RESERVING FOR UNKNOWN LIABILITIES

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SUMMARY

The consideration of unknown liabilities is a difficult area because there is a high degree of uncertainty involved in any analysis which can be performed. However, this uncertainty should not be used as an excuse to avoid carrying out any analysis where it is thought that there is potentially material exposure to such liabilities arising.

This paper looks at some examples of unknown liabilities and a categorisation which may assist with identifying other potential liabilities. We consider some of the factors affecting the approach to reserving, and some methodologies which can be applied.

We hope that this paper will be of use to practitioners who are involved in reserving classes of business with potential liabilities which are not reflected in the available historical data. We also hope that it will be a useful source of reference when justifying the reserving approach adopted to the Inland Revenue, regulators, reinsurers, auditors or other interested parties.

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1 INTRODUCTION & SCOPE

1.1 Introduction

There have been many examples of the emergence of material unexpected liabilities resulting in an adverse impact on the financial condition of insurance companies and in some cases leading to the insolvency of the insurer. There are other examples of liabilities which, whilst they have not proved critical to the survival of the insurer, have had a significant effect on the results of certain classes of business.

There have been a number of papers published which look at aspects of specific sources of claims, such as Asbestos related and Pollution liabilities and the methods which might be adopted to produce reserve estimates. Some of these papers are listed in the Bibliography. In this paper, we have considered a wide range of types of unknown liabilities, and looked at various aspects of reserving, with the aim of providing a framework which is applicable to reserving in many situations.

1.2 Scope

This paper considers issues relating to the reserving of "unknown liabilities". We took as our definition of unknown liabilities any matters for which there is potential insurance coverage but which were not specifically recognised at the time the business was written. Therefore, the unknown liabilities covered by this paper have the common feature that at the time of writing the business there was no actual historical experience of the specific liabilities, or of their likely distribution in or impact on the insurance market, on which to base an analysis.

We have also included some comments on the methodology which could be applied to new classes of business where, although the liabilities being covered may be known at the time the business is being written, there is the feature mentioned above that no actual historical experience is available.

Our definition of unknown liabilities is restricted to potentially insured events rather than general unknown risks such as fluctuations in interest rates. However, for some insurance products, or Alternative Risk Transfer (ART) mechanisms, fluctuations in interest rates or currency exchange rates are the source of claims.

Consideration of extreme events, that is events with an extremely low probability of occurrence but which are part of the intended coverage of insurance, are also excluded from this paper. Examples of such matters are the possible occurrence of earthquakes, volcanic eruption or asteroid impacts.

Our paper explicitly excludes specific consideration of liabilities arising from Year 2000 and other date related risks (Y2K), as we understand that this is being covered by a separate working party. However, some of the methodologies and issues covered in this paper may be applicable to such risks.

1.3 Structure of the Paper

In Section 2 we give some examples of the sort of unknown liabilities which are considered in the paper. We include a categorisation of the liabilities, which may be of use when thinking of the sort of liabilities which could affect a particular book of business. In Section 3 we expand on one aspect of this categorisation, by considering in more detail the causes of unknown liabilities. We have included these Sections because we believe that thinking about the origin of unknown liabilities can aid in the reserving process.

We have not tried to produce an exhaustive list of previously unknown liabilities that have arisen in the past, nor of potential liabilities for the future. Rather, we have looked at some examples which we feel are representative of the issues being covered.

In Section 4 we discuss the process of emergence of unknown liabilities, which is relevant to the approaches which may be adopted for reserving.

In Section 5 we look at legislation and other aspects relating to reserving for such liabilities.

Some methodologies which may be appropriate for establishing reserves are outlined in Section 6, and in Section 7 we give some of the steps which may be taken to mitigate the impact of unknown liabilities.

1.4 Use of the Paper

We hope that the paper will be of use to practitioners who are involved in reserving classes of business with potential liabilities which are not reflected in the available historical data. We also hope that it will be a useful source of reference when justifying the reserving approach adopted to the Inland Revenue, regulators, reinsurers, auditors or other interested parties.

In parts of the paper we suggest investigations or reserving methodologies which would involve a large amount of effort. We also make comments on

the potential impact of unknown liabilities on such things as the financial condition of insurance organisations. The appropriateness of these comments and suggestions will depend on the potential materiality of the unknown liabilities in comparison to the overall business of the organisation, and on the level of uncertainty which would still remain were such approaches to be adopted. It will also depend on the time and resources available for any analysis. We are not suggesting that all parts of this paper will be relevant or applicable to all situations.

The views expressed in this paper are those of the Working Party as a whole and do not necessarily reflect the views of any individual member nor of any organisation with which any member is or has been associated. Anyone using this paper to make decisions should independently verify its accuracy, and should seek his or her own professional advice.

2 EXAMPLES

2.1 Categorisation of Unknown Liabilities

The table in Section 2.4 gives examples of unknown liabilities of the type that this paper is intended to cover. We have categorised the examples by current status and by source.

The "current status" groupings refer to the degree to which a liability is known or unknown:

- completely unknown
- known potential issue, but not known whether there will be any impact on insureds / potential claimants
- losses known to have been suffered by insureds, but not known whether the insurers will be affected
- insurers known to be affected, but the quantum is unknown or difficult to quantify
- known quantum, but distribution within the insurance market is unknown
- known quantum and distribution

We have used the "current status" groupings to structure some of the later sections of the paper. These categories and the "cause / source" categories could be useful in other situations, for example as an aid to brainstorming possible unknown liabilities for a particular class of business.

2.2 Progress of Liabilities through Categories

As a liability emerges, it is likely to progress through the various categories shown. The category labelled "completely unknown" therefore includes fairly general examples such as "unidentified side-effects of products on health". Once a possible side-effect has been identified it would be placed in the next category, "known potential issue but not known whether any impact". Later, if scientific studies confirm that the product has caused a specific illness, the next grouping would apply: "losses known to have been suffered by insureds". In some circumstances, this may not necessarily imply that the losses are an insured liability - once it is known that insurers will be affected, the next category will apply: "insurers known to be affected but unknown quantum". This category includes liabilities about which a considerable amount is known, but which remain difficult to quantify.

Even once the quantum of insured liabilities becomes clearer, the distribution of this quantum across the insurance market may still be very uncertain. For example, the definition of an insured "event" may have a significant effect on the distribution of ultimate net payments across primary insurers and excess or catastrophe reinsurers.

Eventually, a previously unknown liability will move into the final category, "known quantum and distribution". We have included in this column some examples of liabilities which would previously have been considered to be unknown liabilities, but which are now known. The rest of this paper is intended to cover only liabilities falling into the first five groupings.

Of course some potential liabilities may "drop out" of the table before reaching the right-hand side, that is they may never result in actual payments by insurers. Other liabilities may skip some of the categories listed, rather than progressing through them one by one. The process of emergence of unknown liabilities is considered in Section 4.

Several examples of unknown liabilities may have more than one cause or source. Each example in the table has been entered only once, under the source which is thought to be most relevant to its current status. For example, pollution has a current status of "insurers known to be affected". It was changes in legislation and court rulings that made it clear that insurers would be affected. When the issue of pollution first arose, the source might have been recorded as "changes in attitudes".

Some examples of unknown liabilities could have more than one current status. For example, the status of the liability may be more advanced in the case of the affected insurers than the reinsurers - particularly if there are unresolved issues concerning the aggregation of claims for the purpose of making reinsurance recoveries (eg pensions misselling). The current status of a liability may also vary between insurers, depending for example on whether they write primary or excess business and on their location or jurisdiction. A further circumstance in which there may be more than one current status is in cases where there is the potential for more than one "wave" of claims. For example DES-related claims, where less is known about potential third generation claims than about first and second generation claims. Waves of claims are considered in more detail in Section 4.

2.3 Other Sources of Unknown Liabilities

For some unknown liabilities, the source could be regarded as "new information". Many liabilities come to light through new information becoming available. We have not used this as a separate "source" category, as the new information itself is what helps to identify the liability rather than being its original source. However, the availability of information via new mechanisms such as the internet facilitates class actions and the spread of liability.

There are , no doubt, other sources of unknown liabilities in addition to those which we have suggested. We have used these examples to clarify the type of unknown liabilities being considered in this paper. Reviewing the nature of the insurance cover written may help to identify other sources of liability for the specific class of business being reserved.

2.4 Table of Examples

The table shown below gives examples of unknown liabilities of the type that this paper is intended to cover, categorised as described above.

