

# Claims Inflation – Uses and Abuses

## Paper Prepared for GIRO 2005

### Working Party Members:

Simon Brickman  
Will Forster  
Simon Sheaf (Chairman)

### Summary

Claims inflation is one of the key assumptions used by non-life actuaries. It is relevant to virtually every aspect of their work, whether reserving, pricing, planning or capital modelling. In some instances, an appreciation of past inflation is needed, whereas in other cases, it is the estimation of future inflation rates that is key. Unfortunately, claims inflation is notoriously difficult to measure with any degree of certainty.

In this paper, we focus on inflation for UK liability classes and US professional negligence. We have tried to obtain input from a wide range of sources, both actuaries and other professionals with an interest in this area, including underwriters, claim managers and personal injury lawyers.

As part of our research, we conducted a survey of the claims inflation assumptions currently used by actuaries and, in this paper, we present the (somewhat limited) results we obtained. We then discuss the sources of information on claims inflation that are readily available.

After this, we consider the current drivers of trends in both claim frequency and claim severity. Many of these drivers were identified in the survey responses we received from actuaries, and in our discussions with underwriters, claim managers and lawyers.

The paper then moves on to discussing a number of methods for estimating claims inflation, ranging from the fairly simplistic to the more complex. Finally, we highlight some of the common pitfalls that actuaries should avoid when making claims inflation assumptions, and using them in their work.

## **Table of Contents**

1. Introduction
2. Survey
3. Sources of Information
4. Drivers of Trends in Frequency
5. Drivers of Trends in Severity
6. Possible Methods for Estimating Claims Inflation
7. Pitfalls

## **Appendices**

1. Copy of Survey Questionnaire
2. Data from Responses to Survey
3. References

# 1 Introduction

## 1.1 Background

Claims inflation is one of the key assumptions used by non-life actuaries.

An appreciation of claims inflation rates is needed in virtually all the areas that non-life actuaries get involved, including reserving, pricing, planning and capital modelling. For reserving, an understanding of historical rates of claims inflation is of primary importance, whereas for planning, and capital modelling, the actuary needs to understand the expected future rates. For pricing, both the past and future rates are needed – the former in order to restate the past years on a comparable basis to the current year, and the latter in order to project the results into the next policy year.

Like it or not, non-life actuaries cannot get away from claims inflation!

Which is a bit of a problem since it can be very difficult to measure. It is hard to accurately gauge the level claims inflation has been running at in each past year. This is because the truth is hidden in the claims data which is distorted by lots of other factors such as changes in the mix of business, changes in limits, deductibles and policy terms, and changes in settlement patterns. And, however difficult it is to put figures on past inflation rates, it is even harder to estimate the future level of claims inflation.

With our somewhat, shall we say, “select” membership, there has been a limit to what the Working Party has been able to achieve. In particular, it quickly became clear that we were not going to come up with infallible methods for estimating past and future levels of claims inflation, so we set ourselves the rather more modest aims of:

- Identifying sources of information on claims inflation;
- Considering the range of factors that influence claims inflation;
- Ascertaining the range of inflation assumptions used by non-life actuaries in the UK;
- Suggesting possible methods for estimating claims inflation; and
- Highlighting some issues for actuaries to be aware of.

Claims inflation rates clearly differ between different countries and different lines of business. With our limited resources, it was clear that we were not going to be able to cover everything. We decided to focus on liability, rather than property, lines since claims inflation is clearly both more significant and more uncertain on liability lines. In addition, we decided to focus on two territories – the UK and the US, since these account for the majority of work undertaken by non-life actuaries in the UK.

More specifically, we decided to focus of the following country / line of business combinations:

- UK Employers Liability

- UK Public Liability
- UK Professional Indemnity
- UK Motor – Bodily Injury
- UK Motor – Material Damage
- US Medical Malpractice
- US Professional Indemnity

We felt that it was important to split the analysis of UK Motor between Bodily Injury and Property Damage claims because of the very different influences on the inflation rates for these two claim types. This does, of course, mean that one purely property line has been included in our analysis. However, we took the view that it made sense to look at the whole of the Motor risk and this was the best way to do so.

When considering claims inflation, it is important to separately consider the frequency and severity of claims. Total claims inflation is clearly the combination of the trends in frequency and severity, but very different factors drive the trends in these two elements. Consequently, it is only by looking at them in isolation from one another that the actuary can fully understand what is going on.

In our deliberations, we were keen to get input from as wide a group as possible. Consequently, we sought the views not only of non-life actuaries, but also of other professionals with an interest in this topic, including senior underwriters, claim managers, and personal injury solicitors. The Working Party felt that it was important to gather input from these various groups since they all look at the issues involved from different perspectives. Our hope was that, by getting the views of each of these groups, we would end up with as rounded and complete a picture as possible.

The views of actuaries were obtained via a survey, while the views of the other professionals were obtained in face-to-face meetings and telephone conversations. The Working Party would like to thank all those people who took the time to discuss their views with us, as well as those actuaries who completed and returned the survey. Without the help of these people, this report would have been far less informative, as well as considerably shorter!

## **1.2 Outline of this Report**

In this section, we outline the contents of the remaining sections of this report.

The Working Party was keen to obtain the views of the non-life actuarial community on claims inflation. In particular, we were keen to find out what assumptions they were currently making for claims inflation, where they were getting those assumptions from, and what they considered to be the factors driving trends in claim frequency and severity. In order to meet these objectives, we produced a short survey that actuaries were invited

to complete. The structure and results of that survey are discussed in Section 2 of this report.

As mentioned above, one of the Working Party's aims was to assist non-life actuaries by identifying sources of information on claims inflation. We undertook some research in order to do this and the sources that we identified are discussed in Section 3. We concentrate specifically on sources of information relating to the UK and the US, but also identify a number of sources for other countries.

In the subsequent two sections of this report, we discuss various drivers of trends in claims inflation. Section 4 discusses drivers of trends in claim frequency, while Section 5 discusses drivers of trends in claim severity. These drivers were identified from three sources:

- Our survey of non-life actuaries;
- Our discussions with senior underwriters, claim managers, and lawyers; and
- Background reading.

Although the list of factors identified and discussed is clearly not exhaustive, it is intended to give the reader a flavour of the sort of things that are driving claims inflation and which, therefore, need to be considered when attempting to predict future rates.

Section 6 briefly discusses a number of methods for estimating claims inflation. This shows the variety of options available to the actuary, ranging from the relatively straightforward to the statistically more sophisticated. Many of the methods we discuss have previously appeared in the actuarial literature. However, we felt that it would be helpful to pull them together as a single reference point, and as an aid to readers who may not have previously been aware of some of them.

Finally, Section 7 highlights a number of common pitfalls that actuaries should avoid when making claims inflation assumptions, and using them in their work. It includes consideration of whether a particular measure of claims inflation is credible, whether it is appropriate for the specific purpose to which it is being put, and whether it is being applied correctly. Many of the pitfalls discussed will be familiar to the experienced practitioner, but it is hoped that this section will raise issues that other readers may not have previously considered fully.

## **2 Survey**

### **2.1 Details of the Survey**

In order to ascertain the views of non-life insurance actuaries on claims inflation, the Working Party conducted a survey. The aims of the survey were:

- To look at the range of inflation assumptions used by non-life insurance actuaries;
- To look at how they derived their assumptions; and
- To get the views of actuaries on the drivers of current trends in both the frequency and the severity of claims.

The survey began with background questions on the type of company the respondent worked for and the types of actuarial work they were involved in.

The survey then sought views on the levels of claims inflation in 2005 in certain classes of business in the UK and the US. The classes that were included were the following:

- UK Motor – Bodily Injury
- UK Motor – Property Damage
- UK Employers Liability
- UK Public Liability
- UK Professional Indemnity
- US Medical Malpractice
- US Professional Indemnity

For each of these classes, the survey asked for the respondent's views on the level of claims inflation in 2005, and the sources of their assumptions. It also asked whether their inflation assumptions were on an underwriting year, accident year or settlement year basis.

Finally, the survey asked for the respondent's views of the main factors influencing trends in claim frequency and claim severity.

This survey was placed on the profession's website and advertised in one of the profession's eNews Bulletins. A copy of the survey is included as Appendix 1 to this report.

Unfortunately, the response rate was very disappointing – only 14 replies were received. Since the survey was anonymous, there is no way of knowing how representative the views of the respondents are of the wider non-life insurance actuarial community. As a result, we have been unable to draw any conclusions from the responses. Nevertheless, we have conducted a limited analysis of the 14 completed surveys, and the results of that analysis are discussed in Section 2.2.

The Working Party would like to thank all those who took the time to complete and return the survey.

## **2.2 Analysis of Responses**

The majority of respondents to the survey (57%) worked for personal and/or commercial lines insurers. There were seven respondents (50%) whose companies wrote commercial lines insurance, and six (43%) whose companies wrote personal lines insurance. We only received one response (7%) from a reinsurer and just two (14%) from the Lloyd's market. Only two consultants (14%) returned the survey and there was one respondent (7%) who worked for a reinsurance broker.

In terms of areas of work, pricing was the most common – 11 respondents (79%) were involved in that area. This was followed by reserving and planning with nine respondents (64%) involved in each of these. Four respondents (29%) worked on capital modelling, two (14%) worked on reinsurance structure design and two (14%) on risk management and/or financing.

In some ways, it was surprising that reserving did not come top since that has always tended to be the area in which most non-life actuaries are involved. One explanation could be that pricing actuaries use inflation assumptions more explicitly than reserving actuaries so were more likely to complete the survey. However, it could also be because the responses were mainly from company actuaries, rather than consultants, and the former group are far more likely to be involved in pricing than the latter. It could also just be a quirk of our small sample and there is no reason to suppose that the pattern would be repeated across the whole profession.

More than half the respondents (57%) were considering inflation on an accident year basis, with 29% viewing it on an underwriting year basis and 14% on a year of settlement basis. Our initial thinking was that company actuaries would be more likely to be considering inflation on an accident year basis, with Lloyd's actuaries more likely to be viewing it on an underwriting year basis. However, while 75% of insurance company actuaries measured inflation on an accident year basis, our sample of just two Lloyd's actuaries proved inconclusive on this point – one selected underwriting year, but the other went for accident year.

We also considered whether the basis on which inflation assumptions were considered depended on the areas of actuarial work that the respondent was involved in. Our initial thought was that pricing actuaries might be more likely to consider inflation on an underwriting year basis, whereas reserving actuaries might be more likely to consider it on an accident or settlement year basis. However, the limited evidence was not conclusive here. There were only two respondents who were involved in reserving but not pricing and, of those, one opted for accident year and the other opted for settlement year. However, of the four respondents who were involved in pricing but not reserving, two selected underwriting year, but the other two selected accident year.

Interestingly, the only people who were viewing inflation on a year of settlement basis were the two consultants.

When it came to the questions on particular classes of business, we asked people only to complete the details for those classes they had experience of. The UK Motor classes produced the most responses with all but one respondent (93%) providing information on those. UK Employers and Public Liability each provoked responses from ten of the people who completed the survey (71%), while seven people (50%) completed the questions on UK Professional Indemnity. The level of responses on the US classes was particularly disappointing with four responses (29%) on US Medical Malpractice and just three (21%) on US Professional Indemnity.

