

Risk Management

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Abstract

This paper gives a brief overview of international developments in the regulation of insurance companies, with particular attention paid to forthcoming developments in the regulation of banking which may have parallels in insurance. It also examines the possible effect on an insurance company should regulation move towards a more realistic assessment of liabilities coupled with a requirement to hold risk-based capital.

Key words

Basel; Risk; Capital adequacy; Risk-based capital; Risk management.

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Basel

The Basel Committee is a supranational authority without formal authority. Nonetheless, its pronouncements have shaped the supervision of banks in many countries for much of the last two decades. The following extract from its website describes its role in greater detail:

‘The Basel Committee, established by the central-bank Governors of the Group of Ten countries at the end of 1974, meets regularly four times a year. It has about thirty technical working groups and task forces which also meet regularly.

‘The Committee's members come from Belgium, Canada, France, Germany, Italy, Japan, Luxembourg, the Netherlands, Spain, Sweden, Switzerland, United Kingdom and United States. Countries are represented by their central bank and also by the authority with formal responsibility for the prudential supervision of banking business where this is not the central bank. The present Chairman of the Committee is Mr. William J. McDonough, President and CEO of the Federal Reserve Bank of New York.

‘The Committee does not possess any formal supranational supervisory authority, and its conclusions do not, and were never intended to, have legal force. Rather, it formulates broad supervisory standards and guidelines and recommends statements of best practice in the expectation that individual authorities will take steps to implement them through detailed arrangements - statutory or otherwise - which are best suited to their own national systems. In this way, the Committee encourages convergence towards common approaches and common standards without attempting detailed harmonisation of member countries' supervisory techniques.

‘The Committee reports to the central bank Governors of the Group of Ten countries and seeks the Governors' endorsement for its major initiatives. In addition, however, since the Committee contains representatives from institutions which are not central banks, the decisions it takes carry the commitment of many national authorities outside the central banking fraternity. These decisions cover a very wide range of financial issues. One important objective of the Committee's work has been to close gaps in international supervisory coverage in pursuit of two basic principles: that no foreign banking

establishment should escape supervision; and that supervision should be adequate. To achieve this, the Committee has issued a number of documents since 1975.

‘In 1988, the Committee decided to introduce a capital measurement system commonly referred to as the Basel Capital Accord. This system provided for the implementation of a credit risk measurement framework with a minimum capital standard of 8% by end-1992. Since 1988, this framework has been progressively introduced not only in member countries but also in virtually all other countries with active international banks.’

This Accord, while introducing a level playing field for much of the global banking system, failed to ensure an adequate match between capital and risk-taking. A uniform capital charge encouraged the pursuit of speculative risks and discouraged the pursuit of business where the capital charge was considered penal. A departure from the 1988 Accord was proposed by the Committee as described in the same extract referred to above:

‘In June 1999, the Committee issued a proposal for a New Capital Adequacy Framework to replace the 1988 Accord. The proposed capital framework consists of three pillars: minimum capital requirements, which seek to refine the standardised rules set forth in the 1988 Accord; supervisory review of an institution's internal assessment process and capital adequacy; and effective use of disclosure to strengthen market discipline as a complement to supervisory efforts.’

The change in approach from the 1988 Accord was described in more detail in [1]:

‘This new capital framework consists of three pillars: minimum capital requirements, a supervisory review process, and effective use of market discipline. With regard to minimum capital requirements, the Committee recognises that a modified version of the existing Accord should remain the "standardised" approach, but that for some sophisticated banks use of internal credit ratings and, at a later stage, portfolio models could contribute to a more accurate assessment of a bank's capital requirement in relation to its particular risk profile. It is also proposed that the Accord's scope of application be extended, so that it fully captures the risks in a banking group.’

A significant change in the management of credit risk was the recognition of the value of firms' internal models.¹ The old standardised approach to assessing credit risk was to be retained, albeit in a modified form, but where a bank had an internal model, so long as it was validated by the regulator, it could be used to assess the bank's capital adequacy. This assessment of capital adequacy would be by reference to the risks run by the bank, and would therefore be a bespoke assessment. The challenge for the regulator would be to ensure a level playing field. The benefit would be that capital requirements would be related to actual risks incurred. A consequence would be that high quality risk management could reduce the requirement for statutory capital where it could be demonstrated to the supervisory authority that the management led to a lower level of residual risk.