Current status: Source:	Completely unknown	Known potential issue, but not known whether there will be any impact on insureds / potential claimants	Losses known to have been suffered by insureds, but not known whether the insurers will be affected	Insurers known to be affected, but the quantum is unknown or difficult to quantify	Known quantum, but distribution within the insurance market is unknown	Known quantum and distribution
Medical (unanticipated health effects of materials & processes; medical progress)	Unidentified industrial diseases Unidentified side-effects of products on health Property damage associated with above	Genetically Modified crops Electro Magnetic fields (eg mobile phones, pylons) Transgenic transplants General improvement in medical treatments General improvement in diagnosis of illness	Tobacco Stress-related illness	Asbestos Silicone implants		Agent Orange
Problems with products/services supplied	Unidentified misselling issues	Y2K (PI claims) Pensions misselling II	Pensions misselling I			
Changes in general environment; changes in attitudes / social trends		Y2K (business interruption claims) Internet (exposure to fraud) Increased record keeping Legal expenses insurance Euro (computer systems) Global warming General increases in propensity to sue Animal rights	Policyholder's Reasonable Expectations (potential D&O claims, eg if bonus rates have been promised that are unsustainable)			

Current status: Source:	Completely unknown	Known potential issue, but not known whether there will be any impact on insureds / potential claimants	Losses known to have been suffered by insureds, but not known whether the insurers will be affected	Insurers known to be affected, but the quantum is unknown or difficult to quantify	Known quantum, but distribution within the insurance market is unknown	Known quantum and distribution
Legislative changes/ court rulings/ political	Unknown future changes in legislation Unknown future changes in multipliers used to calculate BI lump sum payments Unknown future political pressure on insurers Unknown interpretation	No win/no fee arrangements Change in general approach by courts (eg from strict interpretation of policy wordings to taking the "greater good" into account)	Punitive damages	Pollution Ogden NHS recoveries Woolf reforms		
Unanticipated economic/ political changes	of policy wordings Effect of unknown future changes in interest rates on BI lump sum payments Effect of unanticipated economic/political problems (eg global/ regional crash; political unrest)					Mortgage Indemnity Guarantee (from 1980s) Savings & Loans
Insurance market / contracts / wordings	Unknown future market settlements Unknown future market claims spirals	Unlimited exposure policies Changes in contract wordings		Which trigger to use	Disputes with insured / reinsurer Definition of an event (either temporal or physical definition)	
Lack of information		New materials/ processes used by insureds (eg new building materials)	Concrete cancer	New/fairly new type of insurance	Lack of data/ unreliable data	

3 CAUSES

The underlying cause of an unknown liability can usually be allocated to one of several broad areas as outlined below. This categorisation is important because it can provide vital information about how the liability will develop and allows consideration of appropriate reserving methods.

In this Section, we comment in more detail on some of the examples included in Section 2. In some cases, we comment on the reserving methodologies which may be applicable; details of the methods to which we refer are given in Section 6.

3.1 Medical

3.1.1 Unanticipated Health Effects

This covers asbestos related and other health hazard claims. Generally it occurs when a material or process, which was previously believed to be safe, is later found to be the cause of a health complaint. The discovery period for this could be many years, in which case it is possible that many people will have been affected, leading to large potential liabilities. It is also possible that future generations will be affected.

The world is continually developing, and as it does so new materials and technology will be used. There is always a possibility that some of these advances will have a detrimental effect on peoples' health, causing either physical or mental damage.

Reserving Methodologies:

Health hazard matters are likely to give rise to class actions. This can affect the appropriate reserving methodology in a number of ways:

- The definition of an insured event and, in particular, aggregation issues could have a significant impact on the liabilities for a particular insurer or reinsurer. It will affect whether inwards and outwards reinsurance policies will be triggered.
- The payment pattern for claims from class actions typically consists of a long period where only legal expenses are paid, sometimes followed by a shorter period of indemnity payments. This will therefore affect paid claim development methods and cashflow patterns.

Many of the methods discussed in Section 6 of this paper will be of some use in reserving for this type of unknown liability. However, it will clearly depend on the specific circumstances in question.

Where similar events have occurred before then these can provide a Benchmark against which comparisons can be made for reserving. Alternatively, where policy limits exist then these can be used to provide an upper estimate on the reserves required.

Other methods likely to be of use include an Exposure based approach, a Global approach by using Cedant / Market data. These can hopefully be used to get a rough estimate of the potential liabilities which might arise.

3.1.2 Medical Progress

Medical science is continually improving the way diseases are diagnosed and patients are treated. Diagnosis is occurring earlier, and at the same time the life expectancy of sufferers is increasing.

Earlier diagnosis can be either beneficial or detrimental to the insurer depending on the circumstances of the patient. It may facilitate treatment, reducing the pain and suffering of the patient and hence the size of any insurance claim. However, it may also facilitate identification of the cause of illness as the result of some insured product or event. For example, the earlier diagnosis of a disease such as asbestosis will reduce the period of time over which the sufferer could have been exposed to the asbestos. This may help with the identification of the party responsible for the exposure and hence make an insurance claim more likely to succeed.

Increased life expectancy usually leads to an increased claim size for the insurer. However, these improvements in life expectancy are likely to occur gradually over time, and should therefore be reasonably predictable, and not be the cause of any particularly unexpected liability.

Advances in medical science will also make it increasingly possible to attribute a specific illness or group of illnesses to a specific cause. Once a cause has been established, there will be the possibility of insurance claims.

3.1.3 Related Liabilities from Health Issues

In addition to the claims costs arising from these health issues, there may be associated costs involved. For example the costs of monitoring and removing asbestos from houses and the drop in value of properties affected. New "phobia" claims have also arisen, particularly in the US. For example, insurance claims are being made for the suffering which results from the fear of contracting cancer from occupancy in asbestos affected buildings.

3.2 Problems with Products / Services Supplied

3.2.1 Misselling

The pensions misselling issue has shown that large insurance liabilities can be incurred from the misrepresentation of a product at the point of sale. Other misselling issues could occur in similar circumstances, particularly where a 'professional' gives advice to a client. The largest misselling issues would be of most interest to insurers, as these are likely to involve potential accumulations of risk from thousands of smaller claims.

Reserving Methodologies:

In reserving for unknown liabilities such as these, Global or Exposure based methods are likely to be of most use, particularly at early stages of emergence - it is the potential exposure that will be of most concern to the insurer.

3.2.2 Product Recall / Product Liability

Products occasionally need to be recalled when a possible problem is discovered. An insurance claim will result even if it turns out that there was no problem after all.

With ever greater levels of continual product testing, increased claim frequency for product recall is likely to occur. However, there may also be a corresponding decrease in claims arising from damage caused by faulty products, which may therefore lead to a movement of liabilities from one area of coverage to another.

An increasingly litigious and health conscious society may also lead to more frequent health scares resulting in product recall.

Reserving Methodologies:

Benchmarks and Exposure based approaches to reserving, and possibly the Rating Basis are likely to be of most use in these circumstances.

3.2.3 Professional Indemnity

Since the decision in Hedley Byrne v Heller, the English courts have been wrestling with the problem of quite how far 'pure' economic losses are to be recoverable from negligent defendants (and latterly, by whom?). The struggle to find a consistent theory continues. The point to remember from a reserving perspective is that liability for negligent mis-statement is still a department of the law of negligence of relatively youthful vintage (Hedley Byrne was decided in 1964), and reliance on historical statistics for this form of liability is apt to be unreliable. The explosion of liability of auditors is ample testimony to the way in which a shift in attitude on the part of a major system of law can change out of all proportion the assumptions made by hitherto profitable underwriters of a line of business which is 'developing' in the courts.

'Policy' considerations make frequent appearance in such developing jurisprudence, and the availability of substantial levels of third party liability insurance on the part of professional consultants is a very real driver for expansion in this volatile area of the law. So is the ability of the professionals in question to affect the economic interests of ever-larger constituencies of potential claimants, as the size (and perceived ability to withstand negligence claims) of such firms increases.

See, for further bibliography, [10] Clerk and Lindsell on Torts, 17th Edition, p229, paragraphs 7-15 et seq.

3.3 Changes in General Environment

3.3.1 Changes in Attitude

People are becoming more and more likely to sue if they believe that there is a chance of them achieving some sort of financial gain. The advent of Legal Expenses Insurance and of No win / No fee legal arrangements have also exacerbated this trend. In some jurisdictions, class or group actions have also had the effect of increasing the number of people taking court action, and could also increase the possible downside of any court defeats. Lawyers are becoming more active in advertising their services and therefore encouraging policyholders to make insurance claims. This will inevitably lead to increased claims against insurers. This trend is especially prevalent in the US.

The recognition and level of Policyholders' Reasonable Expectations have also been increasing, leading to the possibility of greater claim frequency and severity.

3.3.2 Technological Advances

As technology advances, so too does the opportunity for that technology to malfunction or to be misused. For example, internet fraud, which is a growing problem, is unlikely to have been considered by insurers a few years ago.

The internet has also led to information becoming more readily available. This increases the potential size of class actions, as more affected parties will become aware of the possibility of making a claim. It also speeds up the spread of litigation from one jurisdiction to another, as pleadings in one jurisdiction become almost instantaneously accessible to all others.

Advances in technology have also made it easier to store and retrieve information. This means that more thorough records are kept, which may facilitate the job of a plaintiff who has the burden of establishing proof of liability.

Advances in technology may lead to rapidly decreasing residual values, which could have a beneficial effect for insurers by reducing claim severity. This will occur when cover has been provided on an "old for old" basis, and the value of the insured item has decreased significantly from its value at the time it was insured.

Technological advances may therefore have an impact on the frequency and severity of insurance claims, and on the speed with which they emerge and are settled. This will therefore affect the appropriateness of historical data as a guide to future experience.

3.3.3 Environmental Attitude

Changes in the way people view the environment could be a source of new claims. For example, if the legal or currently accepted stance on animal rights changes in the future, then this could prove to be a source of currently unknown liabilities.

3.3.4 Other Changes

Major transitions, such as from Sterling to Euros, pose risks for the insurance industry in respect of the potential for claims to arise. For example, any computer system failures could lead to an unexpectedly large level of business interruption claims and claims against Directors' and Officers' policies.

