DISCUSSION HELD AT THE INSTITUTE OF ACTUARIES

Mr M. R. Kipling, F.I.A.: This paper is entitled Governance and Risk Management in United Kingdom Insurance Companies. It is a very timely paper in light of the recent publication of the Turner review which, among other things, covers the governance of UK financial institutions.

Mr S. P. Deighton, F.I.A. (introducing the paper)**:** The paper is the first formal output from the Research and Thought Leadership subcommittee of the Enterprise Risk Management (ERM) Practice Executive Committee (PEC). It may seem odd, therefore, that it contains no original research. There is not an equation in sight, and there is only one token diagram. This is because the most important of its key themes is that there is much more to ERM than complex models and fancy mathematics.

There are a number of areas associated with ERM. One of them is understanding the wider governance framework within which an insurance company must operate, and hence the introduction to that subject at the beginning of the paper. The second is how to run the very detailed identification and mitigation of the myriad of small risks across a wide group which is at the other end of the spectrum to the multi-million pound derivative transactions that manage equity risk. Our paper sees this as indistinguishable from the internal control framework that a company needs in order to comply on the governance front.

Another is recognition of the softer skills which are required to be a good risk manager and of the cultural barriers that can get in the way of successful ERM. We tried to bring out some of those in the latter part of the paper but we cannot claim to have been exhaustive.

Another theme is that ERM will only be successful if every single employee in the organisation recognises that they have a responsibility for it at some level. For this to be the case, it has to be well promoted, properly explained and have its successes celebrated. It requires behavioural changes at all levels of the organisation and they must be most visible and most genuine at the very top.

Mr J. R. Graham, F.I.A.: We wrote this paper primarily during the autumn of 2008. I am sure you will appreciate that this was a very interesting period in risk management. We were presented with something of a moving target which led to various re-writes of our paper and caused us to revise our view as to whether banks really were ahead of the insurance industry when it came to ERM.

It is quite likely that some of the comments made in our paper have actually been superseded. Numerous papers have been released by the FSA including the Turner Review, the Bank of England and various commentators in the Board for Actuarial Standards(BAS) as well.

While the banks have clearly been in the spotlight, it is almost certain that the insurance industry will be affected by the fallout. Moreover, we also wait for Solvency II to reveal itself in full.

So we are in a period of a certain amount of regulatory uncertainty in the insurance industry. However, if enterprise risk management is fully implemented, the regulatory issues will more or less look after themselves, so the current uncertainty is not a reason to delay.

The paper looks to bring the reader up to speed as to what ERM actually is, to think about where it is heading and where the actuarial profession fits into the bigger picture.

This is not a technical paper, and it bears reiterating that our intention is to focus the debate away from the detail of modelling risk and towards how this information is to be used to better advance the role of the risk management function. Other bodies including BAS and other PECs, will undoubtedly pick up issues of modelling risks such as insurance and market, and it remains for some other risks not easily modelled by mathematical formula, such as reputational risk, to find a home.

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In a nutshell, this paper looks to put these models into their context. It is worth taking a minute to reiterate what we have potentially learned from the credit crunch. Problems arose in part due to a number of items. Firstly, the models were wrong. They were very, very precise, but they were wrong, which brings us back to "it is better to be approximately right than precisely wrong". An approximately correct model from which results are fed back into the business management decisions is much more valuable than a precisely accurate model which is either ignored or whose outputs are not understood by management. There was blind adherence to complex models.

Secondly, disaster myopia, that is all of the bad things that happen in the world, happened so long ago they just really were not on our radar any more.

Thirdly, network externalities; we mean people running the risks were so remote from the actual risks that they did not know what risks they were running; too many layers in between them and the people actually at the front end. I think more than enough has been said about misaligned incentives in the last few months.

Other areas that have been identified have been a lack of stress and scenario testing. The Financial Services Authority (FSA) released consultation paper 0824 on this very subject which also raises the issue of testing to destruction, identify the scenario that puts you under, and then see how likely you think that may be.

Other contributors to the credit crunch were that in many cases, parts of businesses were ignored. They were either considered not to be risky or thought to be immaterial.

Another area that came to light was the weakness of the CRO role. If no one listens to the CRO, they do not have any clear next course of action, no regulatory remit, and no professional body to back them up.

The other thing which has been apparent is most of the rhetoric has generally focused on the issue of failing to foresee events, which brings me on to the next point. ERM is not about avoiding risk. ERM had increasing focus even before recent events. Now the importance of an effective ERM function has been demonstrated, albeit a proof by contradiction. It is not about avoiding risk per se, but ensuring that the returns on offer are commensurate with the risk exposure, one corollary being that unrewarded risk should be avoided or minimised.

ERM is about identifying opportunities as much as identifying pitfalls. For example, it may allow a company to increase expected returns without increasing risk exposure at all. Moreover, companies with effective ERM frameworks will be able to identify risk arbitrage opportunities better than those without.

So, where do actuaries fit into the big picture? There is no doubt that actuaries play a key role in the risk management of insurance companies. Indeed, actuaries have many of the skills required to be CROs, they have a good knowledge of insurance and risks and the business as a whole. But many will have gaps in their knowledge. This may be a case of lack of awareness of the broader components of ERM, the unknown unknowns, if you like, and perhaps this paper has pointed a few of those out to you.

But where and when we are in a position to be a CRO, our broader awareness and skillsets must be visible to other stakeholders, not just to ourselves. In fact, in the experience of the authors, actuarial departments are often the biggest miscreants when it comes to issues like documentation, version control, and adhering to spreadsheet protocols and other process control and risk limitation issues.

So, to enhance our credentials, as a second line of defence, we also need to demonstrate our effectiveness when at the first line of defence. Conversely, professional risk managers may not be familiar with industry-specific risks and also less able to comprehend and communicate the messages coming out of our risk models. A case can be made for either to upskill and fill the CRO role for an insurance company or other organisations. Still actuaries are potentially in pole position.

