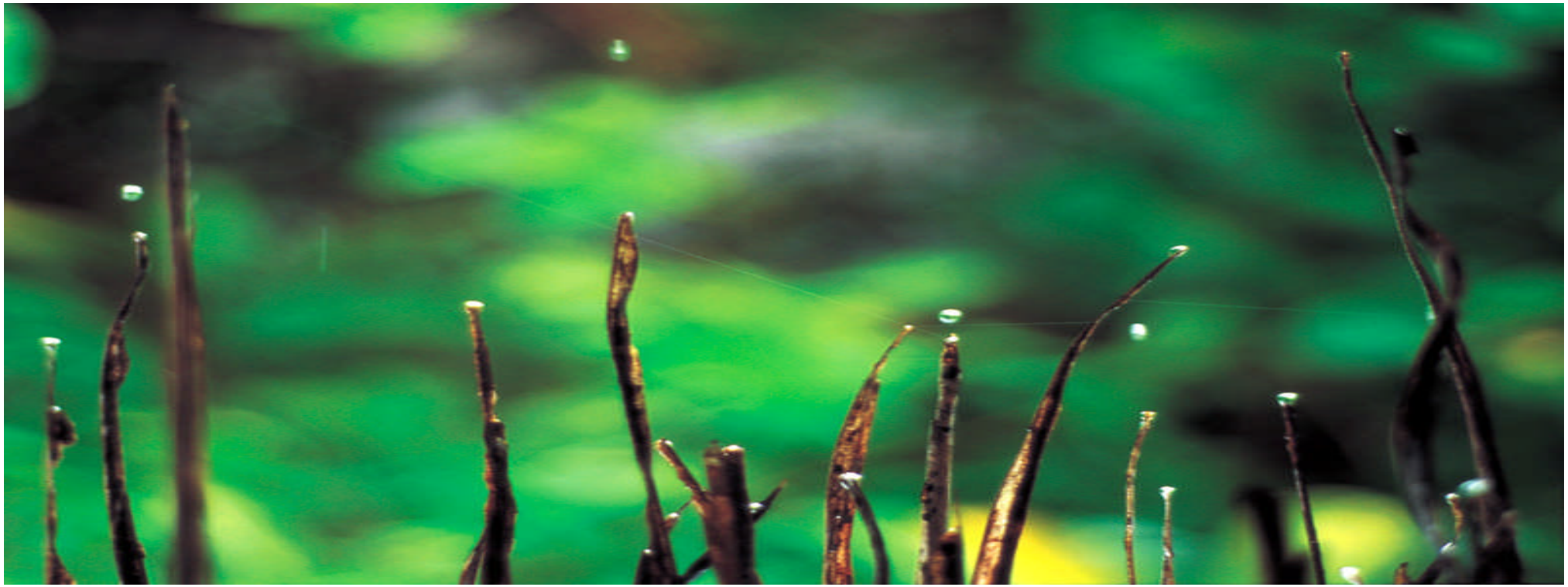
Our Changing Future discussion series and the Faculty of Actuaries Students' Society

March 2007

Current Topics

General insurance



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PRICEWATERHOUSECOOPERS

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1 Industry update

The general insurance industry is an important contributor to the UK economy providing a range of services including property and motor insurance, which help businesses and individuals to manage their risks.

1.1 Market size

In 2005 the industry paid out £20.7bn in claims - a 68% increase from the £12.3bn paid out in 1995.

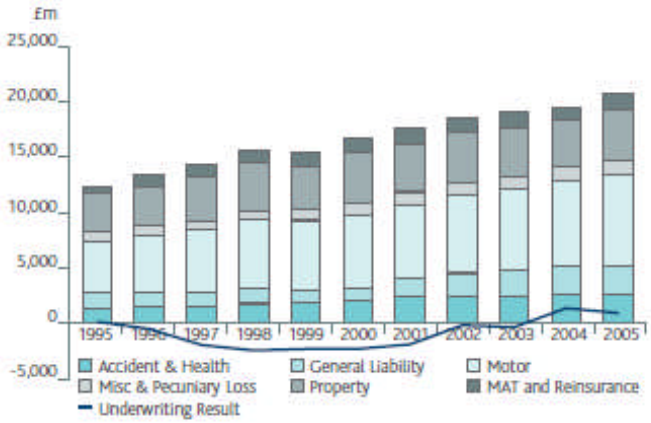


Fig 1: Claims by insurance type, and underwriting results, 1995-2005
Source: ABI

In the same period premium income has grown from approximately £22bn to £32.2bn, an increase of 46%. Despite claims rising at a significantly faster rate than premiums, reductions in expenses and the withdrawal of some insurers from unprofitable markets has led to an improvement in underwriting results.

Fig 2: Total premium by type of insurance, 1995-2005
Source: ABI

There are many ways to buy insurance and the last ten years has seen significant changes in peoples buying habits. This is most clear for retail sectors where the proportion of people buying through brokers fell from 54% to 32%, while the percentage buying direct from insurers grew from virtually 0% in 1995 to 31% in 2005.

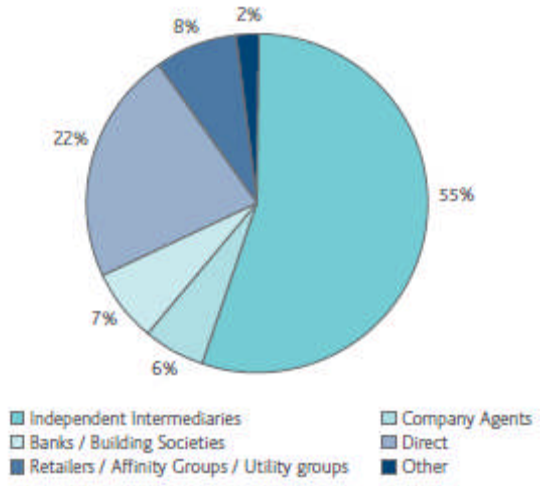


Fig 3: General Insurance Retail Sales, 2005

Source: ABI

Of the 1,118 companies authorised by the FSA to carry out insurance business in the UK, 886 carry out general insurance business. Many of these companies are owned by larger insurance or financial service groups, with 72% of UK business being written by the top 10 general insurance groups.

2005	(2004)	Total Net Written Premium	Premium (£m) 2005	(2004)
1	(1)	Aviva	6,003	5,724
2	(2)	RBS Insurance	4,478	4,478
3	(4)	Royal & SunAlliance	2,552	2,504
4	(5)	AXA	2,463	2,397
5	(3)	Zurich FS	2,375	2,524
6	(7)	BUPA	1,404	1,300
7	(6)	Allianz Cornhill	1,319	1,377
8	(8)	HBOS	833	778
9	(9)	NFU Mutual	762	722
10	(15)	Barclays	589	423
11	(12)	Fortis Insurance Company	573	549
12	(10)	Co-operative Insurance Society	553	632
13	(11)	Lloyds TSB	552	606
14	(16)	QBE International	517	412
15	(13)	Brit Insurance Limited	481	491
16	(17)	Liverpool Victoria	379	384
17	(21)	Groupama Insurance Group	353	273
18	(14)	Legal & General	311	432
19	(-)	GE Insurance	300	-
20	(19)	Pinnacle Insurance PLC	287	273
Total Net Written Premium (£m):			**32,208**	**£31,204**
Share of Largest 5 Companies:			**55.49%**	**56.49%**
Share of Largest 10 Companies:			**70.72%**	**71.90%**
Share of Largest 20 Companies:			**84.04%**	**85.43%**

Source: ABI

1.2 Current Topics

In 2005, the general picture for UK general insurers was reasonable. Premiums were rising and although claims were accelerating at a faster rate, most companies had managed to offset this claims acceleration by reducing expenses by a greater degree. However, not all general insurance firms had a good 2005. Those that were heavily exposed to the US – especially the New Orlean region had horrific losses caused by the four big hurricanes that ripped through the US in 2005.

Following on from 2005, the expectation was that 2006 would also be a bad year for catastrophes. As our second chapter explains, although 2006 was a better year for insurers than 2005, most insurers expect catastrophe-related losses to get worse in the coming few years.

As stated above, claims growth is outstripping premium growth in the non-life insurance industry. Insurers are increasingly becoming aware that increasing premium growth will not be the panacea for improving their bottom line performance and they need to concentrate on reducing claims expenses and claims outgo. Our third chapter gives the result of the PwC Claims survey carried out in 2006, which lists what insurers see as their primary concerns in this area.

