Heriot-Watt University March 2015

The Actuarial "Watt"?

EDITOR'S NOTE

Welcome back to the next edition of The Actuarial "Watt", the newsletter designed to keep students informed of some of the latest topics affecting the world of actuaries. I hope you enjoyed reading the previous newsletter. If you didn't get a copy of the previous edition, it can be found on our website at www.hwsas.com.

A lot has happened since our previous edition: the SAS annual conference took place and the Mystery Bus Tour ended up in Newcastle. There have also been great seminars organised by both SAS and FASS such as a presentation on the implications of the 2014 budget on the financial services industry by John Young (RBS) and a workshop hosted by Erin Cameron (Standard Life).

This month's newsletter will focus on pension reform and health insurance, along with details of the SAS conference and, of course, the Sudoku of the month.

As always, we would love to hear any feedback you may have on the newsletter or the society in general. Just send me an e-mail on jw235@hw.ac.uk and I'll respond as soon as I can.

I would like to thank everyone who got involved in the newsletter, to all of those who either wrote an article or provided the wealth of information for the readers to enjoy.

-John Watret

PENSION RISK IN DUAL PERSPECTIVE

BY AMANDA CI YAN NG

Risk is always a hot topic for every business. There is a saying: "If there is no risk, there is no reward". As an individual, it is very important to understand and manage your own risk effectively. As for pension schemes, there are a wide range of risks including investment risk, longevity risk, inflation risk etc.

From an **investor's** point of view, pension risk is the risk to a company's financial condition that arises from an underfunded defined-benefit pension plan. Before we define 'underfunded', it is important to note that pension risk arises only with defined-benefit plans that provides greater returns. With a defined benefit plan the employer bears the risk of the investments in the plan. Therefore, when investments, such as stocks, perform poorly, a shortfall occurs, meaning there is not enough money in the pension plan to meet the needs of people about to retire. A company can rectify a pension shortfall by increasing investment return or putting aside more money into the pension plan, thereby reducing the company's net income. Therefore, I think that actuarial basis of accounting plays a huge role to prevent the shortfall risk occurring as they provide the company methods used in computing the periodic payment to fund its employee pension benefits.

The actuarial basis stipulates that total contributions from the company plus investment returns on pension assets must match the required annual contribution from the pension fund. Assumptions must be made for the length of workers' careers, the rate of return on plan assets, the rate of salary increases and the discount rate used for future benefits. When reviewing a company's financial statements investors should note whether the company is being aggressive or conservative in these assumptions. For example, if a company uses a very high rate of return on its plan assets, this will reduce the current costs to fund its pension plan.

The UK government has newly introduced **pension freedom rules** that come into force in April 2015 which allow pensioners to withdraw money from their pension as and when they wish once they reach 55. The first 25% is tax-free and the remainder will be taxed at their marginal rate. They can even take the full amount as a lump sum (subject to relevant taxes) but it will be up to the pension schemes themselves to determine whether they allow members to do this. On the bright side, this government rule allows citizens, especially parents, to release cash in advance to help their children get onto the property ladder or pay university fees for education purposes.

However, the new pension rules also bring negative effects on individuals or households depending on how they act and manage their pension funds. From the **pensioner's perspective**, pension risk will occur when an individual risk running out of money early on in their retirement with even modest withdrawals from their savings pots. If someone withdrew £3,000 annually from a £29,000 pot from the age of 65, their savings would run out by the time they were aged 75. **Age UK** did a survey on life expectancy for today's 65-year-olds and currently concluded that it will be around 83 years old for men and 86 for women. The charity added that, in 2013, the median average annuity was bought with a pension fund of only £20,000. With new pension freedoms set to turn retirees away from annuities, a significant number of pensioners risk having to survive for several years at the end of their lives without any income from a private pension. Thus, retirees are being warned to live against splurging savings to prevent this risk to occur.

So what are annuities?

Annuities provide pensioners with a yearly pay-out, usually for the rest of their lives, meaning they act as a guarantee that someone will not run out of cash before they die. But annuities have been controversial in recent years due to people not shopping around for the best deal and thereby receiving disappointing rates.

Age UK said that pension savers should be provided with **'virtual jam jars'** for their money which would guard against them unexpectedly running out of cash when the new retirement freedoms come into force this spring. It wants to see more safeguards put in place to help people control their spending, giving pensioners a greater choice over when and how they spend their money. People approaching retirement will no longer be forced towards buying a retirement annuity with their defined contribution pension pot. Instead, they will be allowed to take money out of their pot, in a series of slices if they wish to, subject to their marginal rate of income tax in that year. The report, entitled 'Dashboards and Jam Jars', calls for pension providers to develop new 'pension jam jar' tools to help people budget, control their money and reach goals for their cash.