The Actuarial Profession has reacted to the situation with the creation of the ERM PEC. This is all part of the global actuarial initiative. Regardless, one thing for certain is that in the future, actuarial work will be closely aligned to if not at the core of enterprise risk management.

So, what kind of environment do we need for ERM to succeed? As is often said, it must be

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driven from the top. It has to be embedded in the strategic planning. There has to be genuine belief and buy-in all the way down from the board room to the coal face. Everybody has to be living and breathing it. This will mean there will have to be some real changes in behaviour and, perhaps more importantly, in mindset. The incentives have to be there to embrace and execute enterprise risk management, and that in itself is part of embedding.

Communication is also key as you need communication to get recognition. For example, risk appetites need to be defined and communicated, and responsibilities need to be defined and communicated. Line management must understand that they are responsible for risk management in the first instance but we also need effective independent functioning risk committees.

Going back to the reporting lines, the CRO ideally should be on the group executive. At the very least he or she should have direct access to the board. What is perhaps more important is the CRO and the risk management team should have the right to challenge management. In fact, they should be expected to challenge management. Enterprise risk management, be it under Solvency II, ICAS or anything else, should not be seen as a regulatory burden or a cost of doing business. If you do see it as a regulatory burden or a cost of doing business, then that is exactly what it will become.

Why is ERM not more advanced? In short, because it is not easy. Discussing things that may go wrong or near misses may not be seen as conductive in terms of managing from their career perspective. It is better to focus on the good things that happened.

The other stumbling block is that of image. The role is not very appealing at the minute and may be seen as a lose-lose situation. You get accused of being negative when identifying risks that never happened, and then you get blamed for missing risks that do come home to roost, and are very much seen as a gatekeeper.

That brings us to the point that training will be required, not just technical training but training on the process and perhaps also people need to be trained to a new mindset. It is a major undertaking; the amount of work is often underestimated. It is quite telling that companies which are well advanced with their Solvency II implementation feel they have much more left to do than companies who have done little or nothing. Finally, if ERM were easy to implement, then more than 3% of 274 companies would have been rated excellent by Standard & Poor's.

To be effective as the chief risk officer, it really needs the support and backing of a professional body along the lines enjoyed by the actuarial function holder. Communication will be key to success, not just internally, but externally to the rating agencies, to regulators and to business partners. Enterprise risk management may well be subject to external scrutiny, maybe through the regulatory process going forward, not just the models but also the processes.

Mr J. P. Ryan, F.I.A. (opening the discussion)**:** In ¶2.7.1, the authors state that risk management thinking has developed largely in the last 10 to 15 years. Much of the thinking actually occurred before that.

What has happened in the last 10 to 15 years is the role of governance, the reporting of boards and reporting of shareholder risk that has made a lot of strides, coupled with a lot of the financial modelling and actuarial involvement in that. Much of the thinking, and a lot covered in the paper, is in fact much older than that.

There is in fact the Institute of Risk Management (IRM). There were professional organisations involving risk managers many years before that and the IRM just got together to form a professional body per se. The Risk Management Professional Journal is well worth keeping in touch with and anybody who is interested in risk management and the topics in this paper should study it.

In ¶4.1.14, the authors talk about the Actuarial Profession knowing a lot of the tools in this area. In fact the Actuarial Profession has not developed much in this type of activity. A lot of the tools, and indeed the risk management circle which was covered in a paper to this Institution in 2000 by the Financial Condition Working Party, covered risk management control. That covers risk identification, risk control, financing and administration.

Risk identification is a very important skill. That is a major part of the risk management process. It is something that is very difficult to pick up and it is something that does not get picked up by models but is, nevertheless, a very important part of the process.

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The authors talk about oversight and management and suggest that management of risk should be at the line level. You need at the line or operating level ownership of risk if you are going to get people to react sensibly towards risk. The management process is much broader than that. It is unlikely that line management will deal with much of the financing of risk or indeed the transferring of risk and many of those things would need to be dealt with centrally.

It is much more complicated than oversight. Oversight is really a concept that has come in the last ten years in terms of the governance issues, and that is an important aspect of that.

The other issue that you need to consider centrally is of course diversification credit, the operating and the diversification of risk. At the operating level, almost by definition, you will not get the diversification element but you will get that across several operations but you want people at the operating level and the line division actually to control. They try to reduce them and cut them down and avoid unnecessary risks but not necessarily managing the whole diversification.

The other important aspect that is sometimes forgotten is whose risk is it? Particularly when it comes to financial institutions, we have policyholders, depositors, shareholders, all of whom have very different interests. When considering the risk management aspect you need to consider all of those. The regulatory authorities will have different aspects of that to the board, to the shareholders, and so on.

In ¶7.4.2, the authors suggest that VaR does not solve everything. I suggest there is very little that VaR solves. I have said on several occasions that VaR only works for elliptical risks. It is widely used by banks in short-term market risk, but certainly does not deal with catastrophic falls in stock markets or credit with CDS swaps, and any bank which was relying on VaR to allocate capital would certainly have come unstuck in the recent process, and many more banks did than otherwise. It only makes sense to use VaR as a calculation for short-term market risk because it is easy to calculate quickly and can deal with lots of market movements. When I mean short-term market risk, I am talking about a few days only. More than that you have to use another risk measure which is totally different. VaR will mis-allocate risks, not only the amount of capital but it will order them incorrectly if you get skew risks.

This is a field in which actuaries can do so much more. It is very, very encouraging, the work done by the ERM group and as a Profession we have much to contribute so actuaries can do so much more in this field. ERM is still only in its infancy, and we need to do a lot more work, particularly in some of the more complex risks, and the risk identification skills where our training per se does not necessarily help us but where the logical mindset that we have is a very powerful discipline.

Mr P. W. Wright, F.I.A.: There is very little recognition in the paper that the big growth in ERM which has been seen, particularly in the banking industry, has not prevented catastrophic collapses in the institutions concerned. It could reasonably be argued that the modelling aspect of ERM, with the models invariably being used to justify lower capital requirements, has been a positive contributing feature to such collapses as too much comfort has been derived from the results of the models. Perhaps the old "ad hoc" actuarial approach referred to in the paper and traditionally used in the insurance industry was not too bad after all. The authors in this respect remind me of the attitude of the FSA which, as late as November 2006, could write in its Insurance Sector Review on risk that "Whilst other sectors of the financial services industry were considered to be further advanced than the insurance industry, the gap is now closing" — a comment which is clearly seen as preposterous now.

