rate to apply to the liabilities of public sector pensions schemes. The correct discount here is the rate of real growth of production; it is the analogue of the private sector's rate of return on capital employed. It is also obvious that the use of this rate maintains the share of production that these pensions represent constant. The amount foregone in current consumption by the acceptance of lower current wages by these employees is maintained to be equivalent in terms of the proportion of future consumption that they will receive in their retirement. This discount rate preserves the share of total production foregone today as the same share of future production; this is the minimum that an employee might be expected to accept. These are after all employee savings. The employee is risk-sharing in the sense that if total production declines, that future standard of living will be lower. Using lower discount rates, such as that current on index linked gilts, overstates the current wage equivalent and commits the pensioner to a lower share of future production, a lower living standard.

"...the idea that we should discount a stock at the current marginal cost is flawed."

The nonsense of such lower rates is easily demonstrated in macro-economic context. If we discount GDP at these rates, we will arrive at a current national wealth estimate. With GDP at £1,400 million and assuming no real growth in this in order to be conservative, and with long-dated index-linked gilts offering 70 basis points of return, the present value of our national wealth would be £200 trillion, in which case the estimates, derived in this way, of pension liabilities at £1 – £1.5 trillion are trivial. Estimates of national wealth, which includes these pensions, place this closer to £10 trillion.

Further, the idea that we should discount a stock at the current marginal cost is flawed. If we were to consider the stock in this way, it would fail to take account of the fact that most of this stock was originated in pension awards made long ago when rates were markedly higher than today. This use of today's rate makes the same mistake as those analysts who look at sovereign debt yields demanded today and presume the cost of the government debt going forward will be this rate, when in fact the cost of most of this debt was determined at the time it was issued and the rate at which new rates will apply is determined by the rate of maturity and refinancing of that debt.

One way of viewing these pensions is that they represent lower demands upon the current population that might otherwise be met by taxation; the use of the implicit funds is reflected in higher disposable income for the population than otherwise might be the case. This population is free to consume or invest this income as is their will, resulting in higher current and future production. This is, incidentally, the growth in the available tax base, both immediately and over time.

Working capital

As liquidity and working capital have figured repeatedly in this paper, some comment on the role of working capital in the economy is warranted. As noted earlier, companies spend much time and effort managing their cash and liquid resources. In the main, they have a financing gap as wages must be paid before the receipt of the proceeds of their sales occurs. Having the resources at hand to bridge this gap is critical for their efficient operation. Working capital, the difference between current assets and current liabilities, is needed; it is a concern with their net operating liquidity.

"...pension regulation is placing a liquidity pressure on the sponsor companies."

In addition to direct costs of credit, which may arise from short-term liquidity shortfalls, companies may also cut back on investment and production when they are liquidity constrained. In addition, working capital difficulties have been known to lead to insolvency and capital scrappage, and increased unemployment. The combined economic results of weak private sector working capital may be lower employment, lower output and higher inflation. There is evidence[22] that this working capital channel was important in determining the behaviour of companies during the recent financial crisis.

By placing emphasis on the funding of pension schemes, pension regulation is placing a liquidity pressure on the sponsor companies. This liquidity demand is not just for the initial contribution but also for any shortfall in scheme funding at its future accreted values arising from inadequate income or market price performance. A purely unfunded arrangement would require these values to be

22 See: Fernadez-Corugedo E., McMahon M., Millard S., and Lukasz R.: "Understanding the macroeconomic effects of working capital in the United Kingdom." Bank of England Working Paper 422, April 2011.

recognised, but would lack any liquidity concern until payment of the pension. These funding regulations remove the incentive for companies to provide pensions, by making them, in terms of liquidity and working capital, indistinguishable from cash wages paid. These funding regulations, in addition, make the sponsor company's finances dependent upon the evolution of financial market prices. This is true whether or not the company is listed and traded; it is true even if the company has no dealings in traded securities.

It is often said that unfunded pensions would be sources of cheap capital for sponsor employers; this is untrue. The cost of unfunded pensions would be the return on capital of the sponsor employer. It is also said that funding pensions helps to develop capital markets, making finance widely available. This is true for those enterprises which have access to markets, but they are only a small proportion of the entire corporate sector. It is also important to recognise that the majority of pension funding is expended on the purchase of existing shares and bonds, altering their prices, rather than directly supplying capital to other companies. By contrast, in the case of book entry unfunded arrangements the capital is directly employed within the firm. Empirical studies show that companies are more likely to commit to new investments when they have internally generated capital. These are efficient arrangements.

Of course, companies may fail. The taking of collateral or funding of the scheme with an investment portfolio diversified away from the sponsor's capital structure is a response to this concern. It is an inefficient solution, which may even lead to the failure of the sponsor; at the very least it is costly to them. The efficient solution is pension indemnity assurance to which we will revert later. But first, given the poor investment income performance evident in Chart 15 earlier, and the importance of cash-flows generated, we shall next discuss the investment of pension fund asset portfolios.

DB pension scheme funding

Two principal reasons are usually advanced for the funding of private sector voluntary DB schemes: collateralisation of the sponsor pension promise and financing of the benefits promised. The funding of pension promises is somewhat unusual, firstly because, as noted earlier, it is time-inconsistent. For an employee to accept a deferred benefit only to demand that it be paid up immediately is clearly not consistent. In fact, when a scheme is required to maintain funding at 100% of the best estimate of liabilities, this extends the inconsistency to all future times. Secondly, because this is an example of "wrong-way" risk management, these are actions that increase the likelihood of the insolvency event while lowering the consequence. The prime example is requiring further sponsor contributions to raise funding levels. Remember that risk is the product of the likelihood of an event and its consequence, and that there is a causal order to these. If the sponsor does not first default and enter insolvency, the level of funding at any point in time is of no consequence. It is usually only the case that increased funding lowers total risk faced by beneficiaries when the pension scheme is small by comparison with the sponsor firm.

An occupational DB pension is a promise by the sponsor employer to make payments to former employees at future times; in this there is no fundamental difference from its other liabilities, equity and debt. However, there are no specific designated company assets that support these claims; this is the sponsor covenant. It is the national insolvency regulations which determine the priority of creditors and shareholders in dissolution or re-arrangement. Investors have paid for these claims with cash while pension beneficiaries have supplied their labour; in this regard investors do not differ from pensioners – both face losses. In fact, though many of the creditors of a failed firm are usually pension schemes, there is no attempt to shield other investors from the loss consequences of firm failure; merely to make sure that there is an equitable distribution of the remaining resources in a social welfare efficient framework.

More modern insolvency practices and regimes[23], such as the Bank of England's 'London Approach' and the UK's 2002 Enterprise Act, place much emphasis on the interests of other stakeholders, notably in trying to protect employment through the continuation of parts of a failing business as a going concern. This is not necessarily an altruistic action; the maximum value for all stakeholders can often be realised in this manner. The issues addressed by these more modern approaches are principally those arising from failures of co-ordination and conflicts of interest among creditor classes. There are also the social welfare costs of under-investment, or premature liquidation, as well as the social costs of over-investment, excessive forbearance (such as we saw in Japan in the 1990s, for example) to be considered. This interacts with and is determined by the public policy objectives of encouraging enterprise and risk-taking, which are usually reflected in the degree of creditor or debtor 'friendliness' of the regime.

23 For further theoretical discussions of insolvency regimes, see: 'Key Principles and Features of Effective Insolvency Regimes." (1998) G22 – www.imf.org/external/np/g22/index.htm and "Orderly and Effective Insolvency Procedures"(1999) IMF – www.imf.org/external/pubs/ft/orderly/index.htm

The problem for pensioners is that the company may experience insolvency prior to payment of their pensions. If we are to argue for a special treatment of pension beneficiaries in insolvency, we need to be able to distinguish these creditors from others. For pensioners, this may be done on the basis that they are unable to recover from such loss events, but the case for active members is less strong – they may find other employment and rebuild their retirement provision wealth. It was the problems associated with preferential treatment of pensioners in payment relative to active members that led to much of the legislation which currently encumbers DB schemes: active members close to retirement could find themselves losing all of the pension benefits with little prospect of finding further employment. In other words the regulation we currently have is, in large part, a response to previous, failing regulation.

Funding the scheme has been seen as the solution to this insolvency issue; with compensation fund support operated by the PPF as the backstop for schemes which were inadequately funded. This is scheme funding as collateral provision. The idiosyncratic company-specific risk of sponsor insolvency is substituted by the systematic risk of the scheme's diversified investment portfolio, but at the cost of removing any financial incentive for sponsor employers to offer deferred compensation, while leaving them exposed to the risk of further cost. This funding is accompanied by an institutional design, such as the creation of trusts, to ensure the bankruptcy-remoteness of the portfolios of assets and greater longevity than may have proved the case for the sponsor firm.

However, even with full funding at the level of the technical best estimates of pension liabilities, a scheme will be unable to purchase annuities in the insurance market to cover these liabilities. The regulation of insurance companies, which ensures the security of their policies by compliance, requires them to hold additional capital and effectively limits their investment portfolios. The price of bulk annuitisation will typically lie in the range 130% to 150% of the technical best estimate. This is in effect a fair guide to the value of the sponsor covenant for a DB scheme. It is recognised in the UK in the form of the 2003 Debt on Employer legislation, which defines this enforceable debt as funding to the level of the Pensions Act 1995 section 75 value, which is in essence a cost of bulk annuitisation calculation[24].

If it is to be stand-alone and run-off in an orderly manner, a pension scheme needs to be funded at far higher levels than technical best estimate, which is the value of the pension promised by the sponsor. This is necessary if the scheme is to be able to cope with adverse developments in the risk factors to which funded DB schemes are exposed. It is also necessary because there will be future expenses associated with the management of the fund and scheme. The scheme in effect needs to be funded as if it were an independent insurance company writing pension annuities.

There are now many groups supplying sponsor covenant quality assessments to schemes, as this is recommended by the Pensions Regulator; few are quantitatively based. This is surprising inasmuch as the quality of the covenant is principally an accounting question. However, there is one readily available quantitative metric for the covenant quality of listed companies, the market capitalisation. Many analysts like to report the liability values of pension schemes or their deficits, usually with an accompanying scare story, and then to compare these deficits with the total market value of the company's traded equity. In fact, as we expect markets to look through such accounting opacity, the market price is expected to include the collective wisdom on the true level of pension liabilities, with the consequence that the market value of the firm's equity is in fact a direct measure of the value of its covenant.

If this level of funding is demanded prior to sponsor insolvency, the sponsor employer must offer lower pensions on terms that provide for the extra cost involved; this will make the pension actuarially unfair to the pensioner relative to wages and remove any incentive for employees to accept the pension promise at full face value in their wage negotiations. The much-rumoured proposed application of the European Solvency 2 insurance regime to funded DB schemes will require such capital buffers.

The Dutch FTK regulations formerly operated such a buffer regime; requiring over-capitalisation of the pension liabilities. There are now proposals being discussed (FTK 2) to alter this. In addition, the Dutch approach is one of conditional indexation, under which members risk-share in the sense that pensions may not increase in line with the terms generally expected; by accepting these terms the members are in effect capitalising the pension scheme or lowering the buffer requirement, by substituting their willingness to receive poorer pensions for further capital resources and costs to sponsor employers. This is a variation on limitation of capitalisation of a venture by guarantee. With 130% funding critical in the Netherlands, it seems unlikely that pensions can be efficient for either employers to provide or employees to accept.

