

## ABSTRACT OF THE DISCUSSION

**Mr N. R. Gillott, F.I.A.** (introducing the paper):

“We are pressing the boundaries of actuarial science. Identifying realistic adverse scenarios for insurance business gives rise to unique difficulties and challenges not usually faced in other industries. We propose to require all insurance companies to make their own assessment — on reasonable assumptions — as to the capital and other financial resources they need in order adequately to meet the risks and uncertainties of their business. For non-life insurance firms the change will be profound and, for the unprepared, may come as an unwelcome shock.”

These are not my words, but those of Sir Howard Davies, the Chairman of the Financial Services Authority (FSA), speaking a couple of weeks ago at the Insurance Institute of London.

The regulatory system in the United Kingdom is changing. The FSA has been established; the Financial Services and Markets Act and associated rulebooks are on their way to implementation. The FSA will ask general insurance companies to justify that they have adequate financial resources to protect policyholders against the risk that the insurer may not be able to meet claims. All types of risk to which the insurer is susceptible will need to be considered. Thus, as well as evaluating the more traditional risks, such as claims reserving and asset risks, an insurer will be required to evaluate such risks as fraud and management failure. Every insurer will have to document the process that it has used to ensure its financial adequacy. The authors of this paper believe that the FSA's approach is sensible.

Such a requirement is in line with the Turnbull Committee requirements for quoted companies, and reflects the increasing concentration on the study of risks being undertaken by commercial companies. These risk studies are not just valuable only for regulatory purposes. Perhaps, more importantly, they help management to run companies more efficiently, and hence to maximise shareholder value. The paper was written to promote discussion on how such insurance company financial assessments should be undertaken. The authors recognise that the paper is far from a definitive statement of the methods to be used. There is clearly much more work to be done in this area. However, it is hoped that the paper will provide an important impetus within the general insurance actuarial community to progress the development of financial condition assessment methodology.

The authors believe that a holistic approach to the assessment of risk is required. Thus, in most cases, an assessment of all the risks and any correlations between them will be required. While there are a number of ways in which this may be done, it seems unlikely that a proper investigation can be undertaken without some assessment of the distribution of each of the individual risks, and without some methodology for combining the risks into an overall risk distribution. Such an analysis will not be a static exercise. Consideration of risk mitigation procedures that might be taken now, or in the future, and their effect on the total risk profile will have to be considered.

It is believed that there are two distinct roles that need to be undertaken. The first concerns the assessment of a number of individual risks, the second concerns the methodology for bringing together all these individual risks into one overall risk profile. There is no suggestion that actuaries have a monopoly of ideas in these areas. Indeed, for some risks, such as the risk of IT failure, it may well be that other professionals are better able to assess the position. However, the authors do believe that the training of actuaries and the type of work that they do makes them particularly well qualified to undertake both the assessment of a number of the individual risks and also the role of combining the individual risk profiles.

The Working Party believes that actuaries have much to offer to the identification, control, financing and administration of risks within general insurance companies. There is certainly more work to do to establish the actuarial profession as the natural provider of such services.

Sir Howard Davies said, in his speech to which I referred earlier: “We do not underestimate the difficulties [of identifying realistic adverse scenarios for general insurance business], but are pleased to see that the actuarial profession is rising to the challenge, and welcome the paper on financial condition assessment recently published by a working party of the Institute and Faculty of Actuaries.” The paper is certainly not the beginning of the end of the process, but it may represent the end of the beginning. The new regulatory requirements will not come into force until 2003, and, as a profession, we have much more work to do before then. I believe that the actuarial profession can play a vital role in establishing the process, being a key player in the risk assessment, and thus protecting the general insurance community and the public.

**Mr J. E. O’Neill, F.I.A.** (opening the discussion, in a written contribution that was read to the meeting): In response to the FSA initiative, the authors have put together concepts from dynamic financial analysis, dynamic capital adequacy testing, variability studies and dynamic solvency testing, and have further developed the notion of a financial condition assessment (FCA). This paper is important, as it is topical, and it provides a framework in which actuaries can structure work on FCA.

Why is it important? While our colleagues overseas have developed both the theory and the practical tools to implement such a regime, there is a gap in our own literature. We actuaries have worked hard to develop a statutory role at Lloyd’s, the most visible general insurance market, and have redefined and repositioned actuarial input into that institution’s assessment of its financial condition. The analysis in this paper will complement the work done by both consulting and in-house actuaries in this field, and also that of actuaries in training.

The paper is also topical. There have been parallel developments in the life field in the U.K., and in the general insurance (or property casualty) field in the United States of America and in Canada. For the U.K. and the remainder of the European Union, we have some other issues to deal with:

- the need to review solvency margins;
- the weakness in the current solvency margin regime;
- the recognition of the relevance of the asset side of the balance sheet; and
- a history of loss making.

These are all issues which exercise both management and regulators.

Turning to the paper itself, the authors consider, in ¶1.1.1, the nature of an actuarial opinion. This raises the question of whether the FCA is a continuous or a year-end exercise. If we were talking about a formal actuarial role, then the ‘opinion’ would be signed in a personal capacity. This would distance the actuary from other professionals, which, in turn, cuts across any collaborative component of the exercise.

In ¶1.1.3, supported by ¶A.3.1, concrete proposals are discussed. There is a bias towards policyholder rather than Turnbull requirements. Likely FSA requirements include documentation of plans, documentation of the risk assessment process, and documentation of procedures for mitigation of risk.

In ¶A.4.7 we welcome the trade off between the size of capital base and the degree of analysis needed to identify and control risk. In ¶A.4.10 we see that these are U.K., and not E.U., proposals, which may influence decisions on where to base an insurance operation.

In Section 1.3 the paper covers the main components of the process which are to identify risks, to establish risk profiles, and then to combine these profiles. The dialogue with the management and the reference to business plans are critical. The authors introduce the ‘risk co-ordination role’, not necessarily held by an actuary.

In Section 2 the authors provide an overview. The proposal is to meet ‘all reasonably foreseeable risks’, and possible ‘short cuts’ are discussed. This may be fraught with difficulty. For example, premiums are not always a good proxy for exposure.

A distinction is drawn between the ‘less comprehensive approach’ that the FSA would require, and a more detailed version, that might add value for shareholders. I do not see these as

alternatives; it may be better to cover both and integrate the approaches, even if the FSA only needs a short review.

There is a well laid out and comprehensive analysis, which is illustrated by Figures 2.2 and 2.3. These graphs should have 'fatter tails', and purchasing reinsurance does not necessarily cap underwriting losses.

In Section 3 individual risks are considered. The classification may prove a daunting task. While the main causes of insolvency may be readily identified, a comprehensive analysis may prove difficult. The Swiss Re Sigma analysis (Swiss Re, 1995) illustrates this; 50% of company failures fall into the 'other' category.

Risk assessment is dealt with in Section 4. One conclusion is that a formal actuarial report is likely to be required, and that current general guidance in GN12 need not be altered or supplemented to accommodate this. This would not be the case if the role were a statutory one or a well-defined collaborative one. This may not represent the current thinking of either the authors or the FSA — but it should be considered, even if only to be eliminated.

Amalgamation of risk is the subject of Section 5. I would question the conclusions of the 'time horizon' discussion. Eighteen months will always be too short. The Canadian model is three years. Perhaps, even this is too short. In some situations a longer period may be appropriate, for example to deal with long-tail business or multi-year contracts. The critical considerations are the periods over which trends can be identified and the time that is needed to take corrective action.

The paper addresses professional issues in Section 6. Some of these may be both more interesting and more difficult than even the commentary here envisages. The main area is the appropriateness of assumptions, and how any differences between actuary and management are accommodated.

