

Dynamic Corporate Management

Maintaining Solvency Over Time

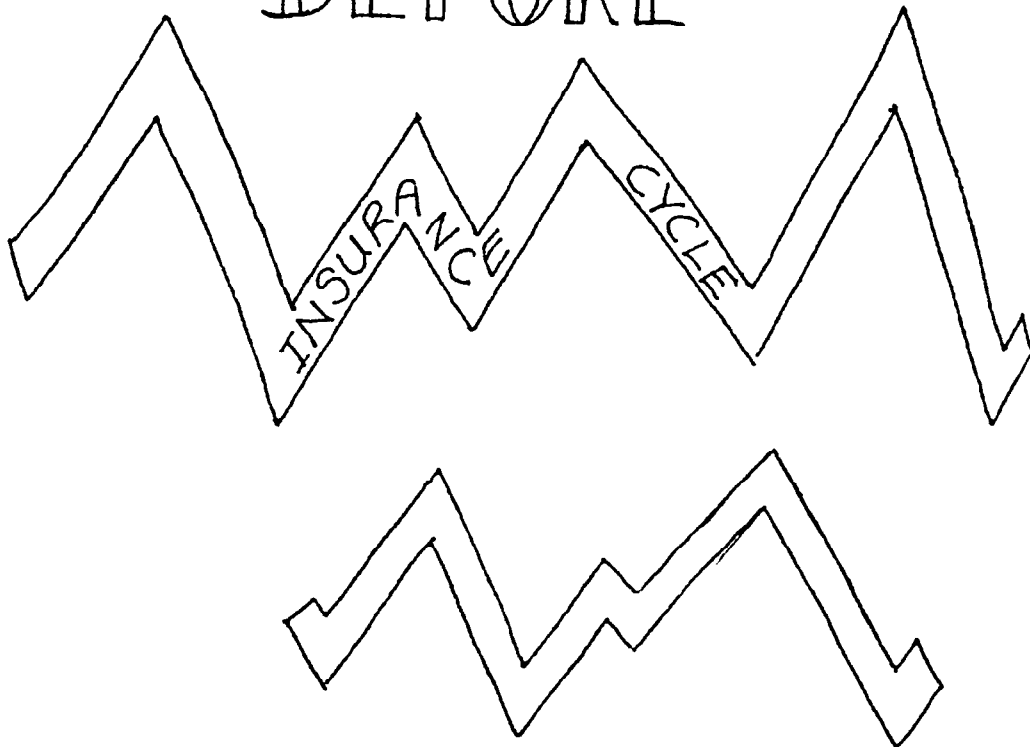
Report of The Dynamic Solvency Working Party to the

General Insurance Study Group

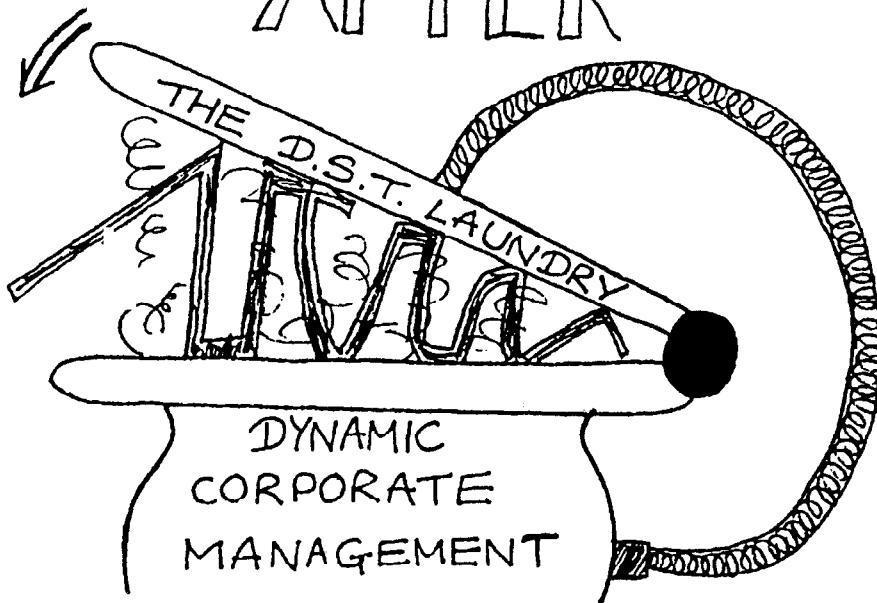
Membership:	Richard Bulmer
	Francis Chacko
	James Dean
	Andrew Macnair
	Ravi Manjrekar
	Nicholas Michaelides, chair
	Peter Rains

August 1993

BEFORE



AFTER



CONTENTS

1	Introduction to Dynamic Solvency
2	Why Solvency Matters
3	What is Dynamic Solvency Testing?
4	Where is Corporate Planning Today?
5	Integration of Solvency and Planning
6	Modelling the Company in a Market Context
7	Select Bibliography

If we consider the personality profile of a typical insurance company manager, (s)he is likely to be task oriented, with a short-term perspective and a tendency to be pragmatic. Over-anxious to find solutions, (s)he will make decisions before understanding the problem or the implications of what is decided. It is then little wonder that the industry has the problems that it does. An idealistic, visionary leadership which sees through the ups and downs of the cycle to the real needs of the customer might generate some immunity from the worse excesses of price competition. If it is true that "people will always need insurance", we really have no excuse for losing so much money.

The primary purpose of this paper is to lengthen the horizon of thinking about the business so as to encourage realistic decision making that will create sustainable advantage without first crippling the balance sheet. The golden rule is that there are no golden rules so do not expect to find all the answers but try to answer the questions we pose.

Read on

1 Introduction to Dynamic Solvency

The working party came to the subject in the belief that this was to be virgin territory and that a simple, introductory paper would break new ground. It came as quite a shock to discover just how insular this perspective was. Within the bibliography are some of the papers we have considered but each of these is the tip of the extant literature. Each carries its own list of papers and the Brender et al paper is an extremely valuable bibliography and commentary in itself and highly recommended reading.

It quickly became evident that we could all too easily replicate what has gone on elsewhere. However, if this paper achieves nothing else, it will at least cause us to consider our activities on a wider stage and point towards previous achievements.

This group is an amalgam of two; it incorporates those who expressed an interest in the cost of maintaining year-end solvency. While this is of interest, it is perhaps subsidiary. The cost of meeting the statutory hurdles by (ab-) using certain accounting mechanisms, financial instruments and so forth may represent the tactics of a company which has not, in previous years, fully incorporated the concept of dynamic solvency.

To be solvent is to be able to pay all debts. In the short term, any company with a positive cash flow should therefore be solvent. A strong flow of cash into the company today may, however, simply be indicative of underpriced business which will generate a large outflow at some future date. Thus there is a strong responsibility placed on the management to ensure that at all times the company currently has the resources to meet all the commitments it has incurred. In most markets,

managements are not trusted to do this without somebody looking over their shoulder.

Being financial institutions of the form that income is known-ish but costs are not, it is imperative for many interested parties that insurance companies can demonstrate publicly that they have the resources to meet their commitments in reasonably foreseeable circumstances. In the UK at present, most of the focus has been on the situation the company finds itself in at some arbitrary date. In general, the question asked is whether the company can meet all its liabilities from its existing assets. In the UK and the rest of the EC, the test is whether net assets exceed a minimum required margin. To calculate this margin, both premium written and claims incurred are taken as measures of exposure. Fixed percentages are applied to these figures and the larger of the two outcomes is taken to be the minimum margin. The effect of this method is generally to require the same margin for all companies of a given size irrespective of their mix of business. Long-tailed lines will, over time, build up proportionately larger technical reserves than short-tailed ones. As reserves are subject to fluctuation, a given percentage change in those of a company with a long-tailed bias would have a bigger impact on the margin than in, say, a personal lines office.

This is but one limitation of the static, year-end approach. Dynamic solvency takes the horizon out to a future date when we can try to assess the company's strength given the execution of its business plan in the meantime. In dynamic solvency testing, we try to understand the circumstances which would place the company under the greatest stress given its current strategies. It can then decide the extent to which strategies should be amended to balance stress potential with profit potential. This brings solvency assessment from a concern with keeping supervisors happy to use as a management tool. We need, though, to look at both perspectives.