These major transitions have a number of features in common with the Y2K situation. They relate to a known future episode which may give rise to a number of causes of financial or other loss. The potential for insurance

liabilities to arise out of such an episode will depend on many factors including the fortuity of the loss and the definition of an event.

Reserving Methodologies:

Reserving for Y2K was considered by the Year 2000 Working Party and presented in their paper at the 1998 General Insurance Convention: [7] Cresswell et al. An update on Y2K reserving methodologies is expected at the 1999 General Insurance Convention.

3.4 Legal

3.4.1 *Legislative Changes*

Insurers have to respect changes in legislation as they occur. Some such changes could have the effect of altering claim sizes, or of allowing insurance claims to be made by new classes of people.

Changes in legislation relating to the required specification of a product may have an impact on insurance claims. For example, Residual Value Insurance provides insurance cover against the value of an item, such as a ship under construction, falling below a certain level. If during the period of cover the legislation governing the standards of design of ships were to change, the value of the ship could be significantly affected giving rise to an insurance claim. Residual Value Insurance has a number of similarities to Mortgage Indemnity Guarantee.

The impact of future legislative changes will be of particular concern to insurance organisations operating in jurisdictions where legislation may have a retrospective effect.

3.4.2 'Strict' or 'no-fault' liability

The enforcement by the courts of personal rights has at its source social norms and values. In a society where 'fault' is seen as an essential ingredient of liability, there is a natural brake on the extent to which the ordinarily careful person may incur liability. Once the need for culpability is removed, however, and the society becomes more interested in compensation for the victim, the advent of 'strict' or 'no-fault' liability leads to an expansion of the circumstances which lead to liability on the part of any entrepreneur, regardless of the degree of care taken by the enterprise. Where consumers are concerned, the norm, since the early 1960's, has been to establish stricter and more stringent liability. This in turn leads to a loss of consistency with traditional systems of limitation of liability, since whether or not it is considered 'fair, just and reasonable' for the perpetrator of damage to escape liability is viewed against an absence of 'fault' considerations. Historical analysis of trends in consumer liability is thus subjected to a large ground swell of 'creeping' enhancement of the level of care expected of the defendant, viz. from the duty to 'be careful', to the duty 'not to damage' in any circumstances.

Examples of the effect of such a move can be seen most graphically in the United States, in so-called 'Superfund' exposures, where strict liability on the part of even a 'small' polluter nevertheless generates liability for matters not even within the physical control of the individual at the relevant time (see SARA, CERCLA, and similar statutory regimes).

Where 'fault' or an 'act' or 'omission' are not an essential ingredient of liability, traditional methods of allocating the liability to a particular period of coverage are rendered unworkable; this in turn leads to dislocation in the distribution of liability within the insurance and reinsurance market as traditional forms of policy (dependent all too often on old fashioned or ill defined notions of 'events' or 'occurrences') fail to match the regimes of liability which they are supposed to cover, which regimes have long since rejected any requirement for a positive act or omission on the part of the defendant.

See, for further bibliography, [10] Clerk and Lindsell on Torts, 17th Edition, paragraphs 1-50 to 1-53 and references there cited.

3.4.3 Court Rulings

Landmark court rulings can have a profound effect on the number and size of claims that insurers face. The Ogden ruling increased the size of lump sum payments that insurers had to pay for Bodily Injury claims. The effect for Excess of Loss reinsurers was even more pronounced than that for primary insurers due to the gearing effect involved.

When reserving at a time when landmark changes to claim frequency or severity are expected, but the precise effect is unknown, it is useful to carry out sensitivity tests on the reserves under varying scenarios for the possible outcome of the Court decisions.

Courts can also interpret policy wordings in a different way to that perceived by the insurance market or intended by the underwriter when the original policy was written. This re-interpretation of policy wordings occurs more regularly on older policies, where the wording was not as precise as on more recent policies. The interpretation of policy wordings may also vary between jurisdictions.

3.4.4 Fraudulent Claims

There seems to be an increasing trend in large fraudulent claims being made against insurance companies. Some of these claims are settled for small amounts so that the insurer can avoid a lengthy and possibly expensive court case. However, there is also an increase in the ability of insurance organisations to detect fraud, for example by sharing information on claimants.

3.5 Unanticipated Economic / Political Changes

3.5.1 *Economic Changes*

Worsening economic conditions will generally lead to increased claims on pecuniary type insurance covers. These could be either legitimate, or fraud related.

3.5.2 Political Changes

Political changes can affect the general environment for insurance claims. For example, one impact of key industries being privatised may be to increase the level of insurance claims. When under State ownership, the Government in the past may have stepped in to provide compensation for new types of health hazard claim. This type of claim may now need to be paid for by insurers and may attract more publicity leading to a more wide scale impact.

It is possible that as public attitudes change, there may be increased political capital from the support of victims of various forms of harm. This may lead to legislation giving rise to compensation in new areas and hence more insurance claims. However, it is also possible that the emphasis would be on introducing legislation which would remove or control the sources of the harm, thus reducing the potential for insurance claims.

Political change may also affect other issues such as the increased pressure on NHS Trusts to recover treatment costs from insurers.

Political unrest could possibly lead to an unexpected amount or class of insurance claims. For example, business interruption claims arising from blockades of the transport network by lorry drivers.

3.6 Insurance Market / Contracts

3.6.1 Insurance Market

From time to time the insurance market negotiates a settlement to pay a certain type or class of claim. This could conceivably leave some insurers or reinsurers with unexpected claims.

Insurance spirals still exist in the market. They make it possible for losses to pass unexpectedly from one area of the market to another, and make it difficult to predict the distribution of liabilities across the market. The marine spiral business of various reinsurers in the late 1980s showed how this could leave several reinsurers with a disproportionately large share of any claims.

3.6.2 *Contracts / Wordings*

Contract wordings can be unclear about exactly what is covered, including how claims are defined. Where there is any doubt as to the exact meaning of a wording, there is the possibility of unexpected claims occurring. For example, some of the underwriters writing excess of loss business in the London Market did not conceive of the possibility that the contract wordings and claims triggers would be interpreted by the Courts in a way which led to primary insurers being able to aggregate many claims into single insured events which could then be claimed against the reinsurance.

For older underwriting years, the insurance company may not even have details of the contracts that were written, leading again to the possibility of unanticipated claims.

At times where the insurance market is soft, there is pressure on insurers to expand the coverage provided. At other times, there may be opportunities for insurers to introduce exclusions or other limitations on coverage. The effects of such changes in policy wordings may be uncertainty until they have been tested in Court.

Insurance policies providing unlimited exposure, or unlimited reinstatements of cover, provide a particularly attractive target for plaintiffs. An organisation having such cover may therefore increase its propensity to be sued.

Reserving Methodologies:

Where there is a material dispute over coverage between an insured and insurer, or other uncertainty over the contract wordings, it will be important to carry out some scenario testing to identify the financial effect of the different possible outcomes.

3.7 Lack of Information

3.7.1 New Materials / Processes used by Insured

With advances in technology and corresponding techniques it is often the case that the resulting new materials and processes on which there may be various insurance coverages will have a different propensity for claims to arise. A lack of relevant information can be a major problem for an insurer when trying to assess such insurance risks. For example if the insured has just introduced a new material or production process into its operation, then there is unlikely to be very much background information available.

One source of information which may be of use to the insurer is the results of safety checks which are currently carried out on all new materials and processes before they are allowed to go into production. However, the tests may not cover all potential sources of insurance liabilities, so there is always a chance that the process or material may give rise to some unexpected problems, resulting in insurance claims. It is important for the insurer to keep in constant contact with the insured, and to monitor any developments as soon as they occur.

An example of this issue is the introduction of the Government requirement in 1985 for cavity wall insulation in all new homes built. The ultimate result of this in respect of claims under 10 year new home warranties was a dramatic increase in susceptibility of homes to damp penetration claims in prolonged periods of driving rain.

Reserving Methodologies:

In order to reserve for these types of risks it is likely that benchmarks or exposure based methods will be of most use. Some degree of similarity should exist between the incidence of claims arising from different new processes or materials. The type of new material or process, and the level of testing carried out, will provide a basis for selecting (and possibly adjusting) benchmarks. However, even where directly comparable benchmarks are not available, analysing the exposure to any particular failure should provide a suitable basis for establishing an initial reserve.

3.7.2 New Class of Insurance

By definition, for new classes of business the insurer is unlikely to have significant data relating to the likely number and size of claims which may arise. Whilst exploring the decision to introduce a new insurance cover the insurer should have assessed the type and volume of claims expected to arise, although there will clearly be a significant unknown element. Indeed, the very introduction of the insurance cover could change the likelihood of the claims arising.

Again the insurer would be well advised to keep in close contact with the insured to monitor how any claims are developing.

Reserving Methodologies:

In reserving for a new class the rating basis can provide an initial estimate, though caution must be exercised where rates have been significantly adjusted from the expected cost of claims. Professional judgement will also be essential.

If the class of business is written by other insurers, then benchmark data may be available, possibly from reinsurers.

4 **PROCESS OF EMERGENCE**

4.1 Introduction

In the previous two Sections we have considered the ways in which unknown liabilities might arise, and looked at some examples. In this Section we look at how the unknown liabilities may develop into insurance claims.

4.2 Emergence

Owing to the variability of type of new unknown liability, there will be no set pattern of emergence. It is useful to consider some contrasting examples, such as mortgage indemnity guarantee (MIG) and asbestos related claims, where the circumstances giving rise to claims, the types of reserves and the market approach to reserving are very different. However, there may be a degree of similarity of events that result in the initial establishing of reserves and eventually the final payments.