The UK public sector "cap and share" arrangements,

24 It is notable that there are two attempts to avoid or evade this legislation currently in progress. These are the Polestar and Silentnight cases, which though very different in detail would , if successful, undoubtedly be retrograde steps for the security of members' pensions in general.

which place absolute limits on government contributions, are similar and make these schemes effectively member mutual in nature; this is an aspect which their many critics have omitted to consider or mention.

There is a variant to the fallacy of composition here; while it may be optimal to require this level of funding for any individual sponsor and scheme, it clearly cannot be at the level of the economy. The ONS reports that the UK DB pension private sector has total pension liabilities of £1.1 trillion at present value under the current accounting standard; this means that UK schemes would need to find another £330 billion to £550 billion of capital resources. To put this into some context, this dwarfs the government's fiscal deficit which is perceived to be so problematic. It is also a multiple of three to five times recent total UK annual business investment. Prior to the recession total business investment was around £144 billion annually and post recession it has been around £122 billion – the share of public corporations in this has been static at £4 billion. Net investment by UK self-administered pension schemes was just £24 billion in 2010; total contributions to DB schemes in 2010 were £44.6 billion, an all-time high. In fact, total contributions to all private pension schemes, including public sector, were only £82 billion.

The Insolvency Service reports that the average long-run rate of corporate insolvency is 0.6% of all active companies; the Pension Protection Fund estimates that it faces an average likelihood of insolvency of 0.4% in its population of long-established companies with DB pension schemes in the current year. This difference is to be expected since the highest rate of insolvency occurs in newly founded businesses where 50% do not survive their fifth birthday. The total pension liabilities of these PPF-covered schemes are £1.1 trillion. Let us then assume that the average scheme is 50% funded at the time of sponsor insolvency, the collective loss in any year is £3.3 billion, using the long-run average insolvency rate. At the lower level of potential scheme funding (130%), a Solvency 2 type regulatory buffer for all schemes covers the expected annual harm to pensioners one hundred times, or more.

To take these calculations a little further, if we assume that schemes run off at 2% per year, the annual loss of £3.3 billion results in maximum steady state exposure of schemes in run-off of £84 billion; one quarter of the excess funding required under a Solvency 2 type regime. This trivial calculation, replete though it is with, perhaps, unrealistic simplification, makes it immediately obvious that the correct manner in which to address the problem of scheme funding at sponsor insolvency is to apply an insurance solution. In the steady state, the insurance industry would need to price only this £84 billion plus the capital it is required to hold to support this level exposure – that is materially lower than required of funded DB schemes if that is mistakenly applied to them by Brussels.

"...a Solvency 2 type regulatory buffer for all schemes covers the expected annual harm to pensioners one hundred times, or more."

Current pension contributions are large in absolute terms, and very large by comparison with firms' net cash position; in the cash-heavy post-recession period, according to the Bank of England's Monetary and Financial statistics, these contributions amount to around 6% of their bank deposits. The increase in cost is pronounced. When measured as a proportion of private sector salaries and wages, it has risen from 12% in 1989 to 16.5% in recent times, or as a proportion of the private sector's gross surplus from 19% to 25%. These values are significant in terms of the operating efficiency and cost competitiveness of many of the companies involved, and sufficient to warrant the closure and cost limitation behaviour of many company sponsors observed over the post-Millennium period. To increase these by the amounts necessary to support such excess funding on prior and subsequent awards would raise these costs to around 50% of corporate earnings or 25% of wages.

Some argue that scheme funding is actually financing of the pension promise rather than collateral security. If this were strictly true, then the correct accounting would not be the balance sheet approach but income and expenditure based. Moreover, DB pension regulation is also balance sheet based; the emphasis on scheme funding levels, that is to say the ratio of, or difference between assets and liabilities[25]. This leads the scheme investment strategy into the time-inconsistency of management to immediate values rather the generation of long term income. It is evident that pension funds now pay scant heed to the income generating characteristics of their investments; the income yield on funds (at market value) has dropped from 5.5% in 1984 to less than 2% in 2010. In part, this has been induced by the trend to allocate more assets to total return dominated strategies such as hedge funds. This is compounded by the use of strategies which serve to hedge the volatility of the balance sheet but are costly to implement. A recent survey of the Mallowstreet pension community showed that, overwhelmingly, funds and their advisors do not consider the income yield characteristics of their investment allocations, which is scarcely consistent with the hypothesis that these funds

25 These statistics are notoriously unstable, being in one case the difference between two large numbers and in the other a ratio whose distributional characteristics are not well-defined. It is clear that under the balance sheet approach it is necessary that both asset and liability estimates must be accurate for the resultant deficit or surplus to be meaningful, and useful as a basis for decision.

exist to defray the costs of pension provision.

The effect of the removal of the advanced corporation tax credit and the proposed abolition of the "contracted-out" rebate is material in terms of these cash-flows, and schemes' reliance upon asset sales to meet the increasing pension payments.

In the absence of further special contributions, the primary concern is that with the expected increases in pensions in payment and new cash commutations, within five years the system collectively is expected to fall into cash flow deficit. The longer term concern is that as the investment horizon lengthens, so does the importance of realised investment income. The longer the term, the higher is the proportion of the total realised return of a portfolio that arises from realised investment income.

"Unfunded DB schemes are far more attractive to sponsor employers for them to provide than funded DB or even simple DC plans."

If DB schemes were entirely unfunded at sponsor insolvency, using the same assumptions as previously, the expected annual loss would rise only to £6.6 billion and the steady state equilibrium to £168 billion, still only one-half of the excess funding required under a Solvency 2 - type regime. This suggests strongly that entirely unfunded DB pensions are fully insurable; that there should not be a problem of insurance capacity even at these higher exposure levels as sufficient capital resources are available to insurers.

Unfunded DB schemes are far more attractive to sponsor employers for them to provide than funded DB or even simple DC plans. Such an insured, unfunded book-entry system would provide meaningful amounts of capital directly to the UK private sector. The incentive for a sponsor to offer pensions as part of an employee compensation package has been restored and augmented. There is a precedent for this in the German book-reserve system. This is not costless capital for the private sector, but it might result in greatly increased corporate investment as there are many empirical studies which show that they have an increased propensity to undertake investments when the funds are internally generated, as opposed to raised in capital markets.

The lowering of administrative expenses associated with book-reserve pensions would also do no harm to pensioners, but it would challenge the business models of many consultants, advisors and fund managers who live rather well from the funding approach to DB schemes.

Pensions Investment

There have been many recent studies and reports which advocate investment of pension funds for the long term. Certainly, investment for the long term is more efficient for pension management than any strategy of chasing a repeated sequence of short-term objectives, and should result in higher achieved returns. However, there is a problem in that a pension is a claim on future production and the minimum that any participating employee should expect or demand for their savings is an equivalent amount of future production to that foregone today, and financial market claims cannot assure this.

In the long run, the returns from equities are dominated by the dividends received, as is obvious if we consider an investment which is never sold, where its value is simply the discounted present value of these cash-flows. Dimson, Marsh and Staunton, in the 2011 Credit Suisse Global Investment Returns Yearbook, report the components of UK real equity returns for the 111 years of their study as: 4.8% arising from the mean dividend yield, 0.5% from real dividend growth, and 0.2% from change in the price/dividend ratio. They report that similar figures apply for the world: 4.1%, 0.8% and 0.5% respectively. The low levels of return from dividend growth are notable and discussed further later.

Empirically, we do not observe positive correlations between rates of GDP growth and the returns of financial investments. Nor does it appear that these converge in the long run; there is evidence that investment portfolios from countries experiencing low growth materially outperform investment portfolios made in high-growth economies.

Empirically, in most countries, the dividend yield growth of equity portfolios exceeds inflation but fails to outperform the growth of GDP in the long run. In fact, the economic arguments for a relation between stock market returns and economic growth are rather weak. It has, for example, been argued that the high-growth rates of Asian economies arise from their high levels of under-employment, together with their high savings rates and imported technology, which do not necessarily translate into higher profits for the shareholders of existing firms.

"Empirically, we do not observe positive correlations between rates of GDP growth and the returns financial investments."

Growth inevitably requires greater capital investment, which can come either from earnings, implying lower current dividends, or from new investors, in which case existing shareholders do not benefit. The effect of new issuance to fund projects has been estimated by Arnott

and Bernstein to cost around two percentage points in returns to existing shareholders. The role of changes in technology is also often misunderstood – unless these firms have enduring monopolies these changes do not result in sustained higher profitability. Technological change benefits consumers rather than investors. When investment occurs in new firms, rather than new projects, the shareholders of existing firms, obviously, do not benefit. In addition the stock markets may not capture the activity of all firms; state control, family-ownership or simply unlisted firms may be material issues.

There is also an argument, due to Paul Romer, that we should expect higher discount rates in high growth economies since these are necessary to persuade individuals to defer current consumption for future, when they will be wealthier in that future. The observation that household savings tend to increase in recessionary times lends some empirical support to this; the Bank of England's reported statistic on home equity withdrawal in the UK is particularly notable in this regard. This has swung from quarterly increases in household indebtedness of the order of £8-£12 billion prior to the recession to declines of £6-£8 billion post recession. However, lower house prices and fewer housing transactions will have contributed materially to these apparent increases in voluntary savings.

There is also the possibility that investors can identify high-growth economies but over-value these prospects when buying stocks, as well as recessionary over-reactions and changes in investor risk aversion to consider. The effects could explain the surprisingly high volatility that is empirically well identified, and so problematic for elementary theories such as the efficient markets hypothesis. Though the lack of relation between stock market returns and national GDP growth is observed everywhere, there is also an aspect of the London market that would tend to further reduce any relation – its particularly international nature. Many of the companies quoted conduct the majority of their business outside of the UK, and would not be expected to be dependent on its growth. The large presence of overseas investors in the UK market, 37%, would also tend to lower relations with UK GDP.

There are several empirical puzzles associated with real dividends and their growth. We would expect dividend growth to be directly related to retained earnings, the increased capital of the firm; the complement of earnings and dividends. This empirically lower than expected rate of dividend growth cannot be explained by the systematic pursuit of projects with lower expected net present value than the projects supported by the firms' existing stock of capital, as this would result in progressively lower returns to capital. It also would not explain a second anomaly that high prices and low current dividend income is usually followed by low dividend growth[26].

There is a related issue of governance, which is that many more corporate sponsors are now seeking to cease their provision of DB than was previously the case. It is evident that many are seeking to employ methods that materially disadvantage scheme members. The debates over "enhanced transfer values" and the use of "pre-pack" insolvency procedures are among the more egregious illustrations; rather drastic forms of cost minimisation. The 2003 Debt on the Employer legislation had the effect of creating a barrier to exit for sponsors and the Pensions Regulator's 'clearance procedures' are clearly counter-measures to this perceived risk, even though the true sponsor motivation is one of cost. These are intrusive regulations. It is also evident that protection of the Pension Protection Fund is the principal objective in many cases. One of the unfortunate aspects of this is that it will serve to condition the attitude of many employers towards other government initiatives such as NEST and perhaps result in a grudging compliance with minimal sponsor contributions. Perhaps the answer lies in less rather than more regulation; for example the effect of lowering corporate taxes in Ireland was to reduce the time and effort spent on avoidance, and resulted in higher total corporate tax receipts. It is also evident that the private sector has been dealing with such issues for as long as commerce has flourished; debt and equity contracts are well served by covenants and resort to the commercial courts when disputes arise.