Pillar two was also described in more detail in [1]:

‘The second pillar of the capital adequacy framework, the supervisory review of capital adequacy, will seek to ensure that a bank's capital position is consistent with its overall risk profile and strategy and, as such, will encourage early supervisory intervention. Supervisors should have the ability to require banks to hold capital in excess of minimum regulatory capital ratios - a point underscored in the course of the Committee's discussions with supervisors from non-G-10 countries. Furthermore, the new framework stresses the importance of bank management developing an internal capital assessment process and setting targets for capital that are commensurate with the bank's particular risk profile and control environment. This internal process would then be subject to supervisory review and intervention, where appropriate.’

¹ In respect of market risk, the Basel Committee had recommended in [2] that internal models could be used, subject to the explicit approval of the bank's regulator. This was quickly incorporated in EU legislation.

The regulator would retain a tool that would allow it to review internal capital adequacy models, and intervene if appropriate. Given the responsibilities of regulators, no less could be expected.

The third pillar, once again described in [1] aims for the use of greater market discipline to encourage disclosure.

‘The third pillar, market discipline, will encourage high disclosure standards and enhance the role of market participants in encouraging banks to hold adequate capital. The Committee proposes to issue later this year guidance on public disclosure that will strengthen the capital framework.’

The importance attached to disclosure had already been signalled in [3]:

‘The issuance of this paper is based on the recognition that markets contain disciplinary mechanisms that can reinforce the efforts of supervisors by rewarding banks that manage risk effectively and penalising those whose risk management is inept or imprudent. Market discipline, however, can only work if market participants have access to timely and reliable information which enables them to assess a bank's activities and the risks inherent in those activities. Improved public disclosure strengthens market participants' ability to encourage safe and sound banking practices.’

The paper went on to list six categories where disclosure would be of particular benefit:

‘The paper recommends that banks, in their financial reports and other disclosures to the public, provide timely information which facilitates market participants' assessment of them. It identifies the following six broad categories of information, each of which should be addressed in clear terms and appropriate detail to help achieve a satisfactory level of bank transparency:

- financial performance;
- financial position (including capital, solvency and liquidity);
- risk management strategies and practices;
- risk exposures (including credit risk, market risk, liquidity risk, and operational, legal and other risks);
- accounting policies; and
- basic business, management and corporate governance information.’

Market discipline would be one tool for ensuring that banks had adequate risk management strategies and practices, and to ensure that their capital was commensurate with these and with their risk exposures.

Insurance Regulation

Similar changes are under way in insurance regulation. In particular, there is the same emphasis on putting risk management at the forefront of each firm's operations. We consider below recent international developments, and pay particular attention to the United Kingdom and Canada.

United Kingdom

The UK regulator, the Financial Services Authority (FSA) has undertaken a major reform of regulation of the whole UK financial services industry. To this end, it published in June 2001 the (draft) Integrated Prudential Sourcebook (PSB) [4], a new set of risk-based regulations and guidance. The influence of Basel is immediately apparent.

Firstly, a minimum quantitative regime for the assessment of liabilities and capital requirements is to be retained. This corresponds to Basel's Pillar One.

Secondly, in a consultation on individual capital adequacy standards [5], the FSA signalled that each firm was to calculate an internal capital assessment (ICA):

‘The ICA is a risk-focussed process designed to address business and systems and controls risks not adequately captured in the minimum capital requirements. In doing so, it provides a framework within which to determine the level of capital a firm needs to meet the adequacy of financial

resources rule ... The main process for achieving this would be through self-certification by the firm, using one of two methods:

- i) the firm's own internally-generated assessment of its capital needs based on rules and guidance included in the PSB; or
- ii) if certain pre-conditions are met, the firm may use an estimate of its capital requirement as determined by its own economic capital model, supplementing it with capital add-ons where the model does not adequately cover the risks identified within this framework.'

The rule referred to on the adequacy of financial resources states, 'A firm must maintain overall financial resources adequate, on reasonable assumptions, to ensure that there is no significant risk that liabilities to customers cannot be met as they fall due.'