In the embryonic stages, the indications of a new unknown liability will be wholly non-numerical. Articles in newspapers, trade press and other forms of media will indicate that a potential problem may arise. The information may emerge over a long period of time, or may appear relatively quickly. In the case of MIG claims, for example, the sudden fall in house prices indicated future losses but not how much or when.

Arguments and counter-arguments are likely as liability is denied by the manufacturer or producer or other such potential responsible party. At this stage these parties may not set up reserves for fear of discovery, if this is thought to be potentially damaging to a denial of liability, and so the insurers may not be notified until this becomes necessary under the terms of the insurance contract.

Some of these types of claims may seem to disappear altogether, whilst others will simmer and eventually explode into a major source of claim. However, given their latent nature, no losses actually disappear completely, but rather their likelihood of giving rise to claims becomes less and less. Smoking claims have been considered to be a major potential problem area for many years, but so far we understand that no significant claims have been paid. As such, it is impossible to estimate accurate amounts of reserves.

4.3 Dispute Resolution

When the balance changes and indications are of some actual damage, then insurers will be advised, although no amount will be established in the reserves. For some sources of claims the insureds will probably be denying liability but media speculation will intensify. Many personal distress stories will appear in the popular press whilst the financial media will concentrate on the wider picture.

As defendants gather to prepare for Court action, the insureds will pass the insurer more information and the insurer will establish reserves, at least for defence expenses. The insurers may perform exposure analyses and calculate their possible gross claims on several bases of probability.

The insurers and insureds will then produce more definitive information which should enable more precise reserves to be established. Loss adjusters, lawyers and others may be involved in this process. Once set, the reserves will not be left unadjusted until payments are made. Adjustments will be made to the estimated reserves as further information emerges. The actual payments may well result as a decision from the Courts or even by a less formal agreement through arbitration or other methods outside of Court. It is not unusual for increases in reserves over time to be followed by a release, which may be partial or even total. Reserves will usually be in the form of claims IBNR and then outstanding, but sometimes they may be in other forms. For example, the bulk of MIG reserves were in the UPR (unearned premium reserve) and AURR (additional unexpired risk reserve).

Decisions will not just follow from the results of litigation between the injured parties and the original insureds, but will depend on the insurance policies themselves. Wordings, restrictions in coverage, problems identifying the actual time of the liability occurring and other issues will often result in litigation between original insureds and their insurers. Courts may interpret wordings differently from those intended by the insurers. Examples of these are the interpretation of "sudden and accidental" pollution exclusions which have been deemed to be ambiguous by the US courts, and event definition problems, which have long plagued the liability market.

The implications of Court decisions will not be confined to the original insured / insurer but will extend to insurer / reinsurer and upwards through the insurance chain.

4.4 Waves of Claims

For certain types of loss, particularly the larger latent claims, there will be waves of claims. This is often because lawyers seek more insurance cover (and "deep pockets"), or because new defendants are found who have some potential liability, albeit not so obvious as the earlier notified defendants had. Asbestos Bodily Injury is a good example of such types of loss that give rise to substantial claims in a series of waves. Third generation DES claims do not appear to be materialising, and this might be an example of a loss that may give rise to no future claims, whilst DES has resulted in significant claims by those in the first generation, who actually took the drug.

As mentioned above, claims rarely disappear without trace. Tobacco related claims have been identified for many years but no significant payments have been made. It is possibly that this area will never give rise to insurance claims, and this is the view of many insurers, but there is always a chance of such claims exploding into action. It is essential that the actuary looking at reserves is aware of such potential areas of claims - the third generation DES claims may be an example.

4.5 Development and Composition of Reserves

The process of emergence of unknown liabilities is reflected in the development of claims. There is normally a gradual increase in incurred claims followed by an acceleration. Sudden movements occur as landmark court decisions are made or larger insureds incur claims. After a period of settling down, further increases and acceleration occur as new waves of claims are notified. In the later stages, reductions can occur as claims may sometimes be settled at a discount to the estimated cost.

5 PHILOSOPHY OF RESERVING

5.1 Introduction

The extent to which it is appropriate or desirable to reserve for unknown liabilities will depend on a number of factors. These include:

- legislative requirements
- the purpose of reserving (eg solvency / internal / pricing / investment)
- the reliability of any estimates which can be produced
- market norms / guidance
- the effects of establishing reserves
- the materiality of the unknown liabilities relative to the total business

In the rest of this Section we comment on how some of these factors influence the approach adopted.

5.2 **Purpose of Reserving**

Several of the factors mentioned above will be dependent on the purpose of reserving. The applicable legislation, relevant interested parties and potential impact of reserving for unknown liabilities vary according to the context in which the reserving is being done:

5.2.1 Companies Act Accounts

These accounts are produced both for shareholders and general public consumption and therefore have to comply with legislation and accounting standards designed to produce a degree of comparability from one company to the next. They are produced on a "going concern" basis. The accounts are audited to confirm that they present a true and fair view, and that they disclose any material uncertainties in the technical provisions that would otherwise not be apparent from the financial statements. The accounting principles include that of prudence which would suggest that all expected liabilities should be allowed for within the reserves. The Association of British Insurers (ABI) guidance quoted in Section 5.3.5 below, shows how this should be interpreted for unknown liabilities. The key piece of legislation relevant to reserving for unknown liabilities is the Companies Act 1985, Schedule 9A Part 1 paragraph 43, which states:

The amount of technical provisions must at all times be sufficient to cover any liabilities arising out of insurance contracts as far as can reasonably be foreseen.

This reflects the wording in the European Insurance Accounts Directive 1991, Section 7 Valuation Rules Article 56 (see [1] European Council Directive).

The Companies Act accounts are relevant to all of the groups listed in Section 5.3 on interested parties.

5.2.2 Statutory Returns

The statutory returns produced for HM Treasury under the Insurance Companies Acts and Regulations are of a similar nature to the Companies Act accounts, being public documents which may be used to assess the financial condition of an insurance company. As they are compiled on a prudent basis to assess solvency, it could be argued that there is a greater need to reflect all potential liabilities in the reserves. However, reserves for unknown liabilities may just be included as implicit margins introduced by means of cautious assumptions in the reserving methodology.

In addition to the regular statutory returns, individual insurance companies may be required by regulators to produce special reports on issues of interest to the regulator. The treatment of unknown liabilities in such reports will depend on the issue being analysed and the precise requirements of the regulator.

5.2.3 Tax Accounts

These are the accounts produced for the Inland Revenue to calculate the tax payable by the company. They adjust the profits shown by statutory returns to profits computed for corporation tax purposes, and are necessary where tax law requires a different basis of calculation from that used in arriving at the statutory returns. The reserving levels need to be acceptable to the Inland Revenue, who have an interest in ensuring that the reserves are not excessive, which would lead to a deferral of taxation. To that end, the Inland Revenue may seek to disallow part of the reserves if they believe that they are not justified on a sound statistical basis.

Some of the divergence between "accounting profit" and "taxable profit" has been created in the past by the tax system following judicial decisions based on historic accounting concepts, which have in many cases been superseded. Notably, reliance has been placed by the Inland Revenue on a House of Lords decision in 1956 - Owen v Southern Railway of Peru Ltd. - as establishing that provisions against future contingent liabilities are unacceptable for tax purposes, unless capable of sufficiently accurate estimation, and appropriately discounted. The case exemplified a supposed tax principle, that neither profits nor losses should be "anticipated".

In recent years, however, the trend of judicial decisions has been to accept current accounting practice in arriving at taxable profit, except where there is an express statutory divergence in the method of calculation. The Inland Revenue have recently published a Press Release (137/99 - 20 July 1999) accepting the use of Financial Reporting Standard 12 - Provisions, Contingent Liabilities and Contingent Assets - in arriving at taxable profit, except where there is an express statutory provision to the contrary. In that Release, they accept that "there is no longer a tax rule which denies provisions for anticipated losses or expenses". Although FRS 12 excludes from its scope provisions arising in insurance entities from contracts with policyholders, the logic of the current judicial approach should produce the same result for insurance companies.

5.2.4 Internal Reserving

Reserving for internal management accounts or as part of the pricing process is different in nature to the three sets of external accounts described above. In normal circumstances, the internal accounts are not for public consumption, albeit they may be inspected by regulators or be made available to rating agencies or other external bodies. The management and underwriters have an interest in determining a realistic estimate of all the liabilities so that they have the best information on which to base their decisions. It may therefore be appropriate to remove any implicit margins in the reserve estimates and replace them with explicit contingency reserves.

If potential unknown liabilities are material for an element of the account under consideration, then it will be useful to include scenario testing or special investigations into the range of possible outcomes. These may be used to choose the appropriate course of action to control such liabilities, and also to help decide upon how they will be reflected in the external accounts.

5.2.5 Mergers and Acquisitions

During mergers and acquisitions of insurance organisations there will be a review of the financial condition of the target organisation or of the merging parties. Transactions of this nature are often carried out under short time scales, and may also involve limited or no direct access to the company involved. This will affect the extent to which any investigations into unknown liabilities can be carried out. It is suggested that this should be explained in any actuarial report on the assessment of reserves which may be produced.

