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By

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This paper reviews a number of recent surveys relevant to risk management by UK insurers. These include the results of four surveys specifically on UK insurers. Our findings suggest that the risk management practices of UK insurers are variable, generally behind best practices in adjacent sectors, and in some cases are a cause of concern. However, we also find that they have been improving significantly.

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1. INTRODUCTION

There has been much concern in recent years about the financial health of the UK insurance industry. Many firms have solvency levels much lower than in the 1990s, and the industry is facing ongoing pressure from factors such as low returns and increasing longevity. Further pressure also comes from changes in accounting standards and in regulatory regimes. The former include possible changes to fair-value standards, and the latter include the adoption of the Financial Services Authority's Prudential Sourcebook, the move towards risk-based capital charges, changes in regulatory disclosure rules, and the prospect of further change from the EU's new solvency rules. The vulnerability of the industry was also dramatically highlighted by the difficulties experienced by Equitable Life, which was forced to close to new business in 2000. Since then, it has become clear that the risk management practices of many UK insurance firms have been poor and few would dispute the need for insurers to improve their risk management practices.

Two questions then naturally arise: first, what is the state of practice of risk management in UK insurance companies? And, second, how has the state of practice changed in recent years? This paper seeks to answer these questions using evidence from recent surveys of the industry. These paint a detailed (and, in places, somewhat worrying) picture and confirm the general impression that the industry could do much better than it is doing to manage its risks. On the other hand, there is also evidence to indicate that insurers' risk management practices have been improving significantly, and this is of course to be welcomed.

Most of this paper is devoted to bringing existing evidence together and we prefer, for the most part, to let this evidence speak for itself. In going through it, we also make occasional comments where we feel that they are called for, and offer some suggestions about how insurance risk management practices compare to those in other financial sectors – and, most particularly, how they compare to the (often superior but certainly far from flawless) risk management practices of capital markets firms and banks. We also attempt to provide some perspective and at the end of the paper we

give a brief discussion of what we believe the most important issues to be. Naturally, we recognise that others might interpret the evidence we present differently, but debate on these issues is to be encouraged.

The primary evidence considered here consists of the results of four recent surveys of the UK insurance industry:

- A detailed and informative 2003 survey by the Financial Services Authority (FSA) survey on UK insurers' risk management practices, together with a further survey issued in 2006.
- A public letter issued in 2004 by David Strachan from the FSA on the credit risk management practices of UK life insurance firms. This letter was based on an internal survey by the FSA and highlights some specific concerns on the part of the FSA regarding life insurers' credit risk management practices.
- A survey carried out by the present authors on the risk management practices of UK life insurers. This survey was carried out in 2004 as part of the authors' work on the Faculty and Institute of Actuaries working party on risk management in UK life insurers.

We would note that the two FSA surveys cover both life and general insurance companies, whereas the latter two cover only life companies. Thus, our surveys tell us somewhat more about risk management in the life companies than about risk management in general insurance companies.

This paper is organised as follows. We start in section 2 with a brief overview of the most relevant risk management principles and guidelines that have evolved in the capital markets and banking sectors: these provide a useful yardstick against which we can assess insurance companies' risk management practices. Section 3 looks at the FSA surveys of 2003 and 2006, which are most conveniently looked at together. Section 4 then looks at the survey in the Strachan letter, and section 5 examines the working party survey. Section 6 then concludes and gives our assessment of the state of practice of risk management in the UK insurance industry and how it has changed over recent years.

2. BEST PRACTICE RISK MANAGEMENT

There has been a long and active debate in the mainstream financial risk area about the principles of good financial risk management, and this had led to a fairly clear consensus. The basic principles or guidelines date back to reports such as the Group of Thirty Report of 1993⁶ and these have been repeated in various forms in many other risk management reports since. For our purposes here we are particularly interested in the following guidelines:⁷

- Risk policies should be clearly set out by senior management, who should set out procedures and controls to implement these policies and make sure that they are enforced at all levels of the firm.
- Good practice requires an independent risk management function, which should be responsible for the formulation and implementation of risk-control systems. This function should have its own independent budget, be independent of any trading or marketing function, and also independent of, and distinct from, the internal audit function. It should set risk limits, check and approve the pricing or valuation models used by the firm, model the risks the firm is taking, monitor its activities, and carry out backtesting or model validation exercises to help ensure the reliability of the models used by the firm. It should also have appropriate enforcement authority.
- The risk management function should be headed by a Chief Risk Officer (CRO), who should, ideally, report to the CEO and have a seat on the firm's principal governing body (e.g., its board of directors, if it has one).

⁶ See Group of Thirty *Derivatives: Practices and Principles*. New York: Group of Thirty, 1993.

⁷ These are distilled summaries of the (to us) most relevant guidelines to be found in the G-30 Report and other relevant literature. For more on these, see, e.g., L. Chew *Managing Derivative Risks: The Use and Abuse of Leverage* (Wiley, 1996), K. Dowd *Beyond Value at Risk: The New Science of Risk Management* (Wiley, 1998) or M. Crouhy, D. Galai and R. Mark *Risk Management* (McGraw-Hill, 2001).

