STUDENTS' ACTUARIAL SOCIETY

PRESENTS

THE ACTUARIAL *Watt*

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NOVEMBER EDITION

HW Students Actuarial Society

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NOTE FROM THE EDITOR

Well hello again and welcome back to another edition of the Actuarial Watt! And yes, we are keeping with two editions each semester...so far.

As some of you may know, project season is hitting students hard as most 4th year students are busy with 3 projects on the go at the same time (hopefully not just me). 3rd year students have had their portfolio theory and stochastic projects to deal with, but it could be worse... at least the 2nd stochastic project is no longer a 48-hour caffeine-fuelled bonanza this year.

So, what other things have we been up to? Well, we held a lecture on how to tackle coding problems by your friendly neighbourhood Amit which I heard was a sell-out event! We also had a career talk from the IMA, an internship talk and not one but two industrial placement talks! You can't say we aren't good to you.

In terms of fun stuff happening, you should hear about the details for the Christmas dinner soon (if you haven't heard about it before picking this newsletter up) so that's one thing to be excited for.

But anyway, let's start talking about the articles on offer. For this edition we are mixing it up and have 4 very interesting articles to share with you. With more and more people choosing to do their shopping online, large companies that focus on E-commerce can capitalize on our new purchasing preferences. However, how responsible are these large companies when it comes to declaring how much tax they pay? Brogan Howe discusses this issue and its impact on other businesses and the government.

More onto the topic of responsibility, in the world of work, it is the responsibility of employees and their employers to think about saving for retirement, (any 4th year taking Pensions will hear a lot about this). With the introduction of the Automatic Enrolment regulation, there are more opportunities for those who are eligible to start saving. Lewis Currie investigates this and the impact it is having in the UK.

Automatic Enrolment is much easier to incorporate due to advances in modern computer systems and other technologies. Riddhi Lakhotiya explains how technology has changed throughout the years and how this has affected the insurance industry.

Aside from technology, climate change has also affected the insurance industry in recent years. With more and more people becoming aware of how humanity is affecting the planet and our climate, Paarisha Emilie explains what this means for the insurance industry and how climate change can have both a positive and negative financial impact for insurers.

That is all from me and if you have made it this far without getting too bored then well played. All that's left to say is good luck with the rest of your studies, thank you for making it this far and enjoy the rest of the newsletter!

Fraser Albiston

FRASER ALBISTON

IS TAX FALLING BEHIND?

With a rise in popularity of purchases made online, multinational companies are able to legally reduce the amount of tax they have to pay. But what impact does this have on local businesses and the Government?

In a modern digital economy, people are managing all their purchases, and finances online. The emergence of a constantly evolving and adapting world, has caused some issues for governments taxing companies for the profits they have made on goods and services. This article will centre around Amazon because students are very familiar with this company. It should also be noted that Amazon has not done anything illegal, when it comes to paying its taxes.

The UK government set out to tackle digital companies such as Amazon, Google, Facebook and Netflix. In 2018, the former Chancellor of the Exchequer, Philip Hammond, announced that he wanted to introduce a "Digital Services Tax" in 2020, to help tax companies who are making a profit and have revenues around the world of at least £500 million. It was hoped that this new tax, would bring around £400 million extra taxes, per annum, to Her Majesty's Revenue and Customs (HMRC).

Amazon employs over 27,500 people in the UK alone, and in 2018, Amazon become a one trillion-dollar company, only the second company to achieve this value. However, the controversy surrounding Amazon is as a result of Amazon's pre-tax profits in the UK increasing from £24 million in 2016 to £72 million in 2017. In the same time, the amount of tax Amazon paid in the UK, fell from £7.4 million to £4.6 million.

One might ask "How does Amazon pay so little tax?". This question has a complicated answer. Firstly, Amazon lowers the amount of tax it pays by paying employee's in terms of shares. This means (HMRC) miss out on the corporation tax and other revenues it would have gained, through taxing the employee's salaries. Another part of this answer is somewhat geographical.

"One might ask "How does Amazon pay so little tax?". This question has a complicated answer."

Amazon sales are online through a 'server' and sales made to UK customers are booked through the UK branch of a Luxembourg company called, Amazon EU Sarl. The fact sales are made through a 'server' which can be located anywhere around the world, brings into question where the sale has actually occurred and should tax on the sale be recorded in the UK, or the place where the server is located?