I now raise some questions for discussion, in part prompted by the paper, but also by wider issues.

First, what is the purpose of the FCA? We know that regulators and policyholders would have one view, based on solvency and the ability to meet financial commitments. We expect shareholders and owners to have another view, focusing on raising capital and securing the right return in terms of level and quality of earnings. We also need to consider the company's managers and the way in which the company is run. This makes a discussion of the company's business plan central to FCA.

In addition, some wider issues should invite comment:

- How does the company manage surplus and free assets, and how do regulators expect to see these managed?
- A 'black box' approach will inevitably attract scepticism, and we have to work to overcome this.
- We should be more sensitive to accounting changes.
- We need to be clear on how we incorporate specialised knowledge outside the actuary's own area of expertise.
- There are capital and debt related items and transactions between affiliates to consider.
- Our analysis should be internally consistent.
- We need to consider behavioural responses to whatever regime is implemented.

**Mr A. D. Smith:** This is a paper of great interest. We have learned a great deal about market and credit risks in the 30 years that stochastic asset/liability models have been in existence, but, up until now, some had viewed operational risks as a box-ticking compliance exercise. The challenge is to move operational and business risks into the same quantitative framework that we already have for market and credit risk. This would parallel work of the Basel Banking Committee, which is also investigating these issues for bank capital adequacy. It would help insurers to make rational risk management decisions in the light of costs saved, rather than to take the minimum measures that Turnbull or the FSA will let them get away with.

Is it possible to quantify operational risks? Yes, it is achievable. Market prices of quoted insurers, and the price of reinsurance, already reflect operational risk. The operational risk adjustment is often implicit, for example in a risk discount rate which is increased to reflect the frictional costs arising from contingent future operational difficulties. We need to be more explicit about how that works, and reconcile that to some of the more detailed analysis that this paper is suggesting. There is a competitive advantage for businesses which can better understand the frictional costs that risks impose on them, and can allocate these costs rationally between business lines.

The Casualty Actuarial Society has carried out a project (Butsic *et al.*, 2001) — the risk premium project — which investigated these frictional costs. It finds that some existing mechanisms, e.g., risk-based capital structures, bank-style capital allocation, and the actuarial literature on premium principles, can best be rationalised in terms of frictional cost allocation.

We have been implementing some of these ideas in our models. We have found that great attention is needed to ripple effects and correlations. These relationships are not merely an afterthought to a longer analysis of individual risk, but are vitally important for solvency analysis. When businesses perform badly, both people and systems may react adversely. The level of operational failures increases, as does leakage of resources to banks and other advisers, while management time comes under increasing pressure.

As an example of this, my colleague, Stavros Christofides, showed me some numbers that he ran recently, based on the methodology in Christofides & Smith (2001). For the company that we were considering, operational risk costs amounted, on average, to around 2% of premium income. In broad terms, this 2% accounts for the difference between the profit streams in business plans compared to what the market gives credit for in the share price. For a pricing exercise, that 2% might be information enough. However, when we looked at capital requirements, we found that, setting a 1% impairment probability, operational risks accounted for around two thirds of the capital at risk. This happens because the operational failures are skewed towards the outcomes that are also bad in other respects.

This sort of quantitative analysis has done much to improve our understanding and pricing of insurance risks. We hope to publish in due course so that others can benefit from these ideas.

#### REFERENCES

- BUTSIC, R.P., CUMMINS, J.D., DERRIG, R.A. & PHILLIPS, R.D. (2001). *The risk premium project*. Phase I and II report. Available at <http://www.casact.org/cotor/rpp.htm>
- CHRISTOFIDES, S.C. & SMITH, A.D. (2001). DFA, the value of risk. *Casualty Actuarial Forum*. Available at <http://www.casact.org/pubs/forum/01spforum/01sp153.pdf>

**Mr M. H. Tripp, F.I.A.:** How are acceptable levels of risk to be set? At the moment the position is ill-defined. We will all need to think about and discuss this question at greater length.

Is it right that risk levels are set by directors, as the paper suggests, and as may be legally correct? If so, should directors inform their policyholders about the level of risk that the company is prepared to bear? If so, how should policyholders be informed? What language should be used? Should the FSA or the Government make clearer comment about the level of acceptable risk? Should the Institute set better guidelines to help its members, and maybe the public as well? How should consistency be achieved between different organisations?

My main theme is civil engineers, aeroplanes and human beings:  
 — *Civil engineers* use increasingly sophisticated computer models, which give them detailed insights into the forces, stresses and strains in the materials that they use, and these computer models help them design things much more efficiently than even five years ago. It gives them more control, and, in some ways, arguably, less risk, but there is less room for error, and the hidden margins are being squeezed all the time.

- *Aeroplanes*. A recent Discovery TV Channel programme featured the Sioux Airport disaster. A small blemish — smaller than a grain of sand — on an impeller blade led to an engine failure, because the blade gave way, and the whole impeller flew out. As it flew out, it fractured a hydraulic pipe, which led to the loss of control of the aeroplane, and hence an accident in which more than 100 people died. Like this, many real disasters have very small, and often unforeseeable, beginnings. The paper refers to 27% non-identifiable risk, and the opener mentioned 50% in his quotation from Sigma.
- *Human beings*. As Mr Smith hinted, human and operational risks are high. Human beings are often ambitious and defensive. There have been incidents in my business career when people have tried to hide things. For example, I recall a big discussion about bank reconciliations, which was, on the face of it, a theoretical discussion between professionals. It led to enormous problems, compounded by the delay in realising the reality of the problem, which included having been provided with the wrong data, massive under-reserving, and premium levels some 40% below where they should have been.

The Working Party mentions all these issues in the paper. My purpose is to emphasise the need for the risk assessment framework to be holistic — not just financial. My worry is that we talk only about financial condition reporting, and I agree with Mr Smith that the subject must include operational risks. As actuaries, we naturally focus on analytic financial risk and financial condition, but what we really want is a holistic condition-reporting exercise. There are words in the paper: ‘relevant risks’, ‘reasonable foreseeable risks’, ‘all significant risks’, ‘realistic conservative adverse scenarios’, ‘systematic and exhaustive definition of risks’, and so on. These are substantial words which need much discussion and clarification.

Coming back to civil engineers, it seems to me that margins are likely to continue to reduce, and that our understanding of risk will become more and more sophisticated. We cannot divorce human risks from the financial. Furthermore, disasters will still happen. We need to make sure that our publics understand both our core skills and the limits of what we are able to do.

As actuaries, we have a key role to play. Our independence, our expertise and our experience enable us to make a valuable contribution. My plea is that we avoid spurious mathematical accuracy, make sure that we put our work in context, and that we do not forget that, in a services industry such as insurance, people are key. It is not possible to undertake a financial condition assessment without a human condition assessment.

**Mr S. Creedon, F.I.A.:** My comments are from the distance of a life insurance perspective. However, sometimes distance can add perspective.

The authors mention, in ¶A.9, the E.U. review of solvency margins, which is an exercise with which some colleagues and I are associated. This paper will be a particularly valuable input, which we may draw on with acknowledgement. Appendix B, the risk framework, is especially valuable.

The challenge which this paper poses to the profession is one of taking the thinking beyond the world of general insurance. Increasingly, we see risks which are fungible across the financial sector. In the mortgage area, risks can be either of a credit nature or potentially insurable. In the credit derivatives area, there is regular comment on contrasting approaches adopted as between banks and insurers. A growing proportion of insurance business, particularly life insurance business, sits within diversified financial service groups.

