

The Actuarial "Watt"?

EDITOR'S NOTE

We hope you all enjoyed our first newsletter of the semester. Just like the previous issue we will also be releasing an electronic version of the newsletter; so that anyone who doesn't receive a hard copy won't miss out. In this edition, we have a range of topical and informative articles on very interesting issues including Typhoon Haiyan, which has recently devastated the Philippines, and Longevity.

Once again I'd like to remind everyone that you can also get involved in the Current Affairs Sub-Committee and contribute to our newsletter at any time by once again dropping me an email at jap12@hw.ac.uk. Any relevant contributions will be welcomed!

This will be our last newsletter of the semester before exams kick in. We hope you all do very well! Feel free to email any of the SAS committee members about any problems with course material you may have, especially our education sub-committee.

We hope you enjoy the Christmas Holidays!

-Jack Paton-

LONGEVITY: WILL ANTIBIOTICS BE THE END OF US?

BY JOHN WATRET

For just over 80 years since the discovery of penicillin by Alexander Flemming, antibiotics have been a force for good. They were able to magically cure diseases that had once killed millions throughout the world such as chlamydia and Scarlet Fever. Penicillin was even branded as 'the wonder drug' during the Second World War as it helped cure bacterial infections of thousands of service men on the front line. As such, the world entered a new and exciting era of the research and design of antibacterial drugs.

The biggest benefit to society of these miracle drugs was increased longevity as we were able to fight back against bacterial infections that would otherwise have been left untreated. This in turn affected the way life insurance and pensions were determined as people were expected to live longer. However, it is difficult to say how much this discovery influenced longevity as research only intensified after the War in an era of relative peace and introduction of the welfare system.

For the years between 1925 and 1940, the life expectancy in the UK remained static at about 58 years for men and 62 years for women. This, however, changed after the widespread use of antibiotics and has been steadily increasing ever since to 78 years for men and 82 years for women (2010), adding an additional 20 years' life in the space of just 70 years (source: ONS). As such, it meant that mortality tables had to be updated more frequently and the need for actuaries to compute life insurance policies increased.

Although the trend in fig.1 in the graph below shows that mortality is generally decreasing as we move towards better healthcare and increased awareness of diseases, there may come a point where this process does not continue and in fact increases to levels experienced at the turn of the 20th century. The graph does not explicitly show how mortality has changed solely due to antibiotic treatment but it does give an indication of the way in which the UK is moving towards an ever aging society where the cost of pensions is mounting. But are we to assume that all infectious diseases are cured by antibiotics?