As a result of the perception of Amazon not paying enough taxes, this has angered high street retailers because not only is Amazon saving money on business rates, it is also saving money on other taxes. Business rates are taxes paid on non-residential properties including shops and factories. Since, Amazon doesn't have many retail shops, this again saves Amazon money. In addition to this, Amazon factories are often located in out-of-town locations, which are cheaper.

Due to the reduced costs that Amazon incur, high street retailers and local businesses struggle to compete with the lower prices that Amazon can charge for their products.

Recently, France has passed a similar tax to the "Digital Services Tax", a 3% tax on revenue of major multinational companies, including Amazon, conducting business in France. This has angered the 45th US President Donald Trump, who believes the tax is not fair on US companies and has threatened tariffs against French products being sold in the US.

It is evident to see that taxing major digital companies is very problematic and risky; a government must balance politics and fairness. A government must show its citizens it wants to tax digital companies 'fairly', without dissuading the companies from investing into that country and economy.

BY **BROGAN HOWE**

REFERENCES
AVAILABLE ON THE WEBSITE

AUTOMATIC ENROLMENT

Between October 2012 and February 2018, the Government phased in new regulation called Automatic Enrolment, making it compulsory for every employee meeting the eligibility criteria – aged between 22 and state pension age and earning at least £10000 – to be automatically enrolled into a workplace pension by their respective employer.

"Automatic Enrolment has granted individuals across all demographics the opportunity to build up retirement benefits that they might not otherwise have signed up to contribute to."

As life expectancy continues to increase, the state benefit system must accommodate a continually increasing number of people. Bearing this in mind, this legislation was implemented to "nudge" more people towards building up retirement benefits. So far it has been a remarkable success as the proportion of eligible staff saving into a workplace pension has increased from 55% in 2012 to 87% in 2018, and the total annual amount saved by eligible savers increased from £73.6 billion to £90.4 billion in that same timeframe. Although it is mandatory that employees be enrolled by their employer, it is not mandatory that they remain so, as there is an option to personally opt out. However, three years after opting out, staff who had done so are automatically re-enrolled, prompting them to reconsider their initial decision.

Implemented indiscriminately nationwide, this legislative change has had a profound impact on one demographic in particular – youth. In the private sector in 2012, only 24% of eligible staff between the ages of 22-29 were enrolled in a workplace pension. By 2018, that figure had risen to 84%. The benefits of beginning to save for retirement as early as possible cannot be understated, with the Director of Automatic Enrolment at TPR (The Pensions Regulator) Darren Ryder asserting that "it's terrific that the chance to save has been opened up to millions more people who may not have otherwise set up a pension. In years to come, young people in their twenties who started saving today will reap the reward of a retirement they can look forward to." Gender parity has also been established. Before 2012, proportionally more males were enrolled in workplace pensions, however by 2018, both eligible male and female enrolment stood at 85%.

Two current issues face the continued success of Auto Enrolment – a rise in wilful non-compliance, and an increase of minimum contribution prompting a potential rise in opt outs. Royal London warns of a "worrying decline" in pension duty awareness, with a decrease from 98% to 94% in medium sized employers, and from 88% to 82% in micro employers. To combat this, TPR use a data led approach to target employers who they "strongly suspect" are breaking the law. Between April 2018 and March 2019, TPR used its formal powers 128,807 times, compared with 102,497 times the previous year. In April 2019, minimum contribution rose from 5% to 8%. Research conducted by TPR when indications of this change were made public suggest that only 2% of staff in micro, small and medium sized business would opt out, however it is too early to draw any definitive conclusions.

Automatic Enrolment has granted individuals across all demographics the opportunity to build up retirement benefits that they might not otherwise have signed up to contribute to. It may seem a lifetime away for a student or young professional. However, starting to save as soon as possible for retirement benefits could be one of the best decisions you ever make.