The table below summarises the 2005 claims inflation assumptions used by the respondents to the survey:

### Summary of Inflation Assumptions

Class	Number of Responses	Mean	Median	Min	Max
UK Motor BI	13	8.9%	9.5%	6.0%	12.0%
UK Motor PD	13	3.8%	3.0%	2.5%	6.0%
UK Employers Liability	10	8.4%	8.0%	5.0%	12.0%
UK Public Liability	10	6.9%	7.75%	3.0%	10.0%
UK Professional Indemnity	7	7.5%	7.5%	5.0%	10.0%
US Medical Malpractice	4	10.9%	10.5%	7.5%	15.0%
US Professional Indemnity	3	7.5%	7.5%	5.0%	10.0%

The range of assumptions appears surprisingly wide for each of the classes. If these rates were compounded over a number of years, they could cause different actuaries to produce substantially different estimates.

However, the wide ranges may be partly down to the wording of the survey. Although we were looking for the combination of frequency and severity, we failed to say so explicitly so it is possible that some respondents may have only provided their severity inflation estimates. Also, although we were anticipating that respondents would provide their total inflation rate, including RPI and/or wage inflation, we again failed to say this explicitly, and it is possible that some people may have provided figures net of RPI or wage inflation. Of course, it is also possible that actuaries really do have significantly different views of the current levels of claims inflation. This may, in part, be driven by the experience of different insurers since some will have been more successful at combating claims inflation than others. However, with our small sample size, it is difficult to know the actual reason for the wide ranges, or whether they are in any way representative of the non-life actuarial profession as a whole.



The following table looks at how actuaries derive their inflation assumptions. For each class, it shows what proportion of respondents who provides an inflation assumption based it wholly or partially on each of the sources we asked about.

### Sources of Inflation Assumptions

Class	Internal Analysis	Published Indices	Other External Information	Discussions with Colleagues	Subjective Judgement
UK Motor BI	54%	23%	46%	54%	77%
UK Motor PD	62%	38%	15%	54%	77%
UK Employers Liability	30%	20%	10%	50%	90%
UK Public Liability	50%	20%	10%	50%	80%
UK Professional Indemnity	43%	0%	14%	43%	100%
US Medical Malpractice	25%	0%	0%	50%	100%
US Professional Indemnity	33%	0%	0%	67%	100%
<b>Total</b>	<b>47%</b>	<b>20%</b>	<b>18%</b>	<b>52%</b>	<b>85%</b>

Perhaps unsurprisingly, subjective judgement was the most common source of inflation assumptions for every class. The next most popular selection was discussions with underwriting and claims colleagues which was identified in at least 43% of cases for each class. This is encouragingly contrary to the stereotypical image of the actuary as someone who sits in a darkened room and never converses with another human being. In our view, it is essential to get input from outside the actuarial department since underwriters and claims handlers can offer a different perspective on the issues affecting claims inflation. Having said that, our experience of talking to other professionals about their view of claims inflation is that they are often reluctant to quantify their ideas and express their thoughts as actual percentage changes. Nevertheless, there is still a significant benefit from taking their thoughts on board, even if they are more qualitative than quantitative.

While discussions with colleagues was identified in just over half the cases, internal analysis was identified in just under half.

External information was used more often to derive UK Motor assumptions than assumptions for other UK lines. The most commonly identified external indices or other information for UK assumptions were:

- The Third UK Bodily Injury Awards Study, published by the IUA and the ABI, which was mentioned by 71% of respondents who used external information to develop inflation assumptions for UK Motor BI;
- The retail price index; and
- National average earnings.

None of the respondents who provided assumptions for US classes identified external indices or other external information. This was surprising as there are more sources of publicly available information in the US than in the UK. However, it is quite possible that this is just because our extremely small sample is unrepresentative.

The questions on the drivers of trends in the frequency and severity of claims provoked a wide range of suggestions. Some came up regularly while others were only suggested by one or two respondents. We have used all the suggestions in compiling our lists of drivers in Sections 4 and 5 of this report.

The responses to the numerical and yes/no questions in the survey are shown in detail in Appendix 2.

## 3 Sources of Information

### 3.1 Introduction

In this section, we highlight some of the available sources of information about claims inflation. These include estimates of the level of inflation, discussion about the drivers of inflation, methods for estimating inflation, and useful statistics to help in the estimation of inflation. We consider separately sources of information relating to the UK, the US, and the rest of the world.

### 3.2 UK

For UK practitioners dealing with bodily injury claims the Third UK Bodily Injury Awards Study, published by the International Underwriters Association and the Association of British Insurers, is close to essential reading (and judging by the results of the survey it would appear that it is widely consulted).

A small number of papers on the UK Actuarial Profession website ([www.actuaries.org.uk](http://www.actuaries.org.uk)) have addressed claims inflation, including:

- “The Cost of the Compensation Culture” (Lowe, Julian et al, 2002); and
- “UK Household: Floods, Inflation and Under-Insurance” (Cowley, Rob et al, 2002).

Economic and demographic data is available at the Office for National Statistics website ([www.statistics.gov.uk](http://www.statistics.gov.uk)).

### 3.3 US

For those interested in the US, there are several papers which address inflation, either directly or peripherally, on the website of the Casualty Actuarial Society ([www.casact.org](http://www.casact.org)).

Towers Perrin Tillinghast produce reports on trends in US tort costs. The most recent one was issued in 2004 and is entitled “US Tort Costs: 2004 Update, Trends and Findings on the Cost of the US Tort System”. It is a very worthwhile read and can be found at [www.towersperrin.com/tillinghast/publications/reports/Tort\\_2004/Tort.pdf](http://www.towersperrin.com/tillinghast/publications/reports/Tort_2004/Tort.pdf).

In addition, there are a number of websites that provide useful economic and demographic data, which may help in constructing proxy indices. Two of these are discussed below.

The US Bureau of Labour statistics ([www.bls.gov](http://www.bls.gov)) gives a wealth of data on inflation, occupations, populations, States, and demographics. It is an excellent "must have" source of data, which provides the user with the ability to devise their own queries.

US census data can be found at [www.census.gov](http://www.census.gov): This website provides on-line data on population statistics, including forecasts.

The final two sources discussed in this section should be of interest to actuaries working in the area of US Medical Malpractice.

A compilation of the substantive Medical Malpractice law of all 50 US States can be found at [www.mcandl.com/introduction.html](http://www.mcandl.com/introduction.html). Unfortunately, this is only up to 2002 but it is an excellent summary of the legislative position across the US.

The National Practitioner Databank website (<http://www.npdb-hipdb.com>) contains details about this US national data source, which holds details of all complaints against all health practitioners. The intention is to improve the quality of health care by encouraging state licensing boards, hospitals and other health care entities, and professional societies to identify and discipline those who engage in unprofessional behaviour; and to restrict the ability of incompetent physicians, dentists, and other health care practitioners to move from State to State without disclosure or discovery of previous medical malpractice payment and adverse action history. Adverse actions can involve licensure, clinical privileges, professional society membership, and exclusions from Medicare and Medicaid.

### **3.4 Rest of the World**

The publicly available information varies widely by country. Many countries have government of central bank websites that will provide economic data series (e.g. the Australian Bureau of Statistics website at [www.abs.gov.au](http://www.abs.gov.au)) although there is a cost attached to obtaining information from some of these.

The Organization for Economic Co-operation and Development (OECD) website ([www.oecd.org](http://www.oecd.org)) contains reports and information by country, including inflation figures. Some of this is at cost.

One slightly surprising source of information is the US Central Intelligence Agency (CIA) website ([www.cia.gov/cia/publications/factbook](http://www.cia.gov/cia/publications/factbook)) which contains outline information by country.

The Eurostat website at [epp.eurostat.cec.eu.int](http://epp.eurostat.cec.eu.int) gives some economic and demographic statistics for EU member countries.

Subscription services such as Axco ([www.axco.co.uk](http://www.axco.co.uk)) provide detailed reports on the insurance environment in many countries by class. These also include key economic statistics for each country.

## 4 Drivers of Trends in Frequency

### 4.1 Introduction

One of the aims of the Working Party was to understand the various factors that drive changes in the frequency and average severity of claims. In order to do this, we were keen to get feedback from as wide a group as possible, not just actuaries but also underwriters, claims managers and lawyers. It was felt that these professions would view claims inflation from different perspectives to actuaries and would therefore provide the Working Party with helpful additional insights. The hope was that, by getting input from all these groups, we would be able to produce lists of the drivers of trends in claims inflation that were as useful as possible.

Consequently, our research on this area comprised of three elements:

- As discussed in Section 2, above, we asked for feedback from actuaries in our survey.
- We had discussions with a number of claims managers, senior underwriters, and lawyers in order to get input from their perspectives. In most cases, these discussions took place face-to-face but one or two of them were by telephone.
- We read a large number of papers and articles that dealt with this area.

The Working Party would like to thank all those who took the time to talk to us. The discussions were open and candid and the information that we obtained was invaluable.

In the remainder of this section we identify and discuss drivers of trends in claim frequency. In Section 5, we look at trends in claim severity. In both sections, we concentrate on those lines of business that we asked about in our survey. While the lists of identified drivers are fairly long they are by no means intended to be exhaustive and there will doubtless be factors that we have failed to mention. Nevertheless, our hope is that the factors we have discussed will give the reader a flavour of what is driving claims inflation and what, therefore, needs to be considered when attempting to predict future rates.

### 4.2 Drivers

**4.2.1 Compensation Culture** Unsurprisingly, the perceived “compensation culture” was mentioned time and again in our research. This could be defined as the desire of individuals to blame someone for any wrong they suffer, and to seek compensation from the party they blame. It has also been referred to as the “blame culture”.

This subject was dealt with extensively in the 2002 GIRO Working Party paper “The Cost of the Compensation Culture” by Julian Lowe et al, so is touched on relatively briefly here.

There has been extensive coverage in the press over the last few years of the perception of the compensation culture and there has been much discussion on whether it is a reality or a myth. The recent report “Better Routes to Redress” from the Better Regulation Taskforce concluded that the compensation culture was an “urban myth” and blamed the media for perpetuating it. However, this is disputed by the insurance industry. Interestingly, the insurers we spoke to believed that the compensation culture really did exist, whereas the personal injury lawyers thought that it did not.

The proponents of the existence of the compensation culture argue that the attitude of society has changed over recent years so that it is now considered more acceptable to blame someone for a wrong that has been suffered and to seek compensation from them. They also argue that society is becoming more litigious. If this is true, then it would clearly be increasing the propensity of individuals to make a claim for a wrong they have suffered and, consequently, increasing the frequency of claims

**4.2.2 Conditional Fee Arrangements** Historically, access to justice in the UK was often provided by the Legal Aid scheme, which lent money to lawyers to pursue cases. However, in order to determine whether a case was eligible for this scheme, claimants were means tested and an assessment was made of the likelihood of winning the case. Over time, this testing became stricter so that most people did not have access to the legal system without risking a large amount of their own money.

Conditional fee (or “no win, no fee”) arrangements were first introduced in the UK in 1995. They enabled a claimant to bring a case, safe in the knowledge that no legal fees would have to be paid if they lost. Lawyers could charge a “success fee” uplift to their normal fees so that they received more income for cases they won, to offset the fact that they would get no income for cases they lost. “After the event” insurance could be taken out by lawyers to cover the risk of them losing a case and becoming liable for the defendant’s legal fees. However, in the event of winning a case neither the success fee nor any after the event insurance premium were recoverable from the defendant – instead they had to come from the damages awarded to the claimant. Because this reduced the amount the claimant could be left with, this system never really took off until changes were made in 2000.