Neither do I take too much notice of the views of the major rating agencies on this subject. Those dealing with insurance ERM may be the paragons of virtue implied by ¶7.5.2 but the decisions of some of their colleagues leave something to be desired. I note the paper records their view, that generally US companies are more advanced than their UK and European counterparts. I wonder when I read this how AIG fared in their surveys.

I would reject the claim made in ¶4.1.4 that "we have seen material improvements in the understanding of market risk". In my view, recent events have emphasised that market risk is

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really uncertainty in the sense that it is not subject to underlying probabilities. Longevity risk may also be in this category along with some important operational risks. ERM methodology, if it is to be of any use at all, will have to get to grips with the treatment of uncertainty type risks.

This all brings me on to the comments made about Solvency II. I am now of the view that there is very little benefit to either the industry or the regulator in following the largely discredited Basel II route in permitting the results of approved models to substitute for the standard SCR. The approval process for internal models is, as described in the paper, quite horrendous. The results of QIS4 appear to indicate only modestly lower capital requirements, and the ORSA exercise will, in all probability, produce a capital target in excess of the standard SCR.

I argue with the statement made in ¶4.3.11 that if the standard SCR is lower than the results of an internal assessment, that this in itself is a reason for the FSA to impose a model requirement. This result may well be caused by poor calibration of the standard SCR, for example the adoption, for political reasons, of a very low equity stress test and weak equity/interest rate correlation. The FSA should not be encouraged to go along with poor calibration thinking that it can override the implications by imposing internal model requirements. Such an imposition should rather be restricted to cover only those cases where a company is faced with genuine bespoke risks.

Finally, I thought the sections of the paper covering non-modelling aspects of ERM were very useful and comprehensive. It would seem from recent events that the need to create the right environment covered in ¶6.11.1 may reflect more than a mere theoretical issue.

Dr L. M. Pryor, F.I.A.: As the paper points out, BAS is part of the Financial Reporting Council (FRC), which is the UK's independent regulator responsible for promoting confidence in corporate reporting and governance. The FRC has responsibility for the combined code on corporate governance which sets out standards of good practice in relation to issues such as board composition and development, remuneration, accountability and audit and relations with shareholders. The code underwent its last major review in 2003, and since then the FRC has reviewed its impact and implementation every two years.

Earlier this month, the third such review was announced. There are several questions on which views are invited, including whether there are any aspects of good governance practice not currently addressed by the code or its related guidance that should be, and whether they comply or explain that the mechanism is operating effectively, and if not, how its operation might be improved.

As an operating body of the FRC, the BAS too is concerned with governance. Our overall objective, which all our standards are intended to support, is that the users of actuarial information should be able to place a high degree of reliance on the information's relevance, transparency of assumptions, completeness and comprehensibility, including the communication of any uncertainty inherent in the information. This ties directly into governance because in insurance companies it is the board that makes the important decisions, and the board often uses actuarial information in the course of making those decisions. As a matter of governance, it is important that actuaries do not usurp the decision-making responsibilities of the board but recognise that the quality of the information they provide has a significant influence on the quality of the resulting decisions.

In ¶4.2.5, the authors point out some of the advantages of principles-based regulation over rules-based regulation in view of the fact that organisations are all different and that rules will not have the desired effect for all companies. I would amplify that by saying that it is impossible to write rules that have the desired effect in all circumstances. On the other hand, as the authors also point out, principles-based regulation can result in uncertainty regarding the boundaries of compliance. It makes it much more difficult to answer the question "Have I complied with this standard or have I not?"

You will not be surprised to learn that this is an issue to which the BAS has given a great deal of thought. We believe that it is outcomes that matter. All our standards are intended to

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serve our overall reliability objective, and each standard will itself have a purpose as it is expressed in terms of outcomes.

We do not think that it is possible to specify behaviours, inputs if you like, that will guarantee the desired outcomes. This does indeed create problems as actuaries ask for more guidance about what they should actually do, but we believe that individual actuaries have a far better understanding of those who will use the information that they produce than we ever can.

We have every confidence that actuaries, by exercising their professional judgment, will be able to decide what inputs will result in those outcomes for their own users and in their own circumstances.

Turning now from governance to risk management, there are just a few brief comments I would like to make. First, the paper makes many references to audit committees. But I can find no mention of their function. Given their important role in ERM, this is perhaps an unfortunate oversight.

In his introduction, Mr Graham said that actuaries are potentially in pole position when it comes to ERM in insurance companies, and in several places in the paper, including ¶¶4.1.14 and 7.4.5, it is stated or implied that actuaries may be better than other professionals at various aspects of risk management. In view of the recent failings of risk management in many different fields, notably banking but in other fields as well, I think that we should be very wary of claiming that we as a profession have the answers.

It would also be interesting to know how much, if it all, recent failures have been correlated with identifiable weaknesses in risk management. By "identifiable", I mean identifiable without the benefit of hindsight, without saying, "Well, of course there have been failures, therefore there must have been something wrong with the risk management."

Finally, Mr Graham also stressed some of the problems that may arise from over-reliance on complex models. This is pointed out in several places in the paper, including in ¶6.9.6, where the authors point out that all model results must be taken with a pinch of salt. It is always possible that the underlying model itself may be wrong. I can only agree wholeheartedly.

As ¶7.4.5 says, it is important to be wary of placing complete reliance on complex models. As the saying goes, all models are wrong but some are useful. A model can only ever be part of the answer.

Mr A. D. Smith (student)**:** The financial firms' recent losses have been widely publicised as have the facts that some mathematical models failed to predict or mitigate the losses. Many of us in the quantitative field are acutely aware of the need to do better next time, but particularly those who have lost their jobs or their life savings, or both. The natural response is to challenge mathematical assumptions underlying models. Certainly the mathematics need to be right and software implementations need to be accurate. Beyond that, it is important to back test models and verify that the mathematics is describing something close enough to the real world.