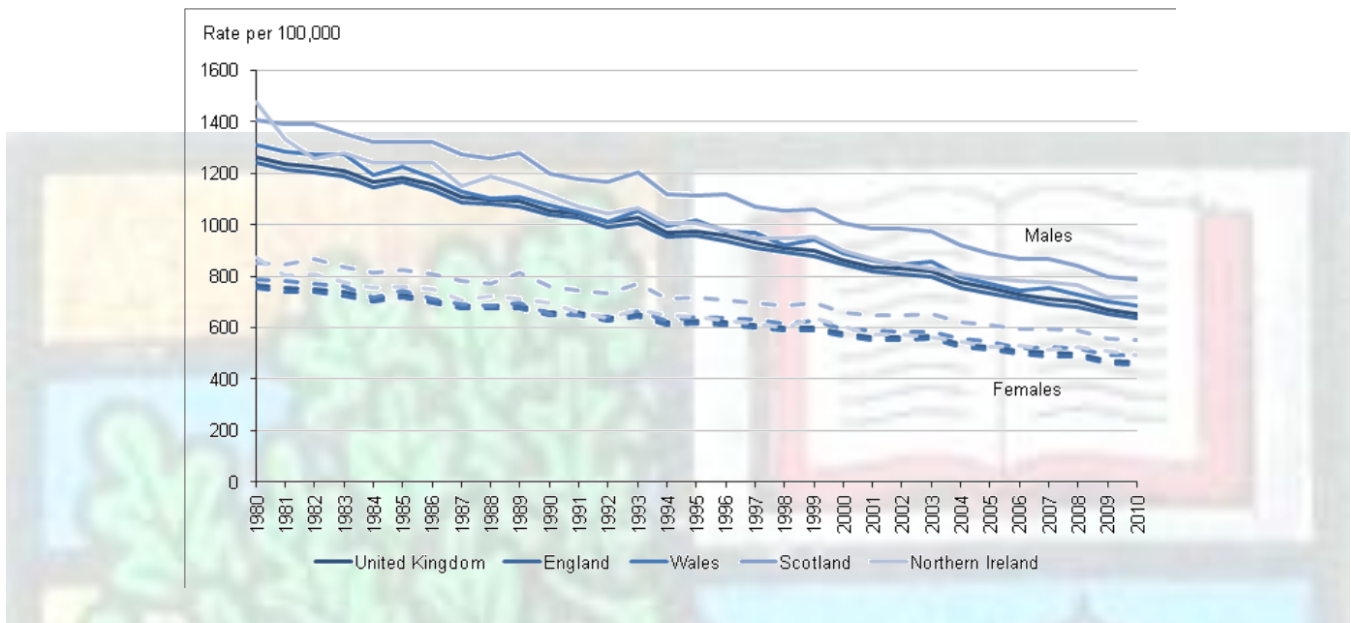


Figure 1 - Current trend in mortality. Will this reverse in the future? Source: ONS website

Nowadays, antibiotics are more prevalent than chocolate and there is growing concern that our biggest downfall will be our reliance on them. A recent article published in *The Lancet* titled ‘Antibiotic resistance – the need for global solutions’ explains how our dependence on drugs as treatment for every illness nowadays is putting our futures at risk. In it, several of the world’s leading scientists explain that the drugs we use for bacterial infections may be redundant in the near future as more and more gram negative bacteria become resistant to them.

We all know too well how quickly viruses can spread with the outbreak of swine flu in 2009 and the affects it can have on society if a treatment is not readily available. Although bacterial infections are not as easily spread, the same effects can be felt if there is no way of treating it with our current array of penicillin derivatives.

And already we are experiencing the effects of antibiotic resistant strains such as MRSA (methicillin resistant staphylococcus aureus) and MDR-TB (multi drug resistant tuberculosis) where our current treatments are unable to cure diseases that were once considered innocuous. As more and more bacteria become resistant, we will steadily slip back into an area before the advent of penicillin where we were simply defenceless against bacterial infections. An even worse thought is the fact that post-surgery wards have a higher prevalence of antibiotic resistant strains, attacking patients with weakened immune systems.

A report by the CDP (centre for disease control and prevention) this year has highlighted the threats posed by antibacterial resistance. It states that in the US, at least 2 million people are infected by these drug resistant bacteria a year and at least 23,000 die as a result with many more deaths due to conditions complicated by such infections. This number is projected to rise over the coming years as we run out of drugs to treat these bacterial resistant infections. Since the discovery and widespread use of penicillin, bacteria have been mutating to gain resistance from the drug. It took 9 years before the discovery of a tetracycline (antibiotic) resistant was found after its introduction: today the gap between a new antibiotic introduction and its resistance has narrowed to months (as was the case for ceftaroline in 2010).

Not only is this a worry to human existence but also to life insurance and pensions. It creates massive uncertainty in the calculation of mortality rates as actuaries do not know whether to follow the current downward trend or account for what could be a sharp rise in the near future. The rising cost of pensions could decrease if more and more people are infected by these resistant infections thus decreasing life expectancy. Life insurance costs could rise to take into consideration the increased chance

of acquiring one of the antibacterial resistant diseases. As life moves forward, we may find that the mortality tables of the 1940s are more appropriate in the year 2040.

All hope is not lost though as the European Commission understands the importance of research into antibacterial resistance and has recently announced funding for new projects aimed at finding alternatives to our current line of defence. Although deaths caused by drug resistant bacteria are currently low in comparison to other diseases such as cancer and arteriosclerosis, there is growing concern that if no action is taken now then we may not live to regret it.

One big problem still exists though: how do actuaries approach this delicate situation without seeming immoral? Is it fair to exclude bacterial resistant illnesses from life insurance policies because research has shown the chance of death associated with them has increased? Or should they risk investing more in pensions knowing that fewer people in the future will be able to receive it? Until there is more evidence of antibacterial resistance having such a negative effect, there will be more than likely no change in the current trend of smaller pensions for an aging population or exclusions from life insurance due MRSA.

QUANTITATIVE EASING

BY ERIC WONG

What is Quantitative Easing?