This leads to the view that the need is for a framework which can be, as Mr Tripp has already said, as holistic and all-embracing as possible. The challenge is to take the excellent thinking in Appendix B and extend it, or reconcile it, with the established framework which exists for banking, or which has been developed for life insurance by, for example, the Society of Actuaries in the U.S.A. Going beyond commonality of framework, I should like to see us open to commonality of techniques. Some quite advanced techniques have been developed, again particularly in the banking world, for risk quantification in various areas, particularly market and credit risk. There is not necessarily a perfect overlap with the risks which occur in general

and in life insurance. For example, the horizon is usually a shorter term in banking and a longer term in life insurance. However, we actuaries, who can play a co-ordinating role, should be open to adopting techniques which have been developed by other professions.

**Mr G. G. Wells, F.I.A.:** Financial condition reporting had its origins in life assurance, and guidance to Appointed Actuaries was formulated in GN2 in 1996. Such guidance has traditionally centred around the year-end FSA valuation. However, guidance has extended, over recent years, to include a requirement to stress test the portfolio over a variety of scenarios, including investment returns, adverse claims experience, and a variety of sales patterns. The results would be presented annually in the form of a financial condition report, usually at a different time from the presentation of the annual results.

Although the focus of the report is intended to be on solvency, there is value to be gained from including work on value added, a measure of the present value of future profits. For non-life insurance a similar approach is clearly possible. As with a life company, the extent of the accompanying report would depend upon the size of the portfolio, the type of business written, and the level of capitalisation. For an initial report, a simple checklist of scenarios to test could include broad areas, such as sales mix patterns, the impact of future acquisition, the impact of claims experience, asset performance characteristics, and qualitative risk analysis. I now comment briefly on these:

- *Sales mix patterns.* Projected future sales and mix of business need to be taken into account, together with the associated underwriting process. It should be remembered that assumed improving loss ratios are normally associated with lower volumes of new business. Another scenario to test is the capital adequacy of a company to closure to new business.
- *Acquisitions.* The capacity of a company to accept acquisitions is clearly dependent upon capital, which needs to be tested.
- *Adverse claims experience.* The portfolio needs to be investigated, in order to identify areas that may cause problems with claims experience and the level of reserving. The reinsurance programme also needs to be tested for adequacy in more extreme scenarios.
- *Asset performance.* The assets backing non-life liabilities are usually dominated by fixed-interest securities. Their volatility is much less than for equities, and, therefore, unlikely to test solvency, but may have an effect on surplus.
- *Qualitative risk analysis.* The risks in the company may not have a directly quantifiable component, and may have been separately analysed as part of a risk management review process. Nevertheless, it is important to analyse the more significant risks, so that a judgement can be made of the possible financial impact. Such relevant risks include policyholders' reasonable expectations (PRE), and PRE applies to general insurance in the same way as it applies to life assurance.
- There are also *regulatory exposures*, for example changes to solvency margin rules; and *asset concentrations, data integrity and controls*. There are obviously more.

On a practical note, I suggest that any FCA work carried out for a non-life company might best be undertaken as part of the normal business planning process. That way, most of the relevant data are to hand, and it is not seen as a new dry exercise that can be deferred or, worse, not undertaken.

**Mr D. E. A. Sanders, F.I.A.:** When I worked in an insurance company, some time ago, there were two types of risk that we considered. The first was the planned risk, which the authors have addressed. The real problems arose from the other sort, the unplanned risk. One example that hit a number of companies at the time was the mortgage guarantee problem. Everybody thought that they knew what was going on. Everybody had done the calculations; there was no problem; there was no risk. The problem was that the market had changed, and that the historic past was no guide to the future claims experience.

In the context of unplanned risk, I have tried to review what has been happening in the life business. There are economic risk factors in the life insurance business, and we have seen that with the PMI rates. We have also had a recent example of increasing longevity combined with an investment return downturn, which has caused problems for the Equitable Life. There are regulatory risk issues, which are also giving problems to the life industry. These include pensions mis-selling and issues related to mortgage-linked endowments. These are all risks which a life actuary would have considered to have been unexpected and unplanned.

The real role of the actuary, in this issue of unplanned risk, is that of a Jeremiah, and he must be a Jeremiah if he is going to be of value. A good example of a completely unplanned risk is the current foot and mouth outbreak. It is a risk, and it will be of financial consequence to the whole economy.

We must do stress testing. When I looked, initially, at the mortgage guarantee problem, I went to the board and told them: "You have a problem." They asked me what the value of the problem was, and I replied that I did not really know, because, with these risks, you actually do not know what the problem really is, and you cannot use past experience to assess the likely cost. You can make an educated guess. I did, and I was wrong by a factor. When I told the board what that value was, they ignored the issue, because, in their view, it was much too big, and they had confidence in the traditional approach. This is a problem that we all face in trying to look at these types of risks. We, as Jeremiahs, will say that there is a real problem out there that needs to be addressed, and we will be ignored, because the board does not want to see it.

What issues of today might give rise to unplanned risk in the U.K. insurance business? I have mentioned regulatory risk. Will there be issues of mis-selling of general insurance products in the future? The issue of asbestos claims has recently taken off in a very dramatic way, and could match, to some extent, the U.S. problem.

This paper addresses the planned risk. As actuaries, we need also to address the unplanned risk, so that we can add real value to the running of a business.

**Mr G. Ireland** (a visitor; a chartered accountant): I make a few observations from the perspective of a member of the Institute of Chartered Accountants Insurance Sub-Committee dealing with accounting matters, and a member of the FEE working party dealing with similar matters.

I now consider two meetings that I have attended recently: one in the U.K. and one in Brussels. Representations made by the Groupe Consultatif to the regulators and to others, broadly along the lines of the proposals set out in this paper, were presented. Unfortunately, the reactions of the accounting profession to the proposals was one of defensiveness. One was basically: "What can actuaries do in this area that we cannot do ourselves?"

The reality is that we have the opportunity, if we work together, to develop the best possible way forward in terms of risk management awareness, rather than in the most fractured way, which might come from a paper presented in the tone of this one. There is a slight danger of aggressive behaviour by actuaries, making their position with the regulators actually backfire, if we are not a little careful.

My suggestion, in response to the paper in Brussels, was that we should have a friendly discussion between our professions — that is, we should sit down and meet with one another to discuss the matter, and to try to see how we could combine our efforts in the most effective way. Regrettably, that suggestion was taken as only part of the answer, as it was felt that there was a grave danger that, if we did not take up the matter with the regulators, there was also likely to be a backlash, in that two problems would arise. One was that the actuaries would create an initiative which might confuse the regulators. The confusion arises from the definition of financial condition. The ways in which actuaries describe financial condition reporting and accountants consider the concept of going concern of companies are different. The other problem is the risk of actuaries taking on more than they have the capacity to deliver.

It is important that we realise that terms or words can actually cause defensive reactions in themselves. Actuaries, in a life assurance context, undoubtedly understand, particularly in

discussions with regulators, what they mean by financial condition reports. However, there is a danger that accountants do not understand such matters, particularly in the general insurance field. I therefore encourage care in the presentation of the paper. If we manage these words carefully, then we can get benefits which I would hate to see lost.

I was particularly interested in Mr Tripp's comments on the relationship between qualitative and quantitative risk. Currently, we are looking to the prospects of the DTI Maxwell Report being published. We are aware of the problems that were created by an over-dominant chief executive in that business. It can be one of the greatest risks to the financial well-being of an insurance company.

My suggestion would be that we do not miss the very important point that, however good the quantitative analysis that is done on risk, if we do not understand the human side of risk management, then we will always miss the major point, not least because humans tend to influence statistics!

**Mr M. G. White, F.I.A.:** The results that will be delivered by different people, in different companies, will vary enormously, because of the subjective nature of much of the work. We have to be very careful about the credibility of what is delivered, and it will be important to communicate, within any report, the difficulties inherent in making judgements.