In 2000, Legal Aid was abolished for most personal injury cases. At the same time, changes to the system of conditional fee arrangements were made so that success fees and after the event insurance premiums are now recoverable from the losing party. This means that a claimant cannot lose financially – if they lose a case, no fee is payable, and if they win, their legal fees, the success fee and any after the event insurance premium is recoverable from the defendant. As a result, there is now no financial risk to an individual claimant and this has increased the likelihood of an individual bringing a claim, which increases the claim frequency.

**4.2.3 Claim Management Companies** Claim management, or accident management, companies are organisations that seek to guide a claimant through the compensation process. They arrange solicitors, medical experts and expert witnesses. These companies

actively encourage individual to pursue compensation claims. Through this encouragement, they are increasing the propensity to claim and hence the frequency of claims.

There have been some high profile failures of claim management companies over the last few years, notably Claims Direct in 2002 and The Accident Group in 2003, and it is possible that this may have reduced the frequency of personal injury claims. However, some of the people we spoke to argued that, even if this was the case, it would only be a temporary effect and other companies would fill the gap.

#### **4.2.4 Advertising by Personal Injury Solicitors and Claim Management Companies**

Over recent years, it has become common to see personal injury solicitors and claim management companies advertising for clients. These adverts appear on television, on radio and in papers and magazines. Posters can also be found in various places, including doctor's surgeries and hospital waiting rooms – to encourage those awaiting treatment for an injury to consider whether anyone should be held responsible for causing that injury. This latter route for advertising has come in for some criticism recently.

In addition, representatives of Claim Management Companies can often be found in town centres and other places where there are lots of people, stopping individuals to ask whether they have suffered a recent injury and, if so whether anyone was to blame.

There can be little doubt that these methods of publicity have increased people's awareness of the possibility of receiving compensation for injuries suffered, and this has increased the number of claims made.

**4.2.5 Legislative Changes** Changes in legislation can affect claims frequency. A few recent and current examples of this are as follows:

- There is a general view that the introduction of conditional fee arrangements has, as discussed in Section 4.2.2 above, had the effect of increasing the propensity to claim.
- The introduction in 2002 of penalty points for driving offences in the Republic of Ireland significantly reduced the number of Motor claims the following year.
- Changes in Health and Safety regulations such as the new noise regulations which will take effect in 2006. These will reduce the number of decibels at which action needs to be taken. It is possible that this could lead to more Employers Liability claims since there may be employees who are being exposed to a level of noise that is below the current threshold but above the new one.
- The new fire regulations that are due to be implemented in October 2006 will introduce an obligation on commercial businesses to be more proactive about managing the fire risk. This will include an expectation that they will deal with minor fires without necessarily requiring the assistance of the fire brigade. It is



not difficult to see how this could have the potential to increase Employers Liability claims.

- The General Product Safety Directive is expected to be implemented in the UK in 2006, following the completion of the DTI's consultation period in March 2005. This provides for tighter definitions of the duties of a manufacturer, including when they are required to recall a product and, consequently, could lead to an increase in the number of product recall claims.

**4.2.6 Tort Reform** Tort reform can also affect claim frequency. One example is that, on 10 April 2003, the Ohio legislature enacted a tort reform law (S.B. 281) to help alleviate the MPL situation in their state. There are several features of this law that may affect frequency. The law calls for reform in arbitration between patients and hospitals/physicians. Now, arbitration is binding if a patient signs a contract before any service is rendered, and after 30 days the contract becomes irrevocable. The law has also changed the statutes of limitation and repose. There is now a one-year statute of limitations for medical liability claims, and a four-year statute of repose. A patient now has a maximum of four years to discover an injury and file a claim.

More generally, in the short term, the prospect of tort reform may cause an increase in claims frequency as potential claimants rush to make claims before the enactment of reforms.

**4.2.7 Court Decisions** The law can also be changed by court decisions. One example is the February 2005 High Court ruling on pleural plaques. This is a condition that can arise following exposure to asbestos and which involves a scarring of the lung tissue. Despite the fact that this condition does not give rise to any impairment of lung function or any other symptoms, the High Court ruled that sufferers were entitled to compensation because of the anxiety caused by the increased risk of developing a more serious asbestos-related condition. This ruling certainly has the potential to encourage more sufferers of pleural plaques to make claims.

Another example is the various test cases on stress in recent years. These have tended to increase the burden of proof that is required in order to succeed in a stress claim and this could well have the effect of reducing the number of stress claims that are made.

**4.2.8 Stricter Definition of Liability** There appears to be a general trend towards a stricter definition of when a party is liable for an incident. In part, this is coming from legislative changes such as the General Product Safety Directive discussed in Section 4.2.5. However, it is also coming from the Courts widening their criteria for finding parties liable. Any extension of the definition of liability has the potential to lead to an increase in the number of claims.

**4.2.9 Economic Conditions** The frequency of claims in some classes can be affected by the economic conditions. For example:

- The instances of car theft may increase during a recession.

- Professional negligence claims against surveyors and conveyancing solicitors are far more likely during a downturn in the property market than when prices are high.
- The numbers of Professional Indemnity claims are likely to increase significantly as the level of bankruptcies and voluntary closures increases.
- It could be argued that individuals are more likely to claim for injuries suffered when times are hard.

**4.2.10 Changing Weather Patterns** Some types of claim clearly increase in certain weather conditions. For example, storms are likely to give rise to significant numbers of claims for damage to property, and claims for burst pipes increase in cold conditions. A fairly extreme example would be the claims following a large hurricane hitting the US mainland.

In recent years weather patterns appear to have got more extreme. Recent examples that could be attributable to climate change include the following:

- The unusually large number of hurricanes hitting the US in late 2004; and
- A spate of significant floods in the UK such as those in Boscastle in August 2004 and Carlisle in January 2005.

Each of these events has led to substantial numbers of insurance claims.

Many scientists believe that there will be an increased frequency of these events due to long-term changes in weather patterns as a result of global warming. Others are less convinced. However, it is clear that any change in weather patterns, whether short or long-term, which leads to such incidents will result in an increase in claim frequencies. Property claim frequencies are likely to be particularly badly affected by such events.

**4.2.11 Traffic Density** The number of cars on UK roads is continuing to increase. In all likelihood, this will lead to increasing numbers of road traffic accidents and, as a result, increasing numbers of Motor claims.

There are various initiatives to reduce the number of cars on the roads. These include the congestion charge for driving in central London on week days, park and ride schemes operating in various city centres around the country, and the government proposal to tax drivers by the mile with rates varying depending on the type of road and the time of travel. If successful, these initiatives might be expected to reduce claim frequencies.

However, there is a contrary argument to those discussed in the last two paragraphs, which is that the more traffic that is on the roads, the slower the average speed will be and this will reduce the probability of a major accident. Conversely, where there is less traffic, cars can travel at higher speeds and this will increase the number of major accidents.

**4.2.12 Road Safety** Offsetting the increasing numbers of cars are improvements in road safety, which will have the effect of reducing the number of accidents. One

example is the introduction of speed cameras on particularly dangerous stretches of road. These cause traffic to slow down and, hence, reduce the number of incidents occurring.

**4.2.13 Car Design** Over time, the design of cars has improved from a safety perspective. There are some features, such as anti-lock brakes, that are designed to reduce the chance of an accident. And there are other features, such as seat belts and air bags, that are designed to reduce the chance of death or significant injury if an accident does occur. In addition, cars are now tested to see how well they will withstand an impact which is again to try and minimise fatalities and injuries. Any features that reduce either the chance of an accident, or the likelihood of death or serious injury if an accident does occur, will reduce the frequency of Motor claims. The former types of feature would reduce both bodily injury and property damage claims, while the latter type would reduce bodily injury claims.

**4.2.14 Population Growth** For medical malpractice, the frequency may be expected to grow in line with population growth. The frequency denominator in Hospital Professional Liability coverage is usually “bed count equivalent” which is a weighted sum of bed types (acute, sub-acute), births, and outpatients, where weights reflect expected relative frequency. The denominator therefore provides no inflation hedge

**4.2.15 Demographics** The profile by age and sex of the population will impact the type and number of medical treatments required. Any changes in the numbers of people having particular treatments would be expected to lead to changes in the numbers of medical negligence claims in respect of those treatments.

**4.2.16 Number of Physicians** The frequency of medical errors will increase with the complexity of the operations performed. Therefore the profile of physicians by specialisation will affect the claim frequency.

**4.2.17 Safety Education** The Second Annual Report published by HealthGrades in 2005 highlighted the number of avoidable medical errors in US hospitals resulting in death and estimated this figure to be around 80,000 per annum. It also used the data to derive a good hospitals guide. By focusing attention on underperforming hospitals the expectation must be to shame them into improving their practices, thereby reducing the frequency of losses for medical malpractice insurers.

More generally, educating people on better safety and risk management techniques will reduce claim frequency in a variety of areas.

**4.2.18 Merger/Takeover Activity** Increases in the number of mergers and takeovers are likely to give rise to an increased number of claims against professional advisors as a result of subsequent problems coming to light. Such issues are likely to emerge some time afterwards and this is therefore a lead indicator of potential claims.

**4.2.19 Risk Management Initiatives** There are many examples of activities the insured may undertake which will lessen the risk of claims. For Professional Indemnity insurance, examples would include:

- Seeking to ensure the client agrees the scope of the work to be undertaken at the outset of any assignment (as evidenced in the Client Engagement letter);
- Regular technical training to ensure the professionals are up to date in their knowledge;
- Diarising of workflow to ensure progress is logged to provide an audit trail and reduce the risk of missing key deadlines; and
- Peer review of work to assess and maintain technical standards.

**4.2.20 Changes in Deductibles** Increasing the deductible on a policy will lead to fewer claims being received because incidents will need to be larger in order to meet the criteria for reporting them to the insurer. Conversely, reducing the deductible will lead to a greater number of claims being received.

**4.2.21 Changes in Policy Terms** In soft markets, it is common for policy terms to be widened. Examples might include types of claims that were excluded during the hard market now being included, or extra covers being included at no extra cost. By definition, any such widening of the terms will lead to an increased claim frequency.

**4.2.22 Underwriting Decisions** It is almost self evident that writing poor quality risks will lead to more claims. The worse the quality of the risk that is written, the more claims it is likely to give rise to. Of course, it is possible than an insurer could be charging an adequate premium for a poor quality risk so that it can be written profitably but that still does not alter the fact that there will be more claims.

In order to minimise the number of claims a policy is likely to give rise to, an underwriter will need to have regard to the many risk features and to the quality of the risk management.

## 5 Drivers of Trends in Severity

### 5.1 Introduction

The Working Party obtained information on the drivers of trends in claim severity from the same sources as those discussed in Section 4.1 on claim frequency. In brief these were the survey of actuaries, discussions with claims managers, underwriters and lawyers, and background reading. As mentioned in Section 4, we have concentrated on those lines of business that we asked about in our survey. Again, although the list of drivers we have developed is quite long, it is by no means intended to be exhaustive and there will doubtless be factors that we have failed to mention. Nevertheless, our hope is that the factors we have discussed will give the reader a flavour of what is driving claims inflation and what, therefore, needs to be considered when attempting to predict future rates.