5.2.6 Lloyd's Solvency Returns and Reinsurance to Close

Lloyd's syndicates have to submit an annual solvency return to the Council of Lloyd's, together with a Statement of Actuarial Opinion covering the solvency reserves. The basis for assessing the solvency reserves is set out in the Valuation of Liabilities rules produced annually by the Council of Lloyd's under paragraph 9 of the Solvency & Reporting Byelaw (No13 of 1990). The basis must be approved annually by H M Treasury in accordance with Section 83(5)(b) of the Insurance Companies Act 1982.

The Valuation of Liabilities rules as at 31 December 1998 stated in paragraph 9 that "The gross reserve is not less than the best estimate of the monetary amount which is expected ultimately to be payable in order to discharge all liabilities in respect of each underwriting year before taking reinsurance recoveries into account."

The Institute and Faculty of Actuaries have published Guidance Notes on the assessment of reserves for the purposes of Statements of Actuarial Opinion for Lloyd's syndicates. The relevant part of this guidance is quoted in Section 5.3.4 below.

As well as producing the annual solvency return, the Managing Agent is responsible for setting the Reinsurance to Close (RITC) of the syndicate. The Managing Agent is required to maintain equity between successive generations of Names. It will therefore need to judge at what stage to reserve for the emergence of new liabilities in the RITC process.

5.3 Interested Parties

Interested parties may focus on different aspects of the available information depending on whether they are primarily concerned with premium rates, the emergence of profits, or the financial condition and solvency position of the company.

5.3.1 Managers and Underwriters

The management of an insurance company should be interested in monitoring all the significant risks to which the company is exposed. The possible emergence of new forms of liability will be relevant to the financial condition of the company through maintaining both premium rate and reserve adequacy, and capital availability. Whether such unknown liabilities can be reflected in premiums will depend on market conditions, but if they are thought to be material they should influence the underwriting process and financial management. The management will also need to ensure that they adhere to the disclosure requirements of reinsurers.

5.3.2 Shareholders / Capital Providers

These parties will be interested in the ongoing value of the company and in the profit stream which emerges.

Profitability is effectively determined as the difference between successive balance sheets, so that changes in reserving basis can introduce instability into reported results (or be used to smooth reported results). Therefore, if the beneficiaries of the profit stream wish to have stable income, the methodology chosen should not introduce unnecessary instability. It may therefore be in their interests for reserves for unknown liabilities to be introduced gradually as the liabilities emerge.

The sudden emergence of significant previously unknown liabilities may damage the share price of a company if it alters the view of analysts and hence potential shareholders. Therefore, failure to monitor unknown liabilities, and disclose them to appropriate parties, may harm long term shareholder value. However, in contrast, if reserving is excessively prudent and this is not properly reflected in the share price, then in the extreme it may make the company a target for acquisition. As it is possible that potential identified liabilities may not eventually lead to insurance payments, management will need to judge at what stage it becomes appropriate to establish and publish reserves.

5.3.3 Policyholders, Intermediaries, Supervisory Authorities and Rating Agencies

Policyholders, particularly in the case of major commercial policies and reinsurance purchasers, will be concerned about the security of the insuring company. This will also be the case for brokers and other intermediaries, supervisory authorities and rating agencies. These bodies will be looking for the insurance company to establish solvency reserves which reflect the risks taken, and to demonstrate that they have sufficient capital resources to cover these reserves including an appropriate solvency margin. They would be concerned if the management was not paying sufficient attention to the possible emergence of new forms of liability, particularly in classes of business where there has been a tendency for such claims to arise. However, if reserving is excessive, this may have an adverse impact on premium rates from the policyholder perspective, as they will be higher than would otherwise be necessary.

5.3.4 The Actuarial Profession

The Institute and Faculty of Actuaries has published Guidance Notes GN20 and GN33 on the assessment of reserves for the purpose of Statements of Actuarial Opinion for Lloyd's syndicates. These make reference to the extent to which the possible emergence of latent claims should be allowed for within the opinion. The relevant paragraphs are 5.2 of GN20 and GN33. These state that:

"In classes which have historically shown a tendency to give rise to latent claims, the actuary should, in the absence of evidence to the contrary, assume continuation of that trend, but need not allow for the emergence of unanticipated major new types or classes of claims."

The Guidance Notes are currently under review. The above extract is based on the Exposure Drafts published in April 1999.

If statements of actuarial opinion are to be extended to general insurance companies in the UK, or an appointed actuary role introduced, then it would be helpful for the profession to address the issues of appropriate levels of scenario testing for unknown liabilities, and when it is appropriate to establish reserves.

5.3.5 ABI

The Association of British Insurers (ABI) publishes Statements of Recommended Practice (SORPs) concerning various issues. In December 1998 it issued a new SORP on insurance accounting (see [2]) which replaced the previously withdrawn 1990 version. This SORP is intended to help insurance companies interpret the Companies Act legislation. Paragraphs 88 and 89 of this SORP indicate that a provision should be established where liabilities are known or can reasonably be foreseen:

- 88 Provision should be made at the balance sheet date for the expected ultimate cost of settlement of all claims incurred in respect of events up to that date, whether reported or not, together with related claims handling expenses, less amounts already paid. If a liability is known to exist but there is uncertainty as to its eventual amount, a provision should nevertheless be made.
- 89 The level of claims provisions should be set such that no adverse runoff deviation is envisaged. This should satisfy the requirement of paragraph 43 of Part I of Schedule 9A to the CA85 that technical provisions should be sufficient at all times to cover any liabilities

arising out of insurance contracts so far as can reasonably be foreseen.

The ABI has also published a Guidance Note for insurance companies on "Controls over procedures for establishing general insurance business technical provisions." Part 3 paragraphs 53 to 58 are relevant to establishing provisions for uncertain events. Paragraph 56, in particular, indicates that where past experience indicates that claims will eventually arise, a suitable provision should be established. This is consistent with the approach adopted in GN20 / GN33 referred to above.

- 53 A particular area of difficulty in the area of claims reserving is in estimating claims incurred but not reported where there is insufficient data from past experience to profile the range of possible outcomes and their degree of probability. This will be the case where there has been no previous occurrence of the type of claim in question or where previous occurrences are insufficient to provide a basis for the extrapolation of future trends in claims development.
- 54 Provision can only be made in relation to categories of claims events which, at the date of the assessment, it is known would, if they occurred, give rise to claims within the terms of policies issued. Where circumstances change so as to create a new category of claims event falling within the cover provided which was not envisaged when the policies were issued, provision should be made for any additional liability arising as soon as the changed circumstances become apparent.
- 55 The accounting guidance requires provision to be made at the balance sheet date for the expected ultimate cost of settlement of all claims incurred in respect of events up to that date whether reported or not, together with related claims handling expenses, less amounts already paid. Claims provisions must satisfy the following criteria:-
 - the event giving rise to the claim should have occurred or commenced on or before the balance sheet date;
 - the provision should reflect the ultimate cost of settlement, and
 - the provision should be such that no material adverse run-off deviation is envisaged.
- 56 Uncertainty as to whether or not claims events have occurred is normally associated with policies covering "long-tail risks", for instance industrial disease and environmental pollution. Whether or not a claim will arise under these contracts may not be determinable

until some considerable time in the future. This may be because the fact that a loss has been incurred in relation to a risk covered by the policy may not become apparent until some time after the event or the commencement of the event giving rise to the loss. Thus, pollution damage caused by a chemical plant may not be identified until the plant is demolished and its site is needed for an alternative use. Environmental pollution and industrial disease risks also have a cumulative "creeping" effect and it may therefore be some time before any damage to the environment or to health is noticed. Delavs between event and claim may also arise because it takes time to attribute loss to a particular cause or individual policyholder. In some cases claims will be dependent on new scientific developments which uncover causal links between diseases and particular categories of pollution or working environment. Until there is some evidence of circumstances which could eventually lead to a claim related to the period before the balance sheet date, it would generally be inappropriate to make a provision. However, where past experience on policies of a similar kind provides sufficient evidence that claims will eventually arise on the policies in question a suitable provision should be established.

- 57 Once evidence of the likelihood of claims arising has been gathered, the problem moves to the assessment of an appropriate level of claims provision. Difficulties may arise where the available statistical data on past experience is insufficient as a guide to where the level of the claims provision should be set. As a result it may sometimes not be possible to determine the full range of possible claims outcomes and/or the probabilities ascribable to claims outcomes.
- 58 Nonetheless, the accounting guidance requires that, notwithstanding the difficulties set out in paragraphs 56 and 57, if a liability is known to exist but there is uncertainty as to its eventual amount, a provision should be made. A practical method for doing this is one which on the basis of known information and reasonable assumptions is able in a logically consistent way and more accurately than any other known method, to identify the predictable range of possible outcomes, so that within that range the level of claims provision considered necessary to satisfy the requirements set out in the second and third bullet points of paragraph 55 can be ascertained. This may require reference to be made to aggregate exposures, probable maximum exposures, detailed exposure analyses of particular events and reviews of industry-wide information and any other relevant information. Controls should be in place to ensure that the provisions established are consistent with all available information. It should be recognised however that it may not

always be possible to achieve the normal expected level of accuracy in this regard where material uncertainty exists and insufficiency of data limits the effectiveness of statistical methods.