- The risk modelling carried out by the risk management function should include identification of the principal risks faced by the firm, which would typically include different types of market, credit and operational risk. (Obviously, for insurers these would also include different types of underwriting risks.) It should measure these risks using state-of-the-art risk measurement models: these models might include VaR models or models to estimate other risk measures such as the tail VaR. It should also carry out stress tests to identify the firm's vulnerability to specified scenarios: these might include market crashes, or changes to market volatility or market liquidity.
- The firm should ensure that risk information is communicated in a timely and appropriate manner, and it is especially important that senior management be kept abreast of any serious risks to which the firm is exposed, so that they can take decisions on how that risk is to be managed.

These suggestions provide a natural benchmark against which we can assess the state of practice of risk management by insurance companies.

3. FSA SURVEYS

3.1. 2003 Survey⁸

3.1.1 Description and overview

The FSA survey of 2003 is the most detailed of the four surveys and gave a detailed snapshot of the state of risk management practices in the UK insurance industry in 2003. This survey was a follow-up to some initial risk assessment (or 'Arrow') visits carried out in 2002. These earlier visits had indicated various weaknesses in firms' risk management systems: these weaknesses were manifest in the scope and role of

firms' risk management functions, in the analysis and articulation of firms' risk appetites, in practices of stress testing and scenario analysis, in the ways in which risks in group companies were aggregated, and in the provision and use of management risk information.

The survey covered 39 firms representative of the company market and was carried out in early 2003. Its findings were also backed up by 19 site visits to collect further information. The firms chosen were representative of the diverse size and nature of life and non-life companies, and included large composites, mutuals, friendly societies, and firms closed to new business. It excluded bancassurers and entities in the Lloyd's market. 11 of the firms were life firms.

To quote the FSA report, the survey "aimed to understand the approaches adopted and recent developments in risk management practices and structures in insurance firms.

In particular ... to understand:

- how high-level risk management practices within the UK insurance industry are developing;
- the adequacy of existing risk management practices and whether we should issue further guidance to firms; and
- the implications for firms' existing risk management systems of our proposals for new rules and guidance in the Integrated Prudential Sourcebook (PRU), including individual capital assessments – the subject of Consultation Papers 190 and 195.”⁹

In attempting to achieve these objectives, the survey also sought to identify common practices and, where relevant, distinguish between life and non-life firms, and between large/complex and smaller/simpler firms. The analysis was restricted to analysis of documentation and discussion with management or staff, and did not include sampling or testing.

⁸ *Review of UK Insurers' Risk Management Practices*. London: Financial Services Authority. October 2003.

⁹ FSA, 2003, p. 3.

The FSA encouraged firms to benchmark themselves against the results of this survey, and to consider whether the common themes applied to them. The FSA also recognised that many firms needed to make considerable improvements if they were to meet the new insurance capital regime as set out in CP190 and CP195, which also aimed to set out a clearer link between risks taken and capital charges.

The main findings of the 2003 survey are as follows:

3.1.2. Practice is improving

A key finding of the survey was that many firms had improved the way they manage risk since the ‘Arrow’ visits of the previous year, and could demonstrate this improvement through improved documentation. Most firms were trying to meet or at least work towards FSA guidance and rules. Many firms had concluded that they needed separate risk assessment and risk committees, and had made progress establishing them. Monitoring of reinsurers had also increased, and so too had the quality and timeliness of information reported to boards.

3.1.3. Inadequate understanding of risk management

However, the report also made the point that many firms had reacted in a mainly reactive pattern. It went on to complain that some firms had designed risk management systems to comply with the FSA rather than because they appreciated that it was good business practice, and to complain that a number of firms did not understand the benefits of good quality risk management systems. This confusion about the purpose of RM also led to misunderstandings over how to comply with guidelines and to problems with RM documentation.

Needless to say, these findings are a source of a considerable concern, as they indicate that a number of firms lacked even a basic understanding of financial risk management.

3.1.4. Risk management organisation

Firms are required to take reasonable care to organise and manage their affairs, and this includes a requirement for adequate risk management systems. The overall responsibility usually lies with the CEO, but responsibilities relating to the management and supervision of risk, and reporting to the governing body (on setting and controlling risk exposures, etc.) can be apportioned to others. Over the previous 12 months, many firms had set up a risk committee and a separate risk assessment function. In a few cases, they had also appointed a CRO. As we have seen in section 2, these changes reflect good risk management practice.

Findings under this heading can be divided under three sub-headings – risk committees, risk assessment, and the relationship between risk assessment and internal audit – with the underlying theme being the independence (or, rather, lack thereof) of these different roles within the firm.

3.1.4(a) Risk committees

- Over 50% of firms – mainly large composites and life companies – had set up risk committees, and these had helped them achieve greater focus and see the significant risks facing the firm (e.g., as opposed to the only risk analysis being that of individual executives focusing only on the risks of particular business lines).
- Some medium size firms had expanded the role of audit committees to include risk and/or compliance issues. However, the FSA report pointed out that such arrangements were sometimes problematic: for example, the role of the audit committee is meant to be independent and non-executive, whereas the role of risk committees tends to be executive; and, in any case, an audit committee is not well placed to be as ‘involved’ as risk assessment requires. We would agree with the FSA on these points, but would also note that a typical audit committee lacks the skills or training to do proper risk assessment anyway.
- A few medium-size non-life company committees had taken the view that RM is part of normal risk management and that a separate RM committee is not needed. The report rightly suggests that this is usually bad practice, unless the firm is very small or structurally simple.