The FSA will reserve the right to impose a supplementary capital assessment (SCA) should the internal one be considered inadequate.

The ICA and SCA together correspond to Basel's Pillar Two.

Thirdly, in assessing the capital adequacy of an insurance firm, the ultimate objective of the UK regulator, is stated in [6]:

'The ultimate objective ... is therefore to seek to have a realistic basis for valuing the underlying building blocks of assets and liabilities, supported by stress and scenario testing to reflect the inherent uncertainties built into the point estimates.'

That the statutory capital requirement of a firm be related to the risks it runs is desirable. One may try to assess the capital requirement by subjecting the balance sheet to stress and scenario testing, to see exactly what circumstances could be withstood. However, if the liabilities on the balance sheet are calculated excessively prudently, then it is not the ability to meet liabilities as they fall due that is being tested, but rather the ability to meet a prudent valuation. In other words, a requirement to meet prudent valuation margins ties up an unquantified amount of risk-based capital in the liabilities. The published liability is therefore overstated, which is not transparent.

Transparency in the published valuation may have to await the publication of an International Financial Reporting Standard on insurance contracts. (See below.)

As well as greater transparency of the statutory valuation, the FSA intends to require firms to document their risk management policies and practices, which must then be shared with FSA. These are to cover the following risks:

- Market the risk that arises from fluctuations in the value of, or income from, assets
- Credit the risk that arises whenever a firm is exposed to loss if a counterparty, who is or may become a debtor, fails to perform its contractual obligations, including failure to perform them in a timely manner
- Liquidity the risk that arises when a firm, although solvent, does not have sufficient financial resources available to meet its obligations as they fall due, or can secure them only at excessive cost
- Insurance arises from the inherent uncertainties as to the occurrence, amount and timing of insurance liabilities. It is the risk of adverse deviations from the cash flows expected when pricing or reserving
- Operational the risk of loss, resulting from inadequate or failed internal processes, people and systems, or from external events
- Group the risk that arises from:
 - a firm's relationship with other members of its group;
 - a firm's membership of its group; and
 - the activities of other members of its group.

The risk management policies are to detail how each firm identifies, measures or assesses, monitors and controls risk.

This focus on transparency and on risk management corresponds to Basel's Pillar Three.

Canada

In late 1999, the Canadian regulator, the Office of the Superintendent of Financial Institutions (OSFI) introduced a new supervisory framework. Its website describes it thus:

'Under the framework, OSFI is focussing its efforts on evaluating an institution's material risks and the quality of its risk management practices, rather than applying a functional approach when conducting on-site reviews. This ensures more effective use of OSFI's resources. In turn, some institutions may benefit from a reduced regulatory burden where they are able to demonstrate their risks are more than compensated for by strong internal controls.'

Among its guiding principles are:

'The exercise of sound judgement in identifying and evaluating risks in an institution is central to the effectiveness of the framework. Work performed is focused on clearly identified risks or areas of concern.

'The level and frequency of supervisory scrutiny depends on the risk assessment of the institution. Institutions that are well managed relative to their risks require less supervision. Not all areas within an institution need to be reviewed every year.

'Supervision includes reviews of major risk management control functions, such as Financial Analysis, Compliance, Internal Audit, Risk Management, and Senior Management and Board Oversight.

'Communication of findings and recommendations to institutions is timely. The degree of intervention will be commensurate with the risk profile of the institutions and in accordance with the Guide to Intervention for Federal Financial Institutions.'

In [7], Hafeman, the Assistant Superintendent, Specialist Support Sector, OSFI, clarified further:

'The risk equation is at the heart of the framework. We first assess the inherent level of risk within each of the major activities, such as lines of business, of an institution. It is important to note that we do not stop here – an institution engaging in high-risk activities will not necessarily be subject to intense supervision. The critical next step is to consider the quality of risk management applied by the institution. Comparing these two assessments, we arrive at the net risk of each activity.'

Once again, the regulator's focus is on risk management: the better it is, the less need for supervisory intervention.