### 5.2 Drivers

**5.2.1 Retail Price Inflation** Perhaps the most obvious driver of increasing claim severity is increases in how much things cost. The cost of repairing or replacing damaged property will increase as the costs of the required raw materials or the products themselves increase. In addition, any compensation to cover future living costs will be dependant on how quickly those cost are rising. In the UK, the cost of retail goods is measured by the Retail Price Index (RPI).

Retail price inflation usually tends to be a positive number – in other words, prices are going up. However, there have been periods in various countries where inflation has been negative. In such situations, this would tend to pull claims inflation down.

**5.2.2 Wage Inflation** Where an individual is being compensated for an injury suffered, part of that compensation may be directly related to the individual's salary. If, following the incident leading to the injury, the claimant is unable to work for a period of time, they will seek compensation for the loss of past and future income. Trends in the size of awards for this head of damage will be driven by wage inflation, both the current levels and the expected future levels.

In addition, the level of some Property losses, such as Household claims, could also be indirectly related to the level of the claimant's salary since, the more they are paid, the higher the value of their possessions is likely to be.

Ideally, the amount of an award should reflect wage trends in the particular industry and occupation of the claimant, but such information is often not available and more general indices of wage inflation (such as national average earnings in the UK) have to be used instead.

**5.2.3 The Courts Act** In the past, compensation in the UK has tended to be paid in the form of a lump sum. Although it has been possible for compensation to be paid in the form of an annuity, known as a periodical payment or structured settlement, this could only be done with the consent of both the claimant and the defendant and, as a general rule, neither have proved keen on this approach. Consequently, relatively few compensation awards have been made on this basis.

There are, however, a number of good arguments as to why it is better, both for the individual claimant and for society as a whole, for compensation for the loss of a regular income stream to be paid in the form of a periodical payment. Consequently, the 2003 Courts Act gave the courts the power to order that compensation for future pecuniary losses be paid in the form of a periodical payment, even if this is against the wishes of the two parties. This power came into force on 1 April 2005 and it is widely expected to increase the use of periodical payments.

For a number of reasons the use of periodical payments is likely to increase costs to insurers:

- The market for impaired life annuities is currently extremely limited. Consequently, non-life insurers who wish to purchase an annuity to meet the periodical payments are likely to have to pay an inflated price, even assuming that they can buy one at all. One possible exception to this is composite insurers where the life arm may be willing to provide appropriate annuities. A number have indicated that they will do this, even if they are not going to sell impaired life annuities to other insurers. In these circumstances, they may well choose not to charge excessive premiums.
- Even if an insurer self-funds, there will be an implicit cost due to the fact that the real discount rate in the bond market is lower than that assumed in the Ogden Tables.
- The court has the option to issue a variation order with a periodical payment order. This would allow the level of payments to be varied at some future date if a change occurs in the claimant's medical condition that was foreseeable at the time the order was issued and mentioned in the order. While, in theory, this variation could be either upwards or downwards, it is likely that, in practice, the majority will increase the payments, if for no other reason than it being far easier for a claimant than an insurer to recognise a change in the claimant's condition. In such cases, the periodical payments will cost more than if compensation had been through a lump sum when no such reassessment would have been possible.
- An insurer's costs to manage a periodical payment award will be far greater than those to manage a lump sum payment. This is because they will need to set up systems to make the regular payments, keep track of the claimant's address, monitor any changes in the claimant's medical condition, and even ensure that the claimant is still alive. This will mean that the loss expenses allocated to a case are

going to be greater if compensation is paid via periodical payments than if it is paid via a lump sum.

- For all these reasons, insurers will be keen to settle claims before they get to court and, therefore, avoid the risk of a periodical payment order being made. Since the claimant's solicitors will be well aware of this, they will be in a position to negotiate a higher lump sum settlement than would otherwise have been the case.

At the moment, it is difficult to estimate the extent of these increased costs since no-one knows how often the Courts will make periodical payment orders, how often variation orders will be made or used, or how the market in impaired life annuities will develop over the next couple of years. In addition, since the number of periodical payment orders is not known, it is hard to estimate the cost of administering each one since the larger the number of orders made against an insurer, the lower the average costs will be.

**5.2.4 NHS Recoveries** In 1999, regulations were enacted that, subject to certain limits, allowed the NHS to recover the costs of treating victims of road traffic accidents from the responsible parties. The government is now planning to extend this to allow the NHS to also recover the costs of treating people injured in other incidents. This will increase the cost of many Employers' Liability and Public Liability claims.

The ABI have estimated that this will increase the total cost of Employers' Liability and Public Liability claims by about 5%. However, the increase is likely to be above this for Employers' Liability and below this for Public Liability since all Employers' Liability claims relate to bodily injuries, whereas some Public Liability claims relate to property damage.

Originally, these new powers were due to come into effect in April 2005, but the government postponed their introduction. Nevertheless, they have said that these provisions will be brought in by October 2006 at the latest.

**5.2.5 Legislative Changes** The issues covered in Sections 5.2.3 and 5.2.4 were specific examples of current legislative changes, but there are many more such changes that also affect the severity of claims. For example, changes in the mortality assumptions and discount rates used to derive the Ogden Tables (which are used to calculate the level of compensation for personal injury cases) will alter the severity of the affected claims.

On US Medical Malpractice business, the imposition of caps on non-economic damages (primarily pain and suffering) can have a significant impact on severity trends. In some States, the cost of the non-economic damages is over 70% of total claim costs. California is perhaps the best example of the impact of capping. In 1976, the Medical Injury Compensation Reform Act (MICRA) was passed in California, which caps non-economic damages at \$250,000. Malpractice losses per physician/surgeon in California are approximately 43% lower than the countrywide average using data through Medical Malpractice year 2000. Between 1976 and 2000, medical liability premiums rose 167% in California while they rose 505% countrywide.

There is also some anecdotal evidence that the existence of a non-economic cap influences juries to award lower amounts under other heads of damage. This may be an anchor bias effect.

**5.2.6 Tort Reform** Tort reform can also affect the average cost of claims. One example, mentioned in 4.2.6 on frequency drivers, is that, on 10 April 2003, the Ohio legislature enacted a tort reform law (S.B. 281) to help alleviate the MPL situation in their state. Several aspects are likely to affect the average loss amounts. Under the section of the law relating to collateral sources, a defendant in a medical liability action would be permitted to introduce evidence of the plaintiff's receipt of collateral benefits - payments from other sources - unless the provider of those benefits has a right of subrogation. However, if a defendant introduces such evidence, the plaintiff may also introduce evidence of the cost in securing those benefits. The law also calls for reform in arbitration between patients and hospitals/physicians. Now, arbitration is binding if a patient signs a contract before any service is rendered and, after 30 days, the contract becomes irrevocable. The law has also changed the statutes of limitation and repose. There is now a one-year statute of limitations for medical liability claims, and a four-year statute of repose. A patient now has a maximum of four years to discover an injury and file a claim. The next component of the law regards good faith motions. A defendant can now ask the court to determine whether a claim is supported by a reasonable good faith basis. If the court finds that it is not, the defendant is awarded certain court and attorneys' fees. These new law changes cited above will all have an effect on medical malpractice in Ohio, but the most significant cost-containment component of the law is Ohio Revised Code Section 2323.43, which implements caps on non-economic damages. Specifically, the law limits non-economic damages payments to the greater of \$250,000 or three times the economic damages, up to a maximum of \$350,000 per person and \$500,000 per occurrence. In the case of more severe injuries, the cap is \$500,000 per person and \$1 million per occurrence. Analyses of the law note that this provision of the law may have the most significant impact on insurance premiums.

An ISO Study in 2004 ("Medical Professional Liability Insurance: A Discussion of Non-Economic Damages Caps") suggests the saving in overall costs will be around 6% for \$1m policy limits, and 17% for \$2m limits. This is based solely on the severity, although there may be frequency effects in addition.

More generally, it is worth noting that tort, and other, reforms can also increase the average severity of claims by reducing the frequency of smaller claims.

**5.2.7 Court Decisions** The average costs of claims can also be changed by particular court decisions. One example would be the February 2005 High Court ruling on pleural plaques that was discussed in Section 4.2.7, above. Although the Court ruled that sufferers from this condition were entitled to some compensation, the level it set that compensation at was below the amounts that were previously being paid. Consequently, while the ruling may have increased the frequency of such claims, it reduced their average severity.



**5.2.8 Judicial Inflation** Any trends in the magnitude of awards made by the courts will be reflected in the average severity of claims. Although at least one personal injury lawyer we spoke to did not feel that recent increases in the level of court awards were any higher than price inflation, other people we talked to felt that they were increasing at a faster rate. If they are correct, this will lead to increases in average claim sizes.

**5.2.9 Inflation of Legal Costs** Legal costs are a significant proportion of the total cost of liability claims, and the general consensus appears to be that this proportion has increased over time. Consequently, any change that influences the level of these costs can have a material impact on claim severity. Some recent examples of such changes include the following:

- The introduction of conditional fee arrangements in the UK (discussed in Section 4.2.2, above) fundamentally changed the way that claimants received access to the justice system. It also fundamentally changed the way solicitors were paid for the service they provide. Most commentators agree that this significantly increased costs to the insurance industry.
- Recently, instead of allowing the level of success fees to be set separately for each case, fixed success fees have been introduced, first for Motor Bodily Injury claims and then for Employers Liability Accident claims. The level of success fees for Motor Bodily Injury claims were set at 12.5%, while those for Employers Liability Accident claims were set at 25.0% (.or 27.5% for Union-backed Collective Conditional Fee Arrangement cases). From 1 October 2005, fixed success fees will also be introduced for Employers Liability Disease claims at the following levels:

• Asbestos-related diseases	Non-CCFA cases	27.5%
• Asbestos related diseases	CCFA cases	30.0%
• Stress		100.0%
• Repetitive strain injury		100.0%
• Other diseases	Non-CCFA cases	62.5%
• Other diseases	CCFA cases	70.0%

In all cases, success fees on Motor Bodily Injury and Employers Liability claims are increased to 100.0% if the case goes to trial. Discussions are currently taking place with a view to also introducing fixed success fees for Public Liability cases. To the extent that the levels of the fixed fees differ from the average success fees paid previously, they will change the average cost of claims. The view of one company we spoke to was that average success fees prior to the introduction of fixed success fees were between 35% and 40%, which would imply that the introduction of fixed success fees may have reduced the average cost of claims.

- One of the key aims of the Personal Injuries Assessment Board in Ireland when it was established was to reduce costs. On 9 May 2005, they announced the results of their first batch of settlements. The average cost for each of these cases was only €1,250, and one award of €64,000 had costs of only €1,450. This compares

favourably with average litigation costs in Ireland which are in the region of 30% to 45% of awards.

- The hourly rates of attorneys will directly add to the total claim cost. Allowance for this inflation can be factored in using an appropriate attorney wage index. For US Medical Malpractice, defence costs typically add 20% to the overall claim cost. Additionally, the insurer may need to include an allowance for its own monitoring costs if it uses external attorneys to advise them on claims handling. This may add a further 2% to the overall claim cost. (Exact values will, of course, depend on the amount of work required of the monitoring counsel.).

**5.2.10 Increasing Number of Heads of Damage** The number of heads of damage in the UK seems to be continually increasing. A recent example of a new head of damage is bullying.

The increase in the number of heads is in the interest of claimants as it can increase the total value of their claims. This is because each new head provides an additional factor that a claimant can be compensated for, without reducing the amounts of compensation that will be paid in respect of any of the pre-existing heads. Consequently, the average cost of claims increases.