3.1.4(b) Risk assessment functions

- 32 firms (out of 39) had set up separate risk assessment functions (RAFs), most of these being in the life sector and established fairly recently. Their main tasks were to facilitate internal brainstorming exercises, maintain risk matrices, and produce or consolidate risk reports. However, these risk assessment functions usually lacked their own independent resources, and this made them reliant on business line resources and undermined their operational independence relative to other units in the firm. And, of course, if only 32 of the large firms had separate RAFs, this means that a sizeable minority did not, i.e., a sizeable minority even among the large firms were failing on one of the most basic requirements of good RM practice. The report voiced even stronger concerns about the lack of independence of the RAF for some of the smaller and/or non-life firms.
- Not surprisingly, the best practice is usually seen in the larger firms, with the life firms generally being better than the non-life ones.
- Although firms were continuing to expand their risk assessment capabilities, the sizes of RAFs remained small relative to comparable functions in banks. The largest risk assessment function was 11 people, but the average only 3, and this inevitably meant that there were limitations on the skills available for risk assessment. This is cause for concern in itself, but also because some firms such as London market firms tend to be small but to have complex (i.e., hard to model) risks.
- The report noted that most risk assessment skills were in finance, underwriting, claims handling and governance. HR, IT and legal skills were found only in the larger firms.
- Where RAFs had been set up, the head was usually a senior manager, and he/she normally reported to the Executive through the legal or finance functions. However, 2 life firms had appointed exec-level CROs and another had plans to do so. As we have seen already in section 2, an exec-level appointment is better because it makes for greater independent oversight.
- Most smaller firms had not set up separate RAFs and/or committees. The FSA report rightly noted that this made it hard for them to demonstrate that they had properly considered the risks they were taking.

3.1.4(c) Risk assessment and internal audit

- Most firms with a RAF also have an internal audit function (IAF). However, the roles of these two functions are often blurred, and the lack of a clear differentiation of their roles creates the potential for the conflicts of roles alluded to earlier. In addition, most firms without a separate RAF had an internal audit function, but as these are sometimes based overseas, oversight of UK activities could be problematic. These issues can also be complicated further by group risk considerations.
- Some smaller and medium firms used their internal audit staff to assess or facilitate assessment of risks. Indeed, some 80% of firms make it clear that the responsibility for assessing the effectiveness of controls lies with the IAF and not the RAF. We would suggest that this is questionable risk management practice for reasons already stated, and is not something we would expect to see in banking or securities firms. It also begs the difficult issue of whether internal audit staff have the skills and training to carry out these tasks in the first place.
- Most internal audit departments had adopted a risk-based approach to planning their work, but in some firms the risks considered and the way they are assessed for internal audit purposes differ from those of the RAF. We would suggest that these issues indicate both overlaps and potential gaps in the coverage provided by the IAF and RAF, and this highlights the importance of thinking their roles through carefully.

To summarise: these findings indicate that the risk management organisational structure of UK insurance companies in 2003 fell short of good practice in a number of significant respects.

3.1.5. Risk appetite

The survey also found that about half the firms sampled had not clearly defined their appetite for risk. This is clearly a problem, because in principle a firm needs to be able to specify its risk appetite if it is to be able to determine which risks should be taken on. But even where firms did set out a risk appetite, it was set out in subjective

terms and with reference to a target credit rating, without a link to the capital or risk management strategy needed to support the risks being taken. As of the date of the survey, no firms had linked their risk appetites to the levels of capital used in the business, and no firms had made any attempt to relate quantified risks to expected quantified rewards.

Many firms' appetites for underwriting risk were set out in business plans and derive from acceptable premium ratings, loss retention, exposures and aggregations, and the report notes that the industry does provide quantified appetites or tolerances for underwriting or other insurance risks. However, it also noted that most firms did not formally set out their appetite for market or credit risk, although of course there are limits (e.g., prudential regulatory limits) to the amount of such exposure they can take on.

These findings suggest that many insurance companies were still thinking of risk management in terms of underwriting risks only, and had not yet come to terms with more recent notions of firm-wide or enterprise risk management. In these respects we see clear evidence of insurance lagging behind capital markets firms and banks.

Nonetheless, we should also note that with effect from January 1, 2005, all firms are now required under PRU 1.4.19 to have a clearly articulated risk appetite or tolerance for each risk category. Many firms appear to have had difficulties in meeting this requirement – not least because of lack of sufficiently qualified personnel – but anecdotal and other informal evidence suggests to us that serious efforts have been made across the industry to work towards it.

3.1.6. Risk information and reporting

The governing body of a firm often uses a risk register, or matrix, to set out the significant risks it faces. Of the 39 firms surveyed, 29 had complete or near complete risk registers, and most of the rest were developing them. Of these 29 firms, most recorded risks and controls using simple in-house spreadsheets or databases, and only 15% used specialist risk analysis, management or reporting systems.

However, risk registers can be flawed in a number of important ways: for example, there could be confusion between objectives and risks, firms might assess risks against FSA criteria rather than their own objectives, formats might be inappropriate, there might be inconsistent parameters across different categories, and so forth.

Most firms had formalised risk reporting processes, and the larger firms typically reported to the governing body each quarter. Many reports were timely and concise, but generally did not form part of the standard management information packages provided to the board. The report also raised concerns that some risk reports lacked credibility because of inadequate RAF independence, and noted that risk reports varied considerably in their depth and quality.

