

# **INSTITUTE AND FACULTY OF ACTUARIES**

## **EXAMINERS' REPORT**

September 2012 examinations

### **Subject ST9 – Enterprise Risk Management**

#### **Introduction**

The Examiners' Report is written by the Principal Examiner with the aim of helping candidates, both those who are sitting the examination for the first time and using past papers as a revision aid and also those who have previously failed the subject.

The Examiners are charged by Council with examining the published syllabus. The Examiners have access to the Core Reading, which is designed to interpret the syllabus, and will generally base questions around it but are not required to examine the content of Core Reading specifically or exclusively.

For numerical questions the Examiners' preferred approach to the solution is reproduced in this report; other valid approaches are given appropriate credit. For essay-style questions, particularly the open-ended questions in the later subjects, the report may contain more points than the Examiners will expect from a solution that scores full marks.

D C Bowie  
Chairman of the Board of Examiners

December 2012

## **General comments on Subject ST9**

The ST9 exam generally requires bullet point form or short form essay style answers that apply general principles to directly address specific circumstances. The answers given below are just one possible set of acceptable answers. Candidates are awarded marks for all reasonable answers including different but still reasonable numerical solutions. Marks are awarded for working in the case of numerical answers.

## **Comments on the September 2012 paper**

The September paper included, relative to past papers, fewer and larger questions. Many of the questions were loosely based on actual events. Examples include pricing operational risk insurance, introducing regulation and a large bank operating a captive insurer. Practical examples of ERM are common place in the press. Candidates should find that regular reading of financial press will prove to be very helpful to their understanding of the issues and concepts contained in the core reading.

Well-prepared candidates scored acceptably well across the whole paper. The comments that follow the questions concentrate on areas where candidates could have improved their performance.

**1** (i) ERM is not mandatory by legislation or regulation.

Company A could be listed on a stock exchange that requires formal ERM.

But the difference is more likely to be due to either the judgment of the board/senior management or to the result of a cost benefit analysis, or a combination of the two.

Company A may believe it is important to have stated risk appetite and risk tolerances and to monitor all risks to maintain within the appetite/ tolerances. In doing so the company will believe that has more control over its risks and will be less likely to make large unexpected losses in the future.

Company A may believe that the ERM allows it to maintain a holistic risk culture which should further help to prevent risks from crystallising into loss.

Company A may be in more need of a higher credit rating (e.g. because it relies more on the bond markets for capital raising) which is supported by its stronger ERM framework.

Company B may believe that it doesn't need a formal ERM as its informal practices are sufficient.

Company B may not believe that the benefit is worth the time and expense of monitoring the risks.

Company B may believe that it is a relatively simple business: profit and sales are targeted and all of the risks can be identified, estimated, mitigated and transferred in the separate business units. There is no need or cost savings in considering them all together.

Company A's structure is such that having a good ERM framework is important for capital allocation purposes.

Company A believes that ERM will help it to spot upside opportunities more readily.

Company A has learned from past mistakes / losses.

Company B might be a relatively new or rapidly growing company and just has not yet got round to full implementation.

(ii) Public shareholders are likely to believe that a company with ERM is better managed with less risk of unexpected losses. As Companies A and B dominate the industry, the shareholders could re-rate the entire industry thereby increasing A's share price.

Maybe investors that favoured A over B due to concerns about their risk management processes will have less reason to do so and A's share price might fall.

Maybe B will be shown to be less efficient and more risky in its ERM reporting and investors will shift to A.

Maybe the quality of B's framework will highlight issues that A should have been considering but hasn't. This may result in A's share price falling at least until it evidences that the issues have been resolved.

*Part (i) – The question was handled well by most.*

*Part (ii) – The question was handled well by most.*

*As ever, additional marks were given for other valid answers including:*

- *One possible outcome is that the share price stays broadly the same, since nothing has changed within Company A.*
- *Company A's share price might rise as it might look better in the short-term than Company B due to B's costs of implementation of the framework without any guarantee of benefits*

- 2** (i) There is very limited money and likely no expertise in government or in the insurance companies. The initiatives will have to be practical and affordable.

The new regulator should collect currently available financial reports, corporate governance, board papers, internal and external audit reports.