**5.2.11 Medical Advances** Advances in medical science can take the form of the development of new surgical procedures, treatments or drugs. They increase the cost of claims for two reasons. Firstly, new, more advanced treatments tend to be more expensive than the previous treatments. As a result, the cost of treating an injured party increases.

Secondly, advances in medical science mean that patients who would have been expected to die of their injuries in the past are now able to survive. However, in many cases they will not make a full recovery and will instead be left severely disabled and requiring substantial amounts of care for the rest of their lives. The costs of this future care can significantly increase the value of a claim. It is a sad but true fact about the compensation system in the UK (and, indeed, in other countries) that the cost of compensation for a fatality is substantially lower than that for someone who is left severely disabled.

On the other hand, a medical advance that enables a patient who would previously have been left partially disabled, to make a fuller recovery, or even a complete one, could push down claims costs. This is because the future care that would have been needed will now either be reduced or no longer required at all. One possible future example is the ongoing research into growing nerve tissue. This could give rise to the possibility of improving the condition of some paraplegics, tetraplegics and quadraplegics.

The cost of treatment will reflect these trends, and information on these costs can be readily tracked and projected. Similarly, the daily bed cost in hospitals is available for tracking.

**5.2.12 Demographics** Since actuaries began to measure life expectancy, there has been a continuous improving trend. This is due to improvements in living conditions and advances in medical science. Any increases in life expectancy will increase claims costs because any element of compensation that is in respect of a regular future financial need will now be more expensive since it will need to provide compensation for a greater number of years. Examples would include future care costs, compensation for the loss of future earning, compensation for the loss of income from pensions, and costs of supporting dependants.

The profile by age and sex of the population can also impact claim severity because, following an injury, the age and general health of a claimant can determine what treatments and procedures are considered appropriate, as well as their likelihood of being successful.

**5.2.13 Interest Rates** The Ogden Tables are actuarial tables that provide multipliers that can be used to assess the present values of future pecuniary losses or expenses in personal injury and fatal accident cases. They are widely used by UK courts and insurance companies in assessing lump sum awards. Essentially, the multipliers in the Ogden Tables depend on two sets of assumptions. One is future mortality rates which we discussed in Section 5.2.12, above. The other is the rate of return that determines the discount rate to be used to calculate the present value of future payments.

The Damages Act 1996 allows the Lord Chancellor to prescribe the rate of return to be used. When future interest rates are expected to be high, it is likely that a high rate of return will be chosen which will lead to lower multipliers and, hence, lower awards. On the other hand, when future interest rates are expected to be low, it is likely that a low rate of return will be chosen which will lead to higher multipliers and, hence, higher awards.

Even if, for whatever reason, the Ogden Tables were not being used to calculate a lump sum award, the insurer would still want to discount the value of the future payment stream that the award is intended to compensate for. In such cases, the discount rate that is used would clearly depend on the expected future level of interest rates.

In this way, the level of interest rates can have a significant impact on claim severities.

**5.2.14 Large Claims** The average severity for a class of business in a particular year can be heavily influenced by the number of large claims that occur. By this, we are thinking of claims that are so large that they would tend to be treated as outliers, rather than big claims that an insurer would expect to get a number of each year. For instance, for most insurers and most line of business, a £10m claim will have a material impact on the average claim size

An insurer who experiences an increasing frequency of such claims, possibly because of a change in the mix of business they are writing, will see significant increases in their average claim severity.

**5.2.15 Contributory Negligence on Employers Liability Claims** A number of the people we spoke to commented that it was becoming increasingly difficult to get any reduction in Employers Liability awards to allow for the contributory negligence of the claimant. It was felt that the courts were adopting an increasingly strict definition of the liability of an employer, and that the UK was heading for a culture of strict liability for such claims. Clearly, any reduction in the contributory negligence percentage will increase the size of the claim.

**5.2.16 Car Design** As increasingly expensive features are added to cars, incidents that would have previously given rise to quite small accidental damage claims (or no claims at all) can now lead to larger claims. Examples include electric wing mirrors and parking sensors in the back of cars.

On the other hand, improved safety features, such as air bags, should reduce the severity of many bodily injury claims.

**5.2.17 Claims Handling Procedures** The competence of the claims handlers and the efficiency of the claims handling systems can have a significant impact on the size of an insurer's claims. There are clearly many ways in which the actions of the claims department can adversely affect the final outcome of a claim. Some examples are as follows:

- The claims handler failing to ask the right questions or request the right information, due to a lack of training or experience.
- Important pieces of information being either missed or picked up late due to poor quality staff or inefficient systems.
- The claims handler failing to recognise issues that might be relevant, due to a lack of training or experience.
- Important deadlines being missed due to poor systems.
- Over-reliance on external providers, such as claim assessors and solicitors, since there may be a trade-off between expense costs and indemnity costs and, in the long run, it may be cheaper to bring more of the work in-house.
- Poor settlements being reached due to inadequate negotiating skills.

Conversely, of course, a claims department that is staffed by high calibre individuals and that has complete and robust systems in place will have a positive effect on the outcome of claims.

**5.2.18 Changes in Deductibles** Increasing the deductible on a policy will, obviously, reduce the total cost of claims to the insurer, since they will now be exposed to fewer claims, and taking a smaller share of those they are exposed to. However, the average ground-up severity of those claims exceeding the deductible will be increased, since fewer claims will now breach the deductible. Conversely, reducing the deductible will

increase the total cost of claims to the insurer, but reduce the average ground-up severity of those claims exceeding the deductible.

**5.2.19 Changes in Policy Limits** For a large claim, an insurer's liability is capped by the policy limit. It follows that changing policy limits will change an insurer's average claim size. If the policy limit on a policy is increased, claims that would have previously been capped by the old limit will now cost the insurer more, which will increase their average claim severity. On the other hand, if the limit on a policy is reduced, large claims will be capped at a lower level which will reduce the average severity of claims.

**5.2.20 Underwriting Decisions** The risks that an insurer chooses to write will have an impact on the average severity of claims that they experience. This is because some risks will carry a greater potential for large losses than others. For example, an Employers Liability policy covering a scaffolding firm will have far more exposure to large claims than one covering a data processing firm. Similarly, a Motor policy covering an 18 year old driving a TVR is very likely to have a greater potential for large claims than one covering a 40 year old driving a Nissan Micra.

## **6 Possible Methods for Estimating Claims Inflation**

### **6.1 Introduction**

In this section, a range of methods for determining claims inflation are described. The methods dealing with the severity trend which are based on individual claims data will require there to be significant numbers of claims for reasonable credibility. Several thousand claims per annum for an homogeneous class of business may well be necessary to derive a reliable claim inflation figure. Generally this may only be feasible across a portfolio, as individual pricing exercises, particularly in commercial or reinsurance business, will usually be conducted on much smaller numbers of claims.

### **6.2 Severity Inflation using Proxy Indices**

This approach splits the claims cost into components that themselves can be benchmarked using published indices. For example, in Motor bodily injury, the relevant indices might be physician fees, wages, and hospital room charges.

Average claims cost should be separated and grouped into components by cohort year. The year in question could be year of settlement, or year of accident. The trend in each component cost can then be benchmarked against various indices to determine which, if any, index provides the best statistical fit. The forecast inflation to use can then be derived by blending forecast inflation in the reference indices, using the anticipated component mix to weight the forecasts. If year of settlement is used, allowance for the delay to settlement will need to be included to forecast the cost of claims arising in the proposed coverage year.

The separation into components can reveal some surprising results. For example, in US Medical Malpractice insurance, non-economic damages (typically pain and suffering) comprise 77% of overall payments for hospitals in Florida. The economic damages – for medical expenses and loss of income - are therefore a surprisingly small part of the total. However the ratio is more balanced for those States which have enacted non-economic caps.

As a practical measure, the choice of suitable candidate indices should be limited to those that are tracked and forecast by independent commentators.

### **6.3 Econometric Model of Frequency and Severity Inflation**

Regression techniques can be used to model expected inflation incorporating lead/lag indicators. The drivers of inflation, discussed in Sections 4 and 5, will form the basis of such a model.

In practice, we are not aware of any such models being used for the liability classes considered in this paper. However, the authors are aware that a model of this type has been used to predict unemployment claims frequency.

#### **6.4 Severity Inflation using Average Incurred Claims by Year of Account**

An obvious approach is to look back at past claims and calculate an index directly from the average claim size each year. This method has the merit of being straightforward.

The problems with this approach include:

- Averages can be terribly unstable, unless the expected number of claims is high and the severity distribution relatively narrow and close to symmetric in the shape of its probability density function
- It ignores any changes in the mix of underlying exposures, which can be corrected if the claims are segmented into suitable homogeneous groups.
- There is an implicit assumption that the settlement pattern is stable which should be checked.
- As with any method where we are deducing claims inflation from claims data, the treatment of open claims needs to be considered carefully. For example, outstanding claims may already include an allowance for future inflation and/or the IBNER may be significant.

One method that can help to overcome the problems discussed in the final bullet point above is to project both the aggregate claims amounts and claim numbers to ultimate and then look at the average cost. However, this will only work if the strength of the case reserves has not changed over time. Alternatively, the calculations can be performed for each development year of each year of account and trends down each column of the triangle can be investigated. Problems with the treatment of open claims are likely to be more severe for methods that look at individual claims as, even if on average there is zero IBNER, the distribution of the individual claims severities is likely to change significantly with development year.

#### **6.5 Severity Inflation using Percentile Claims Cost by Year of Account**

The percentile method looks at the trend in claim costs of the percentile selected. Typically the median will be selected as the percentile to use (i.e. the 50<sup>th</sup> percentile), although it is instructive to look at the trends in other percentiles too to see if inflation is similar across all levels of claims cost.

The idea behind the percentile method is that selecting a given percentile will link claims of similar type. The ratio of the percentile claims cost at different times will therefore provide an inflation measure.

The benefits of this method include

- Potentially, much improved statistical reliability. Technically, the variance of the median may be much lower than the corresponding variance of the average, thus the reliability of the median is that much greater. (Statistically, the extent of the relative efficiency of the median over the mean will depend on the skewness, or long tail nature, of the underlying distribution of individual losses.)

The ratio of the variance of the percentile measure to the variance of the mean is given by:

$$r = \left[ \frac{p^*(1-p)}{n * f(x_p)^2} \right] / \left( \frac{\sigma^2}{n} \right)$$

where

$p$  = Percentile (for example use 0.5 for the median)

$n$  = Number of claims

$f(x_p)$  = value of the individual claim probability density function at percentile value

$\sigma^2$  = variance of the individual claim distribution

[see textbook "Introduction to the Theory of Statistics" by Mood, Graybill, Boes page 257 for derivation of this asymptotic approximation.

A non - rigorous investigation which we performed using simulation and a small number of selected loss distributions suggested that, for more central percentiles, the approximation is a good one for sample sizes of around 20 - 30 claims. For more extreme percentiles, a significantly larger number may be required. Clearly, the actual number will depend on the actual loss distribution and percentile chosen.]

If the claim distribution were normal (unlikely for liability classes!) then this median ratio is

$\pi/2$  : which is actually greater than one

For a lognormal distribution the median ratio is

$\pi * \sigma^2 / (2 * e^{\sigma^2} * (e^{\sigma^2} - 1))$  : which may be much less than one (and reduces with  $\sigma$ )

- Ability to differentiate inflation by claim size.