Two thirds of firms identified key risk indicators (KRIs) to track risks, and a few larger firms also mapped key performance indicators (KPIs) to key risks to help measure and manage risks and report on performance. However, where KPIs and KRIs were used, the report noted that they frequently only considered the risks that were easiest to measure, and were not necessarily targeted at the most important risks. This is worrying, as it suggests that firms might be ‘blind’ to the more important risks that they face, and bearing in mind that a recurring lesson from recent financial disasters is that firms are most vulnerable to the risks that they hadn’t anticipated.¹⁰

The report also noted that management information did not routinely provide commentary on the effectiveness of risk management controls. This is worrying, because it means that governing bodies would have had difficulty determining the residual risks that remain after risk mitigation. The report also noted that this type of problem arises more commonly where internal audit works to its own priorities, independently of the RAF. These considerations further reinforce the arguments made earlier for the importance of an independent RAF.

¹⁰ A notable example is of course Equitable Life, which was blind to its longevity risk exposure until it was too late. For more on the Equitable case, see, e.g., D. Blake (2002) *Out Of The GAR Frying Pan Into The GIR Fire: An Independent Evaluation of the Current State of the With-Profits Fund of The Equitable Life Assurance Society*, Report, Pensions Institute; or C. O’Brien (2006) “The downfall of Equitable Life in the UK: The mismatch of strategy and risk management”, *Risk Management and Insurance Review*, Vol.9 (2), pp. 189-204.

The report went on to say that management information to facilitate monitoring against risk appetite (or within risk tolerance) was “currently hindered by a lack of an established and well-understood methodology for quantifying and monitoring risk. For example, only one firm included reports based on the Value at Risk (VaR) from its investment portfolio and a VaR measure of its insurance book” (p. 16). We would comment here that many banks and securities firms are well ahead of insurance firms on these issues, although the introduction of the Individual Capital Assessment at the end of 2004 provided the platform for these types of measurement to be made, and it is clear that significant progress has been made since on this front.

In sum, the quality and quantity of risk information provided for governing bodies varied significantly from one firm to another. In 25% of cases, management information did not include any analysis of major risks faced. And where risk information was provided, performance indicators relevant to particular risks, analysis of possible ways of handling risks, and comparison of risks against risk appetites were seldom discussed.

In terms of exposure to specific types of risk:

- Operational risks: Op risks received considerable emphasis, and op-risk concerns were similar across life and non-life firms, despite differences between their insurance and credit risk profiles. The main op risk concerns were people issues, IT system related issues, business continuity issues (testing of arrangements, of service contracts, etc.) and regulatory compliance issues (risk of fines, etc.). Indeed, regulatory risk featured highly, and 11 firms regarded it as a major risk. We would suggest firms are right to regard regulatory risk as a major issue: firms do indeed operate in a volatile regulatory environment.¹¹
- Credit, market and insurance risks: Except for investment return and persistency, only non-life companies showed much concern with these risk factors. The report hinted dryly that it was surprising that life insurers were so relaxed about these risks, bearing in mind their reliance on reinsurance treaties and the effect on

¹¹ A good example is the change in solvency rules at the end of 2004, which led to gains for some firms and losses for others. For more on this, see, e.g., C. O’ Brien (2006) “Modernizing insurance solvency regulation evidence from the UK”, *Journal of Insurance Regulation*, Vol.25 (1), pp. 41-60.

solvency of reinsurance default reserves. We would certainly concur with this view.

- Group risks: These were identified as significant by only 2 firms, and companies generally claimed to be relaxed about these risks. However, since it can be politically awkward to worry about group risks, the report suggested (and again we would agree) that some of these responses might not indicate respondents' true views about the risks posed by their parents.

3.1.7. Risk management and capital modelling

Our final subheading is concerned with risk management and capital modelling. A key principle of CP190 and CP195 (and of the rules that were subsequently implemented) is that capital requirements should be tied more closely to firms' risks, against a background where firms' risk measurement systems are becoming more sophisticated and where banking and insurance are converging. It is therefore reasonable to expect firms' risk modelling capabilities to improve over time, but the new regime also requires firms to have the capability to self-assess their own capital needs. They do this by an "Individual Capital Assessment" (ICA) report, which sets out the risks faced by the firm and how they are managed, together with an assessment of the capital that the directors believe the firm requires, using a benchmark of a 99.5% probability of having enough assets to meet liabilities in a year's time.

The report noted that the majority of non-life firms were not yet on track to assess their own individual capital requirements, as envisaged by CP190, and were therefore seeking guidance (especially about the treatment of op-risk charges). For their part, life firms' risk management techniques tended to be more advanced than those of non-life firms, and their compliance processes and the financial condition reports they had been preparing also suggest they had reasonable risk systems. However, firms' financial condition reports were more limited in scope than the ICAs as they were usually confined to solvency testing or to stress testing against specific scenarios.

“Unsurprisingly,” the report notes, “firms have not yet developed capital models that give them an aggregate view of risk”, although the report did acknowledge that all firms had improved their modelling capabilities over the previous 12 months. The financial models used also varied considerably in sophistication, from simple stress testing to complex probabilistic models, and where firms did undertake financial modelling, it was usually carried out within the actuarial or finance function in isolation from the RAF. We would suggest that this represents bad practice, as the modelling work needs to link in strongly to the most significant risks identified by the firm and, where possible, maintain independence from product pricing activity.