Nevertheless, the work and thinking done within, and for, a company to prepare an FCA will help directors to clarify and then to communicate to their shareholders the things that matter in the business. The insurance business is complex, and just implementing accounting rules will not enable shareholders to understand what is really going on.

Then, also dealing with the inevitable limitations of accounting, meaningful reporting of financial condition should render contracts, such as financial reinsurance, less attractive, because these are contracts that can be undertaken more for accounting and presentation reasons than for economic reasons.

**Mr. D. M. Hart, F.I.A.:** The general insurance industry largely exists because its customers have done some risk management. Now we must do our risk management in order to ensure that we, as an industry, can put forward a strong and viable ongoing industry.

I support the point that Mr Ireland made, that actuaries can do so much, but that they cannot cover the whole ground. The authors do not claim to cover the whole ground, but I question whether the 40% that they have come up with is a justifiable figure. A big plus point is that we should be coming up with a multi-disciplinary approach. There is mention of such an approach within the paper. We, as actuaries, cannot answer all the questions. I suspect that the accountants, also, cannot answer all the questions, and I suspect that, jointly, we cannot answer all the questions, but we do need to work together, and have the best of all the professions working on this project to make it really stand up, and for the FSA and the shareholders and all the other stakeholders to obtain the best benefits from this exercise.

I was very taken with Appendix D, which covers the techniques that can be used in this area. I felt that, while it may not be exhaustive, it is a very good introduction to the subject for somebody who has not, in the past, perhaps thought about the issues as fully as he or she might have done.

In ¶D.3.7 I was very surprised by what was said. The first two sentences are: "Whichever risk measure is taken, the actuary may have to make a judgement as to whether the level of risk is reasonable. This may be by benchmarking the level of risk against that which the actuary has seen in other companies, and by taking into account the rating of the company." Surely, the rating of the company should be a result of the risk assessment, not as a precursor to it. The risk assessment ought to be reflected in the rating, not the other way round.

How will the authors take this forward within the profession? I have already suggested that I totally support Mr Ireland's idea of a joint approach with the accountants. My thoughts are that it would be nice to be able to do a case study or two. I know that there is a fairly simplistic case study in one of the appendices, but a case study of one or two of the companies that have



failed in the past would be revealing. That, almost certainly, is not practical, because the data required to do it either do not exist or certainly did not exist at the time. However, I think that it would give us some very good insights into the kind of issues that we ought to be addressing. Also, we have a significant educational aspect that we need to address, in terms of bringing all of the actuaries who might be involved in such a situation up to speed. Clearly, the authors have some very good ideas here, but they need to be enlarged upon and disseminated to the rest of the profession.

**Mr P. Sharma** (a visitor; the Financial Services Authority): I shall address three specific topics from the paper: to speak about the cross-sectoral context of both the FSA's own proposals and some of the analysis in the paper; to draw a link to the international accounting standards initiatives on fair value accounting; and to raise the much vexed question of practicality.

Dealing with the third point first. When we put these ideas to our European colleagues, as we have in small measure already, I know exactly what they will say. They will say that this is all very well in theory, but that it cannot be done in practice. We, in the FSA, clearly do not believe that, or we would not have come forward with the proposals that we have. However, we know that there is very much a case still to be made, and still to be put, both to regulators throughout Europe and the world, and, perhaps more importantly, to the senior management of insurance companies themselves, that this form of analysis can be done in a meaningful way, that gives a true insight into the real risks that insurance companies and other firms are subject to. In drawing up our own prudential requirements, we have a rule of thumb; are we asking firms to do something that well run firms would want to anyway, even if there was not a regulator? That is the rule of thumb that we applied in putting together our proposals on stress and scenario testing, and that is the rule of thumb that applies in terms of whether or not the much more detailed exposition in this paper will work in practice.

Mr Hart made the suggestion that one of the ways in which to take this work forward would be to prepare some more detailed case studies. The FSA would certainly welcome that. Thinking about the European regulators, and thinking about some of the management of some insurance companies, I know that they will not believe that it can be done until they actually see it done. Therefore, there is nothing better than actual near real life case studies.

Moving on to the second theme, which is fair value accounting, and also straying into my first theme, which is the cross-sectoral context, if one looks at the ways in which risk management techniques have been developing, particularly in the market risk sector, and, to a lesser extent, in the credit risk sector, one sees a link across to fair value accounting, to market-based accounting, as a prerequisite to taking any view of the assessment of risks that actually involve measuring risks and quantifying risks. An expert in market risk — and I am by no means that — will tell you that the first and absolute prerequisite to constructing a value at risk module is to mark everything to market.

In the context of insurance risk, I would expect the same analysis to carry across. I very much see the development of this work on FCA reporting and the parallel developments in the accounting field on fair value, although not the same thing by any means, as flowing in the same direction. Both provide more detailed quantitative information about the risks that firms are facing. They are met by the same objection as the one that I mentioned earlier. Many people do not believe that either is practicable.

Turning to the cross-sectoral context, what we are discussing here applies equally, in principle, to banks, to life insurance companies, and to all types of firms. Mr Tripp mentioned the important point that whatever is developed in detail for insurance companies needs to be developed in a way that is sympathetic to the wider developments in risk management science. It needs to be developed in a way where it looks as though what is being done in the general insurance field is the particular application of a wider development in the quantification of risks. Mr Smith mentioned the Basel review for banks, which is now actively pursuing the idea of quantifying operational risks. Within the FSA we are going to take that work forward, and that will be done on a cross-sectoral basis. Again, many of the ideas and the research done there

will read across to insurance, and also much of the work that is being done in insurance will read across cross-sectorally to operational risk. The cross-sectoral context, the need for what is done in the insurance field to fit into the wider field, is important; the need for what is done in developing this further, to demonstrate that what we are seeking to achieve is actually practicable, and the need for this to be tied together very well with developments in fair value accounting.

**Mr G. D. Clay, F.I.A.:** I have some points, drawn mainly from experience with financial condition reporting in the life insurance area. I found the distinction in the paper between Turnbull, looking at shareholders' risks, and FCA, looking at policyholders' risks, slightly surprising. From the life perspective, looking at the policyholder risk, the implication has always been that, if the company does not meet PRE, then shareholders are going to have to do something about it. Therefore, if there are insufficient resources in the long-term business fund, the shareholders' funds will be called upon. What is the risk of that happening? That is where non-executive directors of life insurance companies wake up rather more than they usually do when actuaries are addressing them. I would agree that it is appropriate, first of all, to look at risk from the policyholder's perspective, but then one needs to consider what impact there may be on the shareholders.

From the shareholders' perspective, it might be useful to divide this into two stages. First, what are the risks to the maintenance of the dividend, or, indeed, the ability to pay any dividend; and then, beyond that, at what point would there be a need for additional capital, and what might trigger that additional capital requirement? Going on to a purely life question, is it time for the profession to revisit GN2, and at least make it a practice standard requirement rather than merely recommended practice?

The title of this paper is 'Financial Condition Assessment'. Life actuaries have been presenting 'financial condition reports' for some years, and, picking up on Mr Ireland's point, is there really a distinction? If there is, what is it, and can we try to define it? If there is not, can we not use a common name?

**Mr P. R. Archer-Lock, F.I.A. :** I should like to consider one of the opener's questions, and also one of the points that Mr Wells made. The opener raised the issue as to whether the FCA should be a continuous process or a year-end exercise, and he drew the distinction in terms of whether there is going to be a certificate or not at the end. I believe that the FSA have made it clear that the intention is that there will not be a requirement for an actuarial certificate. However, to get maximum benefit out of this exercise, I think that it should be a continuous process anyway. It is the responsibility of directors to make sure that their companies are financially sound at all times, and, therefore, you need to review continuously whether circumstances have changed, and to make appropriate assessment at the time of those changes. Also, picking up on the point that Mr Wells made, to gain maximum benefit from this sort of work, it should be done in the context of planning. In my view, a planning exercise is also not an exercise set in stone at the start of the year, but it is an exercise that should be continuously reviewed as circumstances change.