But for many of the models that recently appeared to fail, back quality control and back testing was in place. The models failed simply because the last six months turned out not to look like the limited past data on which the models were based. One of the difficulties highlighted relates to the short time period actually available for instruments that had been fairly newly invented which seems to have caused many of our current difficulties as events turn out to be far worse than the worst event in a fitted sample.

So when you have one of these so-called black swan events, I am not sure it is a failure of a particular model but rather a failure of the belief that you can extrapolate past data and get a comprehensive view of the future. We can argue about whether it is VaR or t-VaR and I take Mr Ryan's point here ; but either of those methods calibrated to the historic data might not give you a useful answer simply because of the inherent limitations of extrapolating past data.

I think often the limitations are understood. The difficulty is getting those limitations well-known or to the places where they need to be understood. For example, it was well understood in the quants community that when you are pricing subprime mortgage classified debt obligations that there is a critical dependency assumption inside that. People understood at the quant level

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that you could calibrate that historic data and get one answer, but if that changed slightly it would have immense financial consequences. It was also reasonably well understood that some of the rating transition models that have been used for modelling credit portfolios similarly relied on transition matrices — if they changed slightly, you could lose a huge amount of money.

So that actually was understood before the crisis happened. The problem is one of governance rather than technical modelling. The quants knew this but the CROs did not know it, or at least they did not admit to knowing it. So you have perfect documentation, you have all the checks on the model, you have all the back testing, everything is in place and you show that to your auditors, internal and external. You show it to the rating agencies, you show it to the regulators and they all say, "That is exactly what I expect to see.'' But you cannot easily police the need to think of new things that might go wrong.

It does seem to me that the CRO's role is absolutely vital and I am not absolutely sure that the set of criteria for CROs described in this paper would necessarily get us to somebody who could spot those. So, if I have a criticism of this paper, it is that I prefer to see more about a CRO's need for technical modelling depth in order to offer appropriate challenge to the most complex models within an organisation. Then they might deserve the kind of board access that the authors of this paper would like them to have.

Mr J. G. Spain, F.I.A.: I do not believe that actuaries are well placed to take part in ERM as the experts. My reasons are quite simple. We do not actually understand what it is we do, what we do well and what we do badly.

One of the things that we seem to have been doing over the last several years is conniving with the idea that single values give you a good representation of the future. They do not. This applies to insurance valuations and to pension scheme valuations, whether it is for accounting purposes or funding purposes. Single values do not tell you anything really about the long-term future, and pension funds and insurance companies must be about the long-term.

Why are we still doing this? Why did we ever start it? Because we did, people are not listening to actuaries.

Dr Pryor used a phrase which I thought was quite interesting: "actuarial information''. I was not quite sure if that meant information provided by actuaries or information provided by anybody which was essentially "actuarial''. I used to think that actuaries were required to assess the options inherent in any particular situation.

What are we going to do with those risk assessments? Are we just going to capture one number or are we going to do something BAS, as it happens, have been encouraging us to do for the last year or so, which is to go into the fundamental underlying cash flows which are expected to take place instead of focusing upon capital values?

Mr R. Curtis, Hon. F.F.A.: May I say that I am extremely disappointed that there was no reference made to the absolute pre-eminent work on ERM in the last six months from the International Association of Insurance Supervisors who have actually produced an international standard and guidance paper on ERM.

One of the aspects which I thought the authors could look at more was this issue around culture. We have seen a number of major insurance groups fail over the last few years. You can go back to HIH, and other well-known examples, where the culture of the organisation was manifestly responsible for the lack of adherence to proper risk management disciplines.

You can have the most wonderfully set framework, strategy and tools to assist in that identification of risk and the management thereof. But actually unless the senior management and the board really do care about this issue, and it comes to the very fabric of the cultural essence of the organisation and whether they really are doing this as almost a compliance exercise or whether it fundamentally goes to the root of what they are trying to do in terms of their risk appetite and overall strategic aims, unless the culture is there actually to support all of this, you are still up against it.

I think it would be well worth the paper actually exploring that issue in depth because it is something in the formal literature out there which is lacking in terms of what is the role that

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culture plays, what do you do when you have the dominant CEO and quite an ineffective board? Why are they able to continue going on in that sense?

They will always say but will never admit that they do not take risk seriously, but we have all been there, we have all worked there, we know that culture has basically everything to do with how firms are operating. That is a real central issue that we have not addressed enough.

Ironically, in Solvency II we have done a lot of work over the last number of years trying to have a role, and perhaps ironically, for the actuary and an actuarial function, and one area we probably have not done but maybe we should have and maybe we have missed a trick along the way, is formalise a role of the CRO to safeguard, in a sense, even from his supervisory perspective, that there is independence of that risk function through to not only ourselves but also the board, shareholders and others in terms of this. We all have been there as well where they can be influenced or under the sphere of say CFOs who have, for example, a very different remit and not always complementary to where a risk professional is trying to come from. Many of the other comments by other speakers allude to that conflict.

Mr M. C. Ledlie, F.F.A.: I am possibly unique in having been an Appointed Actuary and then with the change in regime becoming an Actuarial Function Holder and With Profits Actuary. I now hold a CRO role.

Personally, I have no issue within my own organisation about access to the board, but the one thing I notice in particular, is the lack of regulation that exists for myself as CRO compared to the pages and pages of regulation that exists for the Appointed Actuary or the Actuarial Function Holder, and the extensive guidance that also exists in terms of the expectations placed upon the actuary.

There is very, very little coming from the regulator in particular in terms of guiding the CRO role. We have Control Function 28 which has half a page of text, if that much, within the regulations. I think that there is a big opportunity there to think about how this key role in the organisation is regulated and to provide a degree of consistency. I suspect in different organisations a very different approach and role for the chief risk officer will exist.