Investment prospects

In the wake of the financial crisis and the related fiscal difficulties, there has been a pronounced tendency for trustees to be conservative in all of their valuation assumptions; regulation is an influence in this. It is notable that the distribution of scheme investment performance assumptions is far narrower than the actual investment performance experienced. This, along with asset allocation and risk management strategies, is discussed later.

Investment returns have been meagre over the past decade; interest rates are at their lowest levels in the post-war period. In fact, the investment returns from fixed income over the period since the early 1980s have been competitive with those from equities. The growth prospects of the developed world are widely believed to be muted; at least until the current fiscal difficulties are

26 There are, perhaps, explanations in the corporate governance literature, where there is evidence that investors receive higher dividends in countries where the legal and institutional structure is strong and reflected in shareholders' rights. See: LaPorta, Lopez-de-Silanes, Shleifer and Vishny, "Agency problems and dividend policies around the world." Journal of Finance 55, 2000

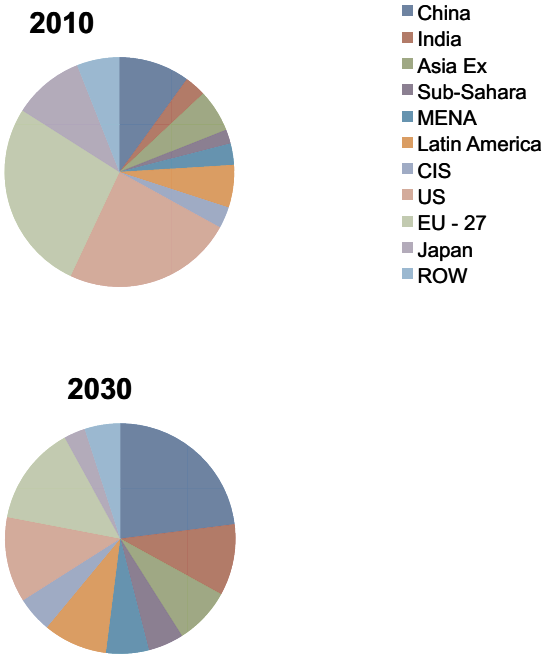
resolved. However, growth globally is close to all time highs and widely predicted to continue at these levels over the coming decades as the emerging world develops. Among the many discussions of the causes of the financial crisis, the Asian savings glut figures prominently. This is widely credited with having driven real returns and risk premia down to their current low levels. However, this is too recent a phenomenon to account for the fact that risk premia have been declining since the early 1980s and that this has been a globally observed trend.

If we look to savings and investment globally, we notice that savings have been declining since the early 1970s while investment has declined even further. Investment rates have declined from around 26% of global GDP to a low of a little over 20% in 2002[27]. By the early 1970s the post-war reconstruction investment boom was largely over – during the 1950s and 1960s investment in Europe peaked of around 25%, reaching highs of 29% in Germany and 35% in Japan. US investment has remained steady at around 20%, or closer to 30% if intangible capital such as education and R&D is taken into account. This downward investment trend has now reversed and investment globally is now approaching 24% of GDP, after a slight hiccup in the financial crisis – this has been led by the high growth rates of China and India in particular. Much is driven by urbanisation and much more looks set to be – 47% of China's population currently live in urban locations and this is projected to rise to 62% in the coming two decades, India's from 30% to 40%. Among the emerging world, only Latin America has little scope for further urbanisation; it is already 80%. This will bring with it inevitable demands for residential accommodation and infrastructure investment, in addition to the demands of commerce and industry. With growth in the 3.5%-4.0% range, GDP globally will rise from the current $62 trillion to $300 trillion or more by 2030. This can also be expected to be accompanied by an increased role for foreign trade from around 26% of global GDP to, perhaps, 34% by 2030. The world will look profoundly different – see Chart 22.

By contrast the outlook for global savings is far less sanguine. Savings rates have fallen since the early 1980s in almost all of the developed world; in some cases spectacularly so. Italy has seen its household savings rate decline from over 26% of GDP to under 10%; Japan from 17% to 6%. Much of this decline is attributed to an ageing effect, the life-cycle model of investment, but it is notable that some countries, such as Germany and France are also ageing but maintaining savings at around 10% or 11% of GDP. It is possible that this decline is a wealth effect, arising from the increased wealth of households held in housing and other assets – in this regard, the availability of credit within an economy may also be material.

Over the past 30 years corporate saving has increased from 10% to exceed 13% – in fact in many developed countries, such as the UK, Germany and Japan, companies are now net suppliers of capital to the rest of the economy.

Chart 22: Shares of global GDP 2010 and 2030 (Author's calculations, UN, IMF and OECD data and studies.)



Household savings rates have increased markedly in some countries, such as the US and UK, since the financial crisis. However, the effect of these on the global savings rate is quite small – if continued they would only add around 1% to global savings. It is also possible that these are simply a response to their decline in wealth, arising from the crisis and that once that is restored, they will revert to their prior ways. Government saving, of course, is highly cyclical.

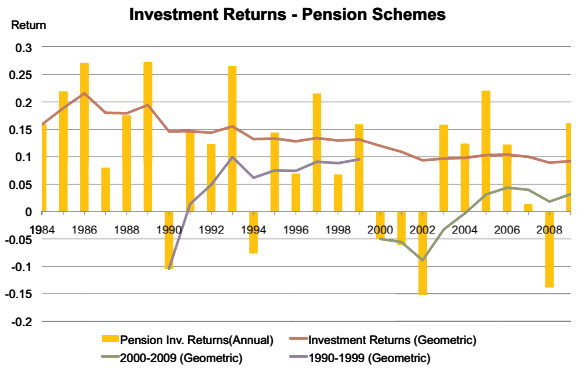
The high household savings rate evident in China seems set to fall as the government's objective of a consumption-based , rather than investment-based economy takes effect. When this is considered in tandem with the ageing of the developed world, there seems little room for savings to respond rapidly to increased investment demand.

27 The figures quoted in this section are the authors' calculations based upon IMF, OECD and other data. A number of reputable think-tanks and consultancies, such as the McKinsey Global Institute, have produced more detailed and similar studies.

It appears that the global decline in real returns and risk premia since the 1980s was rather more a question of larger declines in investment than saving, and that this has now reversed, with projected investment rising sharply over the coming two decades – a pace of increase which savings seem unlikely to meet. With savings around 22.5% of GDP and investment demand perhaps as high as 26% of GDP, the effect can only be an increase in the real returns available in financial markets – perhaps as much as 2% p.a.

The sketch offered here is one of profound changes in the global economy over the coming two decades, but it is far from unconventional. The description is consonant with studies and projections from the UN, IMF, World Bank and OECD and many respected private sector think-tanks. It would be surprising if such radical change was not accompanied by substantial financial market volatility as these markets adjust to the changes in flows. It is therefore a concern that the majority of the discussion of pension fund investment strategies is concerned not with exploitation of these opportunities and their risk management, but rather with liability-relative accounting volatility and the reduction of pension liabilities. Make no mistake, if we reduce pension liabilities we have reduced savings and raised the cost of productive investment, and with that lowered future growth.

Chart 23: Annual total return performance of UK self-administered pension schemes 1984 – 2009 (ONS, Authors' calculations)



Pension fund investment management

Many commentators have drawn attention to the poor performance of UK pension funds in recent decades, relative to the prospective returns assumed by their boards of trustees and corporate sponsors in scheme planning. It is undoubtedly true that these returns have been meagre in recent times, as can be seen from Chart 23.

This figure shows the annual total realised return of UK pension schemes in aggregate over the period since the mid-1980s; scheme contributions and other cash-flows are taken in account. In addition to the simple annual return (bars), the figure shows the cumulative realised annual return from 1984 forward; this declines from a high of over 20% in the mid 1980s, to close to 9% over the entire period. The figure also shows the cumulative geometric return for the decades 1990-1999 and 2000-2009; it is evident that both were lower than realisations over the full period. The 1990s delivered a total geometric return of nearly 10% per annum, while the 2000s delivered only low single digit returns.

When investment returns were as low as was evident in the last decade, and negative in real terms, it was irrational to increase funding contributions. However, additional special contributions, which are largely determined by pension regulation, have reached all time record high levels – £74.1 billion in total over the 2000 – 2009 period, and further augmented by another £15.6 billion in 2010. The direct opportunity cost of these contributions to the private sector is very substantial; the cumulative total opportunity cost of contributions over the 2000-2009 period was £32 billion in 2009 alone – the aggregated opportunity cost exceeds 10% of GDP by 2009. Scheme funding rules and deficit repair schedules appear to be very onerous indeed, for both the private sector and the economy more generally.

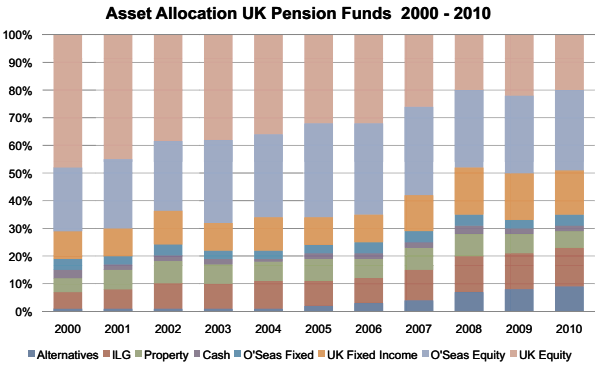
The investment strategies of pension funds have been very widely discussed. This has ranged from the suitability of particular investment management styles, such as hedge and private equity funds, to liability driven investment and fiduciary management. Perhaps the most remarkable element has been the growth in the use of derivatives, from less than 0.5% of total assets, by market value, in 2000 to 7.3% at end 2009. As derivative use is usually an indicator of liability driven investment strategies, it appears that these have gained markedly in popularity; this metric probably understates the actual rate of adoption of these strategies materially, since the sponsor may also choose to hedge risk exposures in the pension scheme using securities, and derivatives themselves have relatively low asset values relative to their nominal values by construction. A fairly priced interest rate swap has a value of zero at inception. In a recent survey[28], Samuel Sender states that 22% of sponsors reported hedging pension fund interest rate risk exposures with derivatives.

28 Sender S., "The Elephant in the Room: Accounting and Sponsor Risks in Corporate Pension Plans." EDHEC Risk Institute, March 2011

The concern with derivatives "investment" is that these contracts do not, in general, generate any productive return; they are strictly an inside game, serving to transfer liquidity among financial market participants. There is also evidence that many derivatives, such as longevity swaps, are priced so that the pension fund pays a substantial 'risk' premium to the writer of the contract; that is the contract has an explicit cost to the pension scheme, albeit not well-defined at contract inception. The calls for cash or other collateral[29] under derivatives credit support agreements are potentially problematic for a pension scheme.