The report further noted that as this work increases over time, the demands on actuaries and others with suitable model skills would increase and a shortage of skills might develop. This in fact is exactly what subsequently happened: when Individual Capital Assessments were introduced, the industry faced an immediate (and serious) shortage of people with the skills needed to carry out this analysis competently.

Most large life companies had also started projects looking at dynamic financial models to help calculate economic and regulatory capital. We would suggest that this indicates that progress is being made. Some firms indicated that they hoped to have developed and tested models for market, credit and insurance risks by end-2003, and to have made more progress on op-risk and group risk by end-2004. However, such models are expensive, and smaller firms were generally not developing capital models as such (although they did have pricing and reserving models). This latter point raises the curious question of how the firms concerned expected themselves to model their ICA capital requirements.

The report also noted that the level and sophistication of modelling techniques should vary and be proportionate to the type and size of business underwritten, as well as to the investment strategy of the firm, and suggested that we would expect more sophisticated modelling for life firms with guaranteed and with-profits business, and for non-life firms with long tail business.

It also noted that the sector has done little work collecting loss data for models, other than for insurance risk. Indeed, only 16 firms had begun building loss databases, and

most of these were in the life sector. However, more recently, the Association of British Insurers (ABI; the industry trade body) has initiated the collation of operational risk loss statistics and it is our understanding that firms are discreetly co-operating with each other under the aegis of the ABI.

Another problem noted by the report is that communication and even co-operation between the risk assessment and actuarial or finance functions is poor in some firms. In others, it is not clear whether non-actuarially trained managers actually understand the outputs of risk models. The dangers of such problems for effective risk and capital management are all too obvious.

Finally, the report noted that the use of models for underwriting, reserving and capital requirements is increasing, and the FSA expected that some firms would use such models to support their ICAs. However, it also pointed out that the credibility of these models is reduced where firms do not use these models for performance evaluation, where data is not collected to validate the results, and where the risks modelled are not reconciled to the findings of RAFs.

3.1.8. Conclusions

The FSA survey of 2004 gives a very informative snapshot of the state of practice of risk management in UK insurance companies in 2003, and it identified a number of specific weaknesses in firms' risk management practices, especially in firms' organisational structures and risk management functions, and in firms' risk and capital modelling practices.

3.2 2006 Survey¹²

The 2006 FSA survey was a follow-up to the first and its principal objective was to review the progress made by firms since 2003 to improve their risk management practices. For this review, FSA researched the practices of 26 firms; they visited 12

¹² *Insurance Sector Briefing: Risk Management in Insurers*. London: Financial Services Authority. November 2006.

and did a desk-based review of the remainder. Firms included both life and general insurers and both proprietary and mutual firms.

The principal findings of the survey fall under the following headings:

3.2.1 Governance and oversight

The survey reported steady progress in insurers' recognition of the business benefits of sound risk management since the 2003 survey. Risk management was now an explicit component of many individual roles, and there was increasing consideration of risk implications as part of business planning and monitoring. It also found, as was expected, that the ICA regime had provided boards with new and useful information on firms' risk characteristics.

However, the report also noted a number of shortcomings. While many insurers had developed committee structures to oversee risk management, it found that some boards relied too heavily on such committees, and many firms did not self-assess the effectiveness of the oversight of risk management. Furthermore, and rather tellingly, few insurers included the development of risk management in their planning.

3.2.2 Risk appetite

The report reported some positive developments, but many insurers had difficulty producing meaningful statements of risk appetite, and most firms had made slow progress in using them for material decision-making.

3.2.3 Implementing risk management

Where firms had an independent risk management function, this had helped to provide impetus and focus for improved risk management. The report also noted that longer established risk management functions had tended to become more strategic in their role. It also noted increasing recognition of the need for the risk function to be independent from the internal audit function.

However, FSA did note some weaknesses. For example, it noted that some risk management functions focussed unduly on some risk types (especially operational risk); and some did little more than coordinate risk management activity without providing any challenge or analysis.

3.2.4 Management information

The survey found that some firms had made good progress in developing and using key risk and control indicators (KRIs, KCIs).

On the negative side, the use of KRIs and KCIs was not widespread and the information provided was often incomplete: few firms conducted sufficiently detailed analyses of underlying trends, and the identification and reporting of emerging and changing risks was frequently inadequate.

3.2.5 Impact of the Individual Capital Assessment process

A significant number of insurers had begun to use their Individual Capital Assessments or other risk-based capital measures in major business decisions such as those related to reinsurance programmes.

None the less, the survey reported that few firms were using risk-based capital for longer-term business planning and, indeed, the level of board understanding of risk-based capital methods was patchy. In some firms, the ICA had been developed with an over-reliance on the actuarial function (or consulting actuaries), but FSA was encouraged to find that risk management functions were increasingly involved in modelling and using ICAs.

3.2.6 Conclusions

The 2006 FSA survey can be summarised very easily: the industry had made some progress since 2003 but its findings suggest that there is still considerable room for improvement.