This material should be analysed to see the strengths and weaknesses of the current reporting structure.

Some weaknesses might be easily remedied. For example, the timing of and/or frequency of certain reports could be improved.

Or the detail contained in some of the reports might be quickly extended to include valuable information.

The new regulator should meet with and form a relationship with the insurance companies.

The companies should be encouraged to form a working relationship and made to believe that honesty and transparency is important.

For example, small breaches in guidelines can be tolerated.

The regulator should introduce regular inspections of insurance companies.

The regulator should issue guidelines of the areas to be inspected.

The regulator must adopt a pragmatic approach as the insurance companies won't have many of the needed practices, information etc in place. The

regulator should provide the company with an inspection report to help the company to introduce change.

If not already in place the regulator should make external audits mandatory. This will provide the regulator with another independent view of many aspects of the companies.

The regulator could require that investments are traded on exchange with reputable brokers and held by international custodians. This should help to ensure that all investments are contained on the company's reports and that they are properly valued at the time of each report.

For the same reason the regulator might introduce minimum internal control requirements for all money movements to ensure that all reports are complete and accurate.

The regulator should commence the systematic collation of available information.

As appropriate the regulator should seek to start to gather new information using surveys and forms.

(ii) The regulator could ask the companies to introduce or strengthen:

- ERM committee
- including its composition, committee charter, reporting templates
- Corporate governance
- Internal audits
- Internal reporting and analysis.
- ERM risk register to help to ensure that risks are being identified, monitored, measured and mitigated or transferred.

The regulator could provide guidance on the likely reporting to be required in the future.

(iii) The guidelines should:

State that the purpose of the hotline is to bring to light dishonesty or incompetence on a significant scale.

State what types of action are likely to have given rise to a breach.

- For example, it should state that intentionally underestimating key risks or excluding them from the regulatory reporting could potentially give rise to a serious breach.

State what actions are not likely to be appropriate to report to the hotline.

- Past calls to hotline might be helpful examples for the guidelines.  
Personnel issues including expense fiddling are not likely to be appropriate

to report to the hotline. Further, generalised issues such as management incompetence which cannot be supported with significant under-reporting would not be appropriate to report.

State amounts which are not likely to be appropriate to report to the hotline.

- Even small insurance companies may have capital in the tens of millions of dollars. It is not likely that failings causing losses of less than \$100,000 would be material to the regulator. They should be reported elsewhere in the company and potentially to other government agencies. This level may be different for different sized companies.

State the minimum information necessary to report to the hotline.

- The call cannot be anonymous to the regulator. Contact information must be left.
- The caller must also expect that he will be required to provide some form of evidence to prove his assertions.

State the potential required future involvement of anyone using the hotline.

- For example, a follow up call and the evidence if needed.

State the potential voluntary future involvement of anyone using the hotline.

- For example, act as a witness in future proceedings.

State the minimum service levels that someone using the hotline can expect.

- For example, the maximum period of time before the caller can expect a return call.

- (iv) Appoint an officer to handle the alleged breach.

Review the information given to the regulator by the company which is relevant to the alleged breach.

Discuss the alleged breach with the caller to ascertain any further details.

Approach the company and seek further information relevant to the alleged breach.

If necessary, conduct an unscheduled inspection of the company to obtain records if it is felt that evidence might be destroyed.

Make a decision on whether the alleged breach is valid, and if so how serious it is.

Inform the company of the decision and implications.

This might be a fine or other disciplinary action.

And likely also increased levels of inspection in the future.

There may need to be an appeal process, but ideally all relevant evidence will have been provided and discussed adequately prior to the final decision.

*Part (i) – The question was answered poorly by many. The question required initiatives with IMMEDIATE impact. Many candidates ignored this. Also, many candidates failed to appreciate that there is very limited money and likely no expertise in government or in the insurance companies. The initiatives will have to be practical and affordable.*

*As ever, additional marks were given for other valid answers including:*

- *Although implementing full new Solvency II liabilities is not realistic on an “immediate” basis, the regulator could reasonably request information on existing balance sheet scenario.*
- *Introduce counterparty exposure limits.*
- *Introduce a risk taxonomy.*
- *Set up an advisory service.*
- *Provide a timetable for the intended full implementation process.*
- *Provide education and training on the new regime.*
- *Require companies to set up a Central Risk Function with a Chief Risk Officer.*