It is clear that the accounting and regulation has greatly influenced scheme asset allocations and this has been compounded by poor investment returns experienced. The asset allocation of schemes, over the period 2000–2010, is shown as Chart 24.

Chart 24: Asset allocation by principal asset classifications, at market value. (2000-2010)



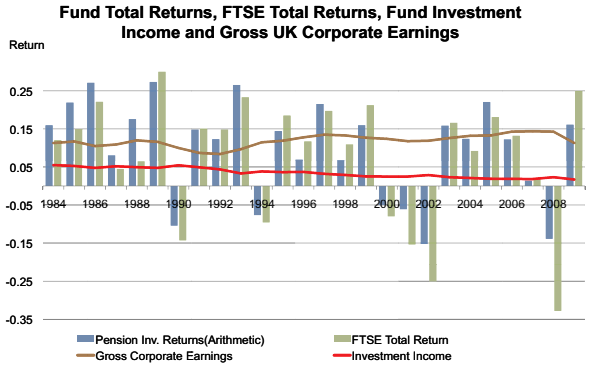
There are numerous possible reasons for such revisions to asset allocations. Schemes have aged in the sense that the division of their liabilities among active, deferred and pensioner members has altered. According to a recent Mercer survey, in 2003, pensioners in payment accounted for 21% of total scheme liabilities and in 2010, this had risen to 35%. This survey reported active members' liabilities as 44% of the total in 2003, which had declined to 31% in 2010. These changes alter the effective investment horizon of the fund. Moreover the allocations between open and closed schemes can be expected to be different due to their differing investment horizons. In 2010, open UK schemes held 52% in equities and 36% in bonds, while closed schemes held 46% in equities and 44% in bonds.

Much of this reallocation is a reflection of increased concern with the management of risk, and in particular the volatility of schemes as reported in sponsor balance sheets. The much discussed decline in allocation to UK equities is very evident; perhaps less well discussed is the increase in allocations to overseas equities which are now a larger exposure than the UK. This is a little surprising as economic theory would suggest that an ageing society, where the elderly own the majority of assets, would invest overseas if domestic wages had risen and profits fallen, and neither of these is true.

The doubling of allocations to UK bonds reflects to some extent the increase in hedging of the volatility of present values of liabilities, where long term interest rates are the prime causal factor. Doubtless also, the increase in holdings of index-linked gilts reflects a desire to hedge inflation factors. However, the low real rates of return offered by index-linked gilts has polarised the investment community and pension scheme trustees (See Chart 28). The increasing allocation to hedge funds is the only shift which, unequivocally, may be considered to be driven principally by the return characteristic, though many hedge funds are now marketed on the basis of their diversification benefits.

Some analysis of the effects of this shift in asset allocation is appropriate. Chart 25 illustrates the total return performance of the FTSE total return index and pension funds together with gross PNFC returns on capital and the income yield of pension funds.

Chart 25: Annual total returns of PF schemes, FTSE-All share, UK PNFC gross returns on capital and investment income yield (at market value) of PF schemes. (WM-State Street, ONS, FTSE)



As is well-documented elsewhere, there was a pronounced lower trend in stock market returns over the period. It appears that the reallocation of assets may have lowered the sensitivity of the portfolio to large losses in equity values, as should be expected given the greatly

29 Liquidity, collateral and pledge-able income are terms which may be used interchangeably in economic theory.

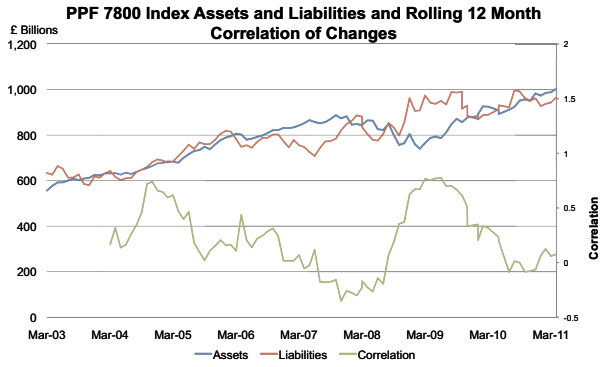
reduced UK equity exposure. It also appears that the reallocation may have greatly attenuated the variability of pension fund valuations relative to equity indices; losses are far lower in poor years, though perhaps at the cost of underperformance in good years. Somewhat surprisingly the correlation between pension fund performance and the FTSE index is lowered only marginally from 0.96 to 0.92. Of greater concern, however, is the lack of relation between corporate earnings and either investment portfolio results or FTSE returns: in the first period, prior to 1999, the correlation between the FTSE and earnings was 0.12 and between investment portfolio results and earnings was 0.01; in the second period, these were -0.07 and 0.03 respectively.

The volatility of the FTSE index was 11.6% in the period 1984-1999; the volatility of the median WM pension fund portfolio was almost identical at 11.1%. However, in the period 2000-2009, the volatility of the FTSE was 19.4% and of the pension fund portfolio just 13.5%. This reduction in volatility has a value of almost exactly 1% in the ultimate realised geometric return. In other words, pension schemes should be prepared to pay as much as 1% for such a reduction in volatility. In the period 1984-1999 the FTSE returned an arithmetic average of 12.6%, very close to the average of gross UK PNFC earnings, and the pension fund portfolio 13.7%; in the period 2000-2009, the FTSE returned just 0.3% and the pension fund portfolio almost 4.0%, both very far from the UK PNFC average of 13.0% in this period.

The most notable change is in the declining rates of investment income generated by the portfolio, from over 5.5% in 1984 to less than 2% recently. We shall discuss this aspect in more detail later.

For all of the discussion of lower risk investment strategies and widely publicised examples, there is remarkably little evidence that these asset reallocations have been effective. To illustrate this (See Chart 25) we use PPF 7800 index data, showing the asset and liability index series and the rolling 12 month correlation of changes in these asset and liability values. There is some evidence here that pension scheme liabilities may have stabilised. Adjusted for the level of the discount rate, liabilities have only risen marginally in the period from mid 2006; this would be consistent with scheme closures and the many other measures taken to limit the absolute growth of pension liabilities.

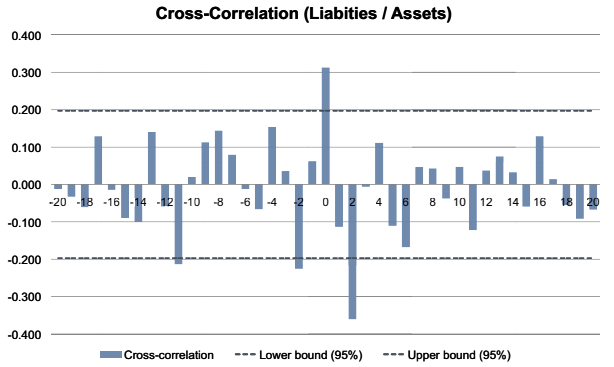
Chart 26: PPF 7800 index asset and liability estimates, together with rolling 12 month correlation of changes in these values. (PPF and author's calculations)



If these asset-based liability-hedging strategies were effective, we would expect high and stable correlations between changes in their values, but we observe widely changing correlations which never reflect more than 60% of the covariance of assets and liabilities. This is most surprising given the time, effort and expense that has been dedicated to these hedging strategies.

This is not a question of leads or lags, or the length of the window used to calculate the rolling correlation, as can be seen from examination of the autocorrelation function of these changes (Chart 27). This shows few lags are statistically significant and even those which are have low explanatory power – approximately 10%. More sophisticated and complex econometric models produce similar results.

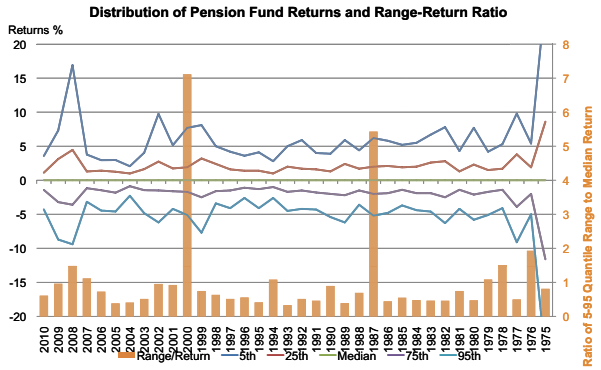
Chart 27: Cross-correlations of changes in asset and liability values at various monthly lags (Dotted lines: 5th & 95th confidence intervals) (PPF, Author's calculations)



It is also far from obvious that all of these changes in asset allocation have even altered the return variability among pension fund asset portfolios. Chart 28 illustrates this, showing the performance of 5th, 25th, 75th and 95th quantiles of the distribution of pension fund returns relative to the median performance. This chart also shows the 5-95 percentile range normalised by the median return achieved.

However, it is evident that the volatility of pension funds relative to the volatility of the FTSE indices has declined markedly. Though not illustrated here, the ratio of rolling six-year volatility of FTSE indices to pension fund volatility has declined from around 90% to just 60% in the most recent periods. However, it should be noted that this is principally driven by the dramatic increases in market volatility, the FTSE index volatility, which has occurred.

Chart 28: Range of pension fund returns relative to median, and range of returns distribution normalised by the median absolute return (1975 – 2010) (WM – State Street, Author's Calculation)



The most obvious measure of the success or failure of these measures is the variability of scheme surpluses or deficits. This is shown as Chart 29, again using the PPF dataset – though similar effects are evident in other index datasets. This chart also shows a linear regression of the data. This has low explanatory power but indicates that the situation is deteriorating rather than improving. It is also evident here that deficit or surplus volatility has increased rather than declined.

There is considerable dispute over the applicability of liability relative management strategies and the hedging of risk factors. The extent of this debate can perhaps be judged from the distribution of allocations to index-linked gilts, which is shown as Chart 30. These are widely regarded as good hedges of the inflation exposures of pension schemes, and used for this purpose. The low levels of implied returns have led many commentators to suggest that they are poor value. Five percent of funds now have allocations in excess of 37% of total assets but more than 25% have no allocation at all. It is evident that not only have many sought to buy these securities in significant amounts, but many have also actively sold them – more than 20% of pension funds.