It is not to say that the actuary has been perfect and there have not been failures but we have learnt over decades in terms of how the regulation and professional guidance for the actuarial role supports individuals in that role. We have important provisions such as a requirement for an actuary taking the role to get direct access to the Board, and an actuary would not be able to take on the role without that.

So in thinking about reviews, such as the Walker Review, an important area where the Actuarial Profession could respond is in sharing some of our learning in the life assurance sector with other sectors such as banking and suggesting some ways in which enhanced regulation and enhanced professionalisation of the CRO role would be of great value.

Mr J. R. Bowman, F.I.A.: One of the things I particularly liked about the paper is the lack of formulae because the subjects we are talking about cannot be reduced to simple formulae. There is no one point answer.

What we must do as actuaries is communicate that what we are talking about for the benefit of all our stakeholders, our shareholders as well as our customers, is talking about a range of outcomes, and that, though people might wish it, even with all the mathematical abilities at our disposal, we cannot give you a single answer.

My main focus in my remarks is about culture. There is a need to win over every single person in the organisation if ERM is actually going to deliver, and it is essential that there is leadership from the very top. This must become business as usual.

I see very strong similarities with what happened back in 1988 when compliance came in. What we have here is an opportunity to show how things are now quite different. We have to have an approach which, if you like, runs all the way through what we do. It has to be embedded within the insurance company.

We need as a Profession to show real leadership here. We need as a Profession to look forward as well as backwards. We are in a new situation, not only a situation caused by the

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economic circumstances in which we have found ourselves, but the huge opportunity which Solvency II gives to the Profession.

That is an opportunity which we as a Profession must seize. The opportunity as I see it for us, is one of turning what are complex subjects into simpler ideas which people at all levels involved in running companies can actually bring into everyday working. That to me is quite a challenge for the Profession because we are not known for our communications skills as we are for our mathematical skills.

I would say the CRO role is a leadership role which is demanding. But actuaries are used to filling leadership and demanding roles. I think we are well equipped to show the leadership which is needed, particularly at this time, but we do not have time on our side.

It is very important that the work of the working party is continued; that we seize the opportunity. We already have actuaries filling the roles of CRO, and I see that only growing. There will be a need for guidance. This is an area which I think we can show that we as a Profession can take new opportunities. We can add value, especially for customers as well as shareholders.

We can show that we are a Profession which is capable of moving with the times; not only moving with the times, but helping to create the environment in which economies can prosper.

Mr H. D. Sutherland, F.I.A.: I should like to address what are the next steps for the Profession, and suggest some practical points that maybe we ought to consider. In doing this, I am thinking about the sort of messages we are getting through this paper and through what we read about Enterprise Risk Management; the need for this to be seen as holistic; the need for it to be regarded as embedded in the business and in the culture of the business; the fact that we cannot have a risk management silo where ERM is carried out separate from the rest of the organisation; that it does need to be part of the whole culture of the organisation; and that we as actuaries can bring significant benefits to this.

In the closing paragraph of the paper, the authors talk about the need to get non-believers to believe in Enterprise Risk Management, and also to get believers to be seen to behave in a consistent way. What I think we ought to be considering as a Profession is making it a requirement that all actuaries spend some time in a central risk management operation, ideally, as part of the CRO's function; this is a way in which they learn how to apply the technical subjects that they have studied to this broader ERM context, but that they spend only a short period of time within the CRO function before moving back into other aspects of the business, and taking that message, that culture, back with them where they go.

So ideally, I think we ought to consider embedding that sort of requirement into our professional structures. If we look at other professions, at the medical profession, at the legal profession, we can see that as part of the professional development and professional qualification process there is a similar requirement.

What we could do in a shorter-term period is to say that just as all actuaries have to attend a professionalism course and have to revisit that every ten years, maybe all actuaries should have to do an ERM course. It is very passive, it is very receptive, but at least it helps show that we are taking forward these ideas.

Alternatively, maybe we should say that as part of the mandatory CPD that every actuary has to do, there must be a minimum element which relates to ERM, so that every year everyone is at least thinking and reading about this.

If we feel that this is not an approach for the Profession and something that we should be requiring for all actuaries at this time, then we should at least be encouraging insurance companies to regard this as part of the way they wish to train their actuaries, including a period of time within the CRO function as part of the actuarial student's development. I think we should certainly get the message over to our students that as part of their development, taking them forward to a more professional role in the future, they should be seeking to spend some time in the CRO function.

Mr M. G. White, F.I.A.: In discussions on ERM, I would like to see even more on the role

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of incentives. It is of course all too easy to criticise the conventional measures of corporate success and the way in which their use in setting management incentives has had perverse effects. It is far harder to design sets of objectives and incentives to be adopted by and within an insurance business which together have the desired long-term result. There are lots of good things which just do not show up in the published numbers. Essentially, you cannot aim directly at the desired end result, but need to have some understanding of how the complex system which is an insurance company in its market, and the people working within it, really operate.

Research in this area is something to which I believe the Actuarial Profession is in a good position to contribute. In the current climate this presents a good opportunity for us to put forward useful ideas, possibly radical ideas, which get taken seriously.

Mr R. J. Houlston, F.I.A.: I would like to turn things round slightly and consider governance and the role of directors. There is a regulatory requirement for directors to set the risk appetite. The paper mentions risk appetite regularly but its use changes from strategic appetite through to individual targets for amounts of risk.

I believe that as a Profession we are good at strategic thinking. Therefore, I would like to see actuaries taking a major role in enabling boards to set risk appetite.

In terms of expressing risk appetite, I do wonder whether a new more precise terminology needs to be created. The paper tries to quantify risk appetite and talks about level. It is not entirely obvious to me what level is.

There seems to be some contempt for the recent use of sophisticated stochastic models and probability of ruin. However, I believe that probability of ruin is where the board needs to start, even if quantification is done without complex models.

My belief is that the term risk appetite should be reserved for simple requirements such as what is the acceptable probability of meeting ICG in all reasonably foreseeable circumstances? This seems to be a really good way for a board to express its objectives. Everything else can then follow. The risk management department will then help the board to understand the implications, provide the solutions and manage the risk.