**Mr R. C. Wilkinson, F.I.A.:** Recently I have spent much time in the Australian market. As you may be aware, there are many problems there. The message that I bring to the Institute is that we should make sure that actuaries who give assessments on what we call probability testing, in terms of sufficiency of reserves, need to qualify carefully what they are telling people. In the Australian market, they have used this for a long time, and, as some of you may be aware, the Australian market is effectively going through its fourth problem in terms of liquidations or certainly of company collapses.

The suggestion of putting a few case studies together is a very good one. In practice, the Australians have suggested that, for projecting forward, you need different probabilities of sufficiency, depending on whether you are writing direct business or reinsurance business. For a

direct company, they are saying something like 75% is sufficient, and, for a reinsurer, 99% is sufficient. What actuaries need to say is that these probabilities of sufficiency have been based on past experience. They are based on certain scenarios, and you need to qualify the issues very carefully. The biggest exposure that has hit everybody is, effectively, insufficiency of reinsurance, initially, and reinsurance not operating as you expect, and no analysis of the past will tell you that unless you properly scenario-test all your business, including the reinsurance. This is quite a daunting task. I am sure that, in the U.K., we will not fall into the same trap that other countries have fallen into.

The second issue is on the operational risk side. We still have many lessons to learn from the Bank of England, and what has been going on on the banking side. I was involved with one of the largest life companies to collapse, a Canadian company, and we were involved in the U.K. At the time we had the Bank of England in, and the way in which it managed the risk portfolio, it could actually tell how long the bank, which was a subsidiary, had to survive before we took action. It said: "You have about 15 days, and after that whoever it is will pull their lending. These are all the covenants"; and it was all there in place.

Obviously, that is one extreme, because a lot of the banking side is very short term. On the life insurance side, the DTI, at the time, did not have the same controls in place in terms of what the risks were, partly because things were looked at only once a year, and reporting was done only at the following end of June. I know that that has now been brought forward, but, in terms of the suggestion of continuous assessment, this needs to be looked at very carefully by directors.

The most recent case in my experience of operational risk is an IT situation, where people were putting in a new product on the life side, and we were asked to look at the risks. The first risk that we gave was a risk in terms of the people who were coding the new product. Management said: "There is no risk with that at all. They are all very good people. We are assured that all their risk profiles are very good, and that they have checked everything over." We said: "Have you ever looked at the coding?" They said 'no'. In fact, the coding was all in Hebrew. If you speak Hebrew, that is fine, but, if you cannot, there is a problem. The second risk was that 13 of the 14 programmers were Israelis, and if there was any form of problem in Israel, and they were called up, 13 of the 14 would go straight back to Israel. Therefore, there would be nobody to complete the project. I am not sure how you measure that probability. It is something that senior management needs to be aware of. There are many issues in terms of operational risk regarding letting everybody know, at senior level, what is going on, so that at least people identify what the problems are, and how they need to be taken forward.

**Ms C. Nicoll** (a visitor; a risk manager): A number of the comments that we have had in the discussion have drawn together some experiences that I have had as a risk manager, and have become involved in in sorting out one or two problems of insurers.

Mr Wilkinson brought to mind a thought that struck me very forcefully when I read this paper. Table 3.1 gives the American study showing that failure of ceded reinsurance accounted for only 3% of the apparent failures compared to 27% of non-identifiable risks. A number of previous speakers have highlighted the importance of the human dimension, and how very important it is that everything is joined up. Other speakers have spoken about the importance of having a perspective over time.

Having worked in risk management, I sympathise with the speaker who felt that boards were suspicious of professionals who were trying to stray into the operational area. For instance, you can devise a very splendid and apparently effective reinsurance programme to suit your underwriting portfolio. This may sound absolutely trite and obvious, but, if you cannot pull up the details of that reinsurance a lot later in time, when you may need to call upon it, it was not worth buying in the first place.

My experience goes back quite a long way, and, possibly, practices in the market have improved considerably since then, but I noted that, in the indication of the authors as to the

areas of activity in a company where they thought that they could be helpful, they obviously had a double tick in all the reinsurance columns, but they also had ticks under information, technology risk and administration risk. I know that a lot of work has been done on trying to relate the insurance that you buy to the risk that you are underwriting, so that later on — and sometimes it is very much later on — you actually have some kind of record that feeds you back, because people do not stay with companies for ever. There is an awful lot of information that, traditionally, has been held in people's heads. The actuarial profession, here, could make a real contribution, in bringing home to boards the importance of tying everything together, so that the money spent on reinsurance is money well spent.

**Mr J. Thirwell** (a visitor; Director of the British Bankers Association): I am responsible for writing the banking industry's response on operational risk to the Basel Capital Accord consultation paper. The Basel Capital Accord proposal is all about quantifying operational risk, patently because capital is quantified. It interested me, when I read the paper, that, when you got on to other risks — and you are a profession that patently is a quantification profession — all the way down there were single ticks and crosses. I found that rather heartening, because I have a little battle with the regulators in some respects. A parallel is drawn between market, credit and operational risk in banks. It is perfectly true, that with market risk tied to transactions with clear objective prices, or whatever, to count you have something that you can quantify.

Credit risk is a bit more difficult. Fundamentally, it is tied to a single kind of transaction, a loan. Once you have a transaction, you can count every single time that you perform that transaction, you can count defaults, you can do all sorts of things. Much data hangs off those transactions, or can be made to.

Operational risk is completely different. Yes, a lot of it, if you use the narrow definition of operational risk, relates to transactions, and so you can add them up, and you can see how often something goes wrong. However, there is a huge amount of operational risk that you cannot count, because you simply do not know. You do not count every single activity that goes on in any of your firms. You do not have a base from which to calculate probabilities of problems occurring.

Considering the point made by Ms Nicoll about Table 3.1, I was fascinated by the table, because, if you look at the work that R3, the U.K. insolvency profession, produces, they simply come up with one huge reason for company failure, and it is management. It is the human factor that makes the quantification of operational risk extremely difficult.

**Mr P. J. Twyman, F.I.A.:** There is a fundamental assumption behind the paper that things stay roughly the same, but, in real life, things are continuously evolving, and the risks that were once risks are not risks today, and the things that we do not identify as risks today will be seen as risks sometime later. In the insurance field, it takes longer for this to become evident than in some others. If we look at the example of Long Term Capital Management (LTCM) in the U.S.A., this had two Nobel prize winners working on it; probably the best risk management system and understanding of everything that they were doing that you could possibly find, yet it imploded in a very spectacular way. It was basically because risks had been changing in nature throughout the period of time. The same sort of thing has happened to general insurance, and will continue to happen in the future. The mistake that I think that the paper makes is that it assumes a static position, where, in reality, life evolves.

All of this actually determines the way in which companies compete against each other, and processes like this can be used to limit competition between companies, or can be used to encourage competition between companies. We all know that the safest place, in terms of all these assessments, is to be like the average company, because, in that way, you will not get into any trouble, and you will always be able to tick all of the boxes that are indicated here.

The problem with that position is, whilst it is the safest, it is the one that does not create any return that outperforms the cost of capital, because, by definition, if you are average, you are only going to earn average rates of return. So, companies are always going to be encouraged to

do things that are not average; in other words, to take different risks or to differentiate themselves in other ways. That is what happened with LTCM. It differentiated itself, competitors figured out its weaknesses, and immediately began to invest in those areas, until there was ultimate meltdown.