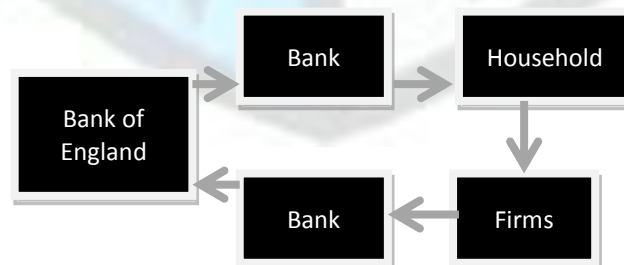
Quantitative Easing (QE) is an unconventional monetary policy which aims to stimulate growth, improve the liquidity of the capital market and maintain stable inflation rates. QE was launched on the 13th March, 2009 after the low bank rate failed to increase spending. This was in response to a sharp fall in demand as business and consumers reduced their spending. In layman's terms, there was not enough money in the economy.

How it works

The Bank of England's Monetary Policy Committee has been purchasing assets financed by new cash that the Bank created electronically. The BoE purchases assets from private sector businesses, including insurance companies, pension funds, high-street banks and non-financial firms. Most of the assets purchased are government bonds. Since the market for these assets became illiquid, the BoE could find sellers fairly quickly. The BoE is also buying smaller amounts of private debt like corporate bonds. These purchases are aimed towards improving conditions in capital markets, and thus making it easier for companies to raise capital. After the BoE injects money into the economy through different channels, businesses and household can then deposit the money into their bank account. So commercial banks have more funds which they can use to finance new loans. However, by increasing the money supply in the economy, the price of good and services could become inflated. If the committee thinks inflation would go above target, it could raise the bank rate and sell assets to remove the extra money put into the economy

The Effects

The BoE's injection of money into the economy works through different channels and has a variety of potential effects.



Policy signaling effect

This happens when the economic agents learn about the likely path of future monetary policy from asset purchases. For example, when the BoE announces the extension in QE fund, some agents may decide to save more reserve as there would be new injection anyway. As a consequence, the channels between banks, households and firms would break down.

Portfolio balance effect

When the BoE buys assets, this increases their price and so reduces their yield. This encourages the sellers of assets to use the money they received from the BoE to switch to other financial assets like equities and corporate bonds.

Lower borrowing cost

The QE actions would push the price of assets up; equivalently the yields of assets are reduced. This leads to a reduction in the borrowing cost for firms and households. It is then likely to boost spending and investment in order to control inflation.

Liquidity improvement

While the portfolio balance effect is in force in the economy, this can lead to an improvement on the liquidity in the economy generally.

Consumers’ confidence effect

QE improves the economic outlook and therefore it can boost consumer confidence. Since the yields are low in general, it can reduce the borrowing cost. In turn, this encourages consumers to borrow cash for things such as mortgages.

Bank lending effect

Those selling assets to the BoE deposit more money into their bank accounts. So commercial banks have more funds which they can use to finance new loans. Ideally, it would increase bank lending in order to stimulate more spending and investment. However, this channel is likely to be relatively weak as banks continue to repair their finances in the wake of the crisis. That's why the BoE is buying most of the assets from firms other than banks.

Impact on pensioners

Since the yields are reduced significantly, this would lead to a reduction in the income of annuities. For the pensioners without a defined benefit pension plan, QE would reduce their income.

Early Timeline of QE

Date	Event
2009	
5 February	Bank rate reduced from 1.5% to 1%
13 February	First purchases of commercial paper begin
5 March	Bank rate reduced from 1% to 0.5%. The MPC announces it will purchase £75 billion of conventional bonds with maturity between 5-25 years.
13 March	First purchase of gilts begins

25 March	First purchase of corporate bond begin
7 May	MPC announces it will inject further £50 - £125 billion
6 August	MPC announces it will inject further £175 billion.
5 November	MPC announces it will inject further £200 billion.

2010

8 January	First sales of corporate bonds
4 February	MPC announces that QE asset purchases will be maintained at £200 billion