The main concern with this method is the extent to which it is reasonable to assume that the type and mix of claims remains stable over time. As with the Retail Price Index, where regular revisions to the basket are needed to stay up to date with spending behaviour, the drivers of claim costs can also change over time, for example due to new heads of damage, or changes in risk management affecting the mix of accidents in Motor bodily injury cases.

## 6.6 Severity Inflation using Burning Costs by Layer by Year of Account

This analysis can be conducted on settled claims by settlement year to derive inflation by settlement year. Alternatively, the incurred claims on an accident year could be used for an accident year inflation derivation.

The aggregate of projected ultimate claims cost to a particular layer of coverage may be compared over time to derive a first cut trend factor. However, to deduce the implicit inflation, some mathematics are necessary, as the cost to a particular layer will change as the layer itself loses purchasing power over time.

The formula for the burning cost is given below. A mathematical distribution is then fitted to the calculated burning costs for a number of layers. The lognormal is commonly used for this purpose, although any family of distributions that has a scale parameter representing the level of claims could be used. The process is then repeated for each historic year and the implied inflation can then be derived. In the case of a lognormal distribution with stable shape over time, the inflation factor between years will be given by the exponential of the change in mean parameter. If the shape parameter has also changed, the inflation factor will vary with claim size (see mathematics below).

$$BCost(x_1, x_2) = (C(x_2) - C(x_1)) - x_1 * (F(x_2) - F(x_1)) + (1 - F(x_2)) * (x_2 - x_1)$$

where

$x$  = Claim value

$F(x)$  = Cumulative probability distribution

$C(x)$  = Cumulative loss cost distribution

In the case of a lognormal model with fitted parameters  $\mu_t, \sigma_t$  at time  $t$  the inflation factor at percentile  $p$  from time  $t$  to  $t + 1$  is given by

$$\exp((\mu_{t+1} - \mu_t) + \Phi^{-1}(p) * (\sigma_{t+1} - \sigma_t))$$

where

$\Phi$  is the cumulative density function of the Normal distribution

This method is similar to the percentile approach, except that claims are grouped into layers of claims cost rather than at discrete percentile values. Also a layer is held fixed

over time, and inflation deduced mathematically, as opposed to treating the inflation factor as the link between a given percentile over time.

## **6.7 Graphical Valuation Methods**

This is not so much a method of deriving inflation as a useful check, often used in pricing, to test the validity of a given inflation assumption.

The approach is to apply inflation to past claims to express them in current value terms. A graph of the resulting average claims over time should then be drawn to help decide whether the required assumption of “no significant trend” is reasonable.

## **6.8 Analysis by Year of Settlement**

All of the above methods can be repeated using year of settlement in place of year of account. Year of accident may also be tried though this is likely to be very similar to year of account with a slightly more complete picture in terms of development.

When using year of settlement, outstanding claims will be removed from the analysis and the results will be cleaner. However, the quid pro quo is the need to then superimpose a settlement pattern on the claims distribution to create an average cost for a given year of coverage.

## **6.9 Probabilistic Trend Models**

The Probabilistic Trend family of models introduced by Ben Zehnwirth explicitly handle inflation by modeling the log of incremental payments in terms of accident year, development year and calendar year trends. Estimates of inflation are therefore a direct output of the modeling approach. Interested readers are referred to the following papers:

- Zehnwirth, Ben; Probabilistic Development Factor Models with Applications to Loss Reserve Variability, Prediction Intervals and Risk Based Capital; CAS Forum; Spring 1994; and
- Barnett G and Zehnwirth B; Best Estimates for Reserves; 2000 Proceedings of the Casualty Actuarial Society, Volume LXXVII.

## **6.10 Frequency Trend**

Provided exposure data is available, the calculation of trend in frequency is straightforward. The trend in the ratio of claims to exposure by cohort year (for example, accident year) will provide the frequency trend.

However, when using this approach on relatively small data sets, the credibility of the data could be an issue.

Many liability classes provide coverage on a claims made basis and this will reduce the uncertainty in the calculations as the necessary information will be available at the end of the coverage year (with perhaps a slight delay to allow for any grace period on reporting). The main area of uncertainty in some classes will relate to the proportion of claims settling at zero cost. For example, in US Medical Malpractice, this proportion can be as high as 70%. Changes in reporting practices or the treatment of potential cases (otherwise known as “circumstances”) may result in large swings in frequency, without of course any impact on aggregate claim costs. Allowance for trends in nil claims must therefore be included to ensure the overall model of claims cost hangs together properly.

The exposure measure may be an imperfect measure of the risk. For example, in Motor insurance, the exposure measure commonly used is “vehicle years”. This, of course, provides a sensible scale of the number of exposed risk units. However, it fails to adjust for vehicle usage, experience of driver, and so on. If adjustment can be made for these more refined factors, the trend may be reduced and the volatility of the residual trend is also likely to be reduced. Thus, discussion of frequency trend cannot be divorced from the definition of exposure used.

## **7 Pitfalls**

### **7.1 Introduction**

In this final section, we look at some of the common pitfalls associated with the use of inflation estimates in actuarial work. Whilst we expect that experienced practitioners will be wearily familiar with these, and will no doubt be able to list others, we hope that some readers will find the following discussion illuminating.

A common pitfall is using a measure of inflation that is simply not fit for purpose. Other problems arise with how to apply the inflation to the historic claims, and just whether we have a credible and unbiased measure of inflation at all. We discuss each of these categories of pitfall in turn below.

### **7.2 Is the Measure of Claims Inflation Appropriate?**

#### **7.2.1 Frequency vs Severity Trends**

A first consideration is whether the inflation measure required should be a measure of the total increase in claims costs per unit exposure (often called claims escalation), which will therefore contain elements of both frequency and severity trends, or whether separate frequency and severity trends are required.

For example, in business planning or deriving Bornhuetter-Ferguson prior loss estimates the claims escalation is likely to be the most appropriate measure. For excess of loss pricing, separate frequency and severity trends are likely to be required.

#### **7.2.2 Does Inflation Depend on the Size of the Claim?**

Different types of claim within a class can be subject to very different rates of inflation. A common example here is motor claims; larger claims are likely to have a large bodily injury component whereas a greater proportion of the smaller claims will be property damage related. This means that average trends (both frequency and severity) can be inappropriate for many purposes (e.g. excess of loss pricing).

An interesting example is a legal reform aimed at reducing the speculative claims resulting from minor road traffic accidents. If such a reform is successful, the overall frequency of claims may reduce significantly causing a reduction in the total ground-up claims cost. However, the largest claims, where the plaintiff is seriously and demonstrably injured are much less likely to be affected. These claims are likely to make up a greater proportion of the claims costs for excess of loss reinsurers, so the cost of the reinsurer's claims may hardly be affected. Therefore the reinsurer's share of the total loss cost may well rise. If direct writers are granting reductions as a result of the reform,

the reinsurer may therefore need to increase rates as a percentage of the original gross premium.

### 7.2.3 Is a Ground up Trend Being Applied to Excess Claims?

Even in the situation where we have chosen the most appropriate inflation for the type of claims concerned, we need to be careful when looking at excess of loss layers due to the gearing effect on inflation.

A simplified example of this effect follows:

Consider a single claim of size £600K. A reinsurer who writes a £500K xs £500K layer will pay £100K, leaving the direct writer retaining £500K. After 10% severity inflation we would expect a similar claim to pay £660K with the reinsurer paying £160K and the direct writer £500K. So, with ground-up severity inflation of 10% the reinsurer's claims costs inflate by 60% in this case.

Now consider a more general case where the expected number of claims in excess of a given threshold  $\lambda$  for a particular year is  $x$  per annum, and the individual claim amounts above this point are thought to follow a single parameter Pareto distribution with parameter  $\alpha$ . Consider a layer with excess point  $L$  and limit  $(U - L)$ . It is easy to show that the expected claims cost to the layer in any year is:

$$E[(U - L) \wedge ((X - L) \vee 0)] = \frac{\lambda}{\alpha - 1} \left( \frac{1}{L^{\alpha-1}} - \frac{1}{U^{\alpha-1}} \right) x$$

If in the next year we have claims inflation of  $k\%$  then it is easy to show that claims above threshold  $(1 + k) \lambda$  follow a single parameter Pareto distribution with parameter  $\alpha$ . So the expected claims cost in the year is now:

$$E[(U - L) \wedge ((Y - L) \vee 0)] = \frac{(\lambda(1 + k))}{\alpha - 1} \left( \frac{1}{L^{\alpha-1}} - \frac{1}{U^{\alpha-1}} \right) x$$

So the escalation effect to the layer is  $(1 + k)^\alpha$  compared with  $(1 + k)$  ground-up. This demonstrates the gearing effect.

Some further points of interest are detailed below:

- From the distribution function for the single parameter Pareto, we can see that the expected frequency of claim to the layer increases from  $x \left( \frac{\lambda}{L} \right)^\alpha$  to  $x \left( \frac{\lambda(1 + k)}{L} \right)^\alpha$ .