1.1 Supervisor's Role

United Kingdom

The DTI assesses the returns submitted by a company within six months of its financial year-end to determine its ability to continue writing soundly. The EC requirement for a solvency margin of at least 16% of net premiums was (perhaps optimistically) intended to protect an insurer against underwriting losses sustained between its financial year-end and the point at which the company's returns have been prepared, submitted and analysed. The quasi break-up cost and valuation basis required by UK law does not take explicit account of the company's intentions which is why the DTI has started a series of informal visits to companies to understand their future plans.

Canada

In Canada, plans are afoot to implement dynamic solvency through the establishment of appointed actuaries. Here the focus will be on the business plan and the ability of the company's resources to sustain planned activities over at least the next twelve months. The stated objective of Canadian Dynamic Solvency Testing or DST is to

"enable the actuary to provide advice about trends in surplus and threats to the company's solvency, and to identify courses of action which may mitigate the threats".

This is amplified in one of the footnotes which says, "It is important to realize that the primary purpose of this exercise is not to find out if a company will be solvent or not at a future date, but the extent that certain factors or elements can adversely affect the solvency of a company". This pro-active stance should help companies avoid strategic dead ends as long as management is prepared to amend its strategy and introduce appropriate contingency plans. It is probably at this point that the supervisor and management may be expected to converge, if not clash.

The United States of America

The USA is approaching solvency from the so-called risk-based capital approach where capital requirements are based on the scale of the balance sheet risk, both of assets and liabilities. Another working party has the brief to cover this development and we do not attempt to emulate them here.

1.2 Manager's Role

Most managers are interested in keeping their jobs and getting promotion. Determining the impact tomorrow of what they decide today has not always been one of their strong points yet is essential if their primary interests are to be fulfilled. Business planning is still in its formative years in the general insurance business and has mostly been the preserve of the accountant. Hence, much of the work has been on point estimating and budgetary control.

The horizon of the wise manager will be much longer than that of either the DTI or the Canadian authorities. Also, it is imperative that even the sacred cows are sacrificed in the interest of an objective assessment of the future. For example, history teaches us that nobody ever learns from history. So, who is to say that the next downturn of the insurance cycle will not hit us or be even more severe than last time? What corporate plan ever included such a scenario? They all seem to show growth and chirpy loss ratios. We hope that we may help to open a chink of light in this dark corner.

1.3 Our Objectives

Within this paper we shall endeavour to link the supervisor's interest with that of the management. It is clearly vital that the company remains solvent in the eyes of the supervisor. Also, in order that directors can continue to allow their company to trade, they must at all times reasonably believe that it is currently solvent. However, that may not be sufficient for long term viability. Every failure was once solvent! How do we ensure that our employer or client goes from strength to strength?

In other words, *how do we manage our company's capital strength in the light of the relative position of our competitors and the absolute test of solvency adopted by the particular regulatory framework we are working within?* Given that capital is relatively scarce, how do we best allocate our resources in order to maximise the value created by their use? To what extent should risk be managed by the insurer rather than the shareholder? As buying reinsurance reduces the long-term profitability of the business, it would not appear to be in the interests of the shareholder so what factors should motivate its purchase? If reinsurance is bought for capacity purposes, why not get the capital from the current investors and reward them rather than the shareholders of the reinsurer?

We consider briefly the perspectives of the various stakeholders to show both the common interest in solvency as well as some of the differences in perception as to what makes a company solvent. We then examine the role of corporate planning in helping the management to ensure the prosperity of the company. Next is a section on the ways in which assessment of solvency can be incorporated into the planning process. It is this section which addresses the key issues raised in the previous paragraph. The features of a market-oriented model are then briefly discussed. Finally there follows a select bibliography which includes comments on the papers listed. We suggest that we raise more questions than answers but perhaps there is a lesson there. Let us not presume to know but be ready to find out.

2 Why Solvency Matters

While we can define solvency in this context as "at all times currently having the resources to meet all the commitments already incurred", the relevance and even understanding of this will vary according to the perspective of the stakeholder.

2.1 Managers and Employees

Good management will consider the aims and needs of policyholders, shareholders, supervisors, etc., and so will have an eye to all the considerations mentioned in sections 2.2-2.5 below. It will also have regard to the position of the company workforce and of the directors and managers themselves.

Generally, managers and workforce will be interested in the continued solvency of the company, so that salaries continue to be paid and the pension fund topped up. Some bonus schemes can encourage shorter term thinking although continued employment should be a sound incentive to manage a financial institution on a long term basis. Also senior managers in a company which has failed financially may find it difficult to obtain a similar post elsewhere. The degree to which reputations suffer will depend on the reasons for failure but it is rarely a wise move to have such an association, either from the market's viewpoint, or that of the supervisor where, as in the UK, the latter has the power of veto over senior appointments.

Many of the considerations will suggest conflicting courses of action, and management will sometimes need a pragmatic solution in order to balance the needs of the various stakeholders. This is most clearly seen in the distinction between a company's absolute position and its position relative to its main competitors.

When considering, for example, the level of exposure to equities in the company's investment portfolio, management may decide that the dangers

from over- or underexposure are smaller than the risks from a level of exposure which is out of line with that of the company's peers. If a stock market crash hits all major insurers equally, the supervisor cannot (the argument runs) close them all down; the suppliers of capital will not desert the sector entirely; the more talented managers cannot all flee; and so on.

There is a subjective element to this which can be seen in the Canadian approach of dynamic solvency testing using a range of assumptions. In some scenarios all insurers will be insolvent, while in others practically all will be solvent. The importance of assessing the relative position is reflected in the growth of agencies which evaluate the financial strength of insurance companies and allocate a rating. Most companies will have passed the statutory tests but some will have cleared the hurdles with a greater margin than others. The assessment by these agencies is taken into account by those who buy insurance and it is likely that better quality business will go to the stronger companies, thus accelerating the decline of those which are already weak. Management of all aspects of risk commensurate with capital resources is therefore vital to avoid becoming frail relative to the market and starting a steadily falling spiral.

2.2 Shareholders

It has been argued that in a perfect market companies should not, from the perspective of their shareholders, take actions to protect solvency on the grounds that it is for shareholders to diversify their own investment portfolios if they wish to reduce risk. The argument runs that any actions taken to protect solvency imply extra costs, such as the reduction in return from investments which do not maximise yield or the profit margin element of a reinsurance premium.

In the real world, dealing costs prevent shareholders from diversifying their portfolios completely, so they look for certain companies to exercise a degree of prudence. If a shareholder invests in companies with risk-taking profiles, then he/she should not be too discontent if there is the

occasional failure. However, insurance companies necessarily present quite the opposite profile, and so serve their shareholders by following low-risk strategies. If insurance futures ever are generally available, this will become even more true, as investors will then have a choice between investing directly in insurance through futures or investing through the risk-filtering medium of an insurance company.

It would not be impossible to imagine an insurance market consisting of major and minor insurers, all following low-risk strategies, plus a range of specialist insurers following high-risk strategies such as not seeking to reduce underwriting risk (by reinsurance) any further than occurred naturally through the pooling of risks. While this would require special treatment by policyholders (who would themselves have to diversify by spreading their cover) and regulators, such a market could serve the interests of shareholders better by making available a spread of risk levels.

However, it should be a feature of such a market that most of the insolvencies would occur among the specialist companies and be attributable to identified high-risk causes. In reality, the majority of failures seems to result from poor management practice of one sort or another, rather than from following a high risk/reward strategy. This is reflected in the June 1991 report of AM Best on primary causes of US insolvencies from 1969 to 1990 :

Deficient loss reserves/inadequate pricing	28%
Rapid growth	21%
Alleged fraud	10%
Overstated assets	10%
Significant change in business	9%
Reinsurance failure	7%
Catastrophe losses	6%
Miscellaneous	9%

While there will be elements of high risk and poor management in at least the second and sixth of these, we could, somewhat arbitrarily, classify the first four as poor management and the latter four as high risk/reward. (It is true that to invest in a company with poor management is a high risk, but it is also likely to lead to low rewards.) Thus we could divide failures into 69% poor management and 31% high risk strategy, and say that the insurance world of the last twenty years does not appear to have rewarded an investor seeking to invest efficiently in high-risk/reward insurance-based ventures. In view of this, shareholders of insurance companies should be presumed to be expecting the management to seek a low-risk strategy.