Both life and general insurance companies in Canada are subject to risk-based capital requirements. For Canadian life offices, the requirements are defined in the Minimum Continuing Capital and Surplus Requirements (MCCSR). This specifically addresses capital requirements in respect of the following five risks:

1. asset default risk (risk of loss resulting from on-balance sheet asset default and from contingencies in respect of off-balance sheet exposure and related loss of income; and the loss of market value of equities and related reduction of income);
2. mortality/morbidity/lapse risks (risk that assumptions about mortality, morbidity and lapse will be wrong);
3. interest margin pricing risk (risk of interest margin losses with respect to investment and pricing decisions on in force business other than asset default and changes in interest rate environment);
4. changes in interest rate environment risk (risk of loss resulting from changes in the interest rate environment other than asset default and interest margin pricing risks); and
5. segregated funds risk (risk of loss arising from guarantees embedded in segregated funds).

In addition, OSFI requires each company's actuary annually to prepare a report for its management and board on its expected financial position in various future scenarios. The purpose is not to identify capital requirements but to reveal the sensitivity of the company's balance sheet.

European Union

The European Commission is preparing a major reform of the solvency rules for insurers (so-called Solvency II). Regulators throughout the EU must at the very least ensure that their regulations comply with EU directives.

As part of its investigations, it is expected to consider links to the work of the IASB (see below) and the possibility of using internal models for prudential supervision. It has also commissioned KPMG to produce a 'Study into the methodologies to assess the overall financial position of an insurance undertaking from the perspective of prudential supervision' [8].

The study has been published on the European Commission's website. In the foreword, it is stated that:

'One of the objectives for the project is to establish a solvency system that is better matched to the true risks of an insurance company.'

International Accounting Standards

The mission statement of the International Accounting Standards Board (IASB) is:

'The International Accounting Standards Board is an independent, privately-funded accounting standard setter based in London, UK. Board Members come from nine countries and have a variety of functional backgrounds. The Board is committed to developing, in the public interest, a single set of high quality, understandable and enforceable global accounting standards that require transparent and comparable information in general purpose financial statements. In addition, the Board cooperates with national accounting standard setters to achieve convergence in accounting standards around the world.'

To this end, the Board has thus far issued thirty-four international accounting standards (IAS) and is currently developing more International Financial Reporting Standards (IFRS). Two accounting standards, IAS 32 and IAS 39 have been issued on financial instruments, though insurance contracts have been exempted from their scope. The definition of a financial instrument, however, is:

'any contract that gives rise to both a financial asset of one entity and a financial liability or equity instrument of another entity.'

A proposed definition of insurance contract is:

'a contract under which one party (the insurer) accepts significant insurance risk by agreeing with another party (the policyholder) to compensate the policyholder or other beneficiary if a specified uncertain future event (the insured event) adversely affects the policyholder or other beneficiary.'

Insurance risk is proposed to be defined as:

'risk other than financial risk ... insurance risk is significant if and only if there is a reasonable possibility that an event affecting the policyholder or other beneficiary will cause a significant change in the present value of the insurer's net cash flows arising from the contract.'

If these definitions are adopted, one could well conceive of many insurance products, for example, pension policies, falling under the scope of IAS 39. The significance is that under IAS 39, financial liabilities are to be measured at fair value, i.e. 'the amount for which a liability could be settled, between knowledgeable, willing parties, in an arm's length transaction.'

This is different from the prudent valuation of liabilities to which actuaries are accustomed. However, it accords well with the notion of risk-based capital: employing prudent margins in a traditional actuarial valuation ties risk-based capital up with the liabilities, making for opacity rather than transparency.

Risk-based capital

The trend towards a realistic valuation of liabilities coincides with an assessment of capital adequacy that is based on the risks a company actually incurs. One definition of the means and aim of a risk-based assessment of an insurance company's financial resources is given in [4]:

‘for the purpose of determining the adequacy of overall financial resources, a firm ... must carry out appropriate stress and scenario including taking reasonable steps:

1. to identify realistic adverse scenarios in which any of, or any realistic combination of, market, credit, insurance, operational, group or other losses or risks might occur or crystallise; and
2. to ensure that in the event of each scenario, it would still have adequate financial resources to meet liabilities to customers.’

The means therefore will be stress and scenario testing, and the ends will be to ensure that customer liabilities can be met even if a reasonable combination of risks crystallise.