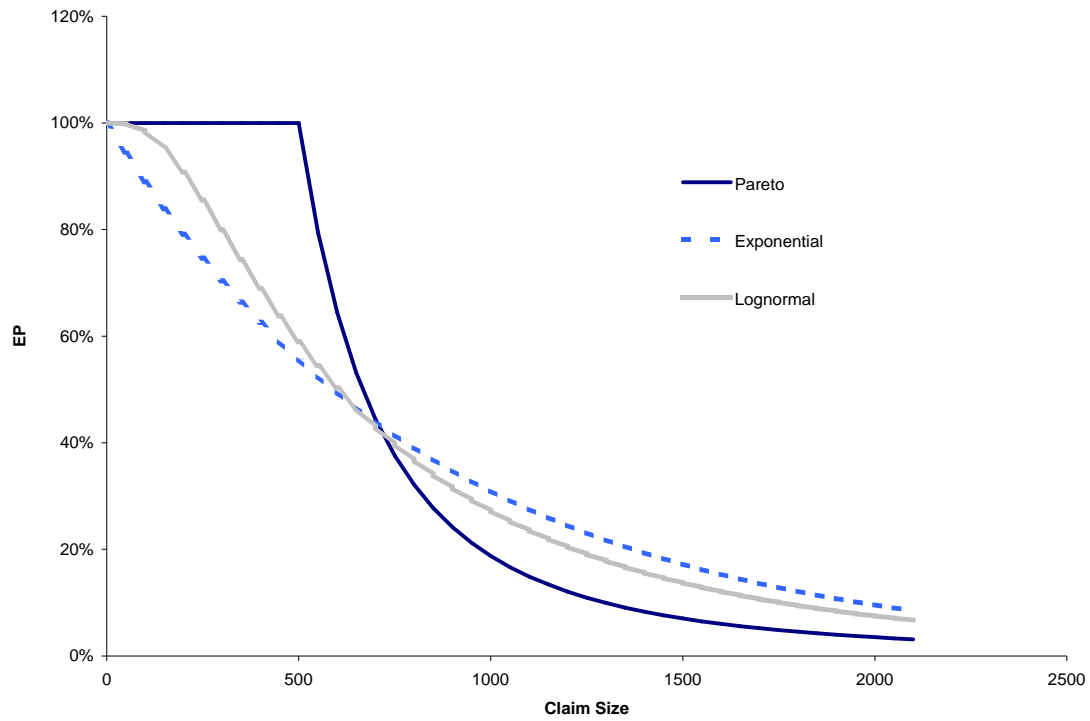
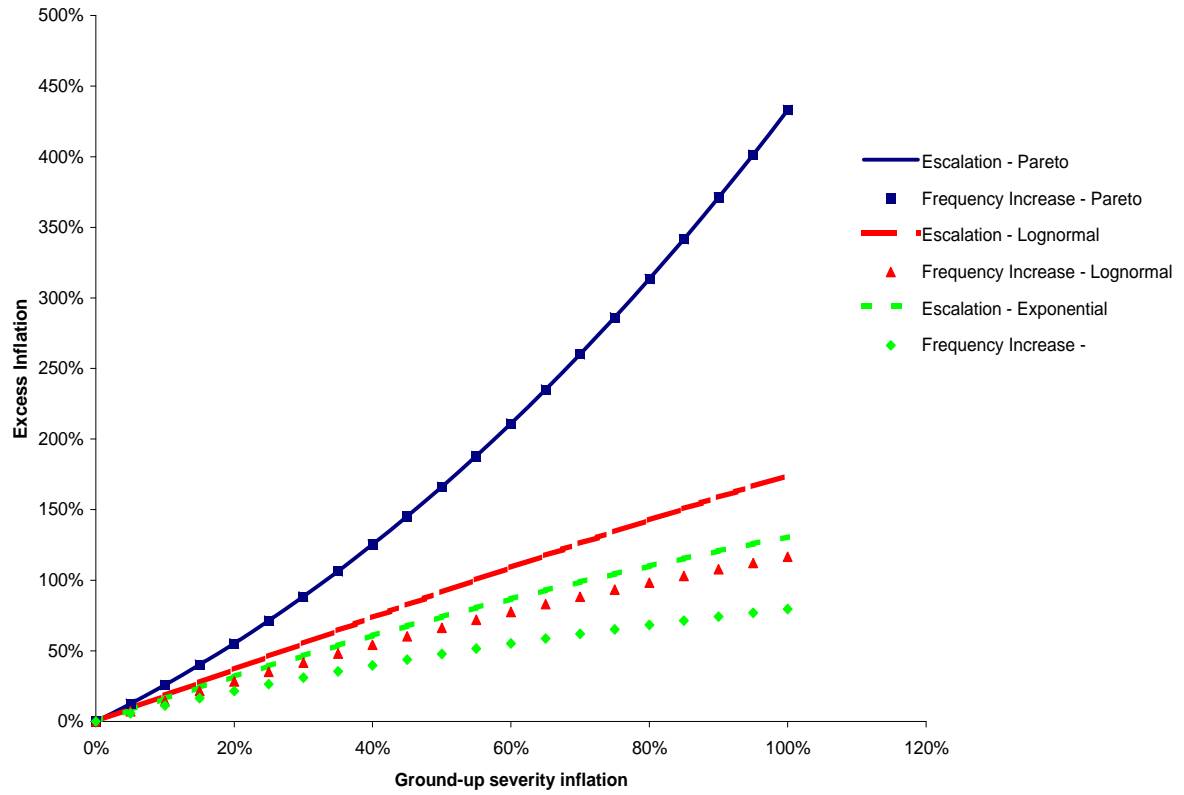
In this case, therefore, the entire escalation can be seen to be caused by an increase in the frequency of claims hitting the layer. The average severity of claims *to the layer* is constant.

- The higher the value of alpha, the greater the gearing effect on excess layers implying that this effect gets more significant for loss distributions that are less heavily tailed (as the probability of claims hitting the layer increases by a greater percentage).
- For this distribution, the gearing effect on claims escalation is independent of the layer. This is not generally the case!

As we have seen, when considering excess layers, the distinction between frequency and severity inflation may get a bit blurred. The gearing effect is partially as a result of the fact that as ground-up severity trend increases the probability that claims will hit the layer (and therefore from an excess of loss insurer's perspective causes an increased frequency trend). If we divide the claims escalation to an excess of loss layer into frequency and severity components we can get some interesting effects.

Consider the simplified situation where claims are of two types, one of which has fixed value 100 and one of which has fixed value 500. The expected frequency of both types is the same - one per annum. Thus the expected cost of claims to a 100 xs 100 layer is 100 per annum and the expected frequency of claims to the layer is 1. After 20% claims inflation (assuming it affects both claim types equally), we have claim sizes of 120 and 600. Now the expected cost to the layer is 120 per annum with an expected claims frequency to the layer of 2. So in this case the expected annual claims cost to the layer has escalated by 20%, the expected claims frequency has risen by 100%, and the expected claims severity has fallen by 40%. Needless to say, this is an artificial example but it does show that the effect of claims inflation on excess of loss layers may not always be obvious.

The first graph below shows the effects of different ground-up trends on the cost of claims to a 1,000 xs 1,000 layer. The effect on the total claims cost and the effect on the frequency of claims to the layer are both shown. Three different distributions are chosen: Single Parameter Pareto ( $\alpha = 2.4$ ), Exponential ( $\theta = 854$ ) and Lognormal ( $\mu = 6.4$ ,  $\sigma = 0.83$ ). Their survival functions are shown in the second graph. The severity inflation is assumed to apply uniformly to all claim sizes.



A sensible, and commonly used, approach to allow for gearing problems in experience rating is to apply ground-up severity trend to ground-up claims and then layer the claims appropriately. However, life becomes more difficult where the business being reinsured is itself excess of loss business as the gearing effect is compounded and the original ground-up claims may not be available.

Note that, throughout this section, we assume that the frequency of ground-up claims is constant. Any ground-up frequency trend will be additional to the trends discussed above.

#### **7.2.4 What about Deductibles and Limits?**

When experience rating reinsurance business, the effect of original deductibles and limits needs to be considered very carefully. It is clearly possible to over-inflate claims beyond the limit of cover or to under-inflate by not considering the gearing effect of the original deductibles. Information about original deductibles and limits may be patchy and details of claims lying within deductibles may not be available at all.

The situation becomes much more difficult when dealing with deductible and limit profiles that have changed significantly over time, especially where deductibles have been decreasing and/or limits have been increasing. In this situation, experience rating can be very misleading unless the changes are dealt with very carefully. Some authors have suggested a blend of experience and exposure methodologies to deal with claims escalation in this situation (e.g. “An Improved Method for Experience Rating Excess of Loss Treaties” by Mata and Verheyen).

#### **7.2.5 Is there a Double-count?**

It is easy to double-count inflation. For instance if we are rating a traditional Employers Liability policy and the measure of exposure being used is wageroll, this will already have an element of wage inflation in it. If we then on-level the historic rates by applying severity and frequency trends, the rates from the earlier years are likely to be overstated as we have effectively double counted the wage inflation component (which will be one of the drivers of severity inflation). One way around this is to attempt to strip the inflationary component out of the wageroll increase, or to use an exposure measure without an inflationary component (e.g. number of employees).

A related problem is to misunderstand what the inflation measure being used represents. For example, a common misunderstanding is to use an aggregate annual inflation measure (such as the Tillinghast US Tort Cost annual inflation calculation) without appreciating that this may include exposure and frequency growth. The exact requirement will depend on the rating method being used. As in the example above, exposure will often be adjusted automatically as it is used as a rateable basis. Many methods also project frequency trends separately.



### **7.3 Is the Inflation Being Correctly Applied?**

There are many different methods of applying the claims inflation to individual claims when experience rating.

Different drivers of trend can be settlement-year, accident year, or underwriting-year effects. This may influence the best choice of methodology for inflating the claims.

A commonly used, and appealingly simple, method is to inflate each claim by underwriting year. So, regardless of when (or whether) a claim is settled the same inflation multiplier is applied to each claim from a certain underwriting year; the underlying assumption here is that the settlement pattern in future years will be the same as it has been in the past. However, it is likely that most of the drivers of severity inflation will be settlement-year effects. This shouldn't cause a problem when inflation has been reasonably stable over time; but where it has not been (for example, where a change in the Ogden discount rate has caused a one-off blip), it is likely that many claims will be being adjusted by the wrong amount.

One way around the above problem is to inflate the incremental paid claims and the total outstanding claims using a historic inflation measure from each calendar year to the current time and then inflate forward to the appropriate development year using an estimate of future inflation. This is more intricate but it should be more appropriate where inflation varies by calendar year.

Whichever method is chosen it will have its own set of problems and assumptions. An understanding of these, the nature of the contract being priced and the data supplied will help minimise any distortion.

### **7.4 Is the Measure of Claims Inflation Credible and Unbiased?**

Another question that needs to be asked is whether we have a credible measure of inflation for the class or account in question. For many pricing exercises, there will not be sufficient data to enable us to derive a credible estimate of the claims inflation (which probably explains the reliance of the actuaries in the survey on external sources of data and subjective judgement). In this situation, of course, it is worth questioning whether any experience analysis is credible. Ideally, a credibility blend could be used with external estimates moderated by an estimate from the data itself. Where external estimates or benchmarks are being used, it is a good idea at least to perform a limited analysis to see if there is any evidence in the data to support or reject the estimate.

#### **7.4.1 Liability Claims Inflation is Difficult to Estimate and can be Unstable**

Inflation in liability classes can be particularly difficult to determine. One reason for this is that the legal basis for the claim is subject to change. This is true both in the law and in

insurance contract cover - tort reform in the US is an example whereby some types of claim can have their ultimate cost radically changed. This is generally unlike the situation with Property whereby the subject matter is more stable over time, and the indemnity is more readily capable of assessment without subjectivity. Furthermore, liability claims are subject to court action, with longer time to settle, so that the award in itself may need to incorporate inflation as part of the compensation cost (so called economic damage), or maybe interest charges if in respect of “liquidated” damages (i.e. damages specified in the contract in the event of non-performance). In these situations, credible estimates of inflation will be very difficult to come by and will be inherently subjective. Experience rates should therefore be treated with considerable caution.

#### **7.4.2 Use of Proxy Measures**

A very common method is to construct an inflation index from other indices that are each thought to represent one of the drivers of claims inflation. These drivers should be checked to see how well they do explain the claims cost, both short and long term, as the weights used will need constant monitoring.

In the absence of a rigorous check, it is clearly important to give careful consideration to the key drivers of claims costs and whether they are appropriately captured by the proxy indices selected. For example, defence costs are likely to be a significant component of liability claims and may escalate in a significantly different manner from the indemnity component.

#### **7.4.3 Average Claims Cost can be an Unstable and Sometimes Misleading Measure of Inflation**

When estimating claims inflation directly from the data, it is important to consider the credibility of the estimate and, where possible, compare it with independent estimates (e.g. from other accounts, similar classes, or proxy measures).

In particular, care should be taken when looking at average costs per claim to deduce inflation. Nil indemnity cases should be removed since they can distort averages quite significantly. (In US Medical Malpractice cases, the number of nil claims can vary considerably as sometimes people sue just to obtain information and then do not pursue the case.)

#### **7.4.4 Allowing for IBNER in Estimation Methods can be Difficult**

A major problem when estimating inflation is allowing for development on open claims. This is a particular problem for long tailed business and where the method involves looking at the individual claims. It is likely that the average incurred amount for claims will change from reporting to settlement (i.e. positive or negative IBNER). Even if, on average, there is no development, it is very likely that the distribution of the individual claim amounts will change significantly. This means that methods based on percentiles can be biased. Possible ways around this problem are:

- Project claims amounts and counts to ultimate and then look at the implied severity and frequency by accident / underwriting year.
- Look at only settled claims by settlement year. (It should be noted that people sometimes look at only the settled claims but on an accident year basis. This will probably not be appropriate as the claim size and the delay to settlement are unlikely to be independent.)
- Look at claims at the same stage of development for each accident / underwriting year.