Finally, shareholders may need a steady stream of dividends in order to budget accurately or to meet their own capital commitments. This should be less of a problem for a shareholder with a diversified portfolio, but will be particularly important for one which is a holding company for the insurer and which has no other assets. If it is financed by debt or cumulative preference shares, it will be dependent on a reliable incoming dividend stream to pay its own interest or preference dividends. Clearly, the ability of an insurance company to maintain its dividend is related to its financial strength and to its ability to generate both cash and profit.

2.3 Policyholders

It negates the whole point of insurance if an insurance company cannot pay claims fully and promptly. Even where policyholders are protected in the event of insolvency, such as in the UK through the PPB, there is likely to be an increased delay, the loss of any claims advice service, and perhaps a deduction from the amount refunded (10% in UK for non-compulsory insurance). However, such protection does reduce the importance of solvency to the policyholder, which perhaps explains the predominant effect of price in the current UK private motor market. Whether such emphasis on cost rather than insurer quality is appropriate is questionable, since it seems likely that a strong company will assess claims more fairly than a weak one.

From a statistical viewpoint, what an insurance company is selling is not the repaying of the cost of insured incidents, but the removal of the variation in this cost. In effect, the part of the premium which represents the average cost of incidents which the insured might expect to suffer over the policy period can be separated from the rest, and indeed is sometimes reduced or even removed completely by deductibles, retentions and other forms of self-insurance.

From the insurer's viewpoint the remaining part of the premium represents brokerage, expenses, profit loading, reinsurer's loading, and other costs, but for the insured it is much more straightforward. It is simply that amount which he/she is prepared to pay to transform the cost of the insured incidents from an unknown, highly variable figure to a known quantity.

It follows that an insured will only be prepared to pay such a sum if the uncertainty is genuinely removed; if there is a significant remaining risk that the insurer will fail to pay claims through insolvency, then the company is failing the policyholder to the extent that the latter might decide that there is no value in paying the extra cost.

A large commercial policyholder will be able to spread insurance among a number of companies, making the solvency of individual companies a less critical factor than for a small commercial firm with a single insurer. Equally, the security of individual reinsurers becomes less important if a broker can get several signatures to the slip.

In the case of a mutual, where the members are in effect both policyholders and shareholders, their interests fall somewhere between those set out in sections 2.2 and 2.3. However, they are likely to lean towards the latter since their prime concern will be protection against insured risks and the remarks about diversification of shareholdings do not come into play.

2.4 Regulatory Authorities

A regulator's primary aim is likely to be the protection of policyholders against the risk that insurance companies will not meet their liabilities, or will not fulfil reasonable expectations, though in some countries there is a secondary, and sometimes conflicting, aim of controlling pricing. The regulatory organisation may also have a role in sponsoring the insurance industry of its country and hence in helping it to appear sound to prospective policyholders. There are parallels between these aims (protection and fair pricing) and the twin aims of the policyholder (security and value), though the attitudes towards the use of the country's protection fund will diverge.

There should, however, be a strong distinction between the aims of a regulator with regard to a company and the aims of the company's managers. As discussed above, the latter will regard the preservation of the company as their prime concern, and so will sometimes be more conscious of their company's relative, than of its absolute, position. In contrast, the regulatory authority should look mainly at the absolute position and should be prepared to encourage or require companies in difficulties to cease to write business if such is the only means of avoiding an otherwise significant risk of future insolvency, even if several other companies are in similar positions.

Such culling is actually part of a healthy insurance market since, by reducing capacity and hence permitting the survivors to raise premium rates, it can bring about the end of a soft market. Also it creates room for providers of fresh capital to move in to the market. There is a Darwinian theme to this, with the survivors being the companies with the fittest capital, marketing, underwriting, claims handling, investment management and ultimately management.

The approaches used by supervisors to try to detect insolvency risks vary considerably. It is clear that supervision must combine an assessment of a company's reported position with a view as to its possible future

development.

In Canada this will be done by requiring actuarial projections on various bases.

In UK the DTI is currently updating its methods of analysis of the Financial Year end position and is using company visits to try to assess future plans, with the introduction for two types of company of more frequent short visits to enhance this aim. The Institute of Actuaries is promoting certification of reserves by actuaries or other suitably qualified persons, and should perhaps be advocating the full Canadian approach.

2.5 Other stakeholders

2.5.1 Third Parties

A third party's interest lies only in the security of the insurer protecting the party against which the claim is made, since the cost of the cover is paid by the latter. It will normally have had no say in the choice of insurer, so its interests are represented by the laws which make certain types of insurance compulsory, by any protection funds which will allow the claim to be paid should the insurer fail, and by the supervisor. Politically it might be difficult to pass laws enforcing certain types of insurance if the country's insurance industry is not seen to be sound.

2.5.2 Reinsurers

Reinsurers should avoid companies which they consider suffer a serious risk of becoming insolvent. It is a poor use of management time to cultivate relationships with customers which have no long-term future, and it can harm a reinsurer's reputation to be associated with a direct insurer which becomes insolvent.

A further feature is that, in the event of administration or liquidation, there will be a desire to come to terms as quickly as possible. While reinsurers sometimes benefit initially from delaying payment of debts to

customers in difficulties, there may eventually be a significant speeding-up of cash outflow at the same time as one source of revenue has dried up.

2.5.3 Coinsurers/Market

If an insurer fails, the repercussions can affect the whole market. In the UK, this could be through the levies made by the Policyholders' Protection Board which guarantees 90% of all personal insurance claims and 100% of compulsory insurance claims. The nasty shock that even the Weavers business could be deemed to fall within PPB realms reinforces the value even to the stronger companies of participating in a well regulated market.

Where the claims fall outside PPB scope, there can be moral and commercial pressure on co-insurers to pick up the unprotected share. There is a suggestion, for example, that ILU members should meet claims made against Andrew Weir to maintain the reputation of that market. Lloyd's, despite claims to the contrary, operates on a "mutual" basis in extremis through the central guarantee fund for that very reason. Trade Associations generally might be expected to want their good name to be linked with companies which remain solvent.

2.5.4 Intermediaries

Security is being taken very much more seriously now than even in the recent past and it will tarnish a client relationship if expensive insurance policies turn out to have been worthless. Intermediaries may need to be able to demonstrate that they have taken suitable precautions in recommending a particular insurance company should it fail in due course, if they are to avoid being invited to make good the non-existent cover.

2.5.5 Rating Agencies

These organisations endeavour to add value to the published accounts by analysis and direct contact with both the market and individual companies. By getting beneath the figures and applying certain tests, they

attribute to insurance companies a range of security ratings from those which are thought to represent very good security to those which are considered to be barely solvent. Through this feedback to insurers of the agencies' reports, companies might be expected to give consideration to balance sheet management. This will be both on a continuous basis as well as to address such issues as "how much capital does my parent need to inject to go from BBB to A?"

History shows that these ratings have a very short shelf life - a significant proportion of the 1992 and 1993 UK failures and withdrawals had "A" ratings as recently as March 1992. (Eg English and American, Municipal Mutual and General, NW Re, Orion Insurance, Prudential (broking only)).

Even where the ratings may be successful in warning of insecurity, this may have something to do with self-fulfilling prophecies. English and American, for instance, publicly claimed that their withdrawal from the London Market in 1993 was directly attributable to their downgrading from "A" to "B". They felt that they would only be shown second rate business which would be unprofitable and hinder rather than assist a recovery of their previously good security rating.

3 What is Dynamic Solvency Testing?

In the bibliography, we outline the current state of the Canadian approach [see section 7.4]. The intention here would appear mainly supervisory and to provide early warning that a company is heading for problems, if not insolvency, unless it changes tack. The nature is of a prospective audit over the next twelve months. While the intention of the process is to aid management and the tone of the guidance notes encourages the actuary to be part of the management team, his whistle-blowing responsibility to the Board might put a strain on that relationship.

What might be of greater value to the industry and aid better management of capital would be to incorporate dynamic solvency testing into the strategic planning process. We outline below the current perceived state of corporate planning and then suggest how this could be enhanced by what is effectively scenario testing.

Efforts have been made to allocate capital to lines of business reflecting their particular qualities. Scenario testing, making allowance for these features, should highlight any strain on the overall business and enable particularly capital intensive ventures or strategies to be identified.

We could contrast the direction proposed in section 5 to the development in reserving for outstanding claims. We started there by producing point estimates that were often more reliable than either the claims department or accountants could manage, particularly when inflation was rampant. This has developed into statistical models of the claims settlement function which enable us to understand the nature of any volatility within the process.