This of course is what many insurers have been doing for some considerable time to assess their own economic capital requirements. It is therefore no surprise that regulators are considering the use of a company's own model.

The consequences of this are that the calculated liability on a company's balance sheet should fall and that its statutory capital requirement should change. Whether the aggregate rises or falls depends on the severity of the stress tests applied. However, given two companies which have similar liabilities, given similar stress tests, the degree of aversion to risk will be reflected in the capital requirement. This is intuitively and logically reasonable.

Some very simple examples can illustrate the benefits and the difficulties.

Example 1 Credit risk

Consider a liability to repay Rs 1000 after 10 years.

Suppose two stocks are available that both exactly match the liability by duration:

- a risk-free zero-coupon bond returning 10% p.a.; and
- a corporate zero-coupon bond returning 11% p.a. (We assume that the spread is due entirely to the risk of default.)

Suppose Company A buys the risk-free bond and Company B buys the corporate bond.

A market consistent valuation of the liability at a risk-free rate would give a reserve of

$$\frac{1000}{1.1^{10}} = \text{Rs. } 386$$

So Company A buys Rs. 386 of the risk-free asset, while Company B buys the same amount of the corporate bond.

Now, no matter what any subsequent movement in yields or in spreads is, Company A will be immunised. Company A therefore requires no risk-based capital in respect of this asset and this liability.

Conversely, in the absence of default, Company B expects the riskier corporate bond to yield 1095 at maturity, a small profit. Taking into account expected losses due to default the bond is expected to return the 1000 at maturity.

Suppose however that while the risk-free return remained unchanged, the corporate spread were to move from 100 basis points to 200, and all of this movement is due to an increased risk of default.

The liability would still be Rs 386 but Company B's asset would be worth only Rs. 353. Company B should set aside sufficient capital at the start to cover the shortfall. So Company B, having taken a risk, will require more risk-based capital. The lesson will apply in all contexts: by mitigating risk, the requirement for risk-based capital is reduced.

By valuing at a risk-free rate of return rather than the gross redemption yield of the asset, we have incorporated the expected rate of default of the asset in the reserve, and we hold capital to cover unexpected losses. The amount of risk-based capital is related to the postulated change in the corporate spread and to the amount of that change that may reasonably be ascribed to an increased risk of default. (For simplicity, we have assumed that the whole of it is.)

While the above example is very simple, its methods may be applied to more complex products and more complex investment strategies, for example, by postulating different spread widenings for different ratings of debt, and even by integrating the treatment of credit risk in corporate debt with market risk in equities. It is also quite possible to extend these deterministic methods to stochastic ones to arrive at a capital requirement that gives an acceptable probability of ruin. However, such analyses should be treated with caution: there is very little data at the tails of any distribution of investment returns, so the credibility of any probability of ruin is necessarily low.

Example 2 Operational risk

The definition of operational risk given above is extremely wide-ranging: it covers everything from processing errors in an administrative department to losses arising from terrorist activity. Essentially, it is everything else once the directly financial risks have been identified and categorised. Some insight is gained by considering two very different types of operational risk.

Firstly, there is what one might term leakage: the losses that result from inefficiencies and errors in the normal course of business. These would include errors in processing and paying claims, or delays in processing applications to switch unit holdings in a unit-linked or mutual fund, both resulting in awards of compensation. These would usually be picked up in a company's expense analysis, and, if the liability calculation is based on this, expected losses will be reserved for.

Secondly, there are extreme cases, such as a rogue trader who gambles a significant amount of a company's money and loses it. By their very nature, such cases are rare. It is not apparent how to calculate an appropriate amount of risk-based capital for such unexpected operational losses.

One approach might be to construct a loss distribution from historical data, and then to hold sufficient capital to protect the company against an operational loss pitched at the 99th percentile. However, because of the rarity of the events, the kinds of losses suffered by Barings might not be picked up in the historical data. Secondly, any data gathered over lengthy periods will not be from homogenous exposures: the losses will have arisen under various different frameworks for managing operational risk. Thirdly, even if this type of loss were included in the data, the precise form of any distribution would be open to considerable uncertainty. Lastly, since the risk is not diversifiable, there would be little point in holding a fraction of the potential loss as risk-based capital.