Our fourth chapter considers the other side of the revenue account – pricing --and how a specific technique – predictive modelling – can help insurers price in a more sophisticated manner.

Over the past few years, many insurers have seen some of their Commercial Lines reserves deteriorating at a significant rate (for example US Directors' and Officers business). This has put the spotlight firmly on the reserving process and many companies are now interested in what the uncertainty around the central reserve estimate is. We explore the latest thinking on this in our fifth chapter and consider what can be done to better help insurers estimate this.

Regulation of general insurers has become increasingly sophisticated over the past few years with the introduction of the Individual Capital Adequacy Standards (ICAS) regime in 2005. The ICAS regime forced insurers to explicitly model the uncertainty arising from the material risks in their business and explore how it affected their regulatory capital. Our sixth chapter explores how insurers have responded to this in the third year of implementation.

Our final chapter explores asbestos – the scourge of general insurers who have long-tailed exposure. We explore the US, UK and global asbestos issues as this claim type has different characteristics in different territories.

2 Catastrophes

With the world now seemingly agreed that humankind has had and continues to have a large hand in the climate change we are now seeing, an increasing number of risks and opportunities becoming apparent for the actuarial profession.

Climate change is now a staple of the political agenda, with another Intergovernmental Panel on Climate Change (IPPC) report due out this year. Increasing scientific literature and public interest means that it is not an issue that is about to disappear.

This message is reaffirmed by the insurance industry with the Association of British Insurers (ABI) stating that Climate Change is one of its key themes for 2007.

2.1 Extreme Weather Events

Climate change may mean that what we currently consider to be extreme weather events may become more common. From an insurer's perspective, windstorms and floods can present the costliest of weather-related risks.

'Batten down the hatches. Hurricane activity in the North Atlantic this year is expected to be above average and may reach the "hyperactive" level of the last three seasons.'[1]

The 2006 hurricane season was widely expected to be very active, although not as active as the 2005 season when Hurricane Katrina hit New Orleans causing an estimated $81.2 billion of damage. The prediction of catastrophes, particularly hurricanes, is already an uncertain business, and the increasing scientific backing of a link between climate change and increased hurricane activity has changed the way insurers view risks.

2.2 Case Study: Hurricane Katrina

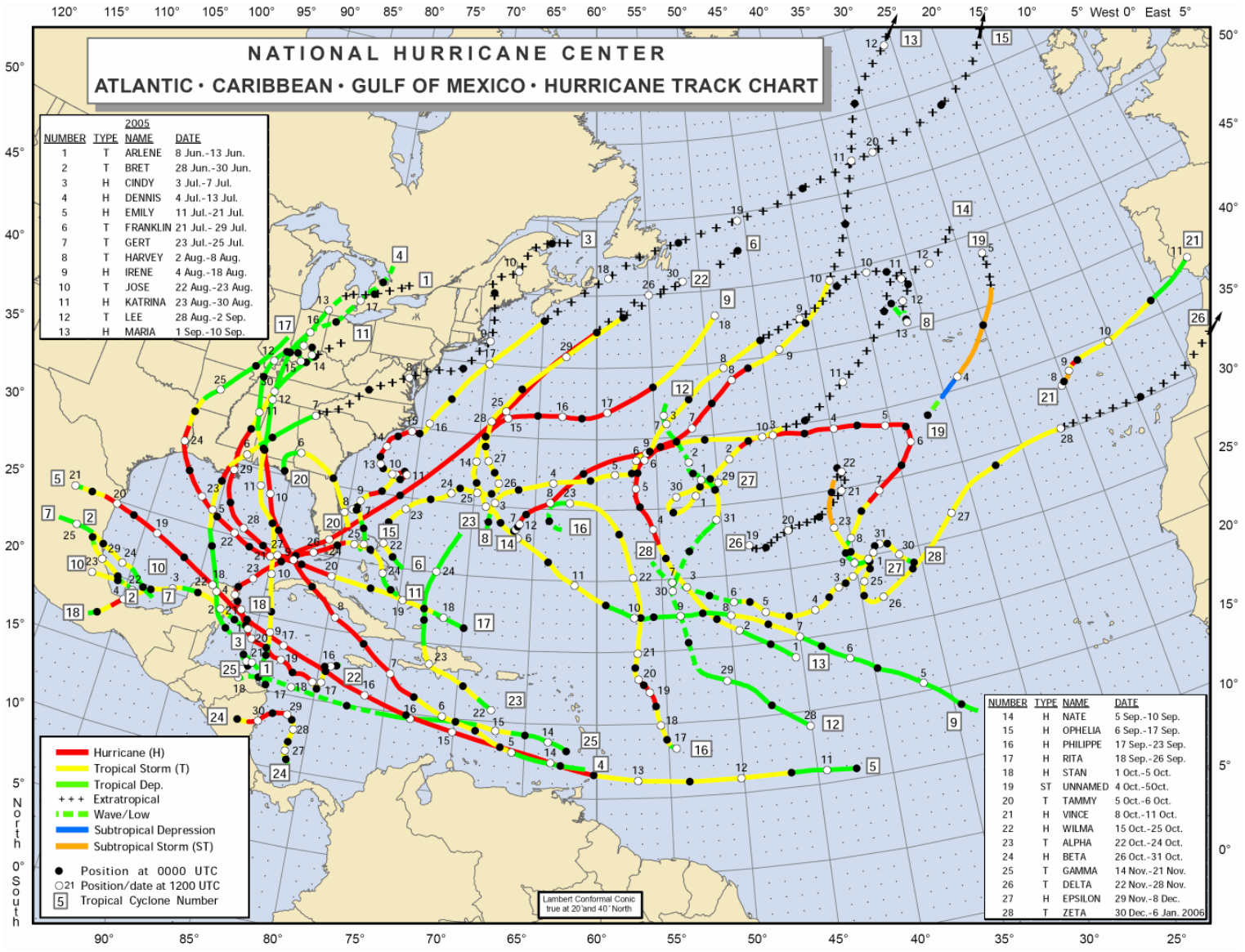
The effects of Katrina were not constrained to the wind damage usually associated with hurricanes.

Katrina first made landfall in South of Florida as a moderate level one hurricane (hurricanes are graded by strength from 1 to 5), bringing winds of up to 80mph and a storm surge of 3-5 feet. A storm surge is an onshore gush of water from the ocean, associated with a low pressure weather system, such as a hurricane, 14 fatalities were recorded and damage caused included flooding, power outages and overturned trees, the associated cost being estimated at $1-2bn.

The hurricane then went offshore, strengthened to a category five hurricane with 175mph sustained winds, but deteriorated to a category three with sustained winds of 120mph, before making its second and third landfalls in Louisiana and at the Louisiana/Mississippi state line. The associated storm surge in Mississippi was approximately 27 feet and reached up to 6 miles inland. In New Orleans the cities levees broke causing approximately 80% of the city to flood. In total at least 1,836 deaths were reported. If this deterioration in strength of the hurricane in the second and third landfalls had not occurred then the costs in terms of lives and money would have been significantly worse.

In the aftermath of the hurricane looting was reported throughout New Orleans along with reports of carjacking murders and thefts. The devastation left behind in the wake of the hurricane led to the New Orleans population being redistributed across the Southern United states placing considerable strain on the infrastructure of these states.