Until now, planning has focused on single figures and it is often unclear as to whether these are best estimates, optimistic targets or simply arithmetic extrapolations. The principles of dynamic solvency testing,

principally through varying the base planning assumptions about the future, provide the starting point for a range.

The Daykin and Hey work [see the Bender et al paper referred to in section 7.1 for summaries of their studies] initially assessed the variability of outcomes given break-up from a year end position. By extending trading for one year and repeating the exercise, they started down the path of modelling various futures. This enables us to try to answer the question as to whether that extra year has made the company more or less risky. It might not, though, tell us so much about what could have occurred during the year itself. Resources have not thus far enabled us to reassess this work to consider whether it provides a stepping stone in the direction we are heading for.

One of the drawbacks, though, of any "black-box" technique is that very few people in the company will understand what goes on inside the box. The transparency of deterministic scenario testing may prove of greater value to management simply through its very comprehensibility. If they see and accept the outcomes of a given set of circumstances, they may be more ready to act.

So, while we could concentrate purely on the context of the supervisory perspective, we consider that a more fruitful initial paper might look at the fundamental management problem: "how do we manage the business and its resources - people and capital - to stay in business forever?".

Any scenario testing needs to be firmly planted in the real world. We keep coming back to "management" - hence the title of this paper. Two management questions which the Canadians include are:

The nature of management information available to detect changes in experience

and

Management's ability and willingness to implement changes in key management policies.

Put another way, does management know what is going on and would it do something about bad news if it noticed?

4 Where is Corporate Planning Today?

4.1 Corporate Planning in General

It is generally regarded that the level and sophistication of corporate planning in General insurance companies fall behind that of other industries. This is summed up in the management consultant's lament: "To run an insurance company you need to know a lot about insurance and that does not leave room for anything else." The special complications of the insurance industry have given rise to additional difficulties to management theorists in applying conventional strategic analysis.

The theoretical development of the application of corporate planning and corporate strategy developed as a separate topic in the 1960's. This occurred with the publication of a series of books mainly emanating from authors associated with the Harvard Business school. It was backed up in the 1970's by a substantial amount of empirical work predominantly relating to American companies. One such programme- the PIMS programme- comprises detailed information from over twenty-six hundred business units and allowed researchers to analyse the impact of market conditions on profitability. By the early 1980's the vast majority of the largest US corporations had separate units responsible for strategic planning.

Analysis of the markets in which a company operates had always been a part of the strategic management process. This aspect of strategic management, however, gained a major impetus following the work of Michael Porter published in 1980. He proposed methods of analysing the industry in which a company operates and the company's position within it. In particular competitive pressures were split into five sources (i) current competitors (ii) potential new entrants to the market (iii) product substitutes (iv) suppliers to the company including the supply of labour and (v) buyers. This method of analysis has formed a major part of subsequent strategic management approaches. Although there is little

agreement among the specialists in this area, on the definition of strategy for example, several tools have been developed. These include the strategy model, the product-market/portfolio model and the risk/return model.

Other topics in strategic management have included the appropriate organisational structure for different types of company and the development of the strategy function itself. McKinsey has suggested four stages of strategic management development:- (i) company budgeting (ii) company forecasting (iii) analysis of the external market (iv) strategic management- including a well defined strategic framework and widespread strategic thinking capability.

4.2 Corporate Planning in General Insurance.

A variety of planning techniques has been used and various company approaches have been documented by the Geneva Association. Most of the documented approaches have been unsophisticated. There have been some exceptions, perhaps unsurprisingly mostly in the United States - where many insurance companies have been using conventional strategic management methods. Survey data shows that in the early 1980's very few US companies were taking account of external influences on the company. Also, a survey in the UK in 1987 suggested only a few UK insurance companies used conventional strategic management techniques.

Turning to modelling, most surveys show a majority of companies make some use of modelling techniques. However, surveys both in the UK and the US show a low use of modelling of overall insurance company activities.

A previous General Insurance Study Group working party (Akhurst et al 1988) looked at corporate planning using conventional strategic management techniques. However, this does not address the difficulty of integrating solvency testing models into conventional strategic management theory.

4.3 Differences between Insurance and other Industries

One reason for the slow development of corporate planning in insurance is the major differences between insurance and other industries. As such, much of management theory has to be modified before being applied. Also, the complexity of the insurance business means that it is not an easy area for management theorists to encompass. As stated earlier, unlike most other industries- where costs can be easily predicted but income is more difficult to forecast- in insurance not only can income be difficult to predict, but costs are also uncertain. To be consistent with the approach in other industries income could be defined to include solely premium income. Then the prediction of costs includes not only the unknown claims experience, but also a reduction in costs reflecting the return on the invested premiums and any associated solvency margin- which commonly includes equities.

Despite the additional uncertainty involved, the insurance business excluding the solvency margin can be analysed with the same methods used for other industries. The solvency margin, however, adds a particular difficulty. Once equity investment is considered, the application of corporate management theory to this part of the business is more difficult, especially Porter's theories on competitive positioning. Nevertheless, the importance of the performance of the invested assets in determining the company's overall return makes a suitable treatment necessary. The 1980's provided a salutary lesson in this regard.

It is possible to have a more efficient insurance business excluding asset management, but still lower overall returns. Also, those firms that produce high asset returns may be encouraged to lower their premiums making other firms unprofitable. One approach is to consider the shareholders' invested assets as an investment trust and adopt approaches used by the investment management industry with particular regard to competitor positioning. The effective result would be that overall management of costs- which in the insurance case would include the reduction in costs from the return on invested assets- would pay regard to competitive pressures. Strategic cost analysis would then be set in terms

of the investment policies of competitors as well as the costs associated with pure insurance strategies.

4.4 Setting Objectives for Corporate Plans.

While management will need to be aware of the needs of various parties, its main aim will be satisfying the shareholders of a company. To this end it may be useful when considering management objectives to consider directly how shareholders are likely to gauge company performance retrospectively. Insurance analysts commonly use dividend growth and share price performance compared with competitors as the main criteria for assessing historic performance. Usually risk adjustment is not made to the returns. This approach implies that not only is performance compared with competitors the main influence on the survival of a company but also one of the main criteria by which shareholders judge company performance. This has some common ground with policyholders' reasonable expectations in Life assurance. If this is accepted then the setting of, for example, return on capital in absolute terms has limited use as a guide to satisfying shareholders. One reason is that views on acceptable returns are likely to change because of market circumstances.

Some authors have suggested that the core objective of a company should be to increase its appraisal value and that executive remuneration should be set in those terms. One consequence of this is that the adoption of a suitable risk discount rate becomes crucial in judging performance both prospectively but also in the period between valuations. However the benefits of, for example, lower risk may be lost on investors in a company. There are usually few objective criteria for establishing risk discount rates. Therefore, it may be difficult in practice to refute claims that the incremental returns were the result of superior management insight rather than increased risk. Furthermore shareholders' risk will depend on their own objectives, which may have little connection with the risk assessment used in the usual appraisal value approach. The objectives for individual classes of business which are set need to be consistent with

overall objectives. Here again, if a competitor positioning approach is taken then companies will attempt to adopt new strategies that differ from their competitors to the extent that they are confident that the returns are above or below the average. Nevertheless, incremental activity will need to be considered by deciding the effect on the outlook for the company as a whole.

4.5 Risk Assessment

Many approaches have been suggested for risk assessment some of which have been referred to elsewhere in the paper. An approach adopted by US regulators in their attempts to set appropriate premium rate levels is to consider the exposure to the non-diversifiable risk of a line of business. The argument is that shareholders in an insurance company should only be rewarded for risk that they cannot diversify away by having other investments in their portfolios. One example of an insurance line with significant non-diversifiable risk is Mortgage Indemnity Guarantees (MIG). The exposure of the performance of this line to general economic conditions may be difficult to diversify away to the extent that most other enterprises are also exposed to general economic conditions to some extent. The estimation process for the non-diversifiable risk of individual lines is extremely imprecise. When considering individual insurance companies the non-diversifiable risk (or Beta) is equally hard to assess. This makes risk assessment of different strategies based on their forecast Betas problematical.