5.4 Effects of Establishing Reserves

Reserving for unknown liabilities could have various effects, some of which may be considered favourable and others adverse:

Favourable:

- Investigating the issue may help monitor and manage its emergence
- Early identification may help control ultimate costs
- Information can be fed back into the pricing of future risks
- Help maintain financial strength
- Demonstrate good management practice to regulators and analysts
- Producing best estimates helps maintain equity between capital providers
- Better reflects the impact of liabilities for taxation purposes
- Helps provide information for investment managers on the term of liabilities
- Compliance with disclosure requirements, for example, those of reinsurers

Adverse:

- Possible adverse impact on share price if action is seen by analysts as going against the market norm
- Investigations will use management and staff time, so the level appropriate will depend on the potential materiality of the liabilities
- Possible target for lawyers. If there is disclosure of reserving for specific issues this may weaken the insurer's position in a case with disputed coverage
- Over-reserving may destroy shareholder value

5.5 Materiality and Reliability of Estimates

As with all aspects of management, the appropriate amount of effort to employ to estimate reserves for unknown liabilities will depend on the potential materiality of the liabilities relative to the rest of the business, and on the level of uncertainty which would still remain were detailed analyses to be carried out. The inherent uncertainty in such ultimate claims amount makes reserving difficult. If the reserving actuary believes that there is a 10% chance of a \pounds 10m claim and a 90% chance of the claim actually being settled at \pounds 1m, then does he reserve \pounds 1.9m or does he reserve some other number between \pounds 1m and \pounds 10m? Clearly the former would be an optimistic assumption and the latter would be a pessimistic assumption, although both might be within a reasonable range of expectation. If the purpose of reserving is for a takeover, then there may be arguments for a higher amount being justified, as a form of risk premium. Similar arguments may be used if the purpose of reserving is for solvency. However, if the aim is for an equitable transfer of the liability, then perhaps \pounds 1.9m is appropriate, although a risk premium may still be justified.

In practice, the unknown liability in the above example is likely to be one of many risks insured, and so it can be reserved within the context of the rest of the business. This enables the uncertain outcome to be treated as part of a statistical distribution for the portfolio of business, so that the treatment of the individual risk can be consistent with the overall philosophy of reserving. However, auditors have to assess whether the potential impact of any material uncertainty in the technical provisions is so great that it will not be apparent to a user of the financial statements without specific disclosure.

5.6 When to Start Reserving

As described above, the requirements for published accounts are that the reserves should cover all liabilities so far as can reasonably be foreseen. It also appears sensible that this principle should be applied to internal accounts which are being compiled on a realistic basis.

The possible methodologies and reliability of the resulting estimates will vary according to the nature of the unknown liabilities and their stage of emergence as described in Section 4. The choice of appropriate methodology is covered in Section 6.3. However, the following generic approach is suggested:

- Where an account has historically given rise to liabilities of this nature, unless there are known changes in policy conditions or other factors which would mitigate the situation, some provision for their future emergence should be made. This would also apply to other, possibly new, accounts containing contracts which experience would suggest have the potential of giving rise to such liabilities.
- In the embryonic stages of emergence of specific liabilities, qualitative information will become available which may be used to start an assessment of the potential impact of the liabilities. The insurer may

choose not to make specific identified provisions for such liabilities if there is potential for this to affect disputed coverage through discovery. However, it is possible to establish reserves in a privileged context, as some interested parties, such as reinsurers, may need to be made aware of the potential liabilities. If the insurer has knowledge of the potential liability it would be appropriate to ensure that the total reserves include some allowance for such liabilities, albeit taking into account the views on coverage. There may also be a need for expense provisions if there is an expectation of coverage disputes or a duty to defend the insured. Consideration can also be given to some of the issues on controlling the potential liabilities, as described in Section 7.

• Once claims are made against the insurer, case estimates should be established based on specific circumstances, and the case estimates and IBNR reserves will be reviewed as described in Section 4.

5.7 Discounting

In practice some companies may choose not to discount the reserves for uncertain classes of business [or to discount at a "risk adjusted" rate of zero] and assume that the future investment income arising will cover the costs of unknown liabilities which have not been specifically allowed for within the reserves. Whilst this approach is one means of introducing an implicit reserve for unknown liabilities, if no assessment is made of the potential for unknown liabilities to emerge it would not be possible to judge whether the implicit margin is appropriate.

In some situations, such as when reporting reserves for Lloyd's solvency, it is prohibited to discount liabilities. In situations where discounting is not prohibited, management will need to consider whether it is appropriate to discount the reserves for classes which may give rise to unknown liabilities. Full discounting for the time value of money should not be performed unless management are comfortable that full provision has been made for all future payments in respect of liabilities, expenses and other aspects of the business. Given the uncertainty in assessing the reserves for unknown liabilities it may be considered appropriate not to discount the reserves for solvency, taxation and other reporting purposes, even where provision has been made for the possible emergence of unknown liabilities.

6 RESERVING METHODOLOGIES

In this Section, we look at some of the failings of traditional actuarial projection methodologies when reserving classes of business involving unknown liabilities, and consider the types of methods which may be more appropriate.

6.1 Failings of Traditional Actuarial Methods

Traditional actuarial methods of reserving can be unreliable or unusable in situations where there is insufficient data to provide a sound basis for analysis or where particular features of the liability are inconsistent with the assumptions in the method. This inevitably gives rise to the need to apply non-traditional methods, as demonstrated by the two examples below.

Latent claims: though widely known and "better" estimated now, until recently little experience existed within the past data for such claims. There was no indication at the time the business was written that further liabilities would arise after many years. Hence the traditional methods failed to make any allowance for such claims. Furthermore, these types of claim are often subject to calendar year effects as well as the usual development year influences. As traditional actuarial methods generally focus on projection using development year patterns rather than calendar years, they are likely to be distorted.

New classes of insurance / new areas of exposure (peril): are not well suited to the traditional methods due to the lack of claims data. There are many examples of this, with new types of insurance product being developed all the time. Two particular examples where heavy losses have previously been incurred include Mortgage Indemnity Insurance and Warranty Cover on New Homes.

6.2 Types of Methodology

This section gives a list of some possible methods that can be used to reserve for unknown or lesser known liabilities. The methods range from simple, pragmatic approaches for use when the available information is very limited, to more sophisticated methods which can make use of relevant detailed information. Clearly not all the methods will be suitable in all circumstances.

Some of the methods described below could be considered to be specific examples of other methods, but they have been listed separately for ease of identification.

6.2.1 Rating basis

It may be possible to employ the methods and assumptions used in setting the premiums, where the existence of the liability was known at the time of pricing the contract and an explicit allowance has been made in the price (for example a new material being used in buildings, or with an entirely new type of insurance). The rating basis will need to be rolled forward, perhaps by employing earnings and claims development patterns. Depending on the purpose of the reserving exercise, margins may be applied to the assumptions used in pricing. As new information becomes available, the pricing assumptions will be replaced with estimates based on actual experience.

Even where the liability is unknown at the time of pricing, a general allowance for unknown liabilities may have been made in the rating basis. In the absence of other information, reserving assumptions for purposes such as solvency should be at least as prudent as any allowance made in pricing.

6.2.2 Professional Judgement

Where no information is available or more robust methods are not required (for example, due to immateriality), an alternative "method" is simply to use professional judgement or choose a politically acceptable number, and then to let this reserve run-off over an appropriate period of time, adjusting for claims experience as it arises.

6.2.3 Benchmarks

A wide variety of benchmarks or other parallels may be used to help assess an appropriate reserve. They may be used directly, for example by applying a simple ratio derived from a similar situation elsewhere, or indirectly, for example using a benchmark to derive an assumption required as part of a more complicated reserving method.

Benchmarks could be based on the experience of other insurers, for example where market-wide statistics are available. Alternatively, they could be based on the insurer's own past experience in similar situations: for example, when reserving for liabilities related to a newly identified health hazard, it may be useful to look at past experience on other similar health hazards. Another example where the use of a parallel might be helpful is that of past court decisions, which might provide an indication of the possible future outcome of a current dispute.

6.2.4 Global model ("top down" approach)

This method involves using a model to estimate global losses to the insurance industry or to "the world" (perhaps based on numbers of people affected, multiplied by an average loss size and the proportion of losses insured). The insurer's own share of the global loss is then estimated. This might be done by using the insurer's share of the relevant total market premium, or from its known share of other similar losses.

This method is likely to involve very subjective assumptions. However, it may be appropriate early on in the emergence of a new type of liability, when very little or no information specific to the insurer is available, but the insurer needs some basis on which to calculate a reserve. Having a model of some form, however simple, can help to justify the reserve. Furthermore, this approach can also help in gaining a better understanding of the liability and the likely process of emergence.

A global model may still be appropriate later on in the process of emergence, provided that appropriate assumptions can be identified.

6.2.5 *Exposure-based methods*

These methods can be used earlier in the emergence of a previously unknown liability than many of the traditional actuarial methods based on paid or incurred claims development. They are suitable at the stage when potential claimants can be identified, that is, when it is possible to identify which policies are exposed to the relevant type of risk. However, as with the Global Model, some of the key assumptions in the method may be subjective and very uncertain.

Possible methods may involve applying percentages to exposures, representing the percentages of cover expected to be burnt. As the volume of information grows it should become possible to develop more sophisticated versions of this approach. Where there are uncertain issues relating to coverage, insurers may not expect to be liable for all the claims made against them. In such situations, it may be appropriate to reduce the claims cost by applying a proportion, or "win factor", to reflect this.

Drawbacks of this approach, however, include that there is often insufficient or no exposure data available.