In addition, a recent article mentions that pensioners might suffer risk in the next round of welfare benefit cuts if the government intend to shave £12 billion from UK social security bill in the next 5 years. As the population gradually increased, the number of pensioners has also shown significant rise causing them to receive more social security budget than before. The coalition government's target is to reduce another £12 billion cuts in order to meet their plan without increasing taxes or reducing spending on public service. However, the fact that the political parties have committed to a 'triple lock' on state pension, it will also continue to rise with inflation. Working on the basis of £12 billion of further cuts, this means pensioner benefits are at risk in the next parliament, whatever party comes to power, as freezing working-age benefits would only reduce the welfare bill by £7 billion. In order for them to meet target, the benefits are increased by less than inflation to reduce real term spending.

Benefits in scope	1% uprating for two years	Two-year nominal freeze	Five-year nominal freeze	Number of families affected (million)
Child benefit only	0.1	0.3	0.9	6.9
All working-age benefits excluding disability benefits	0.8	2.4	6.9	11.4
All working-age benefits	1.1	3.2	9.4	13.1
All except state pension	1.7	4.4	13.2	16.1
All benefits, tax credits and state pensions	3.3	7.0	20.1	19.8

As the biggest contributor to the welfare bill, it would be hard to make significant cut without touching the state pension and there was a 'sizeable saving' to be made by 'suspending the triple lock'. Alternatively, the government could restrict universal benefits that is received by pensioners like the winter fuel allowance that would save between £1.5 billion and £2 billion a year. In order to continue the protection of all pensioners benefit, the government might penalize working age families further by reinforcing rent controls on all tenants and abolishing child benefits to compensate low income families. However, targeting those of working age with further cost might push children into poverty.

In summary, we understand that risk is unavoidable when it comes to business markets, government policy and personal decision making. It is clearly important that the society should be able to handle pension risk in the most effective and appropriate way as it affects their future benefits plan. What I would suggest is an individual should find other possible routes of income and venture into fund investment with a much lower risk. I have come across several people who have invested in a **Unit Trust investment company** using some of their pension funds for more than 5 years. As it is a low risk investment, the annual profit gained by the customers will only show a significant change if the funds are held for a consistent period of time. In the end, the pension funds increased 40% more compared to the initial figure. If investment risks are not suitable for you, there are also some other insurance company policies that provide saving plans. These plans usually provide protection guarantee and investment returns providing that the customer does not pull out from the contract (usually for a maximum of 6 years) before the end of the term policy. It is a method of 'saving money' with extra insurance coverage. Some people might prefer allocating their savings in bank instead. This is also a way to save retained earnings for future benefits. However, we should take account of the annual bank interest and compare it with others to get a better investment return as we cannot predict the future economic market and upcoming inflation rate. Would you take the risk or play it safe?

HEALTH INSURANCE AND THE EFFECT OF OBAMA CARE

BY JASON EBER

In 2010 Obama Care aka the Affordable Care Act (ACA) was passed in the United States of America. There was a lot of discussion during the debates and process to pass the act; however the conversation has died down in the UK as it has come into place. The following discussion is about the key effects that Obama Care will have on the current health insurance market in America.

Unlike in the UK, America does not have a public health service such as the NHS therefore hospitals operate such as any other business. They cannot do procedures unless the patient has some sort of coverage (in the form of insurance) or enough money to cover the expenses. This system means that a lot of people purchase health insurance to cover certain amounts of medical bills. If health insurance is too expensive, and the individual's employer does not cover it, then they will have to pay any medical bill themselves. This creates a problem where a lot of poor Americans tend to avoid hospitals or go without medication as they cannot afford the charges. Overall, this system makes health a privilege of wealth and that is why the ACA has been put into place: to create a fairer system.

There are several aspects to this new format that are particularly interesting, one being that a penalty will be set for not owning health insurance. This means that if you can afford it, you must own a health insurance policy (or pay a fee), whether it be purchased by your employer, covered by the government or bought yourself.

"After three years of exchanges and insurer restrictions, the percentage of uninsured nationally will decrease from 16.6% to between 6.8 and 6.6%, compared to pre-ACA projections" – SOA, Research Cost ACA Report

The Society Of Actuaries (SOA) predict that in three years' time a further 10% of Americans will have health insurance. This creates an opportunity for actuaries to design new products to fit this augmented market. Under ACA insurance companies are being regulated a lot more on the way they set their rates.