Another approach is to consider the shareholders' funds as an investment trust that the policyholders have a right to in certain adverse circumstances. If this concept is adopted then it is in the shareholders' interests to minimize their investment in the company. This will reduce the extent of the policyholders' right on their funds. In practice the financial strength of a company affects its ability to do business. This may be reflected in the profit margin it can include in its premiums, or alternatively the riskiness of its asset mix. Therefore reductions in solvency do not necessarily lead to higher returns on capital.

There are other risk assessment processes that look from a regulatory standpoint. These include the current solvency regulations, the risk based capital approach, and various stochastic models of dynamic solvency. While these are very useful in considering policyholder risk, some adaption is required if full allowance is to be made for competitor positioning as described by Porter.

4.6 Consistent Approach to Assets and Liabilities

One particular difficulty in corporate planning for General insurance companies is in producing consistent projections for the assets and liabilities. Factors such as economic growth and inflation have an impact on both the assets and liabilities. One specific example is the effect of the UK recession on UK property. This had an impact on both asset portfolios and through mortgage indemnity contracts the liabilities as well. Such factors are, however, likely to have an impact across the full range of asset and liability classes. Although some work has been done - on allowing for the effect of inflation across the assets and liabilities in some stochastic models - theoretical work in this area is limited. Therefore it is usually necessary to adopt a scenario approach - possibly based on specific periods of history - when attempting to produce consistent scenarios of this type.

A phrase which provides a link between solvency and planning is "the practical management of capital requirements in a dynamic framework". This section is intended to be practical to the extent that it will include very little theory. It should provide some further answers to the question, "why plan?".

A barrier to planning in insurance has been that we are here to protect against the unknown - that being the case, we cannot, by definition, plan! Such conservatism seems to miss a fundamental point. If an insurance company cannot plan its future with a reasonable degree of certainty then it has possibly become a concentrator of risk, whether through accepting excessive volumes of non-diversifiable risk or inappropriate reinsurance structures. If the insurance company is properly structured then it has transferred in the right mix of "unknowns" and converted them into an aggregation which is "knowable" within reasonable bounds. The integration of solvency testing with planning will measure the extent to which the current strategy is vulnerable and has concentrated risk.

Although the dynamic solvency testing referred to in section 7.4 is largely supervisory, the general approach does at least provide a framework for integration. The starting point is the base scenario which is generally taken to be the corporate plan. From there, a variety of alternative futures can be considered and their impact on financial viability can be examined. The extent to which the company is dependent on a specific future or narrow range of futures can then be determined.

This process can be relatively simple with one variable being considered at a time or complications incorporated. At one level, these would be where there could be interactions between variables. A classic example is where an insurer is providing earthquake cover on properties in which it also holds significant investments.

Also of particular interest to this working party is where these relationships are direct as with mortgage indemnity insurance and the property portfolio. The same harsh economic environment of high interest rates and growing unemployment which reduced property values on the asset side of the balance sheet, also triggered MIG coverage on 100% mortgages issued in the heady property boom of the 1980's. This near-disaster illustrates the danger of failing to address scenarios imaginatively and without deep understanding of the very nature of the business and its drivers.

The next level is where the scenarios are embedded in the market place and the company considers the actions of its competitors and potential new entrants. It also needs to think through the implications of a series of small changes which might eventually result in structural change. As a parallel, the technology of the fax machine had existed for decades before it suddenly became genuinely popular. What were the features which brought it over the threshold from the arcane world of newspapers into everyday usage? Are there similar developments which appear to be ticking over but which could soon erupt into daily use and drastically change our way of doing business?

5.1 Integrity of the Base Plan

In our experience, the standard of corporate planning varies significantly throughout the industry. This is not just a comment on the final documentation but on the process itself and how closely related to reality it is or is expected to be. The plan may be the mechanism by which strategic decisions are taken or reflected; it could be a forecast produced by a staff department in splendid isolation; it might be for the directors alone or widely circulated. The output could be thousands of detailed numbers at one extreme or a few visionary words at the other.

Another important question is the accuracy of the plan itself as a model of company behaviour. This is not a reflection of the uncertainties within the data itself, so much as how well constructed the planning model is. In

other words, if all the assumptions actually held true, would the balance sheet and profit and loss account actually be the same as that appearing in the plan?

If it is to have value, the plan needs to reflect what the business really wants to achieve and considers to be possible. The planning process should therefore involve those who will make it happen so they know their part in it and believe that it is achievable. It needs to be as up to date as possible. The figures should extend to balance sheet items and any other aspects which are considered significant from a solvency perspective. In other words, the components of the plan and the process used to produce it, need to relate to those aspects of the business which have an effect on solvency.

For example, there seems to be good evidence that exceptional growth is quite highly correlated with subsequent financial weakness [section 2.2]. *Within the planning process itself*, any aggressive growth plans should be carefully checked through to examine whether they share the features of observed failures. Does management understand the business? Is this a new area? What controls are in place to ensure that poor quality business will be kept at bay? Thus, some at least of the lessons of the past can be incorporated within the planning process itself. Once the plan is complete, a Canadian-style DST can be carried out.

We have thought long and hard about the nature of the testing - "what if's?" vs "Monte Carlo". None of us is naturally drawn to deterministic approaches because of their arbitrariness and lack of vigour but they are probably the only practical way to approach a variety of scenarios. This is because of the current state in the development of stochastic models - they are not considered accurate enough for the user to be sure that the outcome is not due to the crudeness of the model rather than a potential event. There is some progress being made in building stochastic models of some elements but we are a long way from filling the gaps and then integrating the components.

One of the drawbacks of deterministic models is the tendency to confine the view to a relatively narrow range about the best estimate. *One way to introduce some stochastic element would be to express some of the tests in terms of the underlying variability, the standard deviation of the item in question.* It is the unexpected that causes strain but a 20% range for the value of cash would have a very different level of validity than 20% for equities and the standard deviation basis recognises this.

5.2 How Will Management Ride the Downturn?

The literature, experience and common sense suggest that the key to long term solvency in the majority of companies is the quality of the current management. Even those which have inherited insoluble problems from the past have some responsibility to recognise that sooner rather than later. Testing the plan in a variety of outcomes will identify those circumstances which place the company under the greatest stress. The base plan may or may not recognise the insurance cycle but most certainly the scenario testing should do so. Therefore, although even an unrealistic plan might be accepted as the base scenario, the nature of its detachment from reality should become apparent through the dynamic testing process itself. The Canadian approach, by considering specific scenarios rather than simply claims "plus a bit", does help to achieve this.

This process should help management to develop its strategies rather than simply try to trip them up. For example, although the capital structure may appear perfectly adequate in the base scenario, what happens to it after the impact of the next price war? Would management do better to maintain market share or keep its prices high? How would these answers vary if we look at individual territories and/or classes? Do certain areas emerge as more capital hungry than others, perhaps indicative of non-diversifiable or under-diversified risk? Does management have some convincing answers to these questions? Can they adapt to the dynamics of the business? Can it build defensive alliances with the distribution chain and end customers to increase entry costs for invaders and protect the existing business without having to resort to price cuts?

5.3 Capital Implications of Plan

Much thinking on solvency has been focused on the relative position. There is some validity in this. For example, the whole UK insurance industry cannot, politically, all be forced to stop trading. The same must be true of the banks; in the event of a crisis, blind eyes are turned or rules re-written, *the Government has to do something*.

In an increasingly global market, this focus on the local market rather than the worldwide market begins to look myopic. While the UK market frittered away its capital in the years following 1988, each company consoled itself with the thought that its competitors were doing much the same.

While some of the weaker insurers may have been eradicated, the remaining market has been left open to the predators - new capital unencumbered by the scars of the recent past. This is particularly true of reinsurance where millions of dollars have poured into Bermuda and some new or revitalised subsidiaries of foreign companies have arrived in London. So each company needs to consider absolute strength and, when checking on its relative strength, ensure that the real peer group is being evaluated.

It also means that the company needs to be considering its strategies and potential strategies and the possible impact on its own capital.

5.4 Has Management the Ability to See it Through?

Financial theory has shown that there is no premium for accepting diversifiable risk, hence the cost of reducing variability of results from such business impinges on profitability. If the shareholder has a diversified portfolio, he should prefer the risk to be retained rather than see profit diluted through reinsurance. However, there are other interests, not least those of the policyholder, to be considered. As we have already

noticed, there is also self-interest. Provided that this is enlightened, it may be healthy.