[1] Hurricane Season in Overdrive….Again, New Scientist, 27th May 2006


NATIONAL HURRICANE CENTER
ATLANTIC • CARIBBEAN • GULF OF MEXICO • HURRICANE TRACK CHART
2005
NUMBER TYPE NAME DATE
1 T ARLENE 8 Jun.-13 Jun.
2 T BRET 28 Jun.-30 Jun.
3 H CINDY 3 Jul.-7 Jul.
4 H DENNIS 4 Jul.-13 Jul.
5 H EMILY 11 Jul.-21 Jul.
6 T FRANKLIN 21 Jul.- 29 Jul.
7 T GERT 23 Jul.-25 Jul.
8 T HARVEY 2 Aug.-8 Aug.
9 H IRENE 4 Aug.-18 Aug.
10 T JOSE 22 Aug.-23 Aug.
11 H KATRINA 23 Aug.-30 Aug.
12 T LEE 28 Aug.-2 Sep.
13 H MARIA 1 Sep.-10 Sep.
NUMBER TYPE NAME DATE
14 H NATE 5 Sep.-10 Sep.
15 H OPHELIA 6 Sep.-17 Sep.
16 H PHILIPPE 17 Sep.-23 Sep.
17 H RITA 18 Sep.-26 Sep.
18 H STAN 1 Oct.-5 Oct.
19 ST UNNAMED 4 Oct.-5Oct.
20 T TAMMY 5 Oct.-6 Oct.
21 H VINCE 8 Oct.-11 Oct.
22 H WILMA 15 Oct.-25 Oct.
23 T ALPHA 22 Oct.-24 Oct.
24 H BETA 26 Oct.-31 Oct.
25 T GAMMA 14 Nov.-21 Nov.
26 T DELTA 22 Nov.-28 Nov.
27 H EPSILON 29 Nov.-8 Dec.
28 T ZETA 30 Dec.-6 Jan. 2006
Hurricane (H)
Tropical Storm (T)
Tropical Dep.
Extratropical
Wave/Low
Subtropical Depression
Subtropical Storm (ST)
Position at 0000 UTC
21 Position/date at 1200 UTC
5 Tropical Cyclone Number
Lambert Conformal Conic
true at 20°and 40° North
120° 115° 110° 105° 100° 95° 90° 85° 80° 75° 70° 65° 60° 55° 50° 45° 40° 35° 30° 25° 20° 15° 10° 5° West 0° East 5°
50° 45° 40° 35° 30° 25° 20° 15° 10° 5° North 0° South

Katrina had numerous impacts on various types of insurance including:

- Wind damage to property, residential and commercial.
- Flood damage to property, residential and commercial.
- Business disruption caused by secondary effects such as power outages.
- Displacement costs.
- Increased theft of property.

Although it hasn't been publicised as much in the media, Europe has been subject to increasingly volatile weather over the past decade, including:

- **2007** - Winter storm Kyrill: This wind ploughed through Britain and Northern Europe killing at least 10 people, uprooting trees, shattering windows, flooding beaches, and forcing the cancellation of hundreds of flights at airports from London to Frankfurt. The latest estimates for Kyrill are approximately $4.5 billion according to Swiss Re.
- **2005** - Hurricane-force winds sweeping across Europe effecting Britain, Ireland, Sweden and Germany
- **2004 -** Heavy storms caused 6cm of rain to fall in two hours in Boscastle, Cornwall. The resulting floods caused an estimated £500m damage.
- **2003 -** A heat wave with temperatures hitting as high as $42^{O}C$ engulfed Europe with a death toll estimated at 10,000.

Of course the individual events cannot be directly linked to climate change but it is clear that as temperatures rise the weather we experience is becoming more volatile.

Flooding is the second costliest weather-related catastrophe worldwide and, in Europe, it outstrips windstorms. Apart from the more obvious losses to insurers such as the damage to residential and commercial property, claims can also arise from some of the following sources.

- Clean-up and temporary accommodations costs and business interruption.
- Increases in health problems: Studies in flood-affected areas have shown that respiratory and skin problems, depression and other stress-related conditions increase significantly in the period following a flood.
- Crop damage

Climate change is also predicted to increase rainfall in the more temperate climates and, combined with a rise in sea levels due to thermal expansion and the melting of ice sheets, it can be expected that the frequency and severity of flooding will continue to increase.

Over the past century the average global temperature has risen by around 0.6oC with thermal expansion already leading to a 10-20cm rise in sea levels2. Considering the 7m rise that could occur were the Greenland Ice Sheet to melt, this increase seems fairly unsubstantial. However, many experts believe this will start to happen within the next century.

In the UK, the potential losses that insurance companies face from flooding are also increasing. In Britain, and the South East in particular, a large amount of housing is built on flood plains. The cancellation of the flood assurance guarantee in 2002 has given the option for insurance companies to withdraw flood insurance but, as ever, where there is the possibility of financial gains, some will continue to take on this risk.

The changing climate and environment is leaving insurers with a great deal of uncertainty is assessing risks and pricing policies.

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2 http://news.nationalgeographic.com/news/2004/04/0420_040420_earthday.html

2.3 Latent Claims

With growing pressure to reduce the amount of carbon released into the atmosphere worldwide, it is becoming increasingly likely that this pressure will come to bear on corporations.

Legal actions are starting to appear against companies responsible for high levels of greenhouse gas emissions (GHG), and although none have been successful to date there is the possibility, as with asbestos and tobacco claims, that one successful claim will have far reaching ramifications.

The most high profile of the cases is the State of California's case against six major car manufacturers asking for "monetary compensation" for climate change damage.

Alex Hamer of Reynolds Porter Chamberlain describes the action as the most significant piece of climate change related litigation launched so far3.

"*Over time courts in some jurisdictions inevitably become influenced by public opinion so there is the added concern that where even speculative climate change cases are launched they won't be quashed by the courts as early as the strengths of the case might suggest."*

There is real uncertainty around the fact that there is no clear way of assigning blame for climate change to an individual source. This is a very real problem potentially affecting every single corporation. Some other actions to date include the following.

- **July 2006** – Australian test case (dismissed): The case centred around the alleged failure of the Australian Government to consider the emission of Greenhouse Gases (GHGs) when assessing the impacts of two new coal mines under federal environmental laws. The court found that the government official acted lawfully considering greenhouse emissions and finding no link between the emissions and any specific damage to Australia's environment.
- **Sep 2005** – Connecticut vs. American Electric Power Co. (dismissed by the U.S. District Court for the Southern District of New York): A claim was filed against five US electric utilities alleging that the carbon dioxide emissions from those companies' electric generating facilities constituted a "nuisance" under common law. The case was dismissed as it presented political questions which the judiciary had no power to resolve.

[3] http://www.rpc.co.uk/Default.aspx?sID=754&cID=256&ctID=43&lID=0

2.4 Modelling Opportunities

2.4.1 Catastrophe Modelling

The insurance industry is starting to take climate change seriously. In 2006, in response to the major hurricanes in the previous year, the major providers of catastrophe models explicitly built into their product offerings the explicit effects of climate change. More recently, in 2007, global broking group Willis set out to use a super computer to help insurers and reinsurers get a better understanding of climate change and its impact[4].

2.4.2 Financial Modelling

With carbon trading markets starting to find their feet and ever more complex instruments starting to be traded, the area of carbon offsetting is becoming a growth industry. The European Trading Scheme (ETS) will expand over the coming years. The first expansion in 2008 is expected to cover aviation emissions and all GHGs, not just carbon dioxide. The post-2012 ETS aims to cover all industry sectors. These expansions should lead to a host of opportunities in offsetting strategy within the EU, and with

[4] http://www.lloyds.com/News_Centre/Features_from_Lloyds/Supercomputer_to_plot_climate_change_catastrophe_risk.htm

the US belatedly joining the climate change party the opportunities should continue to grow.

2.5 Product Development

With the emergence of climate change as a hot topic, some insurers are seizing the opportunity to launch new insurance products to appeal to environmentally friendly clients. Some examples are given below, but a raft of such products is no doubt just around the corner.

- **The Cooperative Insurance Society –** CIS has introduced 'ecoinsurance', a motor insurance policy through which CIS offsets 20% of the insured's carbon emissions. There is a 10% discount on cars that emit the lowest carbon emissions and CIS has also ensured that they have an eco-friendly repair network if your car breaks down.
- **Fireman's Fund –** A new 'green' home insurance gives the option of rebuilding in the event of loss using green materials.
- **Lloyd's of London** – Energy savings insurance protects the installer or owner of an energy efficiency project from under-achievement of predicted energy savings.
- **Climatesure** – Travel insurance that automatically offsets the carbon footprint of the travel for which cover is sought.

3 PricewaterhouseCoopers Claims Survey

General insurers are striving to improve claims service and control costs against a background of accelerating claims inflation, ever more exacting customer expectations and mounting competitive, regulatory and fraud-related pressures.

These challenges are likely to be heightened by the softening rating environment, notwithstanding the increases enacted by some prominent market players. Rising building expenses, motor repair costs and personal injury payouts are increasingly eroding margins and making claims inflation ever harder to control. Climate change could add further loss and uncertainty by raising the risk of subsidence and flood damage.

Many leading companies are responding to these challenges by developing more accurate pricing and more rigorous risk controls. They are also refocusing their attention on ensuing that they don't pay out claims that they shouldn't do e.g. paying out a claim on a policy that has expired – situations like this can account for up to 10% of an insurer's total claims.. In particular, the right combination of proficient claims staff, optimum technology and effective vendor management has proved successful in reducing the overall cost of claims, while enhancing margins and customer satisfaction. Yet, others appear to have been less confident and effective in their pursuit of world class claims function capabilities.