BY **LEWIS CURRIE**

REFERENCES
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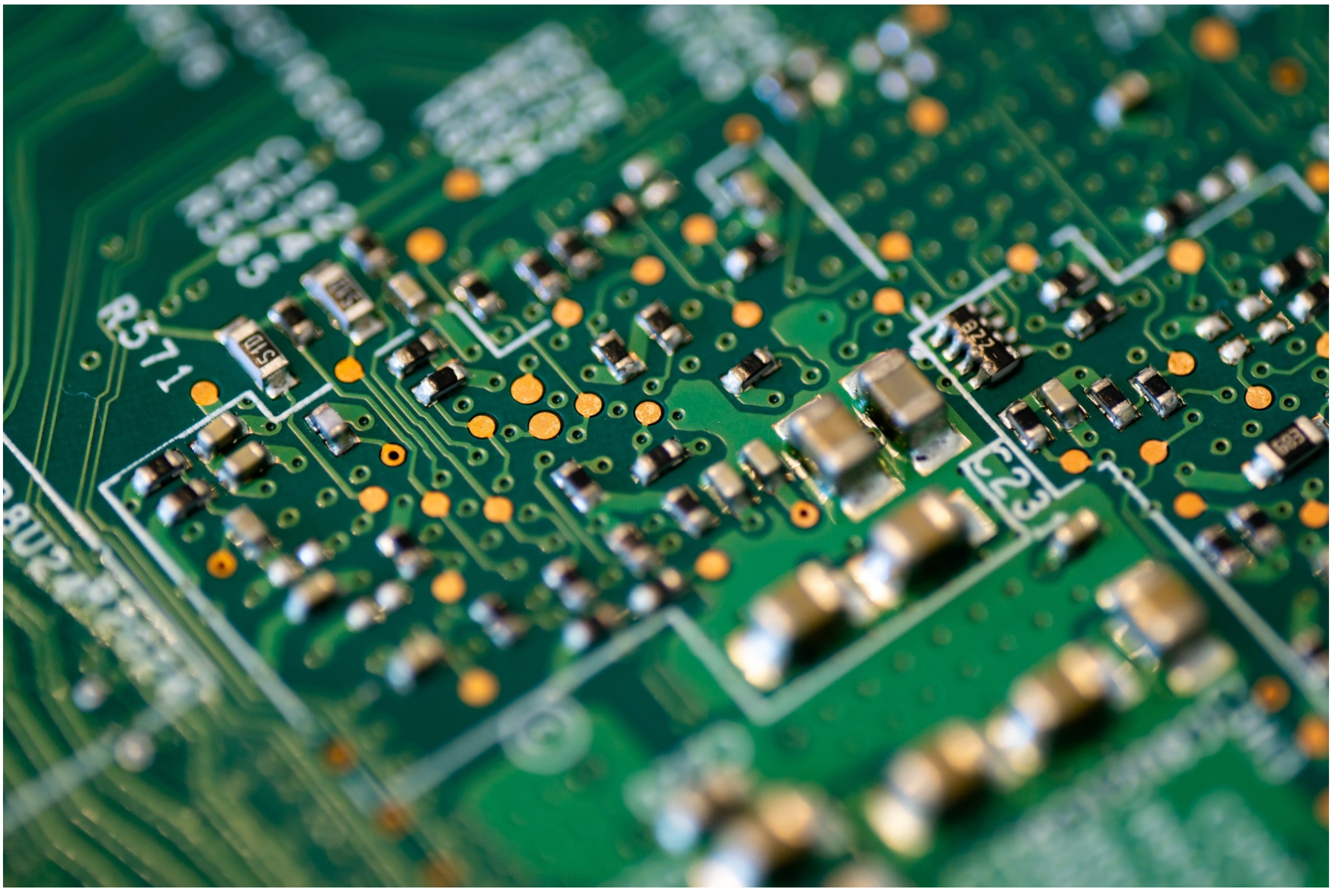
INSURANCE MADE EASY



Technology has come a long way with no sign of stopping soon. How can insurers use this to keep up to date with an ever-changing world and provide the best service to the public?

“people are becoming more aware about the concept of insurance and are noticing its importance”

According to Investopedia, insurance is a contract represented by a policy in which an individual or entity receives financial protection or reimbursement against losses from an insurance company. The insurance sector, over the years, has shown a gradual growth in the number of premiums purchased, meaning that people are becoming more aware about the concept of insurance and are noticing its importance. In the past years due to drastic changes in technology, the insurance sector has been disrupted. The traditional ways of insurance are now being tailored to the new and rapid modernising world.