*Part (ii) – The question was handled well by most.*

*Part (iii) – Many candidates scored poorly. Many made too few points. The regulator is hoping that the hotline might bring to light dishonesty or incompetence on a significant scale before it otherwise would have come to light and hopefully when the impact of the breach is less.*

*Other valid points include:*

- *Encourage whistleblower to discuss with someone else before reporting*
- *Have designated whistleblowing champions in each main company*
- *Make it clear that the call will be recorded*
- *Set out penalties for inappropriate use*
- *A couple of candidates also mentioned giving “rewards” for good use, but didn’t make it clear how that would actually work; indeed, advertising the potential for monetary awards might even encourage more time-wasters who call in on the off chance.*

*Part (iv) – As for the preceding question, many candidates scored poorly. Many made too few points.*

*Other points include:*

- *Log all calls into the system and prioritise them by severity*
- *Keep full documentation of the subsequent process*
- *Have a defined timescale (or turnaround standards) for each step of the process*

- 3 (i) Operational risk is the risk of losses resulting from inadequate or failed internal processes, people and systems, or from external events.

(ii) **Approach I**

The reinsurance premiums are calculated by simply multiplying the mean operational risk losses submitted by each of the four insurance companies by 150%.

Hence, the reinsurance premiums for the four insurance companies are as follows:

<i>Insurance company</i>	<i>Reinsurance premium</i>
Cornwall Insurance	30,000
Devon Insurance	30,000
Somerset Insurance	15,000
Dorset Insurance	60,000

**Approach II**

Using the method of moments we have:

$$E(X) = \alpha / \lambda$$

$$V(X) = \alpha / \lambda^2$$

so that after rearranging the terms we have:

$$\lambda = E(X) / V(X)$$

$$\alpha = E(X)^2 / V(X)$$

Hence, the parameters for the gamma distribution for each of the four insurance companies are as follows:

<i>Insurance company</i>	<i>Alpha (<math>\alpha</math>)</i>	<i>Lambda (<math>\lambda</math>)</i>
Cornwall Insurance	1.600	1 / 12,500
Devon Insurance	2.667	1 / 7,500
Somerset Insurance	2.500	1 / 4,000
Dorset Insurance	2.667	1 / 15,000

Based on the inverse Gamma distribution tables the 99.5<sup>th</sup> percentile capital requirement for each of the four insurance companies is as follows:

<i>Insurance company</i>	<i>Capital requirement</i>
Cornwall Insurance	82,852
Devon Insurance	65,091
Somerset Insurance	33,499
Dorset Insurance	130,183



Since the reinsurance cover is provided for one year only the cost of capital is the capital requirement multiplied by 6%. Hence, the cost of capital for each of the four insurance companies is as follows:

<i>Insurance company</i>	<i>Cost of capital</i>
Cornwall Insurance	4,971
Devon Insurance	3,905
Somerset Insurance	2,010
Dorset Insurance	7,811

The reinsurance premiums are now calculated by adding the cost of capital to the mean operational risk losses submitted by each of the four insurance companies, and then multiplying the sum by 125%.

Hence, the reinsurance premiums for the four insurance companies are as follows:

<i>Insurance company</i>	<i>Reinsurance premium</i>
Cornwall Insurance	31,214
Devon Insurance	29,882
Somerset Insurance	15,012
Dorset Insurance	59,764

- (iii) Approach II is reasonably simple to calculate and takes account of both the expected level of claims and the variability of those claims (through the capital charge) in respect of operational risk losses.

However, the approach does not take into account higher moments such as how skewed the losses tend to be.

Approach I is even simpler to calculate. However, it is arguably too simplistic since the approach only considers the expected costs and not the variability of these costs and higher moments.

Approach II has the advantage of explicitly allowing for the reinsurer's cost of capital, whilst Approach I only implicitly allows for this through the loading.

Therefore, Approach I may lead to the reinsurer charging a premium that is too low, as can be seen by comparing the insurance premiums for Cornwall Insurance under Approach I and Approach II.