PricewaterhouseCoopers has sought to identify the drivers that are likely to shape claims performance expectations and the competitive environment in the years ahead, based on our and our clients experiences.

3.1 Confidence about the approach to claims process is tempered by question marks over the effectiveness of controls.

Insurers strongly believe that their claims philosophy is effective; but the operation of the underlying procedures does not always appear to bear out this confidence. The problem is that insurers cannot be sure that their staff are interpreting their claims procedures consistently with (i) what the procedure should be; and (ii) between the claims staff themselves. Ideally if the processes were all automated and claims staff were led through the procedure through various computer screens, these issues would not happen. However, many companies do not yet possess this technology. This is particularly important when new claims processes are introduced and many in the industry are unsure how they are going to update their reserving and processes if a major change occurred. Closer communication between actuarial, underwriting and claims teams could in particular help to improve the accuracy of reserving, pricing and overall claims handling effectiveness.

3.2 Management information ("MI") does not always provide an adequate basis for informed decision-making.

The majority of the market believe that MI plays a significant role in managing the cost of claims and most feel they receive claims related MI in a meaningful and timely manner. There are, though, significant doubts about the efficacy of MI. In many instances there is MI available but the quantity received makes it difficult to see the wood from the trees – and in particular to inform management of which particular piece of information contained within the myriad of information provided may be the big issue arising that they need to react to. In many instances the MI contains limited analysis and commentary, making it impossible to interpret.

3.3 Many insurers are looking at the impact of the legal reforms and see these as first steps in reducing the high legal cost environment that they are in.

Many Bodily Injury claims take years to settle and incur significant legal costs. However, the majority of them settle without being contested. One way insurers could significantly reduce their costs is to settle their claims more promptly and employ their in-house or outsourced legal practices in a more targeted, efficient manner. For example greater empowerment of staff to settle out of court could also help to avoid the time and expense of legal proceedings. The forthcoming round of legal reforms will enable insurers to carry out more legal services in-house and so reduce the expenses of having to hire lawyers to carry out those same services.. My bringing more legal services in-house, insurers will also be able to control more of the claims process – thereby enabling them to reduce costs. The legal reforms could also help to avoid some unnecessary litigation, though the introduction of 'no-frills' firms could lead to more low value cases being brought against insurers that might not have occurred before. From an internal perspective

3.4 May insurers fail to recognise the importance of claims as when the customer decides on the value of the insurance relationship

The administration of a claim is an insurers' 'acid test'. When the customer calls to report the claim, the insurer's response is often critically important to the customer as to whether they will renew their insurance with that insurer again. If the customer has a relatively hassle-free experience and believes the insurer has helped them with their claim, it provides the insurer with an opportunity to not only regain the customer's business but also to cross-sell other products.

3.5 It is unclear whether insurers are doing enough to tackle the true scale and nature of fraud risk.

Almost all insurers feel that fraud is a problem for their organisation; however few are making significant inroads into tackling the problem. Making better use of available tools such as the industry-wide databases could clearly enhance detection. Many leading insurers are also looking to new technology to help tackle fraud including predictive models, validation software and the embedding of voice and behavioural detection systems into claims management.

3.6 Many insurers have highlighted their disappointment with the results of offshoring, and some are starting to recognise the the return of jobs to the UK as an opportunity to differentiate their brand.

Although many insurers have transferred jobs and services overseas in recent years, the feedback that we have been receiving shows that off-shoring has not been as cost-effective as originally envisaged. Some insurers have commented that the lower claim related skill levels off-shore may actually be reducing the savings from the off-shoring experience (e.g. by increasing claims leakage). Management costs have also increased as insurers realise that they need to spend more time controlling the off-shore operation compared to when it was on-shore.

Customers have also complained about their experience of phoning insurance companies when the point of contact has been off-shore. Some insurers have deliberately started to market themselves as having call centres based in the UK as a opportunity to differentiate their brand. It's still too early to assess whether this strategy has been successful but anecdotally it appears as though customers prefer on-shore rather than off-shore staff to talk to.

3.7 Going forward

In a fiercely competitive environment, compounded by formidable customer expectations, onerous regulatory requirements and heightened profitability pressures, the urgency to demonstrate noticeable results in claims function and liability management continues to escalate. The critical challenge for insurers today is balancing claims service with underwriting and loss control pressures.

High-performing insurers have implemented more accurate pricing and better risk controls. They also have renewed their focus on minimizing claims leakage. The right combination of proficient claims staff, optimum technology, and effective vendor management has proved successful in reducing the overall cost of claims, thus boosting bottom-line profitability while concurrently achieving consistently high levels of customer satisfaction.

4 Predictive Modelling

Predictive modelling attempts to predict the probability of an outcome or outcomes. It does this by building a statistical model based on a sample of data with known outcomes. The model can then be applied to similar data for which the outcomes are not yet known. It may be seen as being both a subset and an extension of data mining, in that it is concerned less with what the data shows about the past, than with what predictions can be drawn from it about the future.

Predictive modelling is used in a wide range of applications, some obvious and some not-so-obvious. Many organisations collect large amounts of data in the course of their day-to-day business. As larger organisations have standardised their systems and captured this data in an electronic form they have created a vast, accessible resource. As data-mining tools become more user-friendly, it gets easier to apply them to this resource.

In the UK the Tesco Club Card is probably the best known (and widely imitated) example of this. The card enables Tesco to change the structure of the data that it collects. First the data goes from being individual sales transactions to a series of transactions that reveal behaviour patterns. Then adding more information, such as customer demographics, the behaviour of one group of shoppers (e.g. at a trial supermarket) can be extrapolated nationally.

Before Tesco, there was another standout success in predictive modelling, which is now largely taken for granted – credit scoring. Credit scores are based on reported consumer behaviour and are designed to predict the probability that a customer will fail to make repayments on a mortgage, credit card or loan. Since they were introduced in the 1970s they have become very successful and an integral part of banking. The degree of acceptance that they have achieved as a standardised measure of a customer's creditworthiness has enabled the commoditisation and securitisation of a wide range of loans and receivables.

In a similar fashion to banks, utility companies usually have small outstanding "loans" to each customer – in the form of services provided but not yet paid for. They may use a combination of underwriting techniques and predictive models to manage their exposure to customers who are likely to disconnect without paying their bills. Measures used to reduce losses range from evidence of previous utility connections to security deposits or payment in advance.

Recently Kings Fund has produced a series of models that predict which patients are likely to be heavy users of hospital services in the NHS. For example, they identify the 0.5% of the population who are likely to be very high users – turning up at Accident and Emergency approximately twice, 1 hospital admission and 4 outpatient appointments in the following year. The general population makes one appearance of any of these types each year.

The attraction for the NHS is that it can monitor and treat these patients, even when they are not lying on beds. This will hopefully maintain their health better than at present – whether it is by visiting their GPs or follow-up by social workers – with the happy side-effect of saving the NHS money.

4.1 Non-Life Insurers

For insurance companies selling non-life policies (e.g. insuring motor vehicles, houses, businesses and against legal liabilities), applications of predictive modelling range from the well established to the blue-sky. At the well-established end of the spectrum lie the targeting of direct mail advertising and the pricing of personal lines policies. At the other end is the pricing of commercial lines policies.

4.2 Personal Lines

Personal lines are the range of insurance policies that are sold to individuals – insuring cars, houses and their contents, and the trials and tribulations of travelling. These policies are usually sold in large numbers with very similar terms and conditions. For example, around 20 million travel policies are sold in the UK each year. While curious actuaries might want to know much more, customers don't like time-consuming forms and so the number of questions (and thus known differences between individual policies) is usually limited. Typical questions might be "which region you are travelling to?" (American medical care is notoriously expensive), "How long are you going for?" and "Are you going to do anything risky?" (e.g., winter sports or sky-diving).

Given the small number of combinations that the replies can fall into, and the large number of policies, a reasonably-sized insurer will find that they have a large number of policies in each category. This will make it easy to estimate premiums – and as the number of combinations increases, provide fertile grounds for predictive models. So it is no surprise that this is where they have made their biggest contribution.

In addition to the data available from the original policy application and the company's experience with the policy, it is often possible to get supplemental information from third party data sources. Typically this will be basic demographic information, or relate to the postcode in which the insured lives. Most controversially, in the United States policyholders' credit scores have been reported as providing useful underwriting information. This has been met with strong resistance from consumer groups.

Predictive modelling applied to calculating premium rates has led not only to more accurate rates, but also more complicated rating structures. These structures use more rating parameters and the inter-relationships between the parameters are more complex. As the tools for performing the analyses have improved, so too has the frequency and depth of rating reviews.