A competent manager should have some notion of being able to offer the market something unique, something that will be valued by at least a segment of that market. He can only continue to offer that service/product if his employer remains in business, hence an incentive to protect the solvency of the company. Given a true and therefore valued competitive advantage, profitability should be assured. It is profitability that is the prerequisite of sustained solvency.

It is far too easy to forget that insurance is a business and, to thrive, needs to have something attractive to offer its customers in return for the price they are prepared to pay. As a generality, middling companies trying to sell at middling prices have returns on capital so low that they cannot sustain themselves. It is likely that this is also true of insurance companies so, has the company a clear competitive strategy? Is it well understood and consistently implemented? Is it trying to mix strategies, to be all things to all people?

There is widespread agreement that the quality and style of management matters in considering the riskiness and future solvency of an insurance company. Determining whether the management is appropriate is also commonly accepted to be notoriously difficult. How can we judge them before we find out the hard way? At a seminar organised by the Society of Fellows of the Chartered Insurance Institute in May 1993 on the subject of insurance company solvency, a number of suggested questions emerged. [Journal of the Society of Fellows, Vol 8 part 1 July 1993] A selection follows:-

Is management too "racy", too concerned with its own comforts and public image?

If the company seems to be the only one with the right answers, how come they are not being copied?

What is their underwriting philosophy? Is it well known?

Is its internal structure efficient and appropriate?

These and many others need to be incorporated in any assessment of whether the company will respond to emergent problems in such a way as to see them through.

5.5 External Factors

In traditional planning, companies will carry out a SWOT analysis to try to identify those factors which could adversely affect its fortunes. For example, it may consider changes in regulations - eg EC Directives concerning discounting and the freedom to do business - and in the wider environment:- technological, political, social, financial and economic aspects.

These areas are obvious candidates for scenario testing. What would happen if one or more of the identified threats materialised? The company may already have contingency plans in place but this process will help to identify priority areas where the survival of the company is potentially at risk unless strategy is changed to reflect the new circumstances. Within the scenario testing, any contingency plans could be tested for validity, thus aiding their refinement.

5.6 Planning Outputs

If the planning process is effectively extended to incorporate scenario testing, it would be helpful if the content of the planning documents reflected the nature of the testing. Those ratios which are considered to be reflective of financial strength should certainly be generated. In addition to those considered important internally, window dressing is also

a feature and output could include pro-formas of the various security agencies' ratio tests.

It is also essential that trends at a lower level are identified - targets for people at the operating level. What rate increases, how much cash to be collected, the value at which claims can be settled, whether income should be allocated towards equities, cash or fixed interest etc? Qualitative targets are very hard to develop but should be worked on. Certain types of business are likely to hold greater appeal than others; new business targets can reflect this. Settlement targets may indicate productivity but, when combined with targets for minimising the number of claims re-opened and values for settlements, can also indicate effectiveness.

5.7 Competitive Pressures/Pulls

Every company is prone to competitive pressures. Each one only prospers if it offers value for money at a price that exceeds its costs. Generally, a company can adopt one of two strategies: it can try to avoid competition by targeting a specialist area that nobody else is interested in and developing sufficient expertise that others are daunted by the "learning curve". Consider, for example, Westminster Motor Insurance Association Ltd. In the 5 years to 1991, its underwriting profit averaged 27% of net premium and was in surplus for every one of those years. By contrast, the company market's underwriting loss for motor insurance averaged 13% of net premium and never showed a surplus! However, Westminster writes black cab business and has virtually cornered this market. The niche strategy is generally of appeal to the smaller companies but there is no reason why larger insurers should not operate in a whole series of niches. That is Zurich's stated global plan.

The second strategy is to stand out from the crowd, whether by offering something special which nobody else can match or by being cheaper for a given product/service level. Driving down costs and thus prices tends to be of limited long term success because it is so easy to copy. Making customers overly price conscious may not be in the supplier's interests

longer term - if they only ever see value in terms of cheapness, how can the supplier ever be rewarded for adding value? Providing a unique - or at least different - and people driven service is harder to copy. People are not a formula: to generate and sustain the right culture is such a huge task that few try and fewer still see it through.

The planning process should reflect the validity and viability of the strategy being adopted and the likely responses from the competition. What mechanisms and desires are in place to strive constantly to develop the advantage so that the company remains at least one step ahead of its rivals in its chosen arena?

A further key issue is the extent to which management will take account of the scenarios in its strategy selection. The whole point of testing the Plan is to refine it. The true test of anything, though, is to put it into effect and this is the test of time. The control loop of monitoring actual outcomes against those expected should result in further refinement not just of forecasts but, more importantly, of activities to optimise the company's position. Therefore, it is vital that both the planning process and the scenario testing are integrated into the decision making process if it is to make a difference to performance.

We can bring this closer to home: the essential feature of insurance business is that the product is sold before knowing its cost. The plan, which may include obtaining certain business volume and/or profitability targets will have taken into account the past claims experience and the market environment. On subsequently writing business it:-

5.7.1 may not be able to get business at the desired rate

5.7.2 may get business but subsequently find its rates have been too low

5.7.3 may obtain the business it expected, on profitable terms.

For all cases it is vital that the Company estimate its true cost as soon as possible. A monitoring system could incorporate a dynamic model of the office with its business targets and expected claims, investments, expenses etc and with the assumptions being regularly up-dated according to the emerging experience.

The difficult cases are 5.7.1 and 5.7.2 and highlight the main problem with the industry: that it is plagued by "Bad Competitors" à la Porter. Many companies insist on doing business at uneconomic rates, either through deliberate policy to "shake out the market" or lack of understanding of the business. The logical course for an office in this situation is not to compete in unprofitable lines, thus sharing the losses and prolonging the situation. If it truly believes, and this is the crux of the case, that the rates are too low, then it must withdraw. If the "good" offices followed this course then losses sustained would be accentuated and drive the others out sooner.

It is not usually practical wholly to withdraw, hoping to re-enter the class in future years. It is also difficult to be sure of the loss making position as there will be uncertainty on claims and investment returns. However, the company needs to have a clear strategy; can it discern and enter profitable niches in the market and does it have the resources to enable it do this, financial and technical. If it remains in the loss making market, how long will it continue? What sort of losses does it think its competitors can sustain? What needs to happen before it stops?

5.8 Integration into a Market Model

One of the achievements of Michael Porter was to provide a way of looking at the market which aided companies to develop their strategy. This model is generally applicable and can be used for insurance - we would be unwise to consider that our business is so different that we cannot apply generalities to it.

However, there are differences and this is recognised in the concessions made in its accounting treatment and need for supervision throughout the world. Through a better understanding of how individual insurance companies work and what marks out the successful from the loss making, the survivors from the withdrawals, we may be able to suggest the most important factors which should be examined in the planning process.

6.1 General Comments

Models are notoriously tricky to build, so why bother? The objective we propose is sufficiently worthwhile as to make at least some preliminary work justifiable: to aid the practical management of the capital requirements in a dynamic framework. Specifically, to be able to help answer the question, if the management does X, will the company still be here and in what shape? A secondary objective is to explain how insurance companies work - the business beyond the investment trust. The target audience in this case would be investment analysts who often regard insurance companies as responsible for managing the investment of the free reserves with a volatile gearing element - the insurance business itself which generates huge losses and, occasionally, some profit. We would hope that we could show that there is some value in the core business itself but the industry has not been a good advocate of its own cause lately. Hence the primary objective!

First of all, though, we need to define the market. In the familiar world of private motor insurance, do we mean the sum total of all private motor policies sold, all private motorists, all policies sold through a particular distribution channel, or a more specific and narrow grouping? In different circumstances, we probably mean any one of these things. We have, though, to start somewhere and a practical constraint is the availability of data. So we probably mean the first and would turn to the DTI returns and Lloyd's data.

We can collate the figures from individual participants and sum them to obtain market figures. Although it is tempting to ignore the smaller companies, privately available data shows significantly stronger growth for most classes among those companies outside the top ten over the past five years or so. These more aggressive companies are often those which are

considered to affect profit prospects for the market as a whole - a thesis which we would hope to test through the model building process.