Each of these approaches has its own set of assumptions and difficulties so care needs to be taken to ensure that any method that is applied is appropriate given the particular circumstances.

## Appendix 1

## Copy of Survey

### Claims Inflation Working Party Survey

Below is a short survey from the GIRO 2005 Claims Inflation Working Party.

One of the things the Working Party is looking at is the range of inflation assumptions used by general insurance actuaries. We are also interested in where actuaries get these assumptions from - are they derived from a detailed analysis of the available data, external information or indices, educated guesswork, or some other source?

To this end, we have selected a number of classes of liability insurance in both the UK and US and asked about your current inflation assumptions and their source. In addition, we have asked for your thoughts on the drivers of claims inflation.

This survey has been designed to be quick to complete. It should take no longer than 5-10 minutes. We would be grateful for any information you are able to provide. We would obviously only expect people to provide information on classes that they have experience of. Consequently, please complete as much or as little of the survey as you feel appropriate.

All the information provided will be treated in the strictest confidence. We are asking for responses to be sent to Peter Stirling, Secretary to General Insurance Board and GIRO Committee. Peter will remove all identifying features from the responses before passing them on to the Working Party. This will ensure that no members of the Working Party will be able to identify where any particular response came from, and that whatever you say will remain anonymous.

**Please e-mail your completed survey to Peter Stirling at:**

***[giro-claims@actuaries.org.uk](mailto:giro-claims@actuaries.org.uk)***

**We would be grateful if you could do this by 29 April 2005 at the latest.**

If you have any questions on the survey, please do not hesitate to contact me.

Many thanks for your assistance with our research.

***Simon Sheaf***

Chairman

Claims Inflation Working Party

Tel: +44 (0)1737 787 468

E-mail: [ssheaf@spt.com](mailto:ssheaf@spt.com)

## Claims Inflation Working Party Survey

### 1. What type of Company do you work for?

Please mark with a cross. Mark more than one if appropriate

- ..... Personal Lines Insurer
- ..... Commercial Lines Insurer
- ..... Reinsurer
- ..... Lloyd's / Lloyd's Managing Agency
- ..... Consultant
- ..... Other            Please specify .....

### 2. Which of the following areas of actuarial work are you involved in?

- |                    |                |       |
|--------------------|----------------|-------|
| Reserving?         | Yes/No         | ..... |
| Pricing?           | Yes/No         | ..... |
| Planning?          | Yes/No         | ..... |
| Capital modelling? | Yes/No         | ..... |
| Other              | Please specify | ..... |

### 3. In the following section, we ask you to provide inflation rates. Please could you confirm the basis of your rates.

- ..... Underwriting year
- ..... Accident year
- ..... Year of settlement
- ..... Other            Please specify .....

4. For the classes listed in the table below, please identify your current inflation assumptions for 2005. In addition, please identify the source of the assumptions by putting crosses in one or more of the boxes.

Please only complete the details for the classes you have experience of.

Class	2005 Inflation Assumption	Assumption Based on						Notes
		Internal Analysis	Published External Information	Published Indices (with or without additional allowances)	Discussions with Claims / Underwriting Colleagues	Subjective Judgement	Other	
UK Motor – Bodily Injury	%							
UK Motor – Property Damage	%							
UK Employers Liability	%							
UK Public Liability	%							
UK Professional Indemnity	%							
US Medical Malpractice	%							
US Professional Indemnity	%							

**5. What are the main factors that you believe influence trends in claim frequency?**

- 
- 
- 

**6. What are the main factors that you believe influence trends in claim severity?**

- 
- 
- 

***Thank you for completing this survey.***

## Appendix 2

### Data from Responses to Survey

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	No	%
Type of Company	Personal Lines	X	X					X	X				X		X	6	42.9%
	Commercial Lines	X	X			X		X		X			X		X	7	50.0%
	Reinsurer			X												1	7.1%
	Lloyd's				X						X					2	14.3%
	Consultant											X		X		2	14.3%
	Broker						X									1	7.1%
Area of Work	Reserving	X	X			X		X		X	X	X		X	X	9	64.3%
	Pricing	X	X	X		X	X	X	X		X		X	X	X	11	78.6%
	Planning		X	X		X		X		X	X		X	X	X	9	64.3%
	Capital Modelling						X			X	X				X	4	28.6%
	Reinsurance						X				X					2	14.3%
	Risk Management / Financing				X							X				2	14.3%
Basis	Underwriting Year					X	X				X		X			4	28.6%
	Accident Year	X	X	X	X			X	X	X					X	8	57.1%
	Settlement Year											X		X		2	14.3%
UK Motor - BI	Inflation Rate	6.25%	12.00%	9.50%	10.00%	10.00%	8.75%	9.00%	10.00%	6.00%		10.00%	7.00%	7.00%	10.00%	13	92.9%
	Internal Analysis		X	X				X	X	X			X	X		7	53.8%
	External Information	X		X	X	X	X							X		6	46.2%
	Published Indices	X						X						X		3	23.1%
	Discussion with Colleagues				X	X		X	X	X				X	X	7	53.8%
	Judgement		X			X	X	X	X	X		X	X	X	X	10	76.9%
UK Motor - PD	Inflation Rate	2.50%	3.00%	3.00%	5.00%	3.00%	5.00%	3.00%	3.00%	6.00%		5.00%	3.00%	3.00%	5.00%	13	92.9%
	Internal Analysis	X	X	X				X	X	X			X	X		8	61.5%
	External Information											X		X		2	15.4%
	Published Indices	X				X		X					X	X		5	38.5%
	Discussion with Colleagues				X	X		X	X	X				X	X	7	53.8%
	Judgement		X			X	X	X	X	X		X	X	X	X	10	76.9%
UK EL	Inflation Rate	6.25%	11.00%	9.50%		12.00%	7.50%			8.00%	5.00%	8.00%	7.00%		10.00%	10	71.4%
	Internal Analysis		X							X			X			3	30.0%
	External Information					X										1	10.0%
	Published Indices	X					X									2	20.0%
	Discussion with Colleagues			X		X				X	X				X	5	50.0%
	Judgement		X	X		X	X			X	X	X	X		X	9	90.0%



Appendix 2

Data from Responses to Survey

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	No	%
UK PL	Inflation Rate	4.25%	8.50%	6.00%		9.00%	7.50%			9.00%	3.00%	8.00%	4.00%		10.00%	10	71.4%
	Internal Analysis	X	X	X						X			X			5	50.0%
	External Information					X										1	10.0%
	Published Indices	X					X									2	20.0%
	Discussion with Colleagues			X		X				X	X				X	5	50.0%
	Judgement		X			X	X			X	X	X	X		X	8	80.0%
UK Prof Ind	Inflation Rate			5.00%		7.50%	8.75%			7.00%	10.00%	8.00%	6.00%			7	50.0%
	Internal Analysis					X				X			X			3	42.9%
	External Information											X				1	14.3%
	Published Indices															0	0.0%
	Discussion with Colleagues					X				X	X					3	42.9%
	Judgement			X		X	X			X	X	X	X			7	100.0%
US Med Mal	Inflation Rate			15.00%							7.50%	12.00%	9.00%			4	28.6%
	Internal Analysis											X				1	25.0%
	External Information															0	0.0%
	Published Indices															0	0.0%
	Discussion with Colleagues										X	X				2	50.0%
	Judgement			X							X	X	X			4	100.0%
US Prof Ind	Inflation Rate			5.00%							7.50%	10.00%				3	21.4%
	Internal Analysis											X				1	33.3%
	External Information															0	0.0%
	Published Indices															0	0.0%
	Discussion with Colleagues										X	X				2	66.7%
	Judgement			X							X	X				3	100.0%

## **Appendix 3      References**

### **Bibliography**

Barnett G and Zehnwirth B; Best Estimates for Reserves; 2000 Proceedings of the Casualty Actuarial Society, Volume LXXVII

Cowley, Rob et al; UK Household: Floods, Inflation and Under-Insurance; GIRO Working Party Report; 2002

Fein, Richard I; Review of “Property-Casualty Insurance Inflation Indexes: Communicating with the Public” paper; Casualty Actuarial Society Website

Franklin, John; The Medical Malpractice Insurance Crises; CAS Ratemaking Seminar; 2004

HealthGrades Quality Study; Second Annual Patient Safety in American Hospitals Report; May 2005

International Underwriting Association and Association of British Insurers; Third UK Bodily Injury Awards Study; 2003

ISO LI-CU-2004-048; Medical Professional Liability Insurance: A Discussion of Non-Economic Damages Caps

Lowe, Julian et al; The Cost of the Compensation Culture; GIRO Working Party report; 2002

McCarthy, Timothy L; Premium Trend Revisited; Casualty Actuarial Society Website

Masterson, Norton E.; Economic Factors in Liability and Property Insurance Claims Costs; Casualty Actuarial Society Website

Masterson, Norton E.; Property-Casualty Insurance Inflation Indexes: Communicating with the Public; Casualty Actuarial Society Website; 1981

Mata, Ana J and Verheyen, Mark A; An Improved Method for Experience Rating Excess of Loss Treaties; CAS Forum; Spring 2005

Mood, Graybill and Boes; Introduction to the Theory of Statistics

Towers Perrin Tillinghast; US Tort Costs: 2004 Update. Trends and Findings on the Cost of the US Tort System; 2004

Zehnwirth, Ben; Probabilistic Development Factor Models with Applications to Loss Reserve Variability, Prediction Intervals and Risk Based Capital; CAS Forum; Spring 1994

## Useful Websites

[www.abs.gov.au](http://www.abs.gov.au) - Australian Bureau of Statistics.

[www.actuaries.org.uk](http://www.actuaries.org.uk) - UK Actuarial Profession website. Includes papers from past GIRO conferences.

[www.axco.co.uk](http://www.axco.co.uk) - Subscription service providing reports on the insurance environment in many countries by, including key economic data.

[www.bls.gov](http://www.bls.gov) - US Bureau of Labour statistics. Gives wealth of data on inflation, occupations, populations, States, and demographics.

[www.casact.org](http://www.casact.org) - Casualty Actuarial Society website.

[www.census.gov](http://www.census.gov) - US Census data.

[www.cia.gov/cia/publications/factbook](http://www.cia.gov/cia/publications/factbook) - US Central Intelligence Agency (CIA) website. Contains outline information by country.

[epp.eurostat.cec.eu.int](http://epp.eurostat.cec.eu.int) - Eurostat website. Contains economic and demographic statistics for EU member countries.

[www.mcandl.com/introduction.html](http://www.mcandl.com/introduction.html) - A compilation of the substantive Medical Malpractice law of all 50 US States

[www.npdb-hipdb.com](http://www.npdb-hipdb.com) - The National Practitioner Databank website.

[www.oecd.org](http://www.oecd.org) - Organization for Economic Co-operation and Development (OECD). Contains reports and information by country.

[www.statistics.gov.uk](http://www.statistics.gov.uk) - UK Economic and demographic data from the Office for National Statistics.

[www.towersperrin.com/tillichast](http://www.towersperrin.com/tillichast) - Towers Perrin Tillinghast website.