In addition to the pricing of policies, predictive modelling is also a useful tool in retaining customers. Keeping existing customers is important for a range of reasons – including the cost of getting new ones to replace them, and often better claims experience. Modelling of customer retention has given insurers a better understanding of their behaviour and led them to experiment with a range of techniques to retain selected groups.

4.3 Commercial Lines

Commercial lines are policies that are sold to businesses – whether to insure their cars and buildings, their products in case of defects or their owners in case of law-suits. There are fewer businesses (around 4 million) than households in the UK, so the potential number of policies is a lot smaller than for personal lines. In addition, those businesses are a lot less homogenous – a mortgage broker working from their home poses quite different risks to a small farm. The result is a much wider range of policy terms and conditions on a much smaller number of policies. These are often sold through insurance brokers - who are no more keen on answering lots of questions than the average consumer. In addition, third party sources of quantitative data are typically not as rich as those available for personal lines.

The difficulties with applying data mining techniques to pricing commercial lines are substantial. But insurers have seen the way that sophisticated models have transformed personal lines insurance and so they have a strong incentive to transfer these techniques into commercial lines. The best candidates currently appear to be small business coverage where there are larger numbers of policies, and there may be less significant customisation.

4.4 Reserving

To date, predictive models have not been widely used in reserving. Where they have been used it has primarily been in the reserving of annuity-like payments streams – where injured parties receive periodic payments of compensation. Workers' compensation or disability covers that provide for ongoing compensation, medical coverage and care produce (hopefully!) relatively small numbers of claims that have very high costs. Records of the number, frequency and type of these payments can be used to establish statistical case estimate models.

4.5 Direct Marketing

Both life and non-life insurance companies that write policies directly to the public or businesses must advertise to reach potential consumers. Direct marketing, such as mail shots or telemarketing, usually have low response rates. For example, direct mail shots may get only a couple of percent of the recipients responding. Direct mailers carry out smaller scale mail shots to gather sample data on who is likely to respond to their marketing. By combining this mail shot data with extensive demographic data (for example from providers like Experian) they can then make their national mail shots more targeted.

Predictive modelling is becoming more widespread. It is driven both by availability and by necessity. Increasing availability of suitable data, good tools and experienced miners is making it easier to build models that are useful to businesses. The necessity is in keeping up with competitors – especially in pricing and targeting products

Further information

Sources:

Travel insurance purchasers: http://www.hm-treasury.gov.uk./media/33C/F7/travelinsurance_review.pdf

Kings Fund model:
http://www.networks.nhs.uk/uploads/06/12/combined_predictive_model_final_report.pdf

Number of businesses in the UK:
http://www.biba.org.uk/mediacentre/medianotes/regulat/regulat2.html

5 Reserving Uncertainty

In a non-life insurance company's external balance sheet and internal management information pack, one of the most scrutinised figures is the company's reserves. By its very nature, the reserve estimate cannot be an accurate figure. It is an estimate of what the company believes it will pay out on claims in the future.

Interest is now increasingly focusing on the variability of the outcome around the reserves. This is being driven by:

- Adverse press reaction – especially regarding the volatility of estimated ultimate claim amounts. The majority of this criticism came from the US press regarding D&O claim amounts for Enron and WorldCom. This criticism of actuaries was part of the reason the UK non-life actuarial profession set up 'The General Insurance Reserving Issues Taskforce' (GRIT). In its report 'A change agenda for reserving' GRIT stated that actuaries should provide 'more information on uncertainty in our reserve estimates' including 'a quantitative indication of the range of outcomes for the reserves'. It also stated that 'a common vocabulary for communicating uncertainty' was required.
- Regulatory requirements - The revised version of GN12, the UK non-life actuarial profession's guidance on reserving, states that actuaries should 'indicate uncertainty surrounding the results' and that this 'should normally be quantified where practical'. In addition, Solvency II will almost certainly mean that companies will need to formally assess the uncertainty in their reserve estimates.
- Capital adequacy – both regulatory (the ICAS requirements) and internal business planning require an understanding of the uncertainty within the reserves and also within the business.
- Management – a better understanding of reserve volatility enables management to ensure that the business written is in line with its risk appetite and make better strategic pricing and investment decisions. It can also lead to insurers optimising their reinsurance programme design.

5.1 Definitions of reserve variability

Before attempting to estimate the variability in reserves, you need to know what range of variability you are trying to measure. Actuaries, as mentioned in the GRIT report, commonly use three different measures:

- Range of reasonable best estimates - The actuary's view of the range of best estimate reserves that a "reasonable actuary" could determine based on the available information.
- Range of probable outcomes - The entire range of possible outcomes, excluding those events that are considered extremely unlikely and could be ignored for all practical purposes. This could mean between the 10th and 90th percentiles of the distribution of the reserve outcomes.
- Range of possible outcomes - Description of the entire distribution function of the possible ultimate claims costs relating to a block of policies – theoretically this could range from zero to infinity.

The range of reasonable best estimates is most commonly used when forming a view as to whether the proposed reserves are appropriate for inclusion in financial accounts. The range of probable outcomes is a useful measure for the purpose of financial planning such as reserving with a certain risk margin e.g. reserving at the 75th percentile.

5.2 How to assess this variability?

Actuaries are increasingly turning to stochastic reserving techniques, such as Bootstrapping or Mack, to help them measure the uncertainty in the outcome. These techniques, which are continually evolving, produce a

distribution of outcomes (rather than a single point estimate, which is the output of more traditional actuarial methods).

However, stochastic reserving techniques by themselves are not a panacea for determining the variability in reserves. For example:

i. Stochastic reserving methods are only as good as the data that is fed into them. If the quality of the data is poor, incomplete or sparse, the methods will not produce credible output.

ii. The methods will only project forward the uncertainty that has occurred in the data in the past. For example, the Courts Act 2003 allowed courts to force general insurance companies to make annual payments to severely injured claimants rather than just paying them a lump sum. Stochastic reserving methods applied to data before this ruling would not capture the uncertainty in reserves introduced by the ruling. Other potential drivers of uncertainty which may not be inherent in the data include:

- Changes in economic drivers such as the inflation rate (e.g. moving from a stable inflation environment to an unstable one);
- Claims process changes for example an organisation deciding to set case reserves at a “worst estimate” basis rather than on a “best estimate” basis; and
- Different type of claim emerging e.g. changes in social attitudes towards claiming, or an underwriting oversight that failed to capture a necessary policy exclusion.

iii. If the data violates certain assumptions (for example, some stochastic reserving methods rely on the chain-ladder assumptions being met, or on normality of residuals), the methods will not be appropriate. Another example of this is that current stochastic methods may not cope with the uncertainty around individual large losses or for latent claims e.g. asbestos, pollution and health hazard claims.

iv. The correlations and dependency structures between classes of business or underwriting years that these methods replicate would be the historical one. This would not take into account any changes in the risk drivers underlying these correlations.

v. The model used may not adequately capture all potential areas of uncertainty. Therefore, different stochastic models will provide you with different uncertainty ranges, even though the underlying book of business and the risks therein are the same.

5.3 An example

The chart below constructed from FSA returns of one of the largest insurers in the UK, for an apparently simple household account, demonstrates some of the potential pitfalls of using stochastic models.

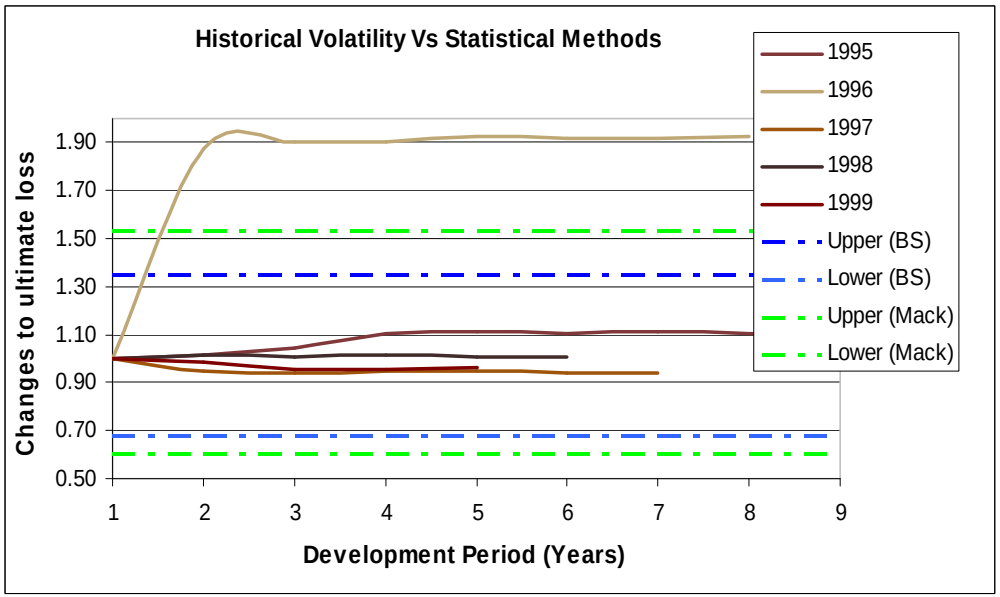


Fig 4: Historical volatility vs statistical methods

We conducted a Bootstrapping and Mack estimation using this company's paid data. The 95th and 5th percentile results are illustrated for both methods as a dashed line on the chart.