6.2.6 Policy Limits

Taking exposure-based methods to one extreme, the reserve could simply be set equal to the policy limits. Again, this may be appropriate if, say, the issue is relatively immaterial (so that only a simple approach is required) and the purpose of reserving is to demonstrate solvency (so a prudent approach may be reasonable). However, this method is unsuitable where the potential exposure is unlimited. Consideration would also need to be given to whether defence costs, or other expenses which may be covered by the insurance policy, are included in the policy limits.

6.2.7 Use of Cedant or Market Figures

An alternative basis for calculating a reserve is to use the reserve (or reserving assumptions and other information provided by the cedant) employed by the relevant cedant, or claimant, making appropriate adjustments to take into account the policy limits and other relevant factors.

If the issue is a market problem, it may be possible to reserve on the basis of information from market-wide investigations.

However, the cedant (or other companies in the market to which reference is being made) may have a very different approach to setting case estimates or IBNR to that which is required.

6.2.8 Reinsurers' expertise

Reinsurers may be able to assist the insurer in setting reserves if they have additional information (perhaps based on the experience of a number of insurers) or expert knowledge.

6.2.9 IBNR to outstanding loadings

In this method, the IBNR reserve is calculated by applying a loading to total outstanding claims. However, this method is only suitable once substantive case estimates have been established. Furthermore, in order to use this method relevant information from which to derive an appropriate loading is required.

The method may be useful in situations where the insurer's data is poorer than that of other insurers in the market, but only where appropriate benchmark loadings derived from those other insurers are available. Consideration would need to be given to the comparative strength of outstanding claims when applying the benchmark loadings.

6.2.10 Simple multiple of average annual cost

This could be considered a specific example of the "methods based on paid or incurred claims development" described below. At its simplest, a reserve based on paid claims development could be calculated as the amount which will fund the current rate of annual payments for a desired number of years, that is:

reserve = recent average annual payments * n years.

The ratio of the reserve to the current level of annual payments is sometimes referred to as the "survival ratio". The chosen figure might be based on market benchmarks.

Similarly, it is possible to calculate an IBNR reserve as a multiple of the current annual increase in incurred claims.

6.2.11 Model based on a number of claims multiplied by an average claim size

This method requires information from which to derive estimates of ultimate numbers and sizes of claims. The degree of sophistication of the method will, however, depend on the information available upon which to base the frequency and average cost assumptions. For example, relatively early on in the process of emergence of a health hazard, the estimated number of claims might be based on, say, the number of people exposed to the hazardous material, multiplied by the probability of an exposed person developing the disease in question, and taking account of the form of insurance coverage. Later on, it should be possible to replace this estimate with one based on numbers of claims reported to date scaled up by a development factor estimated by other means. The estimated average claim size might be based on the sizes of past claims relating to similar health hazards. Later on, that estimate could be replaced by the average size of actual claims to date, adjusted for past and future inflation.

Depending on the form of insurance, or reinsurance, the distribution of claim size may be important. If this is the case, then a frequency / severity model would be more appropriate. In such models, the distribution of claim size is estimated, rather than just assuming an average cost per claim.

6.2.12 Methods based on paid or incurred claims development

With these methods an expected future development pattern is applied to the current level of paid or incurred claims, based on the pattern of claims development observed to date. However, in order to do this a certain amount of claims history is required. This is only likely to be available for liabilities

which have reached the "known liability but unknown quantum" category, and for which there has been a reasonable volume of claims to date.

The assumed future development pattern should take into account any trends in the past development of paid or incurred claims where these can be identified. Care must be taken where there is a possibility of claims emerging in waves (for example asbestos bodily injury, as mentioned in Section 4).

For many unknown liabilities, it will be the calendar year pattern that is most relevant, rather than the development year pattern. Calendar year effects will be seen as a result of events such as landmark court decisions and the publication of scientific studies into side-effects of drugs. Analysis of claims by year of notification may therefore be useful.

There are many forms of projection based methods which could be used, see for example [9] Claims Reserving Manual.

6.2.13 Adjustments to standard actuarial methods

Instead of considering a particular unknown liability separately from the rest of the liabilities, it may be possible to apply a standard actuarial method, adjusted to allow for specific features of the unknown liability. This might involve changing the assumed development pattern or altering the parameters used in a curve-fitting approach. For example, if the Bornhuetter-Ferguson method were used, an addition could be made to the initial expected loss ratio used and the length of development pattern increased to allow for latent claims to emerge.

6.2.14 (Unadjusted) standard actuarial methods

In other situations, standard methods might be applied without adjustment. An example of where this may be appropriate would be a class of business that has shown a history of giving rise to latent claims (for example products liability insurance). In this case, projecting the historical claims data without first removing previous latent claims will automatically give an implicit allowance for future emergence of latent claims. The method involves an implicit assumption that future latent claims will emerge at a similar rate and at a similar level of seriousness to that experienced in the past.

6.3 Choosing a Suitable Approach

In order to determine the methodology to be used for reserving, a variety of factors should be considered including:

- the purpose of reserving, as described in Section 5
- the materiality of the risks
- the extent to which risks are perceived to exist and liabilities known, as described in Section 2
- the source / process of emergence of the liabilities, as described in Sections 2, 3 and 4
- the claims data and other information (for example exposure data) currently available
 - volume
 - extent of development
 - time period covered / relevance

In Section 1.2 we suggested that some of the issues arising from unknown liabilities, as defined in this paper, are also relevant to classes of business where potential liabilities are known but there is little or no historical experience of those liabilities. In the rest of this Section we consider the methods which may be appropriate in these circumstances, and compare them with the methods appropriate where the liabilities were not expected. To do this we look at the following two broad categories of policies:

- (A) new classes of insurance / extensions of original cover,
- (B) new liabilities becoming apparent under existing cover already written.

Though the two categories are quite different there are some methods which will be applicable to both. Certainly with both, as any unknown liabilities go through the process of emergence from being newly considered to having sufficient data for more traditional methods to be applied, the methodologies will also develop.

6.3.1 (A) New Classes of Insurance / Extensions of Original Cover

When a new area of cover is first introduced some form of research and analysis should have been carried out in order to determine the premiums to be charged (or at least the costs expected to be incurred). Although such an analysis will have been performed with slightly different goals in mind the results should still give an indication of the likely overall level of claims experience anticipated. Thus, in the first instance, reserving on the **Rating Basis** is often a useful starting point before any claims data becomes available. The type of research and analysis which may have been undertaken in determining the premium basis, though product dependent, is likely to have involved some or all of the following;

- consultation with relevant experts within and outside the organisation to determine the likely frequency and costs of claims, including the distribution and timing,
- analysis of the likely exposure to events or circumstances giving rise to claims,
- **Benchmarking** (that is, making analogies with other forms of cover least different from the new type introduced),
- data samples taken from non-insurance sources in order to determine the potential effect on insurance.

Other methods which can also be used before claims experience is available include;

(a) Use of Cedant or Market Figures / Reinsurers' Expertise

However these methods can only be used where comparable cover is already offered by other insurers, thereby providing a source of claims data.

(b) **Policy Limits**

Where materiality is not an issue or where time pressure prevents any significant amount of analysis being performed, policy limits can provide an upper limit for the reserve which should be held. A more reasonable approach, however, is likely to be a proportion of the policy limits - where the proportion is determined by benchmarking or intuitive means.

(c) Intuition / Professional Judgement

Professional judgement is always a useful cross-check for other methods. In a sense this reflects a Bayesian approach where the actuary, or other person carrying out the reserving, uses any personal insight, views, beliefs and knowledge in order to produce an initial estimate for comparison with the other methods and actual experience over time. By looking at the differences between these estimates a much greater understanding can be gained.

As time progresses and claims experience data can be gathered this can be incorporated into the reserve estimation process using a **Bayesian Credibility Approach**:

z x E + (1 - z) x A

where z is the weight attached to the original Premium basis estimate and A is the estimate derived from the claims data to date. The Bornhuetter Ferguson method (see [9] Claims Reserving Manual) is one way in which this can be done.

6.3.2 (B) Unanticipated Liabilities Under Existing Cover

In contrast with new areas of insurance cover the Rating Basis approach might often be of little use for estimating the reserves required in respect of liabilities of this nature. By definition, the liabilities were unanticipated and so no explicit allowance will have been made in the premium calculation. However, an implicit margin may have been applied to allow for such liabilities.

Also, regarding the policy limit approach, though this still reflects the upper limit of potential claims experience, it is unlikely to be realistic as the unknown liabilities will be just one of the risks being covered. Often considerable claims experience will already exist, having arisen from other covered risks already known. However, the remaining unused policy limits would give an upper bound on the potential claims payments from the unknown liabilities.

However, though these two methods are less appropriate, many of the other methods described above are valid alternatives where traditional methods are unsuitable. Again, though, it is worth emphasising that the most significant factor in determining which methods are most appropriate is the claims data currently available.

In order to consider the applicability of the methods described it is helpful to consider different key stages in the process of emergence. Four stages have been used below;

- (1) No information available,
- (2) Non-numerical information available via the press, media and trade journals. Limited exposure data, but no claims data,

- (3) Some claims data available initial claim payments estimated, small number of claims settled, but insufficient years to show the past development patterns,
- (4) More fully developed claims data available.

(1) No information available

Some of the simplest methods which may be used at this stage include **Traditional Methods Adjusted** to allow for additional future claims expected to arise due to the unknown liability for which there is no experience in the existing data.