4. THE STRACHAN LETTER ON CREDIT RISK MANAGEMENT IN LIFE INSURANCE FIRMS¹³

Our third principal source of evidence on the state of UK insurers' risk management practices is a letter by David Strachan, the FSA's insurance sector leader. On August 9, 2004, Mr. Strachan wrote to the chief executives of all life insurance companies under the FSA's jurisdiction on the subject of life insurers' credit risk management practices, a subject of considerable importance given insurance companies' reliance on reinsurance and their consequent credit risk exposures to reinsurance companies. The FSA had recently conducted a thematic review of 10 representative larger life companies to examine their credit risk management. His letter reported the findings of this study and asked chief executives to consider practices within their own firms bearing in mind some common areas of weakness and the (sometimes more advanced) state of credit risk management practice in banks and building societies. The fact that the FSA singled out this particular area as a source of concern and then went to the trouble of writing to all chief executives about it is also revealing: the FSA must have been very concerned indeed to have gone to such unusual lengths to send out a warning message.

Mr. Strachan started from the conclusion in the FSA's 2003 survey that "it is perhaps surprising that life insurers do not give [reinsurance credit risk] a higher profile" and noted that it was this conclusion that motivated the FSA to carry out the new study. The good news was that "many firms fully understood the credit risks to which they were exposed and had well-documented policies" to deal with them. A list of good practices was included in the appendix to the letter, and this list covered such risk topics as: clear policies to determine risk appetite and credit risk limits; mechanisms to ensure senior management oversight; procedures to provide management with adequate and timely information; policies to manage, monitor, control and reward investment management involving credit risks; policies to ensure adequate counterparty credit limits, including the use of collateralisation requirements; and

¹³ This letter was published on the web on August 13, 2004, and can be downloaded at

suitable policies dealing with property, alternative instruments, credit derivatives and default reserves.

The bad news was that the study also uncovered some areas of serious weakness:

- Little or no separation of duties in determining the credit analysis and making investment decisions. This left a clear risk that investment decisions might be compromised by decision-makers who are personally involved in dealing with the counterparty.
- No independent review of in-house credit analyses outside the investment team, leading to a danger that investment decisions might be based on incorrect assessments of credit quality.
- No segregation of duties between policy implementation and compliance, leading to dangers that breaches might be covered up or excessive risks taken.
- Management information was sometimes inadequate and could be substantially improved.
- Firms sometimes had no knowledge of their total exposure to a single counterparty, due to inadequate aggregation of risks within the firm. This meant that a firm could be considerably more exposed to a single counterparty than its management realised.
- Little evidence of liquidity risk mitigation: firms were failing to identify and quantify their exposure to liquidity risk, taking into account the illiquidity of the markets for many bonds.
- No mitigation of credit risk from older reinsurance treaties: whilst the credit risks of newer reinsurance treaties were adequately mitigated, there were large volumes of older reinsurance business whose credit risks were not being mitigated.

Strachan's letter concluded with a request that chief executives consider how their firms' credit risk management could be improved to come up to standards of good practice – another clear signal that many firms' practices are well short of good

practice – and effectively warned them that the FSA would be looking at their credit risk management practices closely in their future supervisory assessments.

5. WORKING PARTY SURVEY OF RISK MANAGEMENT BY LIFE ASSURERS¹⁴

5.1. Nature and Scope of Study

Our fourth source of evidence is a survey carried out by the present authors. This survey was carried out in their capacity as members of the Faculty and Institute of Actuaries working party on risk management in UK life insurers. The focus of the survey was on the processes used by life insurers for identifying, measuring and managing risks; in addition, the survey looked at the practice of enterprise-wide risk management (ERM) in these firms, and looked for possible differences in risk management practices between different types of firm.

The survey was based on a questionnaire sent out to appointed actuaries in September 2004. Recipients were asked to send the form to the most appropriate person in the firm or group to complete it, and 39 responses were received. A preliminary version of the survey was published in 2005.

The firms polled varied considerably in their sizes and in their types of business (categorised as with-profits, property-linked, index-linked, protection and annuity). Of these firms, 12 were mutuals and 27 were proprietary. 10 of the former were still open to new business and 20 of the latter. 21 of the proprietary firms were listed, and 6 were unlisted. As a rough guide, the survey found that larger firms are more likely to be with-profits, open to new business and proprietary.

¹⁴ *Risk Management by Life Insurers – A Survey*, by David Bartlett, Mark Chaplin, Kevin Dowd, Patrick Kelliher and Chris O'Brien. Published on the web at http://www.nottingham.ac.uk/business/cris/papers/RMLA_Survey_paper_v2.doc.

5.2. Findings

5.2.1. Reasons for risk management

The reason most commonly cited by respondents for practising risk management was to comply with FSA regulations, the second most commonly cited reason was that risk management was good business practice, and the third mostly commonly cited reason was that it was part of good corporate governance.

These responses give us some cause for concern: if the most common reason for practicing risk management was to comply with regulations, this suggests that many firms have yet to appreciate the benefits that risk management can bring them.

5.2.2. Risk function

33 of the 39 firms had an explicit risk function, 21 had a CRO and 30 had a risk committee. The head of the risk function was typically the CRO, but in some firms the head of the risk function was the Finance Director, the Appointed Actuary or some other officer. The size of the risk function varied from 0 to 22, i.e., from nothing to very large.

The most important skills required of the function were actuarial, accounting/financial, legal/compliance and operations. (And, of course, the survey was addressed to actuaries.)