The full lines represent the change in the expected ultimate loss relative to the company's initial estimate of ultimate loss. For example, the 1996 line, at development period 2 represents approximately a 90 percent deterioration in the estimate of ultimate loss relative to the company's initial estimate of the ultimate loss for that accident year. This highlights how volatile reserve estimates could be.

We conducted the analysis using 10 accident years. However, we only plotted five of these years in order to maintain the clarity of the graph.

We note several striking findings from the chart:

i. The Bootstrapping and Mack methods produce very different levels of reserve estimates at the 95th percentile. Bootstrapping indicates the 95th percentile to be 134% of the mean, whilst the Mack indicates the 95th percentile to be 152% of the mean. So which method should you choose to determine your 95th percentile?

ii. Both methods did not appear to capture entirely the deterioration of the 1996 year. As we had 10 years of data, the worst year (i.e. the 1 in 10 year event) should have been included within the range of 5 to 95 percentile (a range representing a 1 in 20 year sufficiency level). Moreover, the 1996 year is approximately 40 percentage points outside the range, which is a worrying finding by itself. We would need to understand what is driving the large deterioration in this year. Reasons may include: subsidence, data errors, a big storm just at the end of the year, etc. The repeatability of the event may determine whether we keep this accident year in the data set we use for our Bootstrapping or Mack analysis or not.

iii. All the other years (including ones that are not plotted) have very small levels of volatility, but the ranges indicated by the stochastic models are quite wide, relatively speaking.

Hence, in this case blindly using stochastic methods for the analysis of this household account appears not to produce a sensible measure of reserve uncertainty.

The reason for this is that the data does not fit the method. The 1996 accident year is driving the ranges to be wide relative to all the other accident years. So if e.g. the 1996 accident year is a result of, say a one off data error, then should it be allowed to increase the ranges in such a manner?

5.4 So what is the best way to assess variability?

What is required is a framework that helps you meet a number of different objectives. These include:

- understanding the general business and the lines of business written;
- capturing the drivers of uncertainty within these lines of business and also the drivers that could impact the business more generally;
- helping understand the processes by which case estimates and reserves are set;
- using the judgement of the reserving experts in the organisation, underwriters and claim managers to combine all these quantitative and qualitative factors within the framework to derive the uncertainty; and
- capturing the power of the statistical methods available.

The historical data needs to be adjusted to fit the methods used. There are various diagnostic tests that could be applied to identify distorting trends or outliers in the data. The outliers can be excluded from the data to avoid violation of the assumptions and then brought back as explicit adjustments if they are deemed to be repeatable.

The framework should also consider the doomsday scenarios that may not be present in the past data and so not be captured by any model – events that could radically alter the reserve position – and make appropriate allowances for them.

This framework should be flexible enough to apply different methods to different situations. Subject to the quality of the data, and the materiality of the risk to the insurer, a more or less complex combination of models and subjective adjustments should be applied.

These classes of business level reserve range estimates should then be combined to an entity level reserve range estimate using appropriately derived correlations. These correlations should be based on consideration of the commonalities in the risk drivers between lines of business.

To conclude, estimating reserve variability is becoming and will be, a key part of a general insurance actuary's toolkit. We must ensure that we do not just rely on the output of black box statistical methods but instead use a more holistic framework that enables us to capture and estimate the drivers of uncertainty within our organisations.

In a non-life insurance company's external balance sheet and internal management information pack, one of the most scrutinised figures is the company reserves. By definition, the reserves are not an accurate figure. They are an estimate of what the Company believes it will pay out on claims in the future.

6 Capital

6.1 ABI guidance on ICAS for non-life companies

Since the ICAS regime was initiated most insurers have found that the problems they faced in trying to comply with the legislation were common amongst their peers. Over time several favoured or common approaches have emerged to various difficult problems.

On 2 February 2007 the Association of British Insurers (ABI) published a 50 page guide to the ICA process for insurers. This was designed to complement the FSA's own published guidance on the process. It reads as an extended commentary on the rules and requirements of the FSAs ICAS process. It effectively gathers together the wisdom and experiences of some of the key industry groups in this sector.

The guide also suggests an overview of various currently popular approaches to modelling company risks. The guide has been published by the leading trade bodies for the insurance industry to draw together in a single document a wide range of advice and good practice that has been developed for ICA, and it achieves its objectives, providing an insightful and easy to read instruction manual that should enable companies to improve the consistency and clarity of their ICAS.

The guide is publicly available and easy enough to find and download from the ABI's website.

6.2 Embedding capital models within the business

One of the biggest challenges currently facing UK general insurers is the question of how to get the most value from their internal capital models. The scope of this exercise can be vast, and, faced with the many day to day tasks and targets of operating an insurance company, it is can be too easy to see this as a pie-in-the-sky project that is put off indefinitely.

This needn't be the case. Our experience of working alongside a variety of large and small insurance companies in taking their internal modelling approach further has shown us that, once a capital model is in place, a few small tweaks to the components or the parameterisation of the model can immediately begin to deliver worthwhile intelligence about the business. We describe below a variety of projects that basic users of capital models should find within their reach, of increasing complexity.

6.3 Effective business planning

On a basic level, for example, we have on numerous occasions found that organisations treat their business planning process and their ICA process as two separate exercises. This seems unnatural, as, needless to say, a well designed capital model should be grounded in a realistic business plan. While it is possible to build a risk modelling tool without including a facility to model the financial statements of an organisation, it is usually a relatively straightforward task to extend such a tool into a full business planning model that does deliver projected accounts for the company.

Once a deterministic business planning facility has been built the firm should be able to understand and quantify the possible effects of key strategic decisions in a more effective way. We are seeing an increasing number of firms turn this process around so that the capital model helps management investigate and develop the new business plans, which are then used as the basis of any capital adequacy modelling.

6.4 Reinsurance optimisation and further applications

One potential extension of a capital model is to begin to look at how the ability to test different inputs into the model can be made to work for the company. It is a relatively simple exercise to extend a basic stochastic capital model to make it capable of testing reinsurance optimisation strategies, for example.

The basic model might include a claims model that simulates the different types of claims that arise under a typical general insurance contract. Often, for example, claims will characterised as “large”, “catastrophe”, or “attritional” claims. These different types of claims would then be modelled by any of a number of different actuarial or statistical models.

What makes this useful for modelling reinsurance, for example, is the ability to generate the size and timing of each claim or group of claims that might impact the reinsurance programme individually. This then allows a realistic application of various types of reinsurance structure to each stochastically generated claims scenario.

By performing optimisation analysis techniques on the output of the stochastic model it is possible to test and determine the optimal or near-optimal reinsurance strategy at the organisation level. With uncertainty surrounding the capacity of the reinsurance market in the short term such techniques can lead to significant cost savings and deliver greater confidence over short term strategy than would otherwise have been available. Taking this approach has saved companies a significant proportion of their reinsurance costs as they come to understand better the capital costs of the risks that they are taking on.

Techniques such as the one described above, among others, allow for a much more proficient understanding of the relationship between risk and capital within an organisation, as well as reducing the reliance of a company on an external brokerage firms or consultants to tell them what is best for their company.

There are several similar small projects that can be used to derive more value from the capital modelling work. For example, strategic decision making in the fields of investment strategy, corporate acquisitions, and pricing strategies can all be enhanced through the use of an embedded capital model.

6.5 Exploring the link between risk and capital

It would be fair to say that the majority of capital models in use in the London Market today are geared towards determining an appropriate valuation of the regulatory capital requirement of a company. However, this is only one issue of quantifying capital, and one of the more basic ones at that. In all healthy cases, the level of capital held by a company will comfortably exceed that required for the regulator’s requirements.