There is one section of the paper which may be misleading and it was the trigger that started me thinking about the most appropriate definitions for risk appetite. The paper puts forward the argument that if you can get a better return, you might want to increase the risk appetite and write more business. If you do not understand what the extra return is for, it could be very easy to go down the wrong road and increase the risk of failing to cover ICG in some circumstances.

Mr P. A. C. Seymour, F.I.A.: I have listened to many debates about modelling, and the point I continually make and I have to say, I do make it inside the FRC as well because they are having a review of the Combined Code, is that a lot of this issue is actually about the word in this paper's title "governance".

A number of speakers have in effect been echoing that point. Mr Curtis spoke about getting the culture right. But where does culture start? In the board room.

Having experienced being a non-executive director and listened to learned actuaries telling me about their models, in a sense I may have a better chance perhaps than some other non-executive directors in understanding what they are trying to tell me, but it is actually very, very hard for a non-executive director to connect with the engine room and what is going on in those models.

I personally think that many of the problems we have had are due to lack of challenge by the board. Indeed, if I may put it rather crudely, lack of understanding of what is actually happening in their organisations. For that reason, I think the comments made by Mr Curtis, and I have listened to the IAA's debates about modelling as well, are not about the modelling itself; much of this is about understanding, with a lot more stress testing and challenge from the board.

I really do think that questioning and scenario testing and stress testing are crucial elements in this. The biggest problem of all is how you can connect the governance body, the board, to the technical behaviour inside the organisation.

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Mr M. H. Tripp, F.I.A.: Looking at the small organisation that I have the privilege of running, I am amazed by the complexity of any organisation. A business is a system of all sorts of interactions, and what happens as a result of these is in some sense almost unpredictable.

In considering the issue of business systems, the possible next step is that some research about understanding business systems and their complexity would be very helpful. Maybe one element will be organisation design. We have just had comments from Mr Seymour about the challenge for the board. I entirely understand that. At a time like this, it is all too easy, when we are almost looking for scapegoats, to say, "The board let us down so we will replace whatever we have been doing at the moment with a different system, the board having a different set of responsibilities" or whatever. Then something else will go wrong.

Wherever we are at, understanding the totality of an organisation, the business system, the organisation design, whatever it is, will be a really helpful addition to actuarial thinking and CRO thinking.

The second point I wanted to cover is really around does guidance help and to what extent? Does overly detailed guidance cause convergence and, like lemmings, we all do the same thing? The CRO, or the board, or whoever it is who will do a really good job will be the person that just happens to hear something, has the antenna to recognise that it is really important, the imagination to see what could happen and the courage to say something about it.

Mr M. Iqbal, F.I.A.: My first point relates to CROs. Mr Deighton made the point that they have to be devil's advocate. They do but a consequence of that is they have a short shelf life.

The second point relates to mathematical models. We seem to have moved away from using models to saying we need governance and other things that are more important. Maybe banks used the wrong models. But I suspect in many cases the problem was not as much models as the assumptions. If you have a large tranche of sub prime mortgages and self certified mortgages what risk do you attach to that? It is very similar to a life company using select assured lives mortality for a cohort of HIV-positive policyholders.

My third point relates to equity modelling. All the mathematical models are built on the assumption that treating the year on year changes as independent random variables is a useful model. You have to ask whether in modern conditions a public company is effectively being run for management with attractive share options and if so, whether that model is any longer appropriate, especially now when some of the companies are 75% in public ownership.

Mr P. J. L. O'Keeffe, F.I.A.: I am told ERM is not risk aversion but somehow this is going to be the idea which is going to run an insurance company. That is going to be a very difficult message to get through. Mr Seymour has said it has got to start in the boardroom. Somehow somebody has to tell the chief executive or the chairman of the company that ERM is what they have to do, then the chief executive or the chairman has to persuade the board that ERM is what they have to do. The board will have heard all sorts of stories in the past. If they have been in this business for the past 20 years they have had "In Search of Excellence", they have had globalisation, they have had marketing driven organisations, and now, all of a sudden, there is this new panacea which has come along and they have to understand ERM.

Mr Seymour also mentioned that the board must challenge more. That will certainly happen. But what I think is also going to happen is we are going to get pressure from the FSA and the regulators who are going to tell the chief executive and tell the chairman "ERM is what you have to do" and this ought to be the way you look at your business in the future. Alternatively, the board are going to have trouble understanding it, and then the next layer down are going to have trouble understanding it. Before you have everybody understanding it, you will have all the old problems about "Well, I was never really in favour of it." Line managers will say "Well, we will do this in the morning and get on with the business in the afternoon." It is going to be very difficult.

Dr Pryor mentioned that actuaries should be wary of saying that we have particular skills in this area. We are the principal people who have skills in this area. We have it because of our very difficult and very lengthy training which is technical. We have it because of our experience and

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the way in which we have worked in this industry. Nobody understands these problems better than actuaries. So actuaries should be taking a lead.

Dr Pryor said that it was because of past failings we should be wary. Well, we have had past failings and those have been dealt with. It is up to the BAS to produce guidance notes that are going to tell us what we have to do and it is up to our disciplinary system to make sure that people who step out of line get punished.

Mr G. D. Clay, F.I.A.: One of the key considerations in both insurance and pensions was that the institution was promising to pay benefits anything up to 100 years into the future. So the overriding management objective was to make sure that the institution was there to pay the benefits.

Meeting the regulatory capital requirements seems to me to be a necessary condition, both now and at all future times, but not a sufficient condition for institutional survival. Any idea of managing the business with the maximum risk on the currently available regulatory capital strikes me as a recipe for falling into the next unforeseen pothole; therefore it is clearly not very clever for a permanent institution.