5.2.3 Risk identification

Most participants agreed that their firm had a fairly common approach across the firm to the identification of risks. 30 had a common risk register, and in 36 firms the board is notified of all material risks. Delegated responsibility for risk identification usually rests with the business unit (in 26 cases); however, it can sometimes lie with the risk function (11 cases) or internal audit (8 cases). The risk identification process was usually redone on a quarterly or monthly basis.

5.2.4. Risk measurement

The most popular risk measures calculated were stress test losses, followed by probability of solvency less than some specified level, followed by the VaR. In most cases, these estimates were also communicated to board. The main uses of these estimates were as management information, to help set the risk appetite and to help allocate capital. A considerable variety of different modelling approaches was used: at the risk of generalizing somewhat, the most common methods of modelling insurance risks were deterministic scenario analysis or subjective assessment, whereas the most common method of modelling market risks was some form of scenario analysis (and with stochastic scenario analysis generally being a little more preferred to deterministic scenario analysis). Interestingly, most firms allowed for diversification benefits in their risk modelling, and diversification benefits were most commonly allowed for in the modelling of market and credit risks.

5.2.5. Risk measurement

The reasons for identifying and measuring risks varied across firms, and some commonly cited reasons were to set limit policies, to determine strategic asset allocation, to design and price new products, to assess strategic options, investigate possible hedges, and to determine insurance retention levels.

5.2.6. ERM

Respondents were also asked questions on ERM, and responses suggest that life insurers have been making increasing use of ERM. In addition, practically all respondents considered that their risk management objectives were either closely or reasonably well aligned with their business objectives.

The main obstacles cited to effective ERM were insufficient resources, insufficient data and cost. There were also various other differences between firms:

- Small firms were less likely to have appointed a CRO and were less likely to report risk measures to the board.
- Mutuals were less likely to have an ERM framework in place; compared to proprietary firms, they were also more likely to cite compliance with FSA

regulations as their main reason for managing risk, whereas proprietaries were more likely to cite good business practice.

These findings suggest confirm earlier findings that the firms likely to lag behind are smaller firms and mutuals.

5.2.7. Conclusions

Read in conjunction with the FSA surveys, these responses again suggest that life assurers are making progress in developing sound risk management structure, but still have some way to go.

6. CONCLUSIONS

The results summarised above provide a broad-ranging and detailed picture of the state of practice of UK insurers' risk management practices and how they have changed in recent years.

One of the most obvious points is the great heterogeneity of risk management in the UK insurance industry. We get the sense that the life companies tend to be better at risk management than the non-life ones, that the bigger tend to be better than the small, and – possibly – that the proprietaries better than the mutuals. The institutions that are poor at risk management have sometimes been alarmingly so, often lacking the basics of risk management. There is therefore a significant 'tail' of firms that are not practising any serious risk management at all. Fortunately, there is a significant body of evidence that insurers' risk management practices have been improving, in some cases markedly, and this is certainly to be welcomed. However, when comparing the insurance industry against other types of financial institution, the impression is that most insurance companies still lag well behind banks and securities firms in a number of important respects.

As we discussed in section 2, the principles of good-practice risk management govern such issues as: an independent risk assessment function (e.g., why is it needed? how is the RAF resourced? does the RAF relate to business line management? what incentives should risk managers face? etc.); the role of the CRO (e.g., the importance of having a CRO, who the CRO should report to, etc.); the need to think through the relationships between internal audit and the RAF; the need for the RAF to validate pricing and other models used in the institutions; and the role of the risk committee. The FSA survey of 2003 indicated that some firms' fared very poorly by these criteria, but the 2006 survey suggests that progress has been made, for example, on ensuring appropriate independence of the RAF from internal audit. And, of course, there are also important risk management issues that are specific to insurers, many of which are centred on the role of actuaries in insurance companies: for instance, what is the role of actuaries in the RAF? how does the role of actuaries relate to that of risk managers? and what is the role of actuaries in internal audit?

Turning now to risk measurement, there are inevitably major differences in the ways in which insurers measure different types of risk. By and large, the preferred methodologies for measuring insurance risks are scenario analyses – both deterministic and stochastic – though it is clear that stochastic scenario analyses (or DFA) have become more popular. We welcome this development, because such methods are particularly suited to the inherent complexity of many insurance risks.¹⁵ However, the state of practice of insurance risk measurement varies considerably across insurers, and some of the simpler approaches (including some scenario analyses) used by some insurers are likely to be unreliable. It also needs to be emphasised that much of the quality of scenario analyses boils down to the judgement of the modeller: thus, good scenario analysis boils down to good judgement, and 'elaborate' scenario analyses are not necessarily better than simple ones, especially if their scenarios are poorly chosen. Nevertheless, overall, we believe insurance risks are well understood (as we would expect) and often well handled, and the state of the art is certainly improving.

The models used to measure market and credit risks are perhaps less impressive. Evidence suggests that the approaches insurers use to measure these risks are not in general as advanced as those used elsewhere (e.g., in capital markets) to measure these same risks, and we suspect that part of the reason is that insurers are often less familiar with recent market and credit risk developments than some of their capital market counterparts. However, this statement masks great variety in the models used and in their degrees of sophistication, and we should also take account of the fact that insurers are often working to much longer horizons than most capital markets institutions and can therefore be more relaxed about short-term fluctuations. More importantly, perhaps, there is also little doubt that insurance companies are getting better at modelling market risks, and we expect this improvement to continue.¹⁶

There are more serious concerns about insurers' modelling of credit risks. The Strachan letter sent a clear message that the FSA – which was in a good position to know – was very concerned about weaknesses in some (perhaps many?) insurance companies' credit risk management practices. Many insurers are heavily exposed to credit risk (mainly through reinsurance arrangements) and in an atmosphere of low solvency credit risk issues become paramount. If we combine these factors with a belief that most insurance companies have struggled to keep up to pace with recent developments in credit risk management, then the resulting combination of low solvency, high credit exposures and relatively poor credit risk management is a potentially explosive one – and all it would take is an economic downturn to trigger it. There is no doubt, therefore, that this is an area where rapid improvement needed to be made.