Given an aggregation, we can then analyse key data to consider whether there are correlations between individual company and market performance and whether this is on a sustained basis. Do companies "pop up", make a nuisance of themselves and disappear again? What are the features of those who join and survive? If we have any success in finding some parameters to build a model, we could attempt to project into the future. There are at least three ways to do this. The first is demand based - just how many private cars will there be? What will be the impact of the increased tax charges on company cars?... The second is to look at the aggregate market as it currently exists. What can its current capital and profitability sustain?... The third would be to consider each company on its own, based on track records and any clues as to future intentions that can be gleaned.

The extent to which the three approaches converge or diverge may indicate the nature of the dynamics of the market and whether prices will tend to rise or fall and when this might be expected.

One way to test whether this exercise is of any value would be to try to predict the previous five years based on what we knew five or six years ago. Given that the business environment appears to be moving at an ever increasing pace, if we could add little or nothing to the last five years, the likelihood of doing so for the future must be low. This would, though, give us some indication as to whether insurance cycles are predictable. (It is probably reasonable to assume that inflated asset values generated by bullish stock markets will tend to exacerbate competitive pressures as companies attempt to maintain their return on capital through growing market share. As they have all shared in the same good fortune, this common strategy can have only one outcome!).

Any model building should be as simple as possible - for example, we would start by keeping asset and liability risks separate. For individual company modelling, we would need to incorporate the UK solvency hurdle so, if they failed, they would withdraw. The comparison between the market as a whole and the sum of individual companies might be indicative of the pressure for new capital or the need to shed excessive capital.

Given that a model can be developed, we could extend its value by varying an individual company's strategy.

We have made a start by compiling some data and looking at

outstanding claims provisions)
) as % net written premiums
unearned premium reserve)
incurred loss ratios)
paid loss ratios) absolute/relative to market
acquisition cost ratios	

market share.

However, we would appreciate broader input and thoughts before seeking to consider the nature of the model. Is it worthwhile? Are we on the right direction? Is the market too complicated and unknowable to be modelled successfully?

6.2 Comments on Stochastic Modelling

We have already briefly discussed the nature of appropriate modelling: deterministic compared with stochastic. Both approaches have their champions as well as their virtues. The key issues are that models need to be sufficiently accurate to present valid outcomes and that management responds positively to those models. Model building should focus on causative elements like inflation, accident levels, number of vehicles, growth in the economy, the performance of assets, weather patterns and so on. In this way, management will come to understand something of the dependence of the company's performance on these external events, except to the extent that they add value to the company by taking appropriate counter measures. The events will occur come what may: in a given scenario, some companies will fail while others thrive and the difference between the two must be largely down to the strategies carried out.

Stochastic modelling is but one tool to aid management to develop those strategies. Below we indicate an alternative approach. However, any outcome should be tested against two benchmarks. Are both the scenario and the outcome intuitively valid? Some scenarios could be mutually exclusive and thus be indicative of a weakness in the model. Equally, a poor outcome might ignore some of the control mechanisms in the company. If failure of the company results from failure to react to the indicators, that would lay emphasis on a rapid and right response to that particular adverse trend and hence the importance of those controls.

We see this development as a long process but one which will shed light on the company as a whole in a similar way to the revelations which stochastic claims analysis has brought. These methods have not replaced judgement or deterministic modelling but more probably improved them both. We anticipate a similar trend in the modelling of companies as whole entities.

6.3 Scenario Building

"You can see a lot by observing" - Yogi Berra.

We have already intimated that features which can have the most serious and widespread adverse effects are those which represent "discontinuities". Sometimes, they can be arbitrary and appear as if from nowhere. In other cases, the result of a series of visible incremental changes can be to alter a market in dramatic and unexpected ways. What links these two outcomes in the majority of cases is that the outcome was largely pre-determined. The events which eventually led to the discontinuity were already in place, if only we knew it!

Far too often our 20-20 vision is most apparent when we view our market with hindsight. The causes of the MIG losses are now well understood but were not in time for most underwriters to take timely and appropriate action. Had they seen what was there to be seen, they would have found huge MIG losses were a foregone conclusion because of these events (ie 100% mortgages, the Lawson boom, notice of withdrawal of 2x mortgage relief in August 1988, control of general inflation ...) unless they changed their underwriting stance.

Understanding the key determinants at a given time for each class and then aggregating them may reveal to companies how to keep in balance because many of those determinants will cross classes. For example, interest rates, trends in the law, the price of property and the EDI (Electronic Data Interchange) installed base could all impact a number of classes. In other words, modelling should be based on inputs rather than outputs, the causes of premium growth rather than premium forecasts from underwriting departments.

There is often a lag between changes in the original event and its impact on insurance so timing the discontinuity is never going to be easy. Or important: what does matter is to identify the causative events and their

likely consequences. When considering strategies, alternative views on timing can be considered and balanced against a "do nothing/head in the sand" scenario. There will almost always be a cost to change and, by considering the various scenarios, the company can compare this to the possible costs of missing an opportunity or, say, meeting an avalanche of claims.

The point of modelling is not to be able to predict that on the 23 June 1998 company X will be insolvent. Analysis of the external factors should reveal the nature of the forces which are taking the industry in a particular direction. Modelling should help us to understand the business better and so be able to manage the company so it produces a growing and robust stream of profits.

7 Select Bibliography

- 7.1 A Synopsis and Analysis of Research on Surplus Requirements for Property and Casualty Insurance Companies**
A Brender, R Brown, H Panjer
Institute of Insurance and Pension Research, Waterloo Ontario, 1992.

This paper represents an excellent starting point for anyone interested in the subject of solvency. A "Readers' Digest" of books and papers, it guides the reader through the material. The papers are presented with brief summaries both in alphabetical order by (first) author and also by subject. The eleven subject headings are classical risk theory, projection simulation models, financial economics, loss reserving, statistical methods, regulation, financial reporting and surplus management, life insurance, investment models, rate making, and "general".

From the paper, relying on the summaries alone, we refer to three papers which suggest key factors at least correlated to if not determinants of the financial health of insurance companies:-

SALZMANN, RE "RLS Yardsticks to Identify Financial Weakness".
Proceedings of the Casualty Actuarial Society 68 (1981) 172-194

Salzmann's Yardsticks:-

- reserve level
- surplus level
- liquidity
- quality of assets
- operating results
- excessive growth
- reinsurance protection

TRIESCHMANN, JS and PINCHES, GE " A Multivariate Model for Predicting Financially Distressed PL Insurers". Journal of Risk and Insurance 40 (1973) 327-338

Trieschmann and Pinches' Ratios:-

- agents balance : total assets
- stocks cost : stocks market value
- bonds cost : bonds market value
- loss adjustment & underwriting : net premium
- combined ratio
- premiums written direct : surplus

TAYLOR, GC and BUCHANAN, RA "The Management of Solvency".
International Conference on Insurance Solvency I, 1986.

Taylor and Buchanan's Variables:-

- ratio of risk premium to value of liabilities (exposure to insolvency due to future claims fluctuation and asset fluctuation)
- estimated value of liabilities
- expected future rate of increase and variability of unit asset values
- number of claims (proxy for size of portfolio)
- contribution to risk of each line of business

These elements would appear to be worth considering in any investigation into the financial health of an insurance company and should play a key part in the day to day management if that health is to be sustained.

7.2 Strategic Financial Management in a General Insurance Company **JWE Mariathasan, PF Rains** **Third AFIR Colloquium 1993**

The material in this paper has already been summarised in section 4. Rather like the Cummins paper - see section 7.6 - this acts as a beacon towards where tomorrow's advances should occur and encourages us in that direction. The authors start by quoting Nietzsche, "To make plans and project designs brings with it many good sensations; and whoever had the strength to be nothing but a forger of plans his whole life long would be a very happy man: but he would occasionally have to take a rest from this activity by carrying out a plan - and then comes the vexation and the sobering up".

7.3 A New Look at Evaluating the Financial Condition of Property and Casualty Insurance and Reinsurance Companies
TM Redman, CE Scudellari
CAS 1992

This paper is written from an American perspective and so some of its conclusions may not be widely applicable. The essential conclusions are that historic information relating to causes of insolvency - such as that included in section 2.2 - can be incorporated into solvency evaluation reviews of insurance companies. This would seem to provide a solid base for the considerations which should apply in any Dynamic Solvency Testing. Having analysed the failures from 1969 to 1990, they make some interesting observations including

Insolvency by policyholder's surplus:-

Surplus	Proportion of Insolvencies
<\$5m	63%
>\$5m <\$50m	34%
>\$50m	3%

But, the greatest frequency of insolvencies came among the middle group.