Bearing that in mind, one of the significant developments over the last 20 years or so is that the period of tenure of non-executive directors has come down, because they need to be able to demonstrate their independence. The period of tenure of CEOs has also come down and it is now rarely more than five years. Therefore, where is the continuity of view at board level? If you go back 30 or 40 years, most insurance company boards had people who had been on that board for 40-odd years. Members of founding families were still around in many cases. Certainly the senior executives, whether they were board members or not, had been in the business for 30 or 40 years. It was therefore automatic to consider the potential impact over the next 40 years of any proposed action (or inaction).

We now have a governance system that is driven to have far too short term a view for the insurance business. This attitude is reinforced by the nature of many of the remuneration incentives for the senior management, which HR directors have been successfully pushed to have ever shorter payback periods rather than being confined, as they originally were, to shares that vest only in ten years' time.

I hope my comments highlight why I think the nature of the governance problems have changed. My concern is that the nature of the regulatory approach, the governance approach, has not really changed to reflect the new circumstances.

Professor A. D. Wilkie, C.B.E., F.F.A., F.I.A.: Figure 1 (¶6.9.5) is drawn like a probability density function, but what you are wanting is the distribution function. The complement of the distribution function would start at unity at the left-hand side and come down all the way like an l_x curve.

There is another way of presenting this, because the left-hand side represents all the profits, but this has been truncated. I think it could go a lot further to the left as well. But I suggest putting the median in the middle and then put on the right-hand side the complement of the distribution function (on the loss side) which curves down; then to the left of the median put the actual cumulative distribution which also curves down on the other side. So you have two different curves on opposite sides of the middle.

Mr Smith made a lot of comments about mathematical modelling. I would defend the mathematical modelling by saying that mathematical modelling is necessary but the risks are almost certainly greater than the mathematical models show you. They are very unlikely to be less because the mathematical models have taken into account quite a lot of the things which are known to be variable: random numbers of claims, interest rate changes, share price movements, etc. They may not always take account of parameter uncertainty or model uncertainty, but you can build those in as well if you wish.

The real position is almost certainly going to be worse than the mathematical model tells you, and it is extremely unlikely to be better. So do not dismiss the mathematical models as being of no use. They are a necessary framework.

Another thought about what is one looking for at a one in 200 level, for example? If there

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are 200 insurance companies in the country and one of them writes too much business or too risky business or has too big sums assured that it has not reinsured, then its possibility of going bust, having insufficient to pay the claims, might be one in 200, and you want to avoid that.

I could think of an example within the insurance and pension fund business, and I put a probability of this as rather higher than one in 200. It is that some future government would abolish completely tax relief on pension contributions. Pension contributions would be made no different from any other sort of personal saving. You would not get tax relief on the contributions; you would not get a tax-free lump sum and you would pay tax on the interest and on capital gains, but not on the capital content of any annuity. What would that do to pension fund activities and to the pensions business of life offices? That would affect the whole industry, not just one bit of it.

I think one has to think of total industry risks or total calamity risks as rather different from individual company risks.

Mr S. M. Shepley, F.I.A. (closing the discussion)**:** A key question is: What is ERM? And what role does it play in business? One definition is that it is the methods and processes used by businesses to manage risks and seize opportunities to achieve their objectives. Another definition is "a risk based approach for managing an enterprise."

We talk a lot about the CEO having to embody enterprise risk management. I think the second definition, a risk based approach for managing an enterprise is probably what we should be focusing on today. It is much more achievable, it is much more realistic.

If I move on, does ERM realise business benefit? I will paraphrase: why would a CEO want one of those? I think we have had the luxury of listening to a CEO and there have been a number of stakeholders talking, but I am not sure we have articulated why the CEO in his limited tenure of four or five years to make a difference is going to spend a massive amount of his time wanting an ERM compliant organisation. So if he is building a more resilient organisation when the unexpected inevitably happens, then that is absolutely fine. Will it help him take better business decisions in the short run? I think he or she will have the confidence to be able to do that using other mechanisms.

How does one measure the benefits of ERM? We talked about back testing. I think prospectively and retrospectively are two areas which I would suggest we think further on how we assess whether ERM is adding value.

How do we assess the degree of maturity that firms are along the curve embedding ERM? At least one of the rating agencies is very overt in recognising and rewarding organisations that are significantly mature in that regard. Maybe organisations that are mature in this regard will be better able to navigate out of the current economic circumstances. That is the sort of way we should be looking to see whether value is being added.

This paper has done a superb job of demonstrating there are a vast variety of stakeholders involved here. Whether ERM is adding value depends on your perspective. We have the shareholder; we have the rating agencies; we have the regulator. I suppose we have the policyholders underneath that. We have the firm, we have the director of which we have the non-executive flavour; we have the CRO; we have the audit and then we have other specialists of which I include actuaries and risk professionals.

That is a huge plethora of people, that we need to get some coherent traction with. While I agree with the comments that we have a huge and valuable part to play, I think there is no doubt that we need to collaborate and to communicate with a vast variety of people to move things forward.

One of the topics that has cropped up is stress and scenario testing. In my experience, if you put in a room seven or eight key business people from different parts of the business and say, "Right, you have an hour to come up with what the top five risks are to us as an organisation", that is an incredibly illuminating activity. It takes a real skill to tease out what the real risks are such that one can articulate them so that six or seven different perspectives agree that those really other key risks. I think one can build upon that.

I think coming out of that you begin to understand what are the things that you should be

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looking for to model on the tail value, and what are the correlations which are incredibly important, and then you can bungee jump your modelling to support the key stresses, the key risks, that that enterprise faces.

A point was made about point values. It is one of our biggest challenges. How do we communicate uncertainty? There is no doubt sensitivity testing around stress scenario thinking begins to communicate in a very easy way what the sensitivity is to certain assumptions. No doubt the modelling can then be tailored where it is particularly appropriate to come up with an approximate model that maybe does not have the precision that gives extra insight as to how to manage those risks better.

I would also suggest that we embrace scenario planning. There is no doubt in my mind that some of the carriers in Bermuda over the last five or six years had plans in place that should there be a catastrophic failure in their competitors they had on the stocks already business plans capable of exploiting the discontinuity in the market place. I think the class of 2005 reinsurance vehicles are an excellent example of that, where hedge funds brought capital in in the form of letters of credit very rapidly. Whether time will tell us that that was a good move, I think they have made lots of money, but who knows?