Instead companies are interested in optimising their economic capital structures in order to meet the following objectives:

- Achieving and maintaining a target credit rating assessment and outlook
- Maximising the efficiency of the economic capital structure of the business

Managing the economic capital of an organisation effectively is generally not a task that is best achieved by following a rigid “recipe book”. In different situations, different techniques would be applied, and there is more than enough theory underlying the techniques to merit an article of its own, so we will not go into detail here.

In general terms, however, sound economic capital management is a tool that underlies and supports strategic decisions that in turn seek to deliver greater understanding of how the capital structure of an organisation can be manipulated in order to deliver, in simple terms, the greatest possible return on equity to shareholders. This is done by understanding the link

between capital and risk and thus being able to efficiently allocate the economic capital within the business in a logical and coherent way. This – at least in theory – enables a greater understanding of how much capital is required in each area of the business, and why, and enables optimisation techniques to be applied to the applicable variables to deliver more efficient capital structures and improve performance of the whole.

As noted above, this is a relatively complicated area, and it is complicated still further by the well known issues that lie at the heart of cycle management in a "real" insurance (particularly London Market) business. However, this does not mean the techniques are not applicable, simply that the nature and drivers of the insurance cycle must be understood and taken account of when attempting to manage a business over the medium term.

6.6 The near future? The integrated actuary

Looking to the future, we ask ourselves what the likely extension of this is. Currently, much more is possible than slight expansions of the applications of current capital modelling software. With the right training and IT infrastructure it is now, or will soon be, possible to devolve the day to day operation of the capital model to the people who are in control of the various risks that are picked up within it.

For example, the underwriters at the point of sale would have access to the relevant inputs and would fill them out as part of their premium rate monitoring responsibilities. This structure would enable the underwriter to enter and track his view of the risk profile of the contract and simultaneously compare it with any historical performance information of the contract as well as any similar contracts. This enables a far better educated guess as to the risk profile of aggregated classes of business for use further up the modelling chain, when management come to compile the information gathered and use it to assess the capital implications.

Feeding back down the chain, this model can then provide feedback on any proposed contracts and rates by comparing the proposition with the reinsurance structure in place and the target rate that needs to be achieved. The underwriters will have access to (almost) real time information concerning the performance of their book versus the targets they have been set as well as analysis of the performance of the various segments of their book. In effect, the allocation of capital will become a live real time calculation within parameters determined by management rather than a prospective guess as to the optimal allocation of capital six months in advance.

For many companies, and particularly for some lines of business, this is science fiction. However, the tools are in place, and more forward thinking companies are already some way down this road. It is the author's opinion that the applications and benefits of a capital model that is properly embedded within the business in this way are too many to ignore.

7 Asbestos

The word ‘asbestos’ is derived from the Greek for indestructible and this term gives us an idea of the properties that led to this ‘miracle fibre’ being used in such diverse industries. From insulation to brake linings, shipbuilding to gaskets, many people in heavy industries were exposed to asbestos. However, asbestos was also ultimately found to be the cause of numerous diseases such as mesothelioma, cancers, asbestosis and pleural plaques. There actually three main types of asbestos of whichblue asbestos is regarded as the most dangerous of the three types whereas white asbestos is still being used today.

The different asbestos-related diseases have a variety of effects on the human body, mesothelioma, a tumour on the outer lining of the lung once diagnosed always results in death, usually within 2 years of diagnosis. Pleural plaques, on the other hand, involves the hardening of the lining of the lung which does not present any symptoms.

The latency period (the time from first exposure to onset of the disease) can vary from 10 years to more than 50 years. The vast majority of those now dying from mesothelioma, the most deadly disease, were exposed to asbestos during the 1950s and 1960s.

7.1 UK asbestos – Recent court cases and their implications on insurers

The topic of asbestos in the UK and its impact on the insurance industry has started to be the subject of debate since the insolvency of Chester Street Insurance Holdings Limited (formerly Iron Trades Holdings Limited) due to its huge UK asbestos liabilities. Unlike the US, compensation is only generally paid when there is evidence of a disease.

Insurance and reinsurance projections of UK asbestos claims have generally been based on the significant work undertaken by the Asbestos Working party of the Institute and Faculty of Actuaries (available at www.actuaries.org.uk/files/pdf/proceedings/giro2004/Lowe.pdf) and also the work done by Professor Julian Peto and Health and Safety Executive (“HSE”) on the number of mesothelioma deaths in the UK.

However, in recent years, solvent companies in particular appear to be attracting a greater number of mesothelioma claims than were anticipated by the epidemiological studies.

Various reasons given for this include:

- A speed up of claims due to earlier detection methods;
- Increased awareness of claimants and their families;
- A more litigious society;
- Doctors being better at diagnosing mesothelioma than in the past;
- The Fairchild principle;
- The backlog of claims previously rejected in the past or mis-diagnosed now being accepted due to changes in the law; and
- Claims are being shared amongst insurers.

The UK legal system has been constantly evolving to deal with the issues surrounding asbestos. We will discuss the impacts of past, current and possible future cases and their impact on the insurance industry

7.1.1 Understanding the case law

Many of the court cases relating to UK asbestos have been concerned with:

i. whether employers had a duty of care to the employees they exposed to asbestos who then subsequently developed an asbestos-related disease; and

ii. how to allocate the asbestos compensation between the employers who exposed the claimant to asbestos.

The most important of these court cases are discussed below.

Babcock International v. National Grid – June 2000

In this ruling – which involved a welder employed by Babcock whilst working at the National Grid premises – it was found that a company, and by default its insurers, is liable for its employees' asbestos-related diseases even if the exposure to asbestos came while their employees are working for a third party.

This had large financial implications for companies like Babcock as they had previously thought that part of the compensation would have been paid by the employer where the asbestos exposure occurred.

Fairchild (suing on her own behalf) v. Glenhaven Funeral Services Ltd and others – June 2002

This House of Lords decision on 20 June 2002 had significant press coverage at the time. It stated that mesothelioma claimants were entitled to claim full compensation from any of the employers they may have exposed them to asbestos. It was then up to that employer to claim the remaining share of the damages from the remaining other employers. Previously, employers could refuse multi-employer mesothelioma claimants on the basis that it was impossible to tell which of the employers' asbestos fibres was responsible for the claimant's mesothelioma.

FSCS versus Geologistics - Are defence costs part of a protected claim? – December 2003

The Financial Services Compensation Scheme ("FSCS") pays insurance claims on compulsory insurance whenever the insurance company that would have paid the claims has gone insolvent. Prior to this judgement, the FSCS only paid compensation costs – it did not pay for the costs of any legal defence. The judgement found that the FSCS should pay for legal defence costs. This led to a greater burden on the insurance industry as the FSCS funds all its compensation payments by levying solvent insurers.

Bolton Metropolitan Borough Council v (1) Municipal Mutual Insurance Ltd & (2) Commercial Union Assurance Co Ltd – February 2006

This case was interesting as it highlighted how different types of liability insurance responded to asbestos claims.

The case was a dispute between two Public Liability insurers. The outcome of the case was that there was agreement that Public Liability policies with specific policy wording should only consider claims if they are reported within 10 years of the date that the disease is reported. Employment Liability policy, by contrast, typically pay claims that could have occurred 30+ years after they were written.

Barker v. Corus (UK) plc and the Compensation Act – July 2006

This judgement caused a political uproar when it first came out.

It stated that asbestos claimants' employers were only liable to pay a proportion of the compensation payment. The proportion of compensation paid would equal the proportion of time that that particular employer had exposed the claimant to asbestos for. For example, if the claimant had worked for three companies in a 15 year period in an asbestos manufacturing industry, each for five years, each company was only liable to pay one third of the claimant's damages.

This judgement also made clear that if a claimant had been self employed for a period of time; the employers were not expected to pay for it. So in the above example, if the claimant worked on his own for 5 years in an asbestos manufacturing industry as well, each of the above companies would only have paid a quarter of the claimant's damages.

To stop the political fallout, the Government introduced a new clause into the Compensation Act, entitled "Mesothelioma: damages". This clause, in effect, restored the rights of mesothelioma claimants to recover full compensation from whichever employer or insurer can be traced. This amendment affected claims in the UK and is retroactive so that claims that were settled on or after 3 May 2006 (the Barker judgement) and before the date the Act became law, would be able to apply to a relevant court to have the settlement varied.