Stock companies made up 75% of all insolvencies although representing only 50% of all insurers. (Ie Mutuals were more secure than stock companies).

Roughly 50% of insolvencies occurred in companies 15 years old or less.

81% of insolvencies involved premium growth of more than 25% or a decline of more than 5%

The lessons the writers draw from this 22 year history include:-

a) insurance is a commodity - with price so crucial, companies need the strength to survive the stress of both hard and soft markets. Where we are

in cycle may have an impact on the level of resources we should be expecting.

b) company management may be critical but its quality is hard to evaluate.

c) rapid growth means additional exposure which may be underpriced or in new and unfamiliar areas.

d) company characteristics including ownership should be considered.

e) weaknesses in past rating agency ratings can be a guide particularly in such areas as overstated assets and unprotected catastrophe exposure.

f) the future will not follow the past precisely - new issues will emerge

Based on their analysis, the authors suggest certain industry norms:-

i) loss reserves to policyholders' surplus

property 50% - 150%

casualty 200% - 300%

ii) reserve development to policyholders' surplus

< 25%

iii) net leverage

$[(\text{net premiums} + \text{net liabilities}) / \text{policyholders' surplus}]$

property 250% - 400%

casualty 500% - 580%

iv) gross leverage

[the sum of net leverage and ceded reinsurance leverage]

property 300% - 500%

casualty 500% - 700%

Having carried out these tests, the paper expects the company to focus on those areas presenting the greatest exposure. In other words, to act as a catalyst and starting point for management action.

7.4 Standard of Practice on Dynamic Solvency Testing for Property and Casualty Insurance Companies
Discussion Draft
Canadian Institute of Actuaries, May 1993

The current draft was circulated to members of the Canadian Institute of Actuaries. It attempts to define good actuarial practice in DST but does not actually require that it should be carried out, nor does it guide on when that might be a good idea. Simply, if asked to carry out DST, the actuary would be expected to follow these guidelines. Their timetable is looking for finalisation by the end of 1993 so we should expect an exposure draft to be available around conference time.

At present, it is not entirely clear whether DST is a requirement of the Canadian Supervisor or a professional issue. Rather than try here to second-guess the Canadians, it is suggested that we keep a watching brief on their approach and judge its efficacy over time.

Clarity and consistency between the supervisor, professionals and trade bodies would appear to be a requisite of a smooth introduction of any change so significant. (It is interesting to observe, though, that Canada is also trying to define "provisions for adverse deviations" in respect of claims development, reinsurance recoverable and interest rates. This is a subject in itself but it appears to be their intention that these PFAD's would be included in the base scenario for DST - see section 7.5.)

The general approach is to start with a base scenario - which would usually be the business plan - and then test the resilience of the company in a variety of unpleasant circumstances. The draft guidance notes are practical and realistic eg "Since the base scenario may be seen by the board as a most likely scenario, discrepancies with the plan may put the actuary at odds with management, thus jeopardizing the effective performance of the actuary's role" and "The report to the board should be

an interpretive report, not a report brimming with statistics for each scenario that was tested."

The current practice notes include a basic list of the scenarios to be tested in relation to their impact on policy liabilities and other balance sheet items. It is not intended to be exhaustive and omits changes in the external environment:-

I Reinsurance Programme

The occurrence of multiple catastrophic losses in a given year including the cost of any reinstatement.

The occurrence of one catastrophic loss equal to the probable maximum catastrophic loss given the exposure of the company.

A significant increase in the frequency of individual large losses.

The default risk.

II Loss Ratio

Claim frequency and severity - what if worse than planned?

Rate Adequacy - what if planned rate increases not implemented?

III Investment

Significant change in interest rates

Significant adverse changes in investment values

Liquidity of assets to meet cash flow requirements of other adverse scenarios

IV Expense Level and Volume

Business levels below expectations

Rapid growth in excess of the base scenario

- V Unpaid Claim Liabilities
 Impact of adverse deviation from expected values

7.5 Provision for Adverse Deviations
Exposure Draft
Canadian Institute of Actuaries, May 1993

This paper represents an interesting development. Many actuaries have talked about the subject of PFAD's but the Canadians have dared to set out not only the features which might require such a provision but also their scale. The paper is succinct so the interested reader is directed to it but we can give a flavour. It is split into 6 sections: background, overview of the approach, definitions, and then the variables: claims development, reinsurance recovery and interest rate. For each of the variables, there is a list of the considerations, a description of "high margin" and "low margin" situations and the suggested upper and lower levels of these margins.

For example, in considering company claims handling practice, the features of a low margin situation are listed as: "stable claims handling environment, few significant changes in claims staff and handling procedures, no major systems changes, and case reserves established in a consistent and responsive manner."

In selecting a margin for the variability in claims development, the guidance includes the following:

"If the claims are discounted, an appropriate margin needs to be considered for payout pattern. If claims are not discounted, the margin should be reduced appropriately.

"The member should be guided by the following range:

Low Margin Factor	0%
High Margin Factor	15%

"When two or more of the significant considerations exist, the member should use at least the average of the high and low situations."

Chris Daykin - the Government Actuary - has written a brief commentary on the exposure draft as follows: " A study by the Insurance Bureau of Canada has suggested that discounted reserves plus the PFAD could come out on average 3% below undiscounted reserves. However, this clearly depends on the type of business and the extent of the PFAD.

"The PFAD should be a fair risk charge for uncertainty. However, unlike the corresponding discussions in the US, it seems to be acknowledged that uncertainty itself demands a PFAD and that there is no need to classify risk as systematic or diversifiable.

"The Canadian Institute of Actuaries' view is that the discounted reserve, together with the PFAD, could soon be expected regularly to exceed the undiscounted reserve, having regard to falling rates of inflation".

These two Canadian papers have a common purpose in improving the solvency of general insurance companies. DST looks a little way into the future while PFAD recognises that some numbers are more reliable than others. One interesting common feature is the need to understand the dynamics of the business both in statistical terms as well as the "softer" elements. DST considers the risk involved in pursuing the current strategy while PFAD reflects the impact of past business decisions. It is to be expected that there will, over time, be a blurring of these distinctions. By reacting to the outcome of DST, management should find itself tending towards the "low margin situations" of PFAD as it recognises this cost element in its business decisions.

A further general question about the two papers is the wisdom of producing guidance notes that have the appearance of manuals. Is there a danger that practitioners will come to regard this guidance as the ceiling

rather than the floor of their explorations? As well as the theory, a worthwhile discussion could be on the means of implementing it.

7.6 Statistical and Financial Models of Insurance Pricing and the Insurance Firm
JD Cummins
The Journal of Risk and Insurance, 1991

This is a fascinating paper which is more of a signpost than journey's end. Cummins endeavours to reconcile the actuarial and financial models of insurance. There is some very helpful background material on both the statistical and financial models; particularly for those of us with only limited understanding of financial theory, this paper is accessible. Financial theory gives useful insights that may be missing from purely statistical models.

For example, using the Capital Asset Pricing Model, the equilibrium rate of return on any asset is:

$$r_i = r_f + \beta_i (r_m - r_f)$$

where r_i = the expected return on asset i

r_f = the risk-free rate of interest

r_m = the expected return on the market portfolio

β_i = the systematic risk coefficient or beta of asset i
= $\text{Cov}(r_i, r_m) / \text{Var}(r_m)$

The CAPM model implies that investors will be rewarded for bearing systematic or beta risk but not for taking unsystematic risk because this risk can be diversified by properly structuring the portfolio. But this is only the starting point!

From here Cummins shows the insurance CAPM and points to some of the impractical assumptions which limit the viability of some of the conclusions that are often drawn. One hope is that integration might improve the quality of the financial modelling which tends to make oversimplistic assumptions as with the claim distribution functions. The

current reliance on log-normal distributions may understate the riskiness of insurance as currently presented in the financial literature.

Within CAPM work, there is no recognition of the lag between a particular opportunity arising and the market adjusting to the equilibrium. An example here is the 1993 hiatus in the reinsurance market. At the moment there is most certainly - at least in the eyes of the "Storm Rating in the 90's" working party - a premium for catastrophe even though it is a diversifiable risk. As new capital flows into the market, we might expect the predictions of financial modelling to come good. In other words, CAPM may tell us about the equilibrium position but not be too helpful about what happens on the switchback that will take us there.