Chart 29: PPF 7800 index surplus/deficit 2003 -2011, and linear regression. (PPF, Author's calculations)

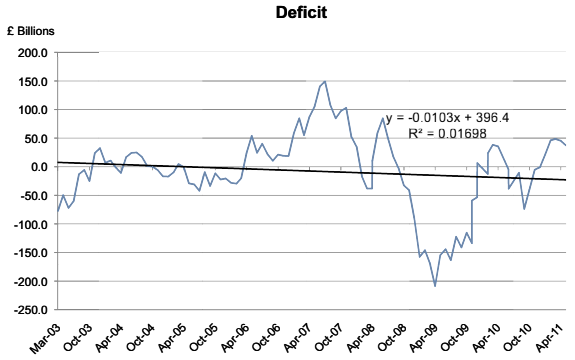
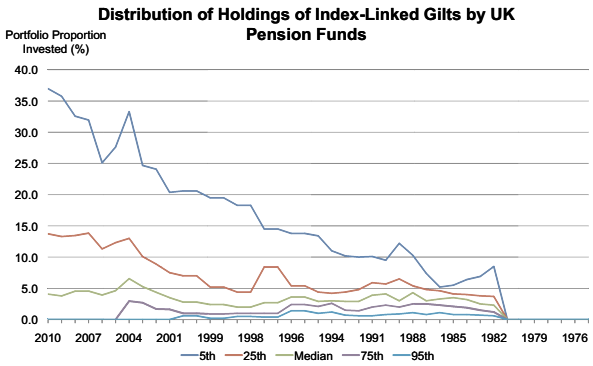


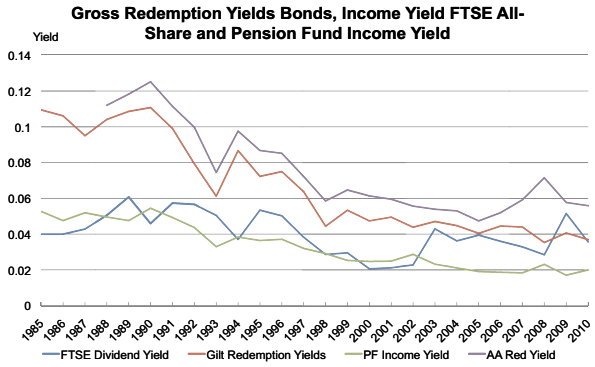
Chart 30: Allocations to index-linked gilts 1982 – 2010 (WM – State Street)



Earlier in this section, we noted the decline in the income yield of pension funds. In the absence of further special contributions, given the expected growth in pensions payable and lump sum award payments, this is likely to result in cash-flow deficiencies within five years[30]. Furthermore, it illustrates the problems that arise from the removal of ACT and the abolition of the contracted-out rebate. But most importantly, we should not forget that, in the long-term, total returns realised tend to converge in the fullness of time to this investment income figure.

30 There is some evidence that scheme members are increasingly deferring their pensions, staying in employment longer. Whether this is an effect of the recessionary environment or their inadequacy relative to expectations is not clear.

Chart 31: Pension fund income yield, FTSE All-Share dividend yield, gross redemption yield UK gilts (all bond) and AA corporate. (ONS, Datastream, Authors' calculations)



The declines in bond yields since the mid-1980s are clearly evident in Chart 31; these will have contributed materially to increases in the present value of liabilities. The variability of the gilt-AA bond spread is also relevant for liability valuations under the current accounting standards. However, the point of most interest is that the income yield of pension funds is below even the dividend yield of the FTSE All-Share index for significant lengths of time.

"...in the long-term, total returns realised tend to converge in the fullness of time to this investment income figure."

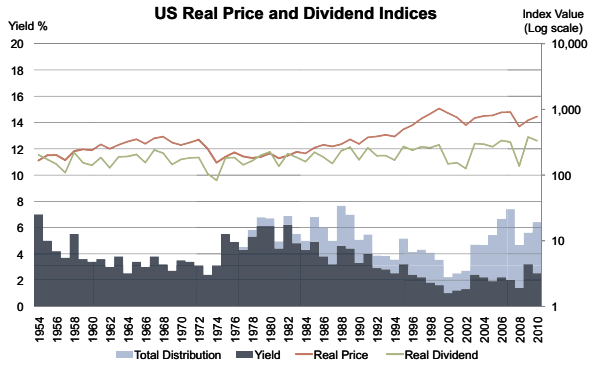
Of course, part of this effect may arise from the use of investment income to pay investment management fees, but the differences are too large to be fully explained by that. The average investment management fee is just 0.37% of assets. It is evident that the decline in investment yield is slower than that of bonds, as is to be expected due to the stock of bonds held at historic yields – the decline is to be expected to have a marginal effect as the inventory refreshes with new and replacement purchases for maturing issues.

There are a number of other effects that clearly have contributed to the decline in income, notably investment through funds rather than direct purchases of shares; for example, the allocation to hedge funds usually generates no dividend income. More than 50% of both the UK and overseas equity exposure is now achieved through mutual funds. It is possible also that cash collateral calls under derivatives contracts have further contributed to lowering of the pension funds net income yield.

As was noted earlier, few trustees consider income yield when setting asset allocation policy; it appears that the trustee concerns now are the degree to which these assets will hedge perceived risk exposures, or the total return achievable. This is the balance sheet view rather than income and expense at work again. There is a further recent development which is also relevant: the use of share repurchases rather than dividends to return funds to shareholders; the dividend series illustrated in this paper are cash dividends only. These share repurchases will be reflected in market price indices. The differences between dividends and stock repurchases are material in a number of ways.

The return of excess corporate cash by open-market share repurchase rather than special dividends has increased markedly in recent decades in both the US and the UK. In the US it is now the dominant method; a situation which was probably assisted by the 1982 Congressional passage of "safe harbour" provisions[31], which removed possible concerns over market manipulation. The developments in the US are illustrated in Chart 32, which shows cash dividends together with total distributions and the evolution of price and dividend indices for the period from 1954. We have been unable to find reliable data for comparable UK buy-backs.

Chart 32: US dividend and total distributions, US price and dividend Indices (CRSP, Barclays Capital)



Though not illustrated here, share buy-backs have in many recent years been the largest single source of demand for US shares. There is no discernable effect of buy-backs on price and dividend indices. However, it is worth asking the counterfactual question: what might the performance of these indices have been if these repurchases had taken the form of dividends paid. It is notable that since 2003 the total distribution yield has been comfortably above 4% and considerably higher than the yield on US Treasuries.

31 SEC Rule 10b-18: This protects companies from the prospect of being sued for price manipulation under the terms of the Securities Exchange Act.

Attitudes to buy-backs have changed. Forty years ago they were taken as an indicator of a lack of management confidence in the prospects for a firm's business. Now they are taken to be expressions of management confidence; this view is suspect.

It should be realised that returns of capital by buy-back or dividend differ in some material ways. All of the usual accounting metrics are unchanged, with the exception of earnings per share (EPS). In the case of a buy-back, EPS increases, while a special dividend reduces EPS. It really is not surprising, given the prevalence of management option incentives, for management to favour buy-back over dividend.

In fact, it is perfectly possible for earnings per share to be increasing while the returns on capital employed are declining. Whether share buy-backs add or subject value for remaining shareholders depends upon the price of the shares repurchased. Those bought below intrinsic value will add value, while those purchased at premiums will subtract it.

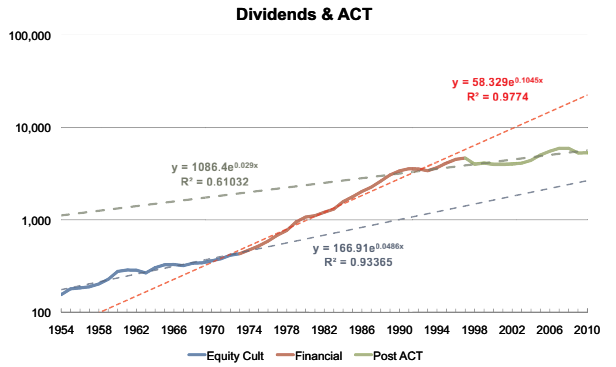
A number of empirical studies have considered whether buy-backs may be justified by the subsequent valuation and market performance of the remaining shares. These analyses support the earlier assertion that buy-back adds or subtracts value depending upon the price at which it takes place.

Until 1993, UK companies were not allowed to hold their own shares and until the 2006 Companies Act came into effect share buy-backs were generally rather complex to engineer. However, some have entered market folklore – the Royal Bank of Scotland's £1 billion buy-back announced in 2006 when the share was trading at £19.30 is one. Just a few years later, it was trading at less than 40 pence.

When we look to UK price and dividend indices a somewhat different picture from the US emerges, but one which appears not to be motivated by these legal changes, but rather the abolition of the advance corporation tax credit for pension schemes and others. ACT, sometimes referred to as an imputation tax credit, was recognition that dividends are paid by companies from their taxed income and that, as tax exempt institutions, pension schemes should recover their pro-rata share of these taxes.

Chart 33 shows the development of UK dividend indices for the period 1954-2010, together with regressions of pre- and post-ACT change data.

Chart 33: UK dividend index and regime regressions (Barclays Capital, Author's calculations)



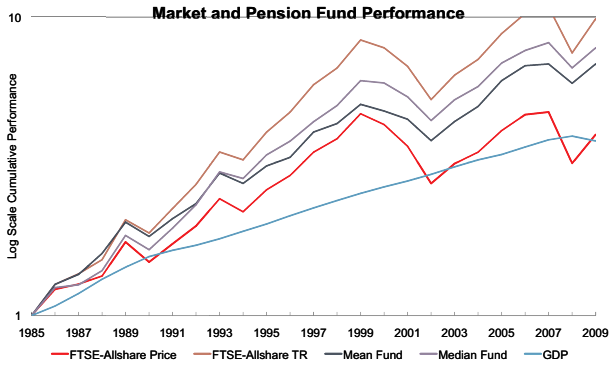
The change of slope in the early 1970s reflects the growing importance and the radical changes of business model of financial services in the UK market. For example, prior to 1972 the banking sector returned 6.9% annually with volatility of earnings of just 2%, but post returned 20.9% annually with volatility of 6.9% until the emergence of the crisis[32]. However, the central issue here is the change of slope resulting from the abolition of advanced corporation tax. We expect this to decline to 77.5% of its previous value but the observed change is far higher. It appears that the Treasury estimate of a cost of £67 billion to the pensions industry from this change has been far surpassed by its behavioural effects.

The discontinuities after the abolition of ACT are pronounced. There are no effects evident from the changes in company law. Discussion of the possible motivations for this apparent change is not, however, relevant to the subject of this paper.

It follows that we should consider the performance of the asset portfolios of pension schemes by looking at their returns relative to both price and total return indices. These pension fund asset portfolios have been corrected for the effects of contribution inflows where appropriate and are the simple annual returns. We have two series for pension fund performance: the median fund as reported by WM-State Street and the mean fund, by value of assets at market prices, which will inform later discussion. The cumulative performance of FTSE All-Share total return and price indices, together with the median and mean pension fund performances are illustrated as Chart 34. If a scheme were to use all investment income to pay pensions, we would expect the fund to deliver a performance closely related to this FTSE price index.

32 The reorganisation of financial markets in the wake of the break-down of the Bretton Woods agreement may be viewed as a fundamental shift of risk from the public to the private sector.

Chart 34: Mean and median pension fund performance, FTSE All-Share price and total return indices, together with nominal GDP. 1985 – 2009 (ONS, WM-State Street, Datastream)



Over this period, the FTSE price index has only fallen below cumulative GDP growth during times of recession; this is possibly evidence of market over-reaction at these times. The performance of both the mean and median fund is strongly correlated with the performance of both the FTSE price and total return indices throughout the entire period. There is no strong evidence of a decline in these associations. The correlation of fund returns with gilts or AA corporate bonds is negative and low in the period to 1989 and similar in magnitude to the correlations of the equity indices. In the 1990s, a strong positive correlation between equity indices, fund performance and gilt yields is observed – of the order of 0.7. This is far less pronounced when the relations with AA corporate bonds are considered – of the order of 0.2. In the period from 2000, the correlation is small and negative for all. This absence of an increasingly strong positive correlation casts significant doubt over the efficacy of interest rate hedging strategies in practice.