"…prohibit insurers from considering health status when issuing coverage; sharply restrict insurers' ability to use most personal health information when setting rates; limit insurers to charging the oldest adult enrolees only three times as much as they charge the youngest adult enrolees" – Allison Bell, Life insurance pro.

Companies will not be able to consult health status when issuing a plan and will be heavily restricted from basing premiums on the individual's health. For actuaries this creates difficulty when modelling someone's life expectancy, using fewer parameters. The difference between the highest and lowest rate is being pushed closer together through ACA and state laws which limit what insurance companies can do.

The aspects discussed show two contrasting effects. Obama Care or the ACA introduces a lot of interesting new features that effect the way that Health Insurance works in America. There are some effects that could potentially be limiting and some that create opportunity. As actuaries we must embrace these policies and adapt to the changes to the profession.

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HOW MUCH DOES AN OCCUPATIONAL PENSION SCHEME COST?

BY LEY KUAN LAW

With the implementation of auto-enrolment, companies that previously do not have employee pension schemes will now have to set one up. An important question for employers and trustees of a scheme, regardless of whether the scheme is new or well established, is how much do the pension benefits cost?

Each employee pension scheme would need to be valued regularly to ensure that it is well funded and the scheme would be able to meet its liabilities when they are due. To carry out these valuations, trustees would need to make a set of assumptions about future experience, which will not be constant because economic conditions vary over the years. When these assumptions change, so do the valuation results. When valuation results change, employers may need to pay in higher contributions to ensure the security of the members' benefits, and this means more cost to the company. To demonstrate the effects of varying economic conditions, we will look at a simple Defined Benefit (DB) Scheme that invests 40% of scheme assets in gilts and 60% in asset classes which are expected to return more than gilt yields, such as UK or overseas equities.

Firstly, we consider a set of baseline financial assumptions in line with the market conditions as at 1 October 2014. We expect 40% of the scheme assets to give a return of 3.0%, which is the current yield on long-term conventional gilts; and 60% of the assets to give a higher rate of return, exceeding the gilt yields by 3% to 5% on average. Hence, to set a prudent and realistic assumption for the long term investment return, we will assume that the risky assets give an additional 3.0% yield. Thus, we get a value of 4.8% for the long term investment return. Under current market conditions, the average annual rate of salary increase in the private sector is approximately 3.0%. This is a reasonable figure to use as our assumption for salary inflation.

The yield on index-linked gilts is 0.5%, and since the difference between yields on long term conventional gilts and index-linked gilts is a good indication of investors' expectations for inflation, we get the current inflation rate to be 2.5%. Typically, increases to pensions in payment and the statutory revaluation of pensions in deferment depend on the current inflation rate, to a maximum of 2.5%, so it would be suitable to assume that these values are both 2.5%. Now that we have got our valuation assumptions set up, we can calculate the contributions that employers need to pay in to the scheme, expressed as a percentage of our members' salaries. Our baseline assumptions give us an annual contribution rate of 17.80%. The total value of our pension liabilities is approximately £54.38 million. Let us look at a few different economic factors in turn to understand how they will affect the contribution rates.