The true test of any system like this is to go backwards, to see how many current crises we can identify that would have been averted by the good use of this process. Certainly, most of the ones that I can think of would probably never have been averted by using this process. One of the reasons is the question of the strength of management, but not wholly so; risks continue to change, yet our processes assume that they remain the same.

**Mr R. G. Thomas, F.I.A.:** I make one short observation, tangentially related to what Mr Twyman said, and also to what Mr Sanders said about planned and unplanned risks, and that it was the unplanned risks that were the important ones. I think that we can all agree with that. There is a cultural problem for the professions, not just the actuarial profession, but for all professions, with unplanned risks.

Professions tend to be about consensus; they tend to be about agreement; they tend to be about thinking the same things; but unplanned risks are risks that the consensus will miss. I do not have a solution for this, it is a very intractable issue. The only suggestion that one could make is that professions should be careful about marginalising unpopular views, or isolated views, or maverick views, because it is the mavericks who are going to be right about unplanned risks. The trouble is that you do not know which mavericks will be right. You see this in problems like BSE — public health problems. The consensus was wrong. The maverick academics were right. There is a problem for the professions that they tend to promote consensus and emphasise consensus, and that marginalises people who are right, as well as people who are wrong.

**Mr A. J. Frost, F.I.A.:** I have been reflecting on problems that we have had in, for instance, the derivatives market place: Barings, Metalls-gesellschaft, Procter & Gamble, Orange County, Allied Lyons, Showa Shell Sekiyu, to name just six. We also had the example, earlier, of LTCM.

What was the issue with these different companies? In the case of Metalls-gesellschaft, it was based on an assumption that the spot price of oil would always be in a certain relationship to the forward price. That was the formula which people used for many years, and eventually it changed. As Mr Twyman said earlier, conditions do change. That was not predicted by the company.

In all these cases, there are examples that actually make sense of their failure. If we were to look in some detail at the companies that have failed in our own sector, there might be some useful lessons. In particular, I would encourage the Working Party to look at their last few pages, at the suggested management structures that they think might work in the future. Appendix G suggests a practical way of working, but I am not sure that it will truly work in that way. In particular, we have a suggestion, which I wholly endorse, of what is called 'FSA co-ordination', 'Turnbull co-ordination', and so on, that would circumvent the chief executive officer (CEO). Most CEOs tend to have a bit of an ego problem, and I wonder whether this will be acceptable to them. Then, is the board of directors going to be competent enough to judge the advice that it has? The main theme that has come through for me is the actual governance of the board, and how it deals with any assessment, once it receives it. If you go back to examples that I gave earlier, possibly they were getting reports, but did they actually act?

Since the 1990s we have had more careful suggestions from the regulators on how to do things. To take an example, I was looking through a website on credit derivatives the other day. The FSA now gives some marvellous advice on how to manage the process. However, how will we manage the things that we are talking about, the instances that will come up and surprise us, as Mr Twyman was saying? Can the board cope with the information that it is getting? What past examples do we have of the structures, shown in Figures G.1 and G.2, working in practice? It could be useful to assess that.

**Mr D. J. Hindley, F.I.A.:** I would like to make an observation on what Mr Frost said. He referred to a number of collapses in the banking industry, and he gave an example where he thought that the reason for failure was due to problems with their risk pricing models. Some of the other failures were also due to a lack of management control. There are some lessons here for the insurance industry. If I look at some companies, and think about some of the underwriting years, or the accident years, in which they have suffered poor results, and ask myself: "What are the reasons for those poor results?" then, yes, some of the reasons are very low prices across the market and very large natural catastrophes. However, some of the problems that these companies have faced are due to a lack of underwriting control. In some companies, where the underwriting controls are not particularly strong, underwriters — one might term them rogue underwriters — will write a book of business that, perhaps, they have not seen before. They do not have much experience of it, and they end up costing the company quite a lot of money in some cases.

Often that does not lead to insolvency and the failure of a company, but, in extreme circumstances, that could be the case. So, it is an issue of management control or human control. I then ask myself the question: "Can actuaries assist in trying to identify this problem?" The answer is: "Yes, we can". We have a lot of input into the underwriting process, into pricing of risks, and so on, and, if we do what a number of speakers have supported, which is look at some past failures — and, as an aside, I would expect that the FSA have already done this to a certain extent in looking at why companies have failed; and it is clearly an important thing to look at from a regulator's point of view. We might find that, in some cases, problems have been caused by lack of management control, or a lack of underwriting control, allowing underwriters to write books of business that, if they had looked at them in a bit more detail, they would not have written, and certainly their managers and their board would have much preferred them not to have written.

**Mr A. C. Spence, F.I.A. (closing the discussion):** We are at a critical stage in developing a role for our profession in the management of non-life insurance companies. Traditionally, life actuaries had senior roles in life companies, but, although a number of general insurance actuaries have achieved senior management positions, the main work of general insurance actuaries has been on reserving and pricing — not areas of work which lead as naturally to senior roles as involvement in financial condition assessment may do.

The authors have demonstrated well that this area of involvement, especially in the role of co-ordinator, will naturally require interaction with all levels of personnel in a non-life company, and will require interaction at the most senior level in companies. FCA will form the key methodology going forward for insurance regulation, and should, as the opener pointed out, form a key area for actuaries adding value to the management of companies. These factors mean that this work should provide a major fillip for the profession, provided that we seize the opportunity before us. We must realise fully the scale of the change in order to realise the scale of the opportunity.

In this context, the comments quoted from the speech by Sir Howard Davies, are, indeed, highly significant. The more times that I have read them and heard them, the more I have appreciated the significance of the change that is in front of us. I remind you that he said that the change will be even more profound for non-life insurers, and may come as an unwelcome shock to the unprepared.

It is up to company managements to get prepared, and to start this process now. This also means that it is up to our profession, as well as to other professions, to start advising the companies that we are involved with regarding the issues that they need to start tackling, and the plans that they need to be making, straight away. As a profession, we also need to ensure that we are as well placed as we can be in terms of how we will approach the work. This paper is a very significant help in this process, but there is still much to do. In capitalising on our existing capabilities, and in advancing these capabilities, we need to be clear as to the importance of successful work with other specialists. I agree completely with Mr Ireland about working

together with other professions, and the benefits that we will accomplish if we work closely with them. Mr Hart also endorsed that view. Through my own work, I regularly participate in multi-disciplinary teams, and I continue to be impressed by the power of the output from a team that is based on many disciplines. It is a lot stronger than one profession working on its own. Successful businesses, today, have to work in this way. Any actuary helping with FCA work will need to interact with other professions and work with them. Regardless of whether the actuary is operating in the co-ordinator role or in the risk assessment role, we will all need to seek views widely, and to present the findings at the most senior level, to make clear the issues involved, and to enable senior management to get the most added value from this work.

We all, as actuaries, have, to some degree or another, significant experience in terms of mathematical skills, and the general insurance actuaries have skills in reserving, pricing, asset liability modelling and dynamic financial analysis. They also give advice on risk mitigation strategies in terms of reinsurance programmes, commutations and other strategies. It is obvious that we have the sophisticated techniques required for the assessment of the risks. As well as having the required mathematical skills, we also have a breadth of experience as actuaries. It is one of the areas where U.K. actuaries are respected world-wide. It is exactly this breadth which is needed in a co-ordinator role, and which needs to be filled, in order to appraise and assess all the areas which are risks for a company, and to explain those issues.

We must also adopt the ability to learn from other professions, such as banking, which Mr Creedon referred to, in order to maximise our interaction with the other professions. We must not assume that the actuarial profession has all the techniques. We have much to learn.