7.1.2 Current cases

Pleural Plaques Test Cases - Grieves v F.T. Everard & Sons Ltd and related appeals

This case is known as "Rothwell" v Chemical (Rothwell, Grieves & ors v Chemical & Insulating Co Ltd & ors).

In 2004, due to the increasing number of pleural plaque claims, Norwich Union, Zurich and British Shipbuilders brought to trial a number of test cases to reduce the level of compensation for pleural plaque claims. They argued that pleural plaques, a scarring of the lungs, should not be categorised as an illness or disease. The judge ruled in favour of all 10 claimants but reduced their compensation substantially. However, the Court of Appeal in January 2006 found that pleural plaques should not be compensable under English Law (i.e. in England or Wales) and referred the case straight to the House of Lords without appeal. We are still awaiting the House of Lords verdict. The Court of Appeal did however make interesting comments that if pleural plaques were compensable under English Law then they believed that the compensation offered previously was too low.

7.1.3 Future cases

There are many areas of activity by companies, insurers and solicitors. Two of the main issues appear to be an attempt to apply the Bolton verdict to EL policies and compensation for mesothelioma claimants with no relatives.

The EL market has instances of inconsistency in wordings and there are plans for a test case involving two concurrent EL policies that have different wordings.

The unions are considering whether they can claim compensation for workers who died from mesothelioma with no relatives (and would therefore have not had any compensation made on their behalf).

7.2 US asbestos – Is the future looking brighter?

The topic of asbestos in the US and its impact on the insurance industry has long been the subject of debate. During the last few years, however, attempts to turn the tide on the number of US asbestos claims filings have started to emerge in the news headlines.

7.2.1 Background

Over the last decade, the number of asbestos claims filings has outstripped previous projections and global estimates of the total cost of

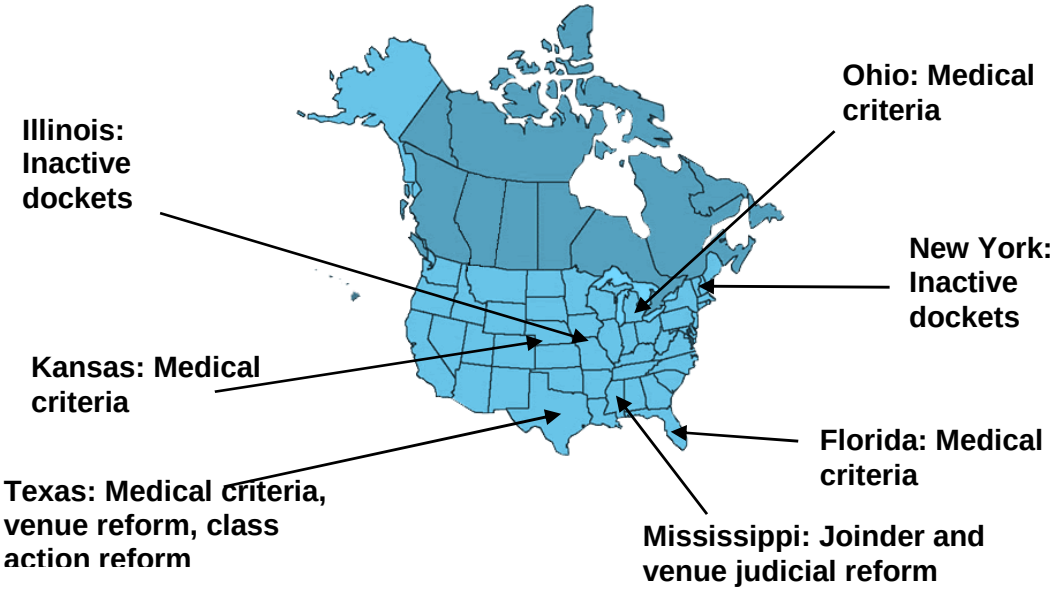
US asbestos claims have been revised upwards. The RAND report in 2005 estimated that the number of claims has rocketed from 21,000 in 1982 to over 730,000, with the number of defendants increasing from 300 to 8,400. Total costs to date have increased from $1bn in 1982 to over $70bn. Some estimates of the total US asbestos liability have increased to over $200bn. This increase in filings and subsequent level of costs can largely be attributed to attorney activity which has encouraged mass filings against both the commonly known and increasingly, peripheral asbestos defendants.

Recently, however, some developments have occurred that appear to favour the defendant companies and their insurers.

7.2.2 US tort reform

A few years ago up to 90 per cent of the US asbestos claims filings were non-malignant claims, many involving individuals with no manifest injury. Claims were centred on a small number of states considered as 'plaintiff friendly' jurisdictions. For example, 85 per cent of asbestos claims filed during 2001-2003 related to just a handful of states, including most notably Mississippi, Texas, and Ohio. In Jefferson County there were more claims filed than there were people living in the county.

In the last few years, some states have started to take action against this rising tide of asbestos claims and particularly the non-malignant claims that have often been made by claimants who have neither lived in that state, nor been exposed to asbestos in that state. These tort reforms have focused on several areas:



Medical criteria

In many states, 'acceptable' medical evidence proving the existence of a medical impairment is now required in order to bring a claim. One has to wonder how claims were previously assessed without this information.

Venue reform

So-called 'litigation tourists' have historically filed claims in states with which they have had little or no connection. In certain states, there is now a requirement to prove residence or exposure within the state where the claim is brought.

Inactive dockets

In some states, claims from unimpaired individuals are now being retained in 'inactive dockets' until the claimant actually develops an asbestos-related disease that does impair health.

Class actions

A class action is a lawsuit prosecuted by representatives on behalf of a group of people who essentially all have the same claim against the defendant. The courts have been increasingly reluctant to certify class actions involving bodily injury cases as it is recognised that these types of claims should be considered individually.

There is also evidence of the US courts and certain judges taking a harder line against some asbestos claimants than previously, most notably in the well-publicised case of Judge Jack in Texas. In June 2005 Judge Jack found that 60 per cent of silica plaintiffs had previously been asbestos plaintiffs. This was despite the chance of having both asbestos and silicosis being compared by Judge Jack as akin to a 'golfer's hole in one'. It was suggested that certain doctors had signed off the medical screenings for cases that they had never seen. Many claims, including all pending silica claims in Ohio, were thrown out on the basis that they had been fraudulently diagnosed with silicosis and both lawyers and physicians were criticised as 'manufacturing' the claims for 'monetary purposes'.

7.2.3 The future

The situation does therefore seem to be looking brighter in some respects from the insurance industry's perspective. There is now a focus on directing payments to those victims of asbestos who are truly deserving and removing the less legitimate claims from the tort system altogether.

However, faced with an increasingly strict legislative environment, US lawyers are likely to seek alternative routes for filing claims. The future for US asbestos still remains uncertain and companies exposed to US asbestos liabilities will need to monitor the legal developments carefully.

7.3 Rest of the world – what is going on?

7.3.1 Other solutions - Japan and Australia

Japan

In August 2006 the Japanese government stepped in to deal with increasing incidence of asbestos related diseases amongst Japanese workers by:

- increasing workers' accident compensation insurance premiums; and
- setting up a fund to cover asbestos-related medical costs for people living near areas that used asbestos as well as to provide compensation to bereaved family members.

The government estimated that 76bn yen will be needed by 2010. Of that amount, about 40bn yen will be required to cover the claims filed in 2005 and 2006. Between 2007 and 2010 Japanese companies are being asked to contribute about 30bn, of which four companies will pay a total of 338m yen annually in addition to their share of increased workers' insurance premiums.

Australia

In 2001, the actuarial estimate of the present and future liabilities in relation to James Hardie's asbestos-related claims was A$286 million. In the same year, James Hardie set up the Medical Research and Compensation Foundation ("MRCF") and transferred to the MRCF the stocks of the asbestos-related subsidiaries along with A$293m in cash before changing domicile to the Netherlands. There were suggestions that the funds were insufficient and a Special Commission of Inquiry was appointed in 2004 to investigate the corporate restructuring.

On 7th February 2007 James Hardie announced a new agreement with the New South Wales government to fund asbestos claimants over the next 40 years and James Hardie made an initial payment of A$184.3 million was made by James Hardie. In contrast to the 2001 estimate, the current central undiscounted estimate of the liabilities as at 30 September 2006 stood at A$1,555m.

7.3.2 Future - China and India

With large populations and a continued use of asbestos what could the impact be to the Chinese and Indian societies? With insurers starting to write business in these new markets have they forgotten the lessons from the first world?