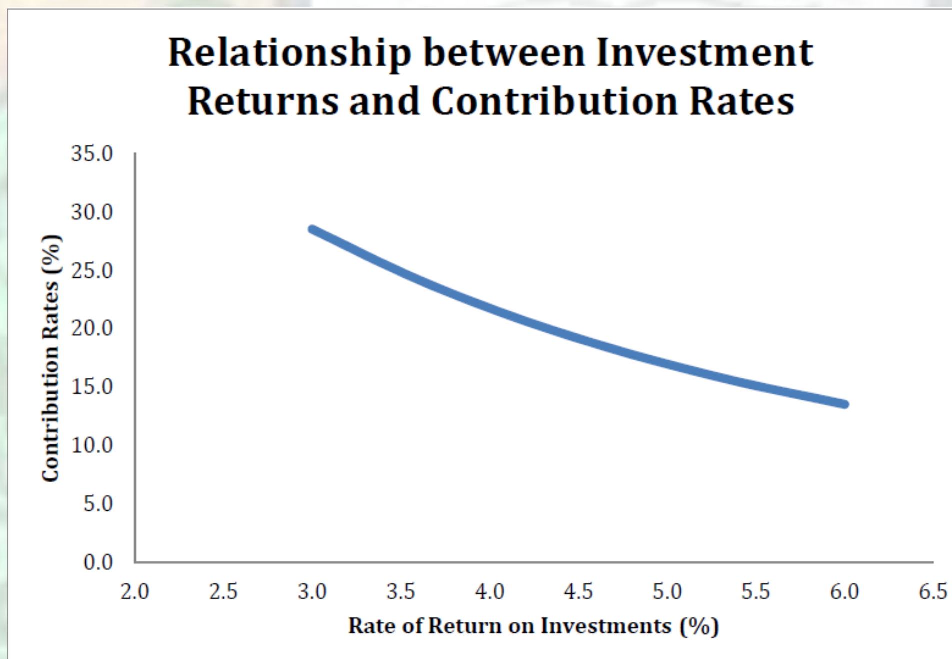
Return on Investments

A key economic factor that affects the cost of the scheme to the employer is the investment performance of the scheme's portfolio. We have assumed that the assets give a return of 4.8%, but what happens if the investments perform poorly, or if they do unexpectedly well? Take a look at the table below:

Rate of return on investments (%)	Liability value (£million)	Contribution rates (%)
3.0	81.26	28.52
3.6	70.69	24.18
4.2	61.84	20.66
4.8	54.38	17.80
5.4	48.06	15.45
6.0	42.68	13.52

As we can see, reducing our assumptions by a small percentage can cause a huge leap in the liability value and contribution rates that have to be paid in by the employers. This difference would be even more significant in large schemes: Just by reducing the interest rate by 1.8% from 4.8%, we have caused an increase of £26.88 million in the liability value! The relationship between the investment returns and contribution rates can be further illustrated in the following graph.

When the investment performance is poor, employers would be expected to pay more into the pension scheme. Conversely, if the investment performance is good, employers can pay less into the scheme.



How, then, should trustees choose the value of interest rate to use in the valuation? Well, firstly, it depends greatly on a scheme's asset allocation; for example, if most of the scheme's assets are gilts and bonds, we cannot realistically expect a very high rate of return, so we should not take into account the higher yield.
Since schemes typically do invest in risky assets, should we take into account the higher rate of return in setting our assumptions? Here, if you don't take into account the higher return, you will end up using a very low interest rate in valuation (such as the 3.0% above) and hence get a very large value for the contribution rates. This approach is overly conservative and will tie up a lot of the employers' funds in the pension scheme.

On the other hand, if you are overly optimistic and expect very high returns, you may end up paying in too low contribution rates. This means if investment returns are not as good as expected nearing the time when payments are due, the company would have to pump in more and more funds to be able to meet the promises made. Therefore, a good method would be to take into account the higher return, but not overstate its value.

Salary Inflation

The benefits of most DB Schemes are linked to employee's salaries, and it is typically their final salaries that are taken into account. However, during the date of valuation, we do not know what each employee's salary will be on the date of retirement, so we need to make assumptions on how their salaries will increase in the future. Salary increases can depend on various factors:

· Employee's length of service. Typically, a new joiner would have a more rapid increase in salary compared to someone who has stayed with the company for a long time.

· Employer's overall financial situation. If the employer performs well, employees should be able to get higher salary increases to reflect this, as this will motivate the employees to do better. Conversely, if the employer does poorly, it may be unable to give high salary increases to its employees.

· Influence of unions. Some unions will ask for a stable increase in salaries, and this should be taken into account during pension valuation.

Here, we will look at the cases of both high and low salary inflation.

Salary Inflation (%)	Liability value (£millions)	Contribution rates (%)
2.0	48.98	15.54
3.0	54.38	17.80
5.0	68.38	24.11

The table shows that higher salary inflation will lead to an increase in the contribution rate. This is because liabilities of a DB Schemes are proportional to the salaries, so if salaries increase by a larger amount, so will the value of the liabilities.

Other Factors Influencing Cost of Pensions

There are various non-economic factors that trustees should take into account when setting the valuation assumptions, such as:

· **Probability of death, ill-health retirement, or withdrawals during service.**

Trustees need to ensure that they have the most up-to-date information about the likelihoods of employees leaving the scheme, because these will have a direct impact on the cost of providing pension benefits to the remaining members.

· **Whether the employer is able and willing to pay for the benefits.**

If the trustees think that the employers are able and willing to pay for any increased contributions should they arise, they can then invest in riskier assets in hopes that it will give a higher return. If a scheme is well funded, this may not be too big an issue, however trustees might be more cautious if the scheme is in a large deficit.