Given the above, a far better approach would be to manage the operational risks, large and small, to seek to ensure that they do not crystallise.

Risk management

Risk management means to identify, measure, monitor and control risk.

Identify

The risks to which the company is exposed should all be known. The company should then focus its attention on monitoring those that are significant.

Measure

The risk should somehow be measured. For directly financial risk, this may be done by translating the risk into an amount of risk-based capital. One difficulty here is to ensure that measurements of different types of risk are consistent. For example, suppose an insurance company has retail mortgages, corporate debt and equities in its asset portfolio, and it aims to identify its risk-based capital by means of stress and scenario testing. It would have to test the effect on its balance sheet of adverse scenarios where equities, debt and mortgages behave consistently. If it chooses a deterministic approach, it may do this by postulating economic scenarios first, and then considering a plausible range of behaviours for each of these asset classes. If it chooses to adopt a stochastic approach, it will have to postulate distributions of the returns from these asset classes and the correlations between them. Neither approach is easy, but the difficulties will be well understood and familiar to any actuary who has had to write a financial conditions report compliant with Guidance Note 2 of the Faculty and Institute of Actuaries.

It is less clear what to measure for operational risk. For risks arising from inefficiencies and errors, it is relatively easy to measure the effect of risks that have crystallised. The following tools are available:

- expense analysis
- measuring the amount of money in suspense, which can reveal operational breakdowns or problems
- the company might already have tools whereby key performance indicators (KPIs) are reported to the board or senior management. These would reveal both areas where risks have crystallised, and those that are functioning smoothly. The types of management information would include backlogs, error rates, amounts of compensation, turnaround times, etc.

The key is to identify quickly those areas where operational risk has crystallised and then to allocate an appropriate resource to rectifying the problem.

To measure the operational risk of the extreme cases, as discussed above, is not worthwhile.

Monitor

The measure of risk, where significant, should then be reported to those responsible for managing it: the board or those to whom they have delegated authority for risk management. This reporting should be succinct, it should identify what is significant, and it should be timely.

Control

Risk is not necessarily a bad thing, so to control is not the same as to eliminate. In Example 1, above, by taking a risk, Company B runs the chance of making a profit. However, any risk should be controlled: the type should be defined and the extent limited of any risk that can be taken.

This is a very familiar concept to actuaries, but perhaps the framework is a little different. For example, with regard to credit risk, a company will typically have a policy whereby its maximum holdings of low-rated debt are specified, or with regard to insurance risk, any underwriting manual will state the terms on which impaired lives are to be accepted if at all.

It is just as important for such controls to be in place for operational risk as for any directly financial risk. For example, it is scarcely less important to collect the correct premium as to have calculated it in the first place. The controls that are required around premium collection will depend on the systems and procedures the company has in place, but at the very least, it will require the software that generates its billing to be held in some secure environment, and for changes to it to require the endorsement of one or more senior managers.

Even in the context of operational risk, these concepts are not new: they are merely examples of widespread sound business practice. What is new is for regulators around the world to take an interest in the risk management policies and practices of insurance companies. This means that not only must the risk management be in place and of a high standard, but it must be demonstrably so.

Implementation

If regulation across the world takes its expected course, so regulators rely on companies' risk management and internal assessments of capital adequacy to a greater extent, the regulators will require significant reassurance that the risk management is adequate and that these assessments are reasonable. In order to give the regulators such reassurance, the companies will have to implement an infrastructure for risk management, and also to share its capital adequacy investigations with the regulator. The latter should not be a problem, particularly if the company already produces a financial conditions report. Further, with regard to the former, insurance companies, having their fair proportion of actuaries, already manage risk. Rather than disturbing a function that probably already works adequately, it is better to develop a risk oversight function that, while it should improve current workings, will also allow these workings to be demonstrated.

Summary

The new environment foreshadowed by international developments in regulation holds out the promise of capital requirements that are related to the risks that each company runs and the quality of risk management that it can demonstrate to its regulator. While risk management itself should hold no fear for actuaries, the challenge is to demonstrate a high quality of risk management without generating an enormous bureaucracy.