We would also express some concerns about other aspects of firms' risk modelling.

- The first relates to risk aggregation: loosely speaking, which correlation assumptions should be made when we seek to aggregate the risks of individual

¹⁵ For more on some of these issues, see, e.g., K. Dowd and D. Blake, "After VaR: The theory, estimation, and insurance applications of quantile-based risk measures." *Journal of Risk and Insurance*. Volume 73, No. 2, June 2006, pp. 193-228.

¹⁶ See, e.g., T. J. Sheldon & A. D. Smith, "Market consistent valuation of life assurance business", *British Actuarial Journal*, Volume 10, no. 3, 2004, pp. 543-605.

positions? It is often assumed that correlations are either plus or minus 1; this makes it possible to aggregate risks easily, but such assumptions are usually too simplistic and give biased estimates. At the same time, more sophisticated approaches to correlation have problems of their own – for example, they can be subject to considerable estimation error – and we get the impression that few insurers have made much progress handling these issues in a convincing way.

- A second concern relates to the absence (or near absence) of backtesting. It is often said that insurers' risk models are difficult to validate (e.g., because of longer horizons, etc.) but such difficulties are not insuperable, and more needs to be done to ensure that models are appropriately tested and validated.
- A third concern relates to the importance of identifying key assumptions and firms' potential exposure to them – that is to say, there are issues of model and parameter risk. There is still a tendency in financial modelling to place too much trust in parameter values that are, inevitably, mere guesstimates. Modellers need to keep reminding themselves that these estimates might be wrong, and incorrect estimates might lead to much greater losses than their models predicted.
- A final concern has to do with the risk measures themselves: it is important for modellers to choose a risk measure that is suitable to the problems they face. In this respect, they should keep in mind that the VaR is increasingly discredited as a risk measure, and in recent years there is a trend towards risk measures such as the tail VaR (also known as expected shortfall or expected tail loss) that have superior properties to the VaR.¹⁷

There is also little doubt that UK insurers have made rapid progress in their risk modelling as a result of the FSA requiring Individual Capital Assessments.¹⁸

¹⁷ The merits of tail VaR were recognised by the International Actuarial Association Insurer Assessment Working Party, "A global framework for insurer solvency assessment", 2004. For more on the relative merits of different risk measures, see also K. Dowd *Measuring Market Risk*, 2nd edition (2005, Wiley), chapter 2.

¹⁸ The FSA is also introducing some clarification of what is expecting from insurers in their ICAs: "Prudential changes for insurers" (consultation paper 06/16), 2006.

However, ICAs have not just been an exercise in risk modelling; the FSA have been requiring insurers' directors to understand and manage their risks better than has often been the case before. In an initial review of the ICA regime,¹⁹ the FSA reported that it had seen progress in risk assessment – for example, with life insurers' stochastic modelling becoming more sophisticated, and with many non-life insurers using external catastrophe modelling software. However, it commented that firms had made only limited progress on the integration of capital and risk management. The FSA recognised that there was more to do, even though some developments that firms were planning would not be straightforward: for example, refining correlations between risk types to take account of extreme conditions is desirable but there is little data available as evidence.

Another theme that emerges repeatedly in the surveys has to do with the lack of qualified personnel. Even before the ICA regime was introduced, it was already apparent that the industry lacked sufficient staff with key risk management skills. The lack of skilled personnel was a major problem for the industry in implementing the ICA requirements (and will also be an issue for continental European insurers when Solvency II is introduced), and there is no doubt that it continues to be a major obstacle towards the industry achieving good risk management standards.

A final issue is the role of the regulatory system. Ideally, we would want firms themselves to see the benefits of good risk management, and to see them compete with each other to improve their risk management practices: this way standards would improve over time in response to changing technology, changes in market conditions, and so forth. It is therefore worrying that much of the drive towards risk management in the insurance industry is regulatory, rather than self-driven, and even the regulators have complained about this reactive response. Of course, we can always hope that a regulatory-driven approach to risk management will help insurers to see the business benefits of risk management, and that this will in time help set insurers' risk management agendas, and we have seen some indication of this happening. However, it would be unwise to rely on regulations to produce good risk management practice,

¹⁹ Financial Services Authority "Insurance sector briefing: ICAS – one year on", Financial Services

and we remain concerned that some firms are not taking their risk management responsibilities seriously. There is also a deeper concern: if firms themselves do not set their risk management standards, there is the danger that the regulatory system will step into the breach and set those standards for them. In that case, the regulatory standards may become an inflexible straightjacket that impedes further improvements in risk management practices, rather than the platform of basic risk management practice that the FSA presumably intended it to be. The danger then is that risk management ceases to be that, and instead becomes a mere exercise in regulatory compliance.