Such an approach essentially requires **Intuition and Professional Judgement** in order to come up with an adjustment that does not appear unreasonable. The simplest of these is to add on an unsupported margin to the calculated reserves. However, this runs into various difficulties:

- there is no statistical backing analysis of any kind, which means that it is likely to be disallowed by the Inland Revenue for tax purposes;
- it is not informative for management accounting purposes; and
- it gives no aid to understanding the potential risks.

Where possible it is preferable to devise some form of statistical analysis based on intuition and common sense in order to form the basis of any adjustment made.

Traditional Methods Unadjusted may also be used, where there is experience of unknown liabilities arising in the past which is considered to give a reasonable basis for the possible future emergence of other unknown liabilities.

Other methods which may be of use include using **Market Data, Reinsurer's Expertise, a Global Model** or **Benchmarks**. However, it is possible that these methods may also be of little use where the liability is unknown to the whole market rather than just one particular insurer. Once information of some kind becomes available then these and other methods become more feasible.

(2) Non-numerical information available

Although at this stage the extent to which reserves may be estimated is still limited, experience and expert opinions will have begun to be formed. In making full use of these expert opinions, methods based on perceived exposures become increasingly useful - for example Global models and Exposure-based models.

Benchmarking, where analogies can be drawn with other previously unknown risks (which are more developed in terms of the extent to which claims information is now available), should be possible to make use of a more diverse pool of information. This approach enables a basis for estimation to be formed based on assumed similarities and differences between the two sets of liabilities. Such an approach also has the merits of being relatively easy to monitor, update and fine tune as more information is obtained.

Global models can provide a useful basis for comparison when employing other, more intuitive, or judgement based methods as a cross-check or test for reasonableness. However, care should be taken to adjust for cases which arise from the liabilities identified but which fall outside the scope of insurance, to avoid the risk of overestimating the insured losses.

Exposure-based methods also provide the foundation for early statistical analysis, and are often more intuitive and reliant upon the knowledge, views and experience of experts. They may be very broad brush with the model and parameters highly uncertain, but even so such an approach may be more defensible in the eyes of scrutineers.

Also at this stage an approach based on **Policy Limits** may be useful as a cross-check.

(3) Some claims data available

As claims begin to be reported and settled the models above can be made more sophisticated to incorporate the new information. Also, though there may still be insufficient information on which to base the more traditional actuarial methods, more simplified versions become feasible, including **IBNR** / **Outstanding Loadings** or a **Simple Multiple of Average Annual Cost**.

(4) Fully developed claims data available

At this stage the traditional actuarial methods based on paid or incurred claims become effective, though continuing use of prior methods as a cross-check and to determine their prior accuracy can provide useful information to aid understanding of the emergence process.

6.4 Additional Comments on Types of Methodology

Though the most important aspect of reserving is to determine the overall size of reserves required it is also important to understand the expected liability profile in terms of emergence, due to its impact on investment and other decisions. It should be possible to perform sensitivity or scenario tests using the methods outlined above. A deterministic approach is likely to be the most pragmatic where a simple allowance for uncertainty might be made by applying adjustments to the relevant assumptions. However, if a more sophisticated approach is required then some of the parameters may be treated as stochastic random variables. Each of these routes has its place: the complexity of the model chosen should be appropriate to the purpose and materiality of the reserve.

The above methods may also help in estimating the likely pattern of payments, where for example the reserves are to be discounted. Some of the methods outlined above already have a development pattern estimated in order to apply the method. Furthermore, some of the above methods may also help in monitoring the process of emergence of an unknown liability and may therefore produce useful management information.

Some of the methods outlined above may require a separate allowance to be made for expenses such as legal defence costs.

Where limited or no data is available, the estimates derived from any method will be highly uncertain. Therefore, the political acceptability of the results from the methods used is likely to be an important issue.

7 CONTROL OF UNKNOWN LIABILITIES

7.1 Introduction

The preceding Sections of this paper describe the emergence and impact of claims from unexpected sources. This Section considers the steps which could be taken to control the impact of unknown liabilities, both before the business is written and once the liabilities have begun to emerge.

7.2 Policy Exclusions

The size and significant effect of unknown liabilities on insurers has led to a balancing act that needs to be performed. Policyholders look to their insurers for wide protection, but equally insurers must be able to price their policies with some degree of accuracy.

A solution is often to have strict policy wordings that exclude the claims resulting from certain types of losses. This type of exclusion can still be in the public interest because as long as the policyholder knows and understands the limitations of cover in his general liability policy, he can decide whether to run the risk of not having insurance in respect of certain losses, or alternatively to purchase specific (and possibly expensive) insurance cover for the risk of those claims arising.

The approach as described in the previous paragraph will do much to avoid costly legal action between insurers and policyholders if such claims do emerge.

7.3 Limiting Aggregate Exposure

Policy wording can be used to limit the potential for aggregation of claims. This can be achieved by having a "cap" on the size of such losses.

Alternatively, the insurers can purchase reinsurance to pass on part of their exposure. This could either be prospective reinsurance purchased before the inwards business is written, or might include some form of run-off reinsurance on an existing book of business.

Great care will be needed in the definition of the relevant trigger, excess, and limit provisions in all contracts, particularly where the nature and extent of the problem has not been fully appreciated. For example, there are reported examples of parties inserting exclusions in insurance and reinsurance contracts of 'asbestosis', which have been held ineffective to extend to mesothelioma claims.

7.4 Coverage Trigger

Where policies are written on an occurrence, or losses occurring during, basis, the policy covers claims from incidents that occurred during the exposure period of the policy. This means that unknown liabilities can arise many years after the expiry of the policy. If policies are written on a claims made basis, they cover claims which are first advised to the insurer during the exposure period of the policy. This means that the insurer knows about the claims arising on the policy earlier in the lifetime of the policy and will also be aware of the general environment which could give rise to claims on the policies currently being written. It is therefore in a better position to feed this information into the pricing of future policies and to limit its exposure to claims arising from similar sources in future.

7.5 Risk Management by Policyholders

Good risk management by policyholders can mitigate the effect of latent claims. For example, clear warnings on pharmaceutical and other products can provide better defences to potential claims from users of these products. Insurers, actuaries, lawyers and others can help in this area. Such risk management can be encouraged by the insurer as part of the underwriting process, with premiums being adjusted to reflect the insurer's views of the quality of risk management taking place.

Burning cost or swing plan contracts or mandatory fixed percentage retentions result in the policyholder retaining a financial interest in the size and frequency of claims. This will give the policyholder an incentive to keep claims to the minimum and hence encourage better risk management both before liabilities arise and once they have done so.

7.6 Commutations

If an insurer or reinsurer becomes aware of the potential for unknown liabilities to arise on particular policies, it could seek to commute those policies thereby removing the chance of future deterioration in the claims experience.

Any company embarking upon a course of commutation or 'buy-back' of policies to avoid future liability should be warned that recovery from reinsurers of such payments is unlikely in the absence of express consent or suitable wording in the outwards contracts.

7.7 "Good Bank / Bad Bank"

In cases where the historical business of a company has given rise to exposure to liabilities causing such uncertainty that the ability to write new business is affected, the management may seek to separate the experience of the historical business from the future business. This might be achieved by effectively putting the existing company into run-off and establishing a new ongoing insurer. This form of restructuring is sometimes called "Good bank / Bad bank". There are likely to be significant regulatory hurdles to be overcome in order for this to be permitted.

8 CONCLUSION

The consideration of unknown liabilities is a difficult area because, by definition, there must be a high degree of uncertainty involved in any analysis which can be performed. However, this uncertainty should not be used as an excuse to avoid carrying out any analysis where it is thought that there is potentially material exposure to such liabilities arising. The overriding issues to consider in reserving for any liabilities are the purpose of reserving and degree of materiality.

In the UK, the governing legislation requires that technical provisions should be sufficient at all times to cover any liabilities arising out of insurance contracts so far as can reasonably be foreseen. This implies that the management, or auditors, signing off reserves need to be comfortable that the reserves make appropriate explicit or implicit allowance for unknown liabilities, where their existence may reasonably be predicted.

As discussed in this paper there have been many situations where it has been necessary to reserve for unknown liabilities in the past - and it is a near certainty that there will be many more cases in the future where this will continue to be the case. As such, it is hoped that this paper can be used both as a point of reference and as a formal record of some of the broadly accepted actuarial approaches to reserving for unknown liabilities. With the regulatory and economic climate progressing as it is, over time it is likely that an increasingly formal approach will become necessary. As this occurs, a review of this paper will become necessary.

By categorising unknown liabilities into their different respective causes and stages of development it has been possible to identify the areas of commonality which in turn can help in forming a systematic approach to reserving for those liabilities.

The reserving methodologies included within this paper, though extensive, do not necessarily form a complete list of possible approaches. Furthermore, it is likely that there are, or will be in the future, other approaches which are considered to be equally suitable for use in the scenarios described. The descriptions given, and indicated areas of use, have deliberately been kept fairly general as the specifics will depend very much on each particular situation.

Although this paper is on reserving for unknown liabilities, it also has relevance to underwriting. It is important when writing a class of business likely to be exposed to unknown liabilities that underwriters, actuaries and claims personnel all work together. The significant delay to emergence often means that risk prices can be too low for too long, or similarly, policy exclusions and other attempts at mitigating claims may be implemented far too late. Only by having an effective early warning system involving the above teams can adverse claims experience be estimated at an early stage and effective action taken.

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