The new fashion of smart homes, which are embedded with sensors, have helped insurers receive real-time data of the customers assets. For example, if there is a water leak due to one of the pipes being burst then an alert is sent to the insurer and the customer. So, in this case, before a major catastrophe occurs, the owner can be warned by the insurer to get it fixed. This reduces the number of claims. Also, with new technology, cars have sensors which can be used to judge how “good” the driver is, how much time of the day he/she spends driving, the distance, etc. This gives the insurer enough data to come up with a customised insurance plan best fitted for the client.

In the past years, the health sector has had dramatic changes with technology. This has not only helped the patient but also helped insurers. Digestible sensors have assisted insurers to customise the optimal pricing for the policyholder. With technologies like smart watches and smart wristbands, insurers can track health charts and therefore encourage their customers to be healthier by offering them discounts or gift vouchers. This reduces the number of claims and also improves the health of the policyholder, it’s a win-win.

In this day and age, people have high expectations for technology-based services like transparency, speed, regular engagement and a personalized experience. This has been a challenge for most insurance companies. However, recently an American company Trōv have an app where one can insure a small item for a limited amount of time by just posting a picture and adding a few details of the item on the app. This revolutionary insurtech enables coverage of items of a smaller scale. For example, one can insure their bicycle for their weekend trip to the mountains.

With modern technology it has become easier to catch insurance frauds. For example, you can track where a policyholder is using location/GPS on phones. Technology has also made it easier to contact the insurance companies to settle claims. Instead of a member of the insurance firm having to travel to review a claim, the policyholder can just send pictures and settle the claim over text messages. Digital technology has significantly shortened the time between reporting and settling the claims as all the data can be collected in minutes.

It is predicted that changes in technology will increase revenues and reduce claims and administration costs in the insurance industry. As seen above, technology has revolutionised the way insurance policies are made, reported and claimed, and helps insurers adapt to a fast-growing world.

BY **RIDDHI LAKHOTIYA**

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Rising Temperatures and Rising Prices

WHAT IS CLIMATE CHANGE?

According to the Met Office, climate change refers to a large-scale, long-term shift in the planet's weather patterns and average temperatures.

WHY SHOULD ACTUARIES AND INSURERS CARE?

To answer this question, we must understand the impact of climate change on the insurance industry.
The changing weather patterns and a changing climate will affect property and agriculture-related losses through changes in frequency and severity of flood, wind, drought, hail and other climate-related events. Insurance companies will need to consider the changes in climate risks when coming up with pricing, reserving and capital modelling.

Besides that, a changing climate may alter the distribution or prevalence of both infectious and non-infectious diseases like malaria and asthma in insured populations. Thus, a changing climate could increase the number of deaths linked to extreme temperatures. It is worth noting that the relationship between disease and climate change is complex - for some populations, mortality and morbidity may fall.

Climate change could lead to rapid changes in the population of different geographic areas. For example, mass migration occurs due to water shortages or floods. Populations that have either shrunk or increased dramatically because of migration could have very different risk profiles than before in terms of different demographic profile, socio-economic status, education, and so on.

Due to changes in mortality, morbidity, population and other climate risks; actuaries should be mindful of the huge uncertainty surrounding climate change. There is a risk that the different models used by actuaries do not adequately represent the reality of a world impacted by climate change when calculating premiums, reserves and capital. In particular, actuaries should consider how sensitive their models are to assumptions and data that could be impacted by climate change.

If the insurer finds that there is greater uncertainty, they will typically charge higher prices for the risks undertaken. Therefore, insurance with greater climate risks may become less affordable. For some types of insurance, the uncertainty around climate risks could lead to prices that few customers or businesses could afford and lower rates of insurance penetration. It could also widen the protection gap i.e. between those who can afford protection and those who cannot.

Table 1 shows the impact of climate change on some risks, inspired by *Mills et al.* (2005), where ''+'' stands for ''positive'' financial impact (gain) and " - " stands for "negative" financial impact (loss). Therefore, it is important to take note that climate change does not only have negative impacts for insurers.

CONCLUSION

Actuaries and insurers should be aware of the adverse impacts of climate change on not just their business, but also the environment and people. The future is not set in stone, so all parties involved in the insurance industry should come up with innovative products to tackle the issue head-on.