The history of UK pension funds may be read from chart 34. The median fund is quite small in size; the mean by asset value reflects much more strongly the largest schemes. In the 1980s, funds were able to achieve returns as good as or better than the broad market; large funds were able to exploit economies of scale and scope and outperformed smaller schemes. In the 1990s as these large funds matured, their performance declined as investment income was increasingly used to meet pensions payable to members, and the median, smaller fund began to outperform. In the 2000s, funds began to achieve better performance relative to the FTSE All-Share total return index, perhaps reflecting the high levels of new cash from special contributions received and the increasing focus upon the balance sheet view of pension schemes. However, this has been achieved at a cost in terms of the income yield achieved.

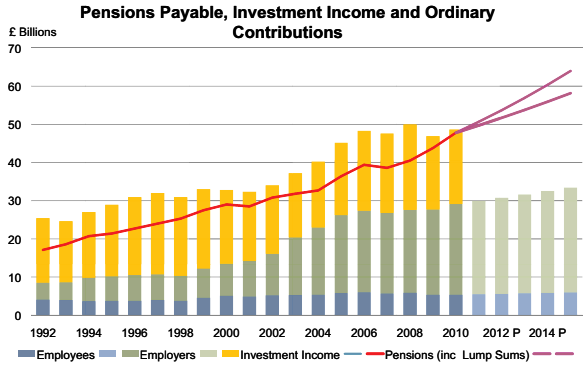
The real surprise, however, is the lack of any significant relation to changes in discount rates, when this topic has been central in so many discussions of the perceived problems of pension funds post-millennium. The correlations of annual asset portfolio returns to discount rate changes is negative (-0.65) and of liabilities positive (+0.65). This indicates that changes of assumptions and revisions to the actual ultimate liabilities have been material. It is also most surprising that the increasing complexity and sophistication of asset allocation strategies has not resulted in a markedly lower correlation or degree of association with the FTSE indices. Given the time, effort and money expended on these, this is cause for concern.

It appears that the basis risk associated with these asset-based liability-hedging strategies dominate performance; that parametric rather than indemnity hedging is highly ineffective in addition to being costly. Another possible interpretation is that changes to scheme assumptions have not been consistent with their investment management actions and strategies.

The low income-yield of these funds can be expected to result in lower future realised returns, and the possibility of some difficult adjustments to losses on bond holdings and interest rate derivatives. It seems that the sponsors of defined benefit pension schemes will face substantial future demands from trustees for additional special contributions. Already, we have seen many schemes offering other corporate assets as collateral for their covenant, so much so that HMRC has opened a discussion of the tax treatment of these contributions. These serve to reduce the funding demands arising in deficit and are, by virtue of their contingent nature, forms of pension scheme insurance. This is a first step towards entirely unfunded but insured occupational defined benefit pension schemes.

It is time to rethink the funded occupational defined benefit pension scheme; the insured unfunded model appears immediately to be a prime candidate to succeed it. The devil with this idea, however, lies in the detail of pension indemnity assurance, which is discussed next for both the legacy funded occupational scheme population and for the limiting case of entirely unfunded schemes. The most pressing issue though is the projected cash-flow deficits that will arise in the absence of further special contributions or increases in investment income. It is notable that some funded local government schemes have already had to borrow to support the payment of pensions. This problem is illustrated as Chart 35.

Chart 35: Ordinary pension contributions, scheme investment income and pensions payable. (ONS, Author's calculations.)

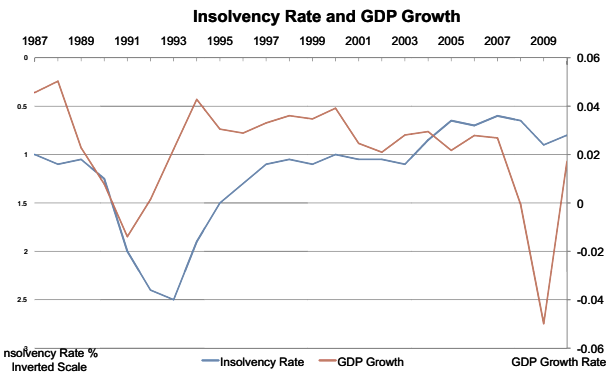


Corporate Insolvency

In this paper, we have repeatedly raised the issue of time-inconsistency in pension scheme management. Sponsor insolvency can be regarded as an involuntary form of inconsistency, which brings with it funding problems for a scheme. However, it is obvious that applying another form of time-inconsistency, such as scheme funding, to resolve this merely moves this problem nearer in time.

Earlier, in chart 12, we illustrated the fact that the private sector can collectively afford to offer pensions, as is evident from a casual examination of its returns to capital. The problem with private sector provision is that individual companies can and will fail; the insolvency rate among active companies is illustrated as Chart 36.

Chart 36: Insolvency rate (as a percentage of active companies) and GDP growth (1987-2010) (ONS, The Insolvency Service)



This Chart covers the period from the application of the 1986 Insolvency Act and includes the 2002 Enterprise Act. There is some evidence that this latter insolvency regime was more forgiving to debtors than its predecessor, in the form of the decline in the insolvency rate from 2003 forward. It is also surprising that the recent crisis should have seen only a relatively minor increase in insolvency – from 0.6% to 0.9%. This is perhaps explained by the greater flexibility exhibited by labour – full-time employment has declined by 2% while part-time has increased by a similar proportion. The policy of forbearance adopted by HMRC with respect to corporation taxes payable has also played a part. If we look to write-offs on bank loans to the corporate sector, these have been benign until 2009, since when they have increased from around 0.25% to close to 1.5%. It is also possible that the implementation of the 2002 Enterprise Act, and other developments have changed the nature of the insolvency rate from being a lagging indicator to one which is much closer to coincident.

When examining insolvency data, it is easy to forget that companies are twice as likely to merge, be taken over or cease trading as solvent liquidations as they are to fail. Those simple comparisons, which show very few of the major companies counted in stock market indices in 1900 are still present in 2010, are misleading; substantial numbers of their heirs and successors are still alive and trading well.

"...we have repeatedly raised the issue of time-inconsistency in pension scheme management."

The adoption of funding for DB schemes was an attempted solution to the insolvency problem; collateralisation of the sponsor's promise. In common with collateral security for loans, it is time inconsistent. This arises because the collateral demand is immediate while the pension payments occur only in the distant future. Unfortunately, it removes any incentive for a sponsor to offer DB pensions; when partly or wholly unfunded, deferring part of an employee's compensation lowers the employer's required working capital.

Some argue that funding is intended to deliver the cash-flows to meet the pension payments. If true, this is certainly not recognised as a primary purpose in European or UK regulation. If true, materially different accounting would apply – income and expense rather than balance sheet. Whatever the intention, the implementation is failing badly. Chart 15 shows the (market value) investment income yield of UK occupational schemes; it has fallen from over 5.5% in 1984 to under 2.0% today. This trend is absent from the profitability of the UK private sector. In fact, the yield of marketable investments of pension schemes has been declining while the corporate sector's profitability has been increasing. One explanation

of this phenomenon is that it arises from the shifts in scheme asset allocation and fund management strategies seen over the past two decades; the role of regulation in encouraging this is undoubtedly significant. The concerns are twofold: pension payment cash-flow adequacy in the short-term and total returns in the long-term. This will be discussed in detail later.

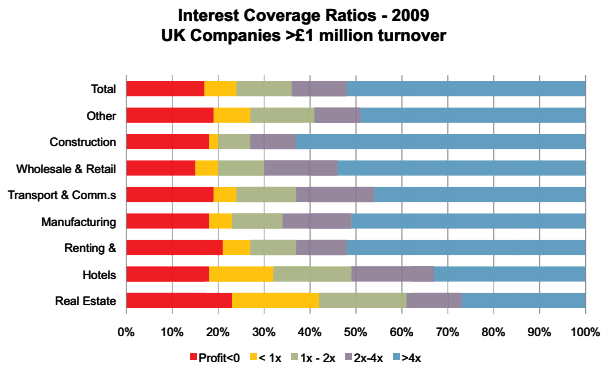
Private sector pension costs have been rising even as the coverage has declined dramatically – see Chart 8 earlier. These are now sufficiently substantial that they affect the costs and competitiveness, and likelihood of insolvency of sponsor employers.

"Funding, and its complex web of regulation, appears to have been a very costly mistake. "

Pension schemes are exposed to the idiosyncratic insolvency risk of the sponsor employer. Chart 37 illustrates the interest coverage ratios, a measure of credit-worthiness, for the principal SIC[33] classifications and overall average for the UK private sector in 2009; clearly there are many sponsors where affordability is an issue, and sustainability and security for the employee or other beneficiary is simply inadequate and incredible. However, it should be noted that this was a particularly poor year, coming immediately in the wake of the financial crisis and the worst post-war global recession.

Perhaps the greatest omission in the volumes of regulation is that there is no credit-standing test for sponsor employers wishing to offer defined benefit occupational schemes.

Chart 37: Interest coverage ratios (EBIT) for UK private sector and principal industrial classifications (Companies with turnover greater than £1 million - 2009) (Bureau Van Dyck, Company Filings, Authors' Calculations)



33 Standard Industrial Classification of Economic Activities.

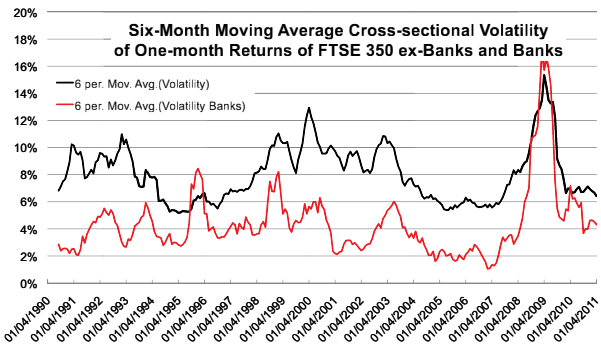
The disparate nature of idiosyncratic insolvency risk can further be illustrated by the systematically different returns to capital exhibited by the manufacturing and services sectors (Chart 38).

Chart 38: Gross profitability UK PNFC manufacturing and services sectors (ONS)

There are many further regularities relevant for credit evaluation that may be discerned from market and accounting data. Price earnings ratios and capital gearing ratios are frequently used in this context. There are also some well-established models for credit, which draw upon financial economics, such as the Merton model. In this, the likelihood of insolvency is based upon the first passage time of the value of a company's assets to a value below liabilities. It can be estimated using the volatility of the market price of a company's traded equity.

The systemic riskiness of companies, sectors and the riskiness of portfolios of credit exposures can be estimated from consideration of the cross-sectional volatility equity returns. This converges in the limit to the systematic risk of these companies. Chart 39 illustrates the evolution of one such measure – in this case the six-month moving average cross-sectional volatility of monthly returns for the FTSE 350 ex banks and also the banking sector.

Chart 39: Rolling six month cross-sectional volatility of one-month returns of FTSE 350 ex-banks and banks. (Datastream, Author's calculations)



As noted earlier, the PPF estimates that the current average insolvency likelihood of its population of schemes is just 0.4%, while the long-term average is 0.6%. If this insolvency likelihood is taken as typical, it means that the PPF population of sponsors has an average life expectancy of 125 years, while the average insolvency rate would imply a life expectancy of 84 years. This is far longer than the term of a typical pension scheme, which might have liabilities extending as far as 75 years into the future. The private sector can collectively support DB pension schemes.