TYPHOON HAIYAN

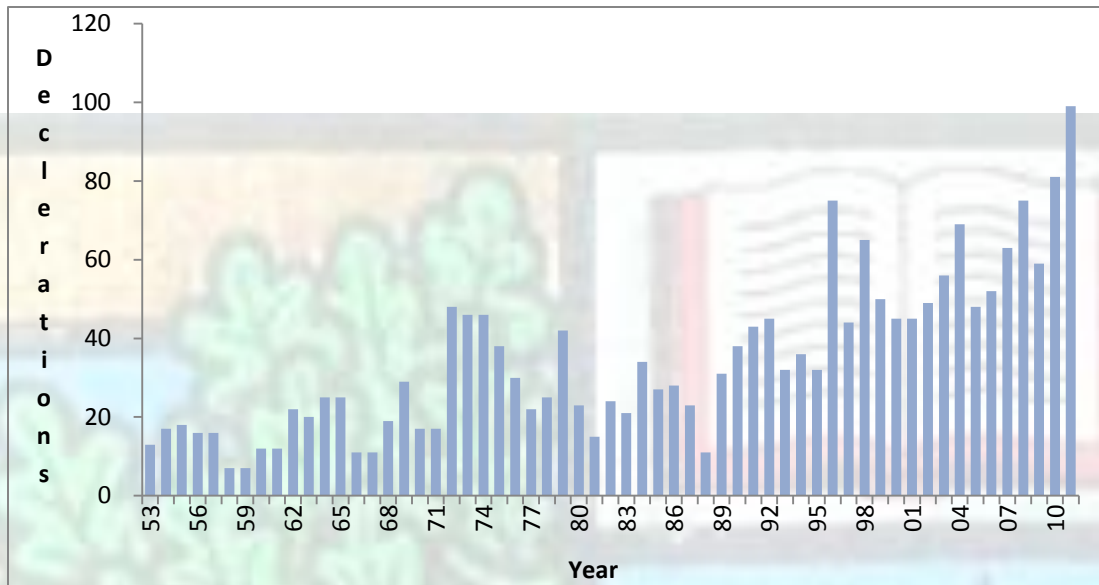
BY HOLLY BURNS

A fortnight ago, the strongest storm ever recorded on land hit the Philippines. Around of 4000 people have been left dead in the wake of Typhoon Haiyan, with the UN reporting that an estimated 11.5 million people have been affected, around 1.8 million displaced, 13,000 injured and 2,000 still missing. Emergency aid has been pledged internationally, from both governments and businesses, but the disaster will cost the Philippines' economy hundreds of millions more. And of the thousands of homes completely destroyed, very few are likely to be covered by insurance.

A survey recently conducted by AIA Group member Philam Life indicated that insurance penetration in the Philippines is lowest in Asia, with only 1.1% of Filipinos investing in life insurance. So although official figures will take many months to be released, it would seem the insurance industry will not be facing large pay outs. However this has not been the case for many natural disasters in recent history.

- The Indian Ocean Tsunami: struck on Boxing Day 2004, devastated local fishing and tourism economies and \$1.3 billion was claimed in insured property losses.
- Hurricane Katrina caused widespread devastation in New Orleans in 2005. Insurance claims totaled \$130 billion and at the time it was declared that Katrina was "the biggest single disaster in insurance history". It has been the only disaster to date which has cost insurers more than the 9/11 attacks.
- Queensland floods of December 2010 were reported by the Insurance Council of Australia to have cost insurers \$1.51 billion in pay outs.
- The huge 9.0 earthquake and tsunami which followed, hit north Japanese shores in March 2011, killing 16,000, and sparking a nuclear crisis after the Fukushima Daiichi Nuclear Power Station was affected. It cost car, marine, life, and personal accident insurers \$25 billion.

It is the consensus of the majority of climate scientists that the global temperature is on the rise, and more extreme weather conditions, like the events above, are becoming increasingly common. After Hurricane Katrina in 2005, John Coomber (who was Swiss Re chief executive at the time) echoed this concern, saying the world was facing "increasing natural catastrophe events" and explained how "price levels in the upcoming months must be adjusted to reflect these developments". This chart shows the steady increase in declarations from 1953 to 2011, where 2011 seen the largest number of Federal Disaster Declarations in America, with 99 being recorded.



This means that although insurance companies are restricted from raising premiums in response to a single event, they are having to adjust their exposure to risk, by factoring in not only past events, but the increased likelihood that they will happen again.

Insurers are required by law to maintain enough in cash reserves to cover any foreseeable event, so companies have to be structured so that they can absorb the costs involved with a catastrophic weather event. Most of them do this by spreading their risk across different geographic locations. Firms also use their capital to invest in schemes that help to combat what they see to be the problem:

- Swiss Re have previously invested in new solar technology in a bid to reduce household carbon emissions
- The Travelers, a personal, business and financial, professional & international insurance company, with offices in every US state, and across Europe, offer a 10% discount on their car insurance to policyholders with a hybrid car.
- Fireman's Fund is a California-based insurance company. It provides personal and commercial property and casualty insurance products across the US. They have cut premiums for "eco-friendly" buildings that save energy and emit fewer greenhouse gases. When it pays out on a claim, Fireman's Fund specifies that policyholders are to replace roofs, windows, and water heaters which are kinder to the environment.