Importantly, as many speakers have said, many company failures are not caused by the mathematical abilities of the individuals who have been building the model. Mr Ireland, Mr Thirlwell, and Ms Nicoll referred to the human side. In fact, it is often the maverick CEO who needs to be challenged by the maverick actuary.

Failures are caused by the assumption that past market conditions will be repeated in the future, and by the assumption that the mathematical model that has worked well in the past will perform satisfactorily in the future. We have seen examples of this in the financial sector overseas and in the U.K. over recent years. What is needed to overcome these issues are people capable of stepping back and seeing the wider picture to assess the wider threats which exist. The breadth of actuaries' thinking is helpful in this context, and the other professionals involved will also make a vital contribution in areas which are nothing to do with the details of the models.

Appendix B includes checklists of items to be considered, which, I agree with Mr Creedon, will be especially valuable, and, in Appendix E, a possible framework for reporting is covered. As Mr Hart highlighted, Appendix D is a very helpful summary of possible techniques for determining aggregate capital requirements. As a result, any actuaries starting to develop their thinking in this area will benefit considerably by turning to the paper to work through the points that it covers, and the authors have produced an extremely useful working document.

There are, of course, areas which, even with the help of this paper, will be difficult to evaluate. Areas which have been referred to, and which are very difficult to quantify, include IT systems and fraud. Mr Smith referred to the challenge which the Casualty Actuarial Society is encountering in looking at the risk premium project, and in trying to assess the frictional costs involved. Mr Thirlwell referred to the quantification of operational risks. Just because these areas are difficult does not mean that we, as a profession, cannot make a contribution. If we can get to grips with these issues, I believe that we will be a good profession at explaining these issues to boards. I would take, as an example, the assessment made by general insurance actuaries of the reinsurance bad debt provision which has been introduced for Lloyd's Statements of Actuarial Opinions. This is not an easy area to assess, and a Working Party produced a methodology which has been widely adopted, and although no one would pretend that the provisions determined are exact or correct in any theoretical sense, it has, at least, meant that there has been some uniformity and an approach which has been understood in assessing the risk. I think that the failures that have occurred have not proved or disproved the soundness

of the methodology, but, at least, it has introduced something which is better than the scattered methodology or lack of provisions which existed before. This has dealt with the issue of different standards from different individuals, which Mr White referred to. In this way, I think that we can contribute to areas which might be difficult to approach, although we will need more work from the profession in order to be able to adopt standards which are acceptable.

In ¶6.2.1 the authors state that there may be a requirement for some additional training for actuaries. Paragraph 3.1.3 points out that there is much literature in the risk management field which we should, as practitioners, become aware of and keep up-to-date with. In ¶4.4.3 it is noted that GN12 would apply to formal reports, and that, for specific risks, there may be a need for working parties or advisory notes to promote relevant techniques and knowledge within the profession.

Mr Tripp asked whether the Institute should set more guidelines, and whether more work should be done. Mr Wells referred to the potential benefits of ideas which are seen in the life industry being introduced. Mr Sharma introduced an idea which has been latched onto by other speakers, in terms of the suggestion of real life case studies being very beneficial.

I believe that it is essential that the profession moves forward and is proactive, and shows that it is capable of leading this type of thinking and working with other professions, in order to develop the working practices further. Many actuaries are likely to feel unsure as to the levels of uncertainties to which many need to work; the amount of detail required; and the way in which operational items should be quantified and integrated with the overall assessment. These areas need to be considered in greater depth now, and further assistance, by way of practice notes, will be invaluable. I urge all those interested to move these issues forward as rapidly as possible, to put the position of the actuarial profession on an even more solid basis, to ensure that we are fully prepared, and that we are taking the initiative.

This timely and helpful paper shows that there is an important role for actuaries. This is a key time for ensuring that we take the opportunity and are proactive in moving ahead in the new regulatory regime. When the history of the development of the U.K. general insurance actuarial profession is written, I believe that the 1970s will be looked back on as the pioneering days; the 1980s will be the days of significant progress in the reserving area; the 1990s will be remembered for the increased move into pricing in more detail; and the 2000s will be seen, I hope, as the time when we took up the challenge and moved into wider management areas initiated by FCA. I believe that our profession has the people and the skills needed, which, working alongside other professions, will enable us to play a leading part in the successful introduction of the new regulatory regime, and thereby to ensure that we continue the traditions of our profession in acting in the interests of policyholders and the other stakeholders in insurance entities.

**Mr J. P. Ryan, F.I.A.** (replying): One particular issue that we, perhaps, could have got a little bit better is the terminology. Mr Ireland and Mr Clay both referred to terminology, and, particularly, the use of the words 'financial condition assessment' or 'financial condition report', which gave a slight over-emphasis on financial risk. We are endeavouring to cover all risks in the organisation. The use of the word 'financial' is required, because the obligations of institutions to policyholders and to shareholders are financial in nature, and, indeed, shareholder value in industrial companies is also financial in nature. It is by no means intended to restrict the risks to financial risks, and much of the paper goes beyond that, looking at other risks.

We are grateful to Mr Sharma for his contribution, and, in particular, for saying that this type of assessment can be done in a meaningful way, within the area of low-frequency, high severity risks, which, in many cases, are the key ones that need to be identified and managed. It is, perhaps, of interest to some that, as part of our research, we talked to some risk managers who said: "Everybody knows how to identify a lot of these low-frequency, high severity risks, so what are you saying that is new?" It is interesting that it may not be new to everybody in this room, and there are other people, particularly in the risk management area, who have done much work in the risk identification area, although not necessarily in the general insurance field.



This ties in with the comments that Mr Sanders made on planned risk. Our framework could have helped him to explain mortgage indemnity to his board, because that was just one of the many potential unplanned risks, one of the many potential low-frequency, high severity risks. If you have a thousand 'one-in-a-thousand risks', then the expectation, if my actuarial science is still up to speed, suggests that there is likely to be one coming home, and that, therefore, means that we need to manage many of them, as we do not know which will occur.

The other point that Mr Sharma made is that FCA is something that well-run companies should do anyway. It should not be regarded as an added burden, but as something that can add value to the organisation, the shareholders, the policyholders and the other stakeholders. In many industrial companies, risk managers are already doing this. Mr Sharma also mentioned the 'mark to market' issue. One of the risks that has been identified is that 'mark to market' is not always the issue. Mr Twyman also referred to this, which is the liquidity issue. The important thing is to identify all the risks, not just short-term market fluctuations.

My biggest disappointment in the discussion is that I think that I am the first person who has specifically mentioned risk identification. This is a key part of the process that we have put together. Figure 2.1 is a circle that goes round and round, which is meant to communicate that risk classification should be a dynamic process. One or two speakers said that it was static; but the whole purpose of the circle is that it is dynamic. Not only that, risk identification also has to be a multi-disciplinary matter, to produce something that actuaries can quantify. The risk co-ordination role that we referred to is the ability to consider all the risks together.

Risk identification comes into the issues in Australia, referred to by Mr Wilkinson. Some of the comments by Mr Thirlwell on the banks and operational risk, and some comments of Mr Turnbull on risk identification, were also very important.

Mr Wilkinson and other speakers said that it was sometimes difficult to assess the probabilities. We mentioned, in the paper, that you cannot readily quantify some cases. Therefore, you need to put adverse scenarios on top of the financial models, and consider what would actually happen if you get a rogue chief executive, if your human resource department gets out of control, or if your employees do not behave in the way that they should. Some of those relatively unquantifiable risks may have to be handled by adverse scenarios, but they should be considered in conjunction with the overall FCA. We are not saying that everything can be put into an actuarial model; what we are saying is that the models, combined with adverse scenarios, the co-ordinated and documented risk identification process, can provide useful financial insight.