The assumption here, that the insolvency likelihood is constant, is not unreasonable as a property of a stable equilibrium in which new DB schemes were created as some older schemes failed, but it is suspect when the population of companies does not refresh itself, as a closed population can be expected to undergo the usual growth and ultimate decline life-cycle of a stylised company.

"The private sector can collectively support DB pension schemes.. "

However this analysis makes clear one of the inherent failings of the unrestricted authorisation of pension schemes for weak sponsors; a sponsor whose likelihood of insolvency is say 1.5% would, under these assumptions, have a life expectancy of 33 years but a scheme requiring sponsor support for 75 years.

It is obvious that funded and unfunded DB pension schemes can be sustainably afforded by the private sector collectively, but the problem of idiosyncratic sponsor insolvency remains. In fact, Germany has long operated a book-reserve unfunded corporate sector system (Direktzusage); this supplied much of the capital that funded the post-war Wirtschaftwunder. Sponsor insolvency is solved there by the simple, and cost effective, method of pension indemnity assurance.

Though most credit insurance is short-term in nature, such as trade credit and factoring, it should be realised that capital markets routinely transact in long-term debt securities and indeed that the insurance sector are among the largest owners of these risks.

Pension Indemnity Assurance

In the UK, an occupational DB pension scheme faces just one risk – sponsor insolvency; in the absence of this, pensions must be paid, by the sponsor employer, on time and in full. The employer sponsor does not have an option to walk away; the "pension put" option popularised by Bill Sharpe does not exist in the UK. The June 2003 "Debt on the Employer" legislation makes this absolutely clear; the pensions debt, which crystallises on sponsor insolvency, is the value determined under section 75 of the Pensions Act 1995. It is, in essence, the shortfall between the cost of a full "buy-out" and the current value of the fund.

This is correct in economic or financial terms as it reflects the principal non-trivial corporate finance problem of DB pension provision. To provide pensions on an independent stand-alone basis a scheme would need to be funded to a higher level than that of the best technical estimate of pension liabilities, in order to be able to cope with the vagaries and uncertainties of financial markets, inflation and longevity. It would need to be capitalised as if it were an insurance company; this is reflected in the costs of liability discharge by "buy-out" transfer to a life insurance company and lies typically in the range 130%-150% of best technical estimate. Note that buy-out closes the scheme, which enters the process of wind-up. This process is one of run-off of the liabilities of the scheme. In other words, "buy-out" cannot be part of ongoing new pension provision.

The problems do not end here, however. There is an inequity with other creditors of the insolvent firm. This excess funding is expected, on average, to be unneeded, so many schemes will have substantial residual assets after all liabilities have been discharged; the question then arises as to the ownership of these assets. In ordinary circumstances, when the scheme sponsor is trading solvently, any residual scheme assets are the property of the sponsor, but when sponsor insolvency was the trigger, by the time that the scheme has fully discharged all of its liabilities, the sponsor company rearrangement or liquidation would have been long settled. In the case of pensions buy-out, these assets are the property of the insurance company.

"...an occupational DB pension scheme faces just one risk – sponsor insolvency "

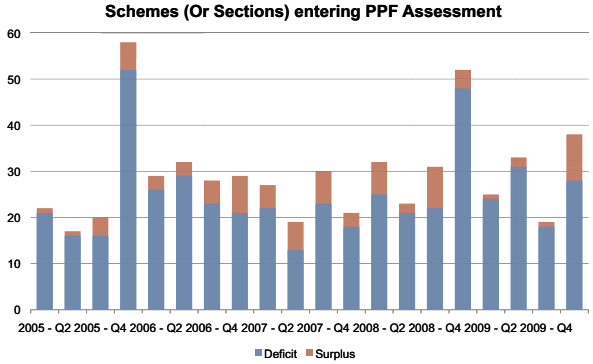
There are similar, related issues with scheme funding and the Pension Protection Fund, though these usually revolve around the (Pensions Act 2004) section 179 and section 143 values; that is to say the technical best estimate of the cost of provision of the reduced PPF benefits (Section 179) and the market cost of these benefits (Section 143). Many schemes are sufficiently well-funded that they can buy PPF or better benefits for their members in the insurance markets; contrary to popular belief these can be quite numerous as illustrated in Chart 40. Of course, schemes, which are funded to levels better than section 179 but less than section 143, enter the PPF and in effect subsidise the

funding of that compensation fund inasmuch as they provide greater funding per unit of pension payable than is necessary.

This 30%-50% difference in value or costs is a quantitative indicator of one of the greatest strengths of collective occupational DB provision. The employer guarantee which is, and should usually be, unfunded beyond the technical best estimate of liabilities has this value to members of the scheme. In addition to a collective DB scheme having a superior risk profile, and hence a lower cost of provision, than individual arrangements, it also saves this excess provision cost by substituting the sponsor balance of cost guarantee. Individual DC would require at least this level of funding. It is the combination of these benefits of DB that make DC provision at least 50% more expensive in contribution cost terms than DB. Collective DB is far more efficient than individual DC and also than collective DC because of the value of this balance of cost guarantee.

It is possible to ameliorate the need for excess capital funding by the technique of risk-sharing between sponsor and scheme member. In essence, this makes the scheme a member mutual. The Dutch model of conditional indexation is one such example. Here, should adverse developments occur members' benefits may be reduced. The scheme members are in effect capitalising the scheme through their acceptance of this condition. The UK public sector's "cap and share" arrangement, under which the employer's contribution is capped with members, under adverse developments, either paying additional contributions or accepting lower pension benefits, is another example of risk-sharing capitalisation of the scheme. UK public sector schemes of this type are clearly now member mutuals. The problem with such mutual arrangements is that the pension ultimately receivable by a member is uncertain; it is no longer pure defined benefit.

Chart 40: Schemes (or sections of schemes) in surplus and deficit relative to S179 valuation entering PPF assessment period. (PPF)



This problem of a contingent cost, where pensions cost more to provide once the sponsor has become insolvent, can be fully and efficiently resolved by insurance. This can be provided by public sector entities or privately, either by mutual or for-profit independent companies. However, self-insurance by the sponsor company itself would be inefficient, as the capital funds would represent a material charge on the liquidity and working capital of the employer company. Self-insurance does not work because it is at heart simply a process of moving the contingent liability from one sponsor pocket to another. This holds true even if the capitalisation is itself contingent in form, such as a charge on company operating or other assets.

The insurance policy written is an asset of the pension scheme and as such reduces the need for other funding under standard scheme valuation accounting. This is not true of compensation fund arrangements such as the PPF; the levies paid or contributions to these compensation funds are entirely sunk costs. The policy may be written as either term insurance or as an assurance policy which remains in effect for the life of the sponsor or scheme whichever is the shorter. It can be written regardless of the status of scheme funding; in fact, entirely unfunded schemes can be underwritten. The question here is simply one of the magnitude of the loss incurred by the insurer upon sponsor insolvency and will be reflected in the premium set by the insurer.

Though the most efficient form of this insurance is pension indemnity assurance, term insurance also has potential uses. For example, a term insurance policy may be used to cover sponsor insolvency during the implementation of a deficit repair schedule, which admits the possibility of longer and more "back-ended" special contributions from the sponsor employer, and lower immediate costs. The problem with term insurance, more generally, is that this may be entirely unavailable or more expensive at the future time of renewal. Unlike a deficit repair schedule, there is no defined date before which sponsor insolvency must occur to be covered; in this there are close analogies to life insurance and assurance – the life covered, in this case, being the life of the corporate sponsor rather than an individual.

The efficient design of this insurance is indemnity in form, paying the full benefits of scheme members after sponsor insolvency; the actual benefits can be secured by the issuance of annuities to individuals on the occurrence of sponsor insolvency. These may be written by either the insurer or purchased from other insurers by that insurer; the question is simply one of relative costs at this future insolvency date. Of course, if there is no market for such buy-out annuity coverage at this date, the insurer must write the annuity policies.

"The efficient design of this insurance is indemnity in form"

It is important to recognise that the standard insurance issues of moral hazard and adverse selection are not problematic here. There is no need for a deductible to mitigate these effects, so the policy may pay full member benefits without incurring additional risk. Members of the pension scheme do not typically control the likelihood of sponsor insolvency, the trigger event of the policy. Nor are they likely, through scheme trustees, to increase member benefits, and scheme liabilities, when the sponsor is in distress and close to insolvency, since this would be a breach of the trustees' duty of good faith to the sponsor employer. This latter concern is with the consequence of an insolvency event.

The trustees are unlikely to proceed against a sponsor employer in the event that scheme underfunding develops since some of their members will usually also be active employees of the sponsor, for whom this action would be harmful. It is also unlikely that the trustees of registered funded schemes, subject to the Pensions Regulator's supervision, will prove more accommodating than justified by the insurance policy's value to the sponsor employer, precisely because of these funding regulations. The fact that the claim of the insurer is defined by the Section 75 value in insolvency means that the sponsor is unlikely to trigger an insolvency event in the hope that it can exercise some (non-existent) "pension put" and emerge having shed the pension liabilities alone; this claim value lowers the recoveries of other creditors.

If the payout of the insurance policy is defined as a simple amount, some fixed sum, rather than full indemnity, the scheme faces the risk that this, together with other assets, will prove insufficient to complete a full annuitisation. If written as insurance which requires an insurable interest, rather than some financial derivatives contract, over-insurance would be problematic. Indemnity assurance is both well defined and complete.

The pension indemnity assurance policy may be purchased by either the sponsor or the scheme itself. It is clear that the beneficiary of the policy must be the scheme, if only to avoid any possible entanglement with the sponsor's other assets in an insolvency proceeding. In general, it is advantageous for the sponsor to acquire the policy for the benefit of the scheme, paying the annual premiums. The reason for this is that these liabilities for future premiums are an asset of the pension insurer and it may be in the interest of the insurer to intervene, at the request and with the agreement of the sponsor, to recapitalise or otherwise assist the sponsor. The insurer when faced with a sponsor in distress faces the loss of both its asset, the value of future premiums payable by the sponsor, and the insured loss, between the current scheme asset value and the cost of annuity provision. There are a variety of ways in which the insurer and the sponsor may effect such an intervention; debt and equity recapitalisation are among the more obvious. The central point is simply that the interests of sponsor and insurer are well-aligned when capital is difficult for a sponsor to raise. Unusually for an insurance policy, the insurer may be able to influence the timing or likelihood of the insured event on which it has written cover.

The cost of the policy, to the sponsor company, in terms of the present value of the premiums payable will typically be below the value of the policy as an asset of the pension scheme. Unlike any of the many 'solutions' to problems of pension scheme risk management in the private sector or indeed the compensation fund operated by the PPF, pension indemnity assurance explicitly adds value to the scheme and sponsor. There are a number of reasons for this.

The policy will be priced by the insurer to capture expected post-insolvency recoveries, which means that the loss to the insurer is smaller than the difference between the section 75 value and scheme funding. It is the larger sum that drives the expected value of the policy as an asset.