· **Increase in State Pension Age (SPA).**

The current SPA is 65 for men and will rise to 65 for women between 2010 and 2018. However, there are plans for the SPA to increase in the future years. Since most companies set their scheme's retirement age in line with the SPA, we expect this to increase as well. This would make the scheme cheaper for employers because employees pay in for longer years and receive benefits for fewer years.

· **Increasing longevity.**

People tend to live longer after retirement, and so if the company is paying out an annuity, it would cost more since they need to pay for longer. However, due to the new legislation stating that employees no longer have to buy an annuity with their pension pot, more people may be drawn to take out their pension as a lump sum, hence reducing the longevity risk faced by the company. These other factors are by no means exhaustive and it would be helpful to carry out further calculation or investigation to study their effects on the pension liabilities.

Conclusion

As seen from above, varying the scheme's assumptions by a small amount can cause significant changes to the liability amount and hence the cost of the scheme to the employers. Therefore, it is important for the trustees to set a realistic and prudent basis with suitable assumptions according to current market conditions, so that the scheme can be affordable to employers and secure to employees.

SAS CONFERENCE

BY JOHN WATRET

Heriot-Watt welcomed several distinguished guests to present at this year's Students' Actuarial Society (SAS) Conference on Wednesday 11th February. The SAS Conference is always an important date to mark in the calendar as it offers students the chance to gain insight into the field of actuarial work and to interact with those currently in the profession. It is not exclusively for students and indeed many qualified actuaries, professors and academics regularly come along, with over 150 professionals and budding actuaries attending this year.

The title of this year's conference was 'The Modern Actuary', referring to the ever-changing nature of the subject and the wide range of positions actuaries are found in today. The typical role of an actuary is fast changing in the 21st century and SAS wanted to highlight this topic clearly to students who may be considering which field they would be suited to for the future.

Ley Kuan Law, the conference director, started proceedings by introducing the speakers. Rebecca Campbell, the Vice-President of SAS, then opened with a great speech on the role of SAS, and reflected on the excellent work each member of the society did throughout the year.

The first speaker, Craig Turnbull, from Moody's Analytics, presented the history of actuarial thought on investment strategy. He initially highlighted the change in life office practices in the UK, from using mainly illiquid assets in the 1890s to the need for a more cash-friendly approach at the turn of the century. This was followed by the rise of equity buying in the 1930s and 40s to cope with the pressures of the great depression and World War II.

This was followed by Dr. Gordon Woo, from RMS, who spoke on the risk management of emerging epidemics. He spoke on the recent Ebola outbreak in Africa and how the cost of aid required to help has grown exponentially the longer the epidemic continued its unrelenting attack on the continent. Gordon explained the economics of epidemic control and how insurance companies can play a bigger role in the future in helping prevent the damage caused by outbreaks.

A third talk from Emma MacKenzie (RBS) and Mark Byrne (Accenture) was about Big Data and how it is possible to use key information to provide better services. They explained that today's world is full of data, from phone records to internet history, and deciphering the useful parts is a challenge. This can be done by data scientists who aim to sift through the data and find hidden meaning.

Afterwards, Russell Borland and Thomas Chalmers, from Leading Figures, spoke about leading your career. As coaches, their job is to help clients achieve their goals. Prominent figures such as the former President of the IFoA, Dr. David Hare, and Fraser Smart, the President of the Professional Services Group of Xerox sent encouraging messages on their careers and spoke on the particular qualities needed to succeed as an actuary.

This year, the IFoA kindly sponsored a prize for the best questions asked, presented by Ms Suzanne Vaughan from the Scottish Board. The prize was split between two students, Jack Wiggins (second year) and Jason Eber (third year).

To close the event, Ben Bailey-Conlon, the President of SAS, thanked the presenters and our sponsors for their support. He also thanked the students for their participation and all guests for attending the event. Students were impressed by the calibre of the conference and the organisation of the event, saying that the topics were interesting and inspired them to find out more. Another year, another successful conference.

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SUDOKU OF THE MONTH

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Complete the puzzle above and stand a chance to win a £20 Amazon voucher! Just scan or take a picture of the completed puzzle (make sure it is readable) and send it to jw235@hw.ac.uk. We'll select one lucky winner from all the correct submissions and will inform you via email if you have won the £20 Amazon voucher. **Contest ends 20th March 2015.**