Mr White referred to the fact that there will be some inconsistency in the way that reports are prepared. Given that the risk identification process will vary from company to company, and, indeed, the risks that different companies face, this is inevitable, especially as they have different amounts of capital involved.

I think that I learnt to crawl, and then to walk and then to run. We are at the stage of crawling in some of these areas, but at least we are crawling. We need to move on to the walking and the running stages.

An important message that I should like to leave with you is that this is not just a regulatory issue, although it is very important. FCA adds value to the organisation, and the regulators should not be regarded just as creating a burden on the industry as a whole, as they can in the many returns that they ask to be filled in. This is an area where the regulators are being proactive in encouraging companies to add value, not only to the policyholders, but also to the shareholders, in terms of increased value and reduced cost of risk, which will, in turn, also lead to a lower cost to policyholders.

Mr Tripp made interesting comments as to who should determine the level of risk. This is where the board directors need to come in, and it is also where there is a lot of devil in the detail; the risk profiles of policyholders and shareholders vary quite considerably. The board's non-executive directors and audit committees have a major role to play in this area. The FSA can set minimum standards; shareholders can diversify in other directions; but policyholders cannot. To the extent that we can encourage non-executive directors and audit committees to do their job better, then this will be a major plus for this paper.

If actuaries believe that they are experts in risk, then FCA is an area where we need to make an effort to move forward. The paper demonstrates that actuaries are being proactive in outlining the methodology to carry out this work. This is not going to be just work for actuaries, it is multi-disciplinary. We have identified the individual risk assessment roles; many of these will be work for other people. The risk co-ordination role is by no means an actuarial monopoly, although we believe that actuaries can contribute much.

On the probabilities of ruin and the contribution that actuaries make, Ms Nicoll referred to the U.S. data and the reinsurance aspect. It is important to recognise that the analysis in the paper was based on U.S. data. It would be different in the statistics of the U.K. This is an interesting area for further research.

'Pulling it together' did not get much discussion, but it requires some understanding of the importance of independence, which was covered in ¶5.2.1, and also the importance of tail dependency, which is covered in ¶5.2.4. Perhaps we do not fully explain independent risks there. It is very important in all this work to get the detail correct. Different risk measures, incorrect risk measures, can lead to different decisions being made. The devil in the detail is very important, and this is an area where actuaries can play a major role.

**The President (Mr P. N. S. Clark, F.I.A.):** We have set Vision and Values for the profession. One of the key parts of Vision and Values is broadening the profession. I feel that this paper is a significant part of that, looking at a number of areas in which the profession can add value and can move into broader areas. For that we are extremely grateful, as a profession, to the members of the Working Party, who have worked incredibly hard to bring the paper forward.

One of the things that I was struck by was what I would call the humility — the fact that it was saying that actuaries do not have all the answers to these questions. I think that it is very positive that we are saying that we have a significant contribution to make to this, but this is not the only one. We need to work with others to produce the best results.

A number of speakers were delighted with the affirmation of Sir Howard Davies of this paper. The profession has come in for a certain amount of stick in some areas, and so it was delightful to see the Chairman of the FSA pleased to see that we were rising to the challenge. That was heartwarming.

I entirely agree with the comments that Mr Thomas made, chiming in with something that I said in my Presidential Address, that we, as a profession — and perhaps it is the mavericks in the profession — need to challenge the conventional wisdom. However, as Mr Thomas pointed out, you need to know who is the right maverick. That is a challenge, because we are continually judged on what we did five and ten years ago. Now we need to be challenging that conventional wisdom.

So, my thanks to the Working Party, the opener and closer and all who have contributed to the discussion.

#### WRITTEN CONTRIBUTIONS

**Mr M. G. White, F.I.A.** (who also spoke at the meeting): I should like to expand briefly on the financial reinsurance issue with an example. It is quite common for a company wishing to exit a line of business to buy a 'run-off' cover, in order to achieve as much finality as possible. Where this cover is limited, as opposed to unlimited, there is always a possibility, however small, that it may be insufficient at some time in the future. However, there will typically be no reserve recognised on the balance sheet for such a contingency.

For such a company, the residual risk of the run-off cover being insufficient may be material. Following the transaction, the concern of the investing community may, nevertheless, be reduced, perhaps erroneously. In this event, a financial condition report could add value by drawing attention to the residual risk and the need to monitor the underlying developments.

**The authors subsequently wrote:** The Working Party was pleased with the reception of the paper, and pleased with the discussion. A number of speakers referred to extreme events, including words such as maverick, and the need for people to think the unthinkable. The Working Party believes that this is an important part of the identification process, but believes that it is important that this type of thinking be undertaken in a formal way, and with regard to both the likelihood and the possible severity of the events. If many such events are possible, it is more likely that one of them will occur. Consequently, it is grateful to the speakers who drew attention to the importance of this aspect.

Mr Ireland and others made the point that the FCA process was not necessarily something that actuaries can do in isolation. The Working Party firmly believes that this is an important point, and emphasises in the paper the need for actuaries to work with others. It does not believe that any profession has a monopoly in this area, but that actuaries have a major role to play, particularly in co-ordinating input and using actuarial techniques for measuring the totality of risk. This is in addition to quantifying specific risks within their conventional expertise. Certainly, the intended message is that there is an important need for liaison with accountants and others.

Mr Hart queried whether actuaries were the experts for as much as 40% of the risk. Interestingly, in discussions with other non-actuarial bodies prior to finalising the paper, the Working Party received a number of queries as to whether this number was high enough. Mr Hart implies that: "The risk assessment ought to be reflected in the rating, and not the other way round". The Working Party would agree with that statement, but was making the point that, for benchmarking, one would wish to compare against comparable companies. Furthermore, an individual company would wish to assess what was a reasonable level of risk according to the rating that it wished to attain. In this context, the phraseology was deliberate, and not the way implied by Mr Hart. Obviously, the level of risk and capital impacts the rating.

Some speakers referred to the difficulty in determining what level of risk was appropriate. Ultimately, this has to be a decision for the board of directors, the FSA, and others, rather than the actuarial profession. The role of the actuarial profession is to advise how changes (in capital, reinsurance, etc.) would affect the overall level of risk facing the company. This can then be used in determining appropriate policy.

We did not spend much time on the theory and the mathematics of combining risks. This, in itself, is worthy of an Institute paper. We did discuss some broad approximations in the main body of the paper, and some more detail in the appendices. However, it has been observed that ¶5.2.4 may be slightly ambiguous, in that it talks of combining risks additively and then considering the robustness of the company to various scenarios. This is, of course, a conservative approach, used only to test robustness when a full-scale model is not appropriate for consideration of the adverse scenarios. A more accurate approach to combining risks is described in ¶5.2.1.

Similarly, in one case we referred to the need for coherent risk measures. This is important, and its ramifications are not widely understood. It is also an area where work is being carried out, and is important for assessing risk. Good references to that paper are:

ARTZNER, P., DELBAEN, F., EBER, J.-M. & HEATH, D. (1997). Thinking coherently. *Risk*, **10**, November, 68-71.

ARTZNER, P., DELBAEN, F., EBER, J.-M. & HEATH, D. (1998). Coherent measures of risk (submitted).

Finally, the authors hope very much that this is a beginning, and that this will stimulate discussion within the profession and elsewhere. Furthermore, they believe that many of the concepts are not solely applicable to the general insurance field, but have applications in both pension funds and life assurance, and, indeed, a broader range of financial institutions. Indeed, since finalisation of the paper, the FSA has published consultation (CP 97), which applies the concept discussed in the paper to other financial institutions that it supervises, including banks, not just to insurance companies.