In addition, the value of the policy as an asset of the pension assurance company prior to insolvency enters the premium pricing, as these assets enhance the pension assurer's capital adequacy.

These future premiums payable are unfunded liabilities of the sponsor; the insurance policy effectively capitalises the sponsor covenant efficiently. This means that the working capital of the sponsor is preserved, other than for the current premium and the demands for scheme funding also decline by more than this liability amount.

Moreover, it is possible, by simple contractual terms, to ensure that the value of the policy as an asset of the pension scheme never declines below the sum of premiums received by the insurer from the sponsor; the policy need never represent a sunk cost. One way in which this minimum value could be contractually achieved would be for the indemnity assurer to offer credit of all premiums received (but not income accrued on these) against the costs of discretionary purchases of annuities, either buy-in or buy-out, at any point in time. This has the effect of limiting the maximum funding needed to meet technical best estimates of liabilities at all times, lowering the total funding demanded of the employer.

The premium charged by the pension indemnity assurer is most efficiently set as a proportion of scheme liabilities; it

would be relatively small in amount, similar to institutional investment management fees, for sponsor companies that are investment grade at the time of policy initiation. This is written as assurance, for the life of the scheme or the sponsor. The company sponsor similarly commits to paying premiums over this life-term. The scheme is therefore assured of cover for its life; there is no possibility that premiums may rise unaffordably, or cover even be entirely unavailable, at some future date.

Though the company is committed to paying premiums for this long-term, it may quite simply work around this commitment by transfer of the liabilities to another equivalent scheme, which would require the agreement of the trustees of the existing covered scheme. This can be executed at minor cost. In fact any form of discharge of scheme liabilities reduces or eliminates the premium payable by the sponsor employer. Lapse of a policy removes the value of that policy as an asset of the indemnity assurer and also removes the liability provision of the indemnity assurer for that policy; it is not problematic in terms of assurer solvency.

"Pension indemnity assurance can clearly be designed to be the efficient solution to the problem of sponsor insolvency that has resulted in so much inefficient and costly regulation and activity."

With the premium set in this way, some further advantages accrue. For example, as longevity and inflation increase, the liabilities of the pension scheme increase, and with this, the revenues of the indemnity assurer. The pension indemnity assurer has natural hedges against the principal risk factors associated with pensions; prior to sponsor insolvency, it is long rather than short these risks. As these risks carry premiums when traded in markets, the pension indemnity assurer may profit by writing annuity or derivatives contracts utilising these long exposures. This further reduces the cost of provision, and premium setting by the insurer; it is a further reason for the difference between the value of the policy as an asset of the scheme and the present value cost of premiums payable to the sponsor.

The policy in force will vary in value to the pension scheme and to the indemnity insurer. For example, if scheme deficits increase, due to perhaps adverse developments in capital markets lowering the value of fund assets, then, ceteris paribus, the value of the policy as an asset of the scheme increases. The policy serves as an automatic stabiliser for the scheme; it is a contra-cyclical instrument. This will reduce or even entirely remove any need for special contributions to make good deficits, which is a further substantial benefit for the sponsor. It will also lower or remove the incentive for scheme trustees to pursue gain-seeking asset allocation and investment strategies, with no regard for their income yield characteristics. By capitalising the sponsor covenant efficiently the policy serves to negate the effects of incorrect accounting standards and the negative effects of actions, including investment policy and allocation based upon them. Note that this variation in value does not carry with it any cash-flow consequences for the insurer; the policy is written and priced as an uncollateralised contract.

In this it differs from credit default swap derivatives (CDS); but the principal difference between CDS and the written policy is that the contract is not negotiable or tradable, which means that it has lower cost, though it is extinguishable. Notwithstanding this, it should be recognised that if the sponsor does not fail it will ultimately bear the full cost of pension provision; together with the policy's countercyclical properties this means that the interest of the indemnity assurer in the asset allocation strategy of the scheme is of very low importance to it.

The scheme asset allocation may affect the value of the fund portfolio at the time of sponsor insolvency, but the risk exposure resulting from scheme asset allocation to the indemnity insurer is both small and complex. In the short-term aggressive scheme asset allocations increase the risk exposure of the assurer, but in the long-term benefit it. The concern is with the costs for sponsor employers that scheme asset allocation bring; in the long-term, conservative low yielding asset allocation strategies cost the sponsor more and lower their financial strength. This increases the likelihood of sponsor insolvency, the primary risk faced by scheme and assurer.

The indemnity assurer may allow the scheme complete discretion in management of scheme assets. In part, of course, because the exposure to any one scheme is small for the pension indemnity assurer, but more importantly, provided the indemnity assurer has knowledge of the scheme asset allocation and strategy, it may, itself, hedge any exposure with which it is uncomfortable, using its own assets or liabilities.

Pension indemnity assurance can clearly be designed to be the efficient solution to the problem of sponsor insolvency that has resulted in so much inefficient and costly regulation and activity. An entirely unfunded defined benefit pension arrangement would not need registration with HMRC; it would be outside of the pension regulation that bedevils current DB schemes. In fact, the wide-spread use of pension indemnity assurance would result in significant multi-billion pound gains for the Exchequer. Its accounting is simplicity itself, a book reserve system. The only current cost would be the annual pension indemnity assurance premiums.

The way forward for the large legacy of funded DB schemes to permit them to be insured efficiently would require only minor modification of existing pensions legislation.

Conclusions

In the 1970s, the UK occupational defined benefit pension system was widely believed to be the envy of the world. Their scale, scope and importance to UK capital markets were widely lauded. While this may have been true, the system had some significant flaws; notably surrounding the loss of benefits for early leavers from a scheme, and the treatment of the dependents of a scheme member. The system penalised labour mobility. Members' rights were really rather weak. Over two decades regulation was introduced to strengthen the rights of members, which raised the true cost of provision for most schemes by more than 100% as more pensions became payable to members and their dependents. These developments were not subject to further analysis or criticism in this paper.

However, the regulation we have seen since the early 1990s is different in nature; it is concerned with the perceived security of member benefits. Though widely spun as a reaction to the abuses of management and notably the Maxwell affair, the principal problem was actually regulation, which treated active members inequitably relative to pensioners in payment. This was compounded by the fact that there is a genuine problem of corporate finance associated with sponsor insolvency and the financing of pension liabilities.

In this instance, funding a scheme to the level of the technical best estimate of liabilities is inadequate. If the scheme with insolvent sponsor is to be able to buy out member benefits with an insurance company or to run off liabilities in a timely and orderly manner, even under adverse developments in the risk factors faced, it needs to be capitalised to far higher levels. The cost of buy-out is an indication of this required level – 130%-150% of technical best estimate. This is the likely level of scheme funding which might become mandatory under the proposed application of Solvency 2 to DB pension schemes.

If funding to such levels is required, the pension proposition cannot be actuarially fair to either the plan sponsor or the scheme member. The value for money of contributions made would then be lower for a scheme sponsor than paying cash wages.

The effect of the new regulation has been to raise the cost of provision of DB pensions. The reality is that these increased costs have made little difference to the security of scheme members. Most schemes will be underfunded at sponsor insolvency, and members will receive only the reduced benefits of the Pension Protection Fund – and the long-term future prospects of that are suspect.

The regulations in effect are simply a new redistribution of the earlier problem of priority in the estate of an insolvent sponsor. They are extremely costly; far more so than any realised improvements in member security merit.

The result has been that employers have reduced or eliminated their provision of voluntary occupational defined benefit pensions. This has been done even though many of these actions, such as closure to new members, raise the cost of provision of the existing stock of pension benefit liabilities. The most evident of these actions has been the shift to offering defined contribution rather than defined benefit pensions, even though these will likely provide grossly insufficient retirement incomes. A defined contribution system is massively less efficient than an occupational defined benefit organisation. It will result in insufficient retirement incomes for most, and great income inequity among the retired population.

The current accounting standards are simply not fit for purpose, but regulation is based upon them. Both the regulatory authorities and preparers and users of financial statements appear to have little influence with the accounting standards-setters. In their 2011 book, "The New Global Rulers: The Privatisation of Regulation in the World Economy", Buthe and Mattli cite a number of instances of unsuccessful interventions by governments. Perhaps, more interesting, they report the results of their extensive survey of chief financial officers, chief accounting officers and others. In this, in Europe, 92% of respondents (US 95%) agreed or strongly agreed with the statement "IASB *will* move to full fair value accounting" but 76% (US 84%) reported they disagreed or strongly disagreed with the statement "IASB *should* move to full fair value accounting". Now, if that were taken as a customer satisfaction survey, the IASB should be in complete turmoil. It certainly indicates that they are not responsive to their "clients". It also does not augur well for any roll-back of the current accounting standards.

The problem for regulatory authorities is that the risk to member security lies in employer insolvency; this risk is the product of the employer insolvency likelihood and the level of a scheme's funding shortfall at that time. It really is inappropriate for the state and its regulatory agents to involve themselves in the management of an employer's insolvency likelihood, which means that pension regulation necessarily focuses upon scheme assets and the balance sheet. This is inefficient and leads to many paradoxes; for example, requiring additional scheme funding increases the likelihood that the sponsor becomes insolvent.

This regulatory focus upon scheme funding and scheme assets has induced a further reaction among trustees; new and more complex asset allocation strategies are now commonplace. It is far from obvious that some of these are justified, such as the hedging of the accounting risk associated with interest rates and the discount function, and also far from obvious that these and many others are effective, such as longevity and inflation hedging.

It is now widely believed that defined benefit pensions are unaffordably expensive; this is a popular delusion, though widely encouraged by those with profitable vested interests. In this paper we have offered simple evidence that these beliefs are mal-founded, and that occupational defined benefit pensions are affordable at both the state and private sector levels.

Trustees are now encouraged to consider many risks which they are assured they face – for example, longevity, inflation and interest rates or discount functions – and to take costly action to mitigate these. This is reinforced by regulatory actions and statements. The reality is that an occupational defined benefit scheme faces just one risk – sponsor insolvency.

Through their role as the balance-of-cost underwriter of DB pension schemes, sponsors do face the risks inherent in their schemes, such as inflation and longevity. However, they also face these risks and their consequences in their commercial activities; any hedging should, if desired, be conducted by them in this context, not by an isolated pension scheme.

This emphasis on perceived risk has distracted trustees from some fundamental issues which should concern them, such as the income generated by the assets in their care and the long-term prospects for financial markets and the global economy. These have direct consequence for their one genuine risk, sponsor insolvency.

It is clear that positioning the occupational pension issue in terms of financial analysis and markets is misconceived and costly. The genuine occupational problem, sponsor insolvency, cannot be solved by any form of regulation based upon scheme funding without incurring excessive costs. As demonstrated in this paper it can be solved efficiently by pension indemnity assurance, encompassing even entirely unfunded schemes.

It is time to rewrite regulation to accommodate and encourage such forms of pension provision. A society with deferred pay is more civilised than one without. It is time to restore the incentives for employers to sponsor defined benefit pensions schemes.

This is not to say that the recommendations made in this paper are universally applicable. Many problems will still exist for those not in employment or self-employed, but without the pension problem resolved for the employed majority, solutions to those issues are likely to remain elusive if only because they are likely to exacerbate inequality and inequity in society and be poisonous in terms of their influence in the political economy.

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