Moving on, we talked about Solvency II. Many comments were made about whether that is a move in the right direction. I absolutely believe that it is. I think the case for change is made.

I think if you look at what the Committee of European Insurance and Occupational Pensions Supervisors (CEIOPS) is doing there are fantastic initiatives underway relating to the quantitative impact studies. There is going to be a forthcoming consultative paper on internal model approval. All those are great touch points for us to be involved in and sharing our views as to how to shape this work.

The key challenge, though, is does it create value? I think at the moment the jury is out. I think it is more about compliance with regulatory stakeholder requirements. I think that is a perfectly legitimate ambition. I think that should be the mindset. It will be great if it is going to help organisations make big, positive decisions. I am not sure it is.

Talking to a non-executive chairman of a pension fund appointed 18 months ago, he perfectly understands the dynamics, big assets, big liabilities, marginal deficit. What has happened over the last 18 months? Discount rates have gone down. Asset values have gone down. Deficit has just continued to grow and grow. In an ERM world I am not sure what we would be expecting that individual to do. I leave that as an open question.

A more probably prevalent situation is an insurance board makes lots of money through a very profitable and large part of their business selling one particular product. What does a non-executive do? Does a non-executive say, "Hang on, are we making too much money from this product?" Even if they had that thought, are we supporting them in mentioning that in a way which is constructive in conducting their role?

Those are very small examples from a subset of stakeholders. Those are things, practical suggestions, and we need to come up with practical solutions to help them through that. But if you go through other stakeholders you can clearly identify other opportunities to do the same.

We need to develop best practice. There are better controls and developments of internal control frameworks that we can do. We need to begin to promote business models that embrace effective corporate governance so that it is not an adjunct and the CRO role, despite it being a difficult role, coming up with difficult messages, needs to be embraced in a way that it can function. Then there is education, which we have covered.

Who should be the CRO? Depending on your perspective, it is an underwriter, it is an actuary, it is an accountant, it is a risk specialist. I did wonder, listening earlier, whether we should force the CEO to have a stint as risk manager. There is no doubt that consideration of whether the CRO should be a controlled function continues.

Actuaries see themselves as a profession focused on risk management in life assurance and general assurance. We are not the only ones but we certainly take a predominant role so we are well-placed to contribute to ERM. We should not apologise for that.

We as a Profession have restructured and recognised the importance of this and the vitality

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that this can give the Profession in terms of varied careers going forwards. So we need to embrace it and we should do something with it.

But I do wonder are we going to limit ourselves by seeing ourselves as the risk manager in insurance? Equally, there is no doubt that we are not the only people that have a legitimate voice here. We need to develop more collaborative approaches. We need not shy away from producing solutions which are outside of our comfort zone. Equally we need to develop some deep technical analysis. I think it is more around tail value correlations and modelling thereof that will continue to legitimise why we have a market leading role there.

Summarising, Mr Graham's comments at the beginning, he talked about building approximately correct models. I thought that was a very elegant way of describing it. I think the debate as to what the actuary's role is in the ERM is one that we must continue. I am not so sure whether we should be creating a role for ourselves which is lose-lose, but that is the challenge, and whether we need to be dirty risk managers I am not sure.

Currently, failure in risk management has been seen by some as a reason for some of the current problems we face. I would like to think that we will know success has been achieved when ERM is seen to have improved decision taking. Perhaps the real acid test is in the current times. Are those forward-looking organisations capable of demonstrating better resilience and decision taking in these uncertain times, and will we be able to say with hindsight that ERM has facilitated that?

Mr R. C. Dix, F.I.A. (replying)**:** This is a new topic. There is nothing certain. We accept there can be some cynicism as to what this actually means. We have attempted to put something in an Appendix A which I think is the most clearly accepted definition but I think all agree that there is further work still to do there.

We tried to show in the paper that actuaries are well placed. We do not believe that we have a god-given right or are the sole ones who are well placed for the work required. We also showed the wider range of it. There is much more to this than quants.

The new training courses are an excellent step by the Profession, and in response to Mr Sutherland, I think you did not aim high enough. Rather than say risk should be part of the training, I should like to say people who are full-time in risks should be looking to go and work in the life department for a period of time, because some of us do aspire to full-time careers in the risk area.

I would caution against making risk appetite too quant. You have to get the board looking at you and not eyes glazing over as soon as you start mentioning probabilities. The risk appetite, yes, some of the core of it will be quant, but it is best explained in very simplistic methods.

Similarly, with stress testing, scenario testing and models, we have to get those across to those who are non-technical and possibly are not even believers. We have to train them to be able to ask the right questions. We do not support the fact that you have to be a quant to be a CRO but you need to know what are the right questions to ask.

Clearly linked to all of this is training of non-executive directors and the management as well. I think that there is a key role for us to play there.

Finally, it is clear from our paper, your comments and the discussion that there is a large amount of work to do in this field. The ERM PEC, and its various sub-committees, look forward to leading the Profession's thinking on this, and will welcome further contributions.

The group who did this always felt this to be the first paper of many. We were not so arrogant to suggest what the future ones were to be, but I sense from this discussion there will be a large amount of possible future research coming forward for us to look at and consider doing and delivering.

WRITTEN CONTRIBUTION

Mr A. M. Slater, F.I.A.: I would like to suggest a different perspective, at which Mr Spain hinted in his remarks. No-one had any doubt that a Chief Risk Officer (CRO) should be bright

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and technically competent, traits which are commonly associated with actuaries. While the authors appeared to think that this made actuaries leading candidates, I believe they ignored the CRO's fundamental responsibility, which I would assert is to challenge with authority their senior colleagues on decisions made. Most UK actuaries simply do not possess either the confidence to do this "kicking of the tyres" nor have been so trained. Therefore, unless and until actuaries educate themselves in such a direction, they will remain largely unsuitable to be a CRO. Those who do fit for such a position are probably not "just" actuaries!

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