Examples of projected impact	Peril hazard	Property industrial	Property auto marine	Liability business interrupt	Health	Life
Higher maximum temperatures, more hot days						
Hospitalizations, death, serious illness	Heatwave				-	-
Soil subsidence	Subsidence	-		-		
Decreased ice in maritime lanes	Float ice		+			
Increase roadway accident (reaction	Accidents		-			
Increased electric cooling demand	Power outage			-		
Higher minimum temperatures, less cold days						
Decrease cold related mortality	Coldwave				+	+
Extend activity of some pests	Infestation	-		-	-	-
Avalanche risk	Avalanche	-		-		
Permafrost melt	Subsidence	-		-		
Increased summer drying						
Damage to building foundations	Subsidence	-				
Decrease water resource quantity	Drought			-	-	
Increase risk of wildlife	Wildlife	-	-	-	-	

Table 1: Impact of climate change on the insurance industry Source: Charpentier, A. (2008)

BY **PAARISHA EMILIE**

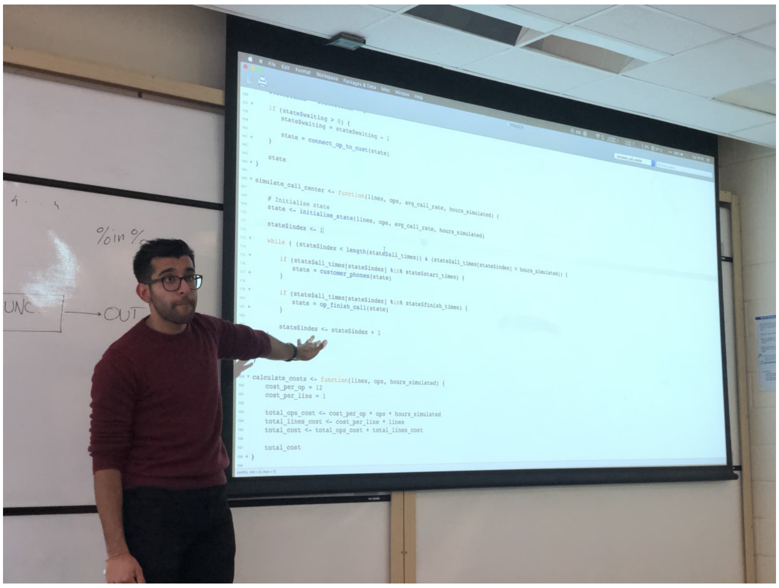
REFERENCES
AVAILABLE ON THE WEBSITE

EVENTS AND ENTERTAINMENT

A very career focused and educational set of events recently. SAS hosts lots of different types of events during the year. Here is a summary of what has happened so far. If you would like to know more about the events we hold and when upcoming events are then check out our website and social media.

HOW TO TACKLE CODING PROBLEMS

A two-part special. Our resident IT extraordinaire, Amit, gave students an insight into the foundations required to help you understand what you will be coding. The second part aimed to show students an example of dealing with coding problems that might pop up in projects. The lectures showed students how to dissect a problem and how to plan steps to deal with the problem.



IMA TALK

At the end of October, Dagmar Waller, a spokesperson for the Institute of Mathematics and its applications gave us an interesting talk into potential career paths that your degree can take you on. Moreover, Dagmar gave advice on how to best prepare yourself for the CV and interview stages of job applications and how a membership for a professional body supports your applications and career prospects.

INTERNSHIP TALK

On the 17th of October, we had seven students who have done internships over the summer shared their experience on the application processes and working experience during their internships. This talk was extremely useful to anyone who is thinking about doing an internship next summer.

INDUSTRIAL PLACEMENT TALK

Another two-part special! If you are interested in taking part in the industrial placement programme and want some info into it, then this was the talk for you! Nine students who were involved in companies in the actuarial industry gave their experience in the sort of work that they took part in during their placement.

SUDOKU CHALLENGE

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Complete the puzzle above for a chance to win a £10 voucher of your choice! Just scan or take a picture of the completed puzzle (making sure that it's readable) and send to fja3@hw.ac.uk . We'll select one lucky winner from all the correct submissions and we will email you if you won.

CONTEST ENDS 29TH NOVEMBER 2019

STUDENTS' ACTUARIAL SOCIETY