Insurers are trying to use their clout in the way they have previously; by promoting fire prevention; lobbying for building codes; testing the crash-worthiness of cars and giving vehicles safety ratings. Although it is a move which could be seen as an attempt to safe guard profits, the insurance industry does seem to combat the effect natural disasters have on them.

DEFINED BENEFIT & CONTRIBUTION PENSIONS

BY JIA-HUI LIANG

There are two main types of company pensions. A defined benefit pension is a pension in which an employer pays an employee a specific amount of money, either per month or in a lump sum, according to one's length of service in the company and salary. Hence, a defined benefit pension is "defined" since the benefit is known and predetermined. Benefits are indexed for inflation, which means that your pension income will increase in line with inflation.

There are two types of defined benefit pension. Final salary schemes are based on the salary you earned before you retire. Career average schemes are based on your average salary across your career.

On the other hand, a defined contribution pension is a pension in which both the employee and employer contribute a certain amount or percentage of money. The contributions can be invested by the company in various different ways to increase its value. One such way is through the stock market. The size of the pension pot depends on the amount of contributions and performance of the investments. Thus, in a defined contribution pension, the contribution is defined, but not the benefit. Once you retire, you can take some of your pension as a cash lump sum and use the rest to secure a pension income by buying an annuity.

The defined benefit pension is advantageous for the employee as it offers more certainty compared to the defined contribution pension. However, since the defined benefit pension is fully funded by the employer, it becomes a liability which will affect the company’s profits. As a result, many companies have shifted from defined benefit pensions to defined contribution pensions. Another reason for this shift is the need to shift the responsibility of retirement planning from the employer to the employee.

From the employer’s perspective, direct contribution pensions help to reduce the financial burden of the company. For example, in 2006, IBM stopped funding its defined benefit plan and moved towards defined contribution plans. The company said that it would save \$3 billion within the next few years.

From the employee’s perspective, this plan provides flexibility regarding investment choices. However, in the defined contribution plan, investment risks are passed onto the employee, instead of the employer. This means that the amount of pension savings could be lower than in a defined benefit plan if the returns on investments did not perform as expected. Based on an article by Towers Watson, from 1995 to 2011, defined benefit plans outperformed defined contribution plans by an annual average of 76 basis points. Hence, it is important for the employee to have some level of financial literacy and understanding of the stock market.

With the introduction of the auto-enrolment programme in the UK in October 2012, workers are automatically signed up for the company pension plan. Furthermore, as direct benefit plans are being phased out in favour of defined contribution plans, this is a cause for concern for employees. The Office of Fair Trading has called on the Pensions Regulator and the Association of British Insurers (ABI) to remove pension plans that offer poor value for money.

In conclusion, defined benefit pensions tend to benefit employees more, whereas defined contribution pensions tend to benefit employers more. Therefore, the UK government has proposed “defined ambition” schemes which would split risks more evenly between employees and employers. It is considering three options – flexible defined benefit pensions, building guarantees into defined contribution pensions and introducing collective defined contribution pensions.

In a flexible defined benefit pension, employers are not required to increase pensions in line with inflation. Employers could choose to provide discretionary benefits such as indexation or one-off bonus payments, in years when the pension scheme has performed well. A “money-back” guarantee for defined contribution pensions would prevent the value of an employee’s pension pot from falling below the level of contributions made to the scheme. Collective defined contribution pensions pool employees’ contributions and pensions would be paid from the collective fund. However, despite the best intentions of the UK government, every pension plan has its drawbacks.

Defined Benefit	Defined Contribution
Funded by employer	Funded by employee and employer
Benefit is known in advance, determined by a set formula based on earnings and duration of employment	Benefit is uncertain, depends on amount of contributions and investment returns
Risks borne by employer	Risks borne by employee

BRAIN TEASER

1	6				7			4
		5	4		8			9
		2	9			3	5	
4	2					7	9	
				1				
	5	3					6	8
	9	8			3	5		
5			2		4	9		
7			6				2	1

Complete the puzzle above and stand a chance to win a £10 iTunes voucher! Just scan or take a picture of the completed puzzle (make sure it's readable) and send it to jap12@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 £10 iTunes voucher. **Contest ends 20th December 2013.**

UPCOMING EVENTS

SAS Mystery Bus Tour

- Date: Wednesday 22nd January 2014
- Tickets will be available soon!

SAS Annual Conference 2014 – “Resistance”

- Date: Wednesday 12th February 2014
- Time: 3:00pm
- Venue: James Watt Centre 1
- Arranged by SAS Conference Director