However, whilst Approach II takes account of the capital charge through the cost of capital, this has been done on a standalone basis. We are told that Southwest Re is a multinational reinsurer so in practice the incremental capital charge in respect of this business is likely to be negligible. Assuming this is the case then it may be appropriate to cost for a lower capital charge, perhaps even on a marginal basis.

Both Approach I and Approach II allow for expenses through the expense loading. It is not clear how the expense loading has been determined or

whether this is on a full or marginal basis. Where this business is deemed incremental to the reinsurer's business plans, there may be an argument for loading for marginal expenses rather than full expenses.

However, the reinsurer is likely to have limited expertise available to assess the expenses and it may therefore be better to err on the side of caution. In particular, the reinsurer may find that claims in respect of operational risks tend to be more contentious requiring greater legal assistance and hence, higher legal fees than is the case for the mortality and property reinsurance claims.

Both Approach I and Approach II are based solely on the insurance companies' historic loss data. Relying on this data alone is unlikely to give a reliable indication of future losses since even where insurance companies have been collecting operational risk losses for a number of years the data is likely to be scant at best.

Further, there are often issues around the quality of reporting, with managers unclear on what is and isn't to be reported, and even a lack of reporting, with truncation of data a distinct possibility. Whilst the size and variability of the losses for the insurance companies may reflect the nature and size of their operations, it may also reflect differing reporting standards and varying levels of disclosure dependent on the culture of the organisation.

Additionally, the historic loss data will not take into account near misses which might provide valuable additional data on the likelihood of further losses.

Finally, the loss data that is available may not be relevant where the insurance company in question has upgraded its framework of controls and mitigating actions to reduce the risk of such losses occurring again.

Therefore, the reinsurer may wish to conduct due diligence on the insurance companies' framework of controls to satisfy itself as to the level of risk that it is exposed to.

However, the reinsurer may not have a competency in managing operational risks, so as an alternative it may wish to employ some other consultancy to conduct the due diligence on its behalf.

Either way, this will lead to additional costs that must be factored into the reinsurance premium.

In addition, there may be other data sources, such as industry wide consortiums that could provide a valuable source of information on operational risk losses. This information could be used by the reinsurer in the selection of underwriting factors and hence, lead to an underwriting process that is more sophisticated than one relying on the historic losses alone.

Once the insurance companies have reinsurance protection in place for operational risks, they may unintentionally relax their framework of controls due to the comfort provided by the reinsurance. Worse still, some of the insurance companies may intentionally relax their framework of controls exposing the reinsurance company to moral hazard. Either way, the claims experience may turn out to be worse than expected as a result.

However, the fact that the reinsurer already has a relationship with the insurance companies may mitigate this risk to a limited extent. This could be further mitigated through an on-going level of due diligence similar to that described above, although this would result in additional costs that must be factored into the reinsurance premium.

- (iv) Dorset Insurance's operational risks are generally best controlled through the implementation of an appropriate system of processes and controls.

These may, for example, include doer and checker processes and/or spot checks to guard against errors and deliberate and unintentional bias.

New processes that are introduced should be subjected to stress testing to understand what may go wrong with those processes, how material the resulting issues may be and how best to manage those issues.

Outsourcing some processes to external organisations can also be used to manage operational risk. However it should be recognised that whilst outsourcing might provide a benefit through the use of dedicated expertise, it requires additional resources to be spent on monitoring and results in less control over the outsourced function, plus exposure to counterparty default risk.

There are also more specific approaches that can be adopted in respect of specific operational risks. These include:

Dorset Insurance will be exposed to business continuity risk that can be managed through the adoption of contingency plans for an alternative business location (with property either owned outright or an option to use a property at short notice) and the ability to use backup servers and data.

Regulatory risk can be managed through the employment of an in-house department that focuses on regulations and imminent changes and to disseminate them around the firm. The department may also undertake lobbying directly on behalf of Dorset Insurance or support existing lobbying groups.

Technology risk can be managed through the employment of a dedicated central IT resource. One of the key decisions in this respect relates to how much work relating to technology to carry out in-house and how much to outsource. The central IT resource, whether internal or external, should provide a response to IT problems in a time scale appropriate to the nature of the issue.

Crime risk, such as fraud risk, can be managed through the framework of controls, where these are consistent with the size of the risk. In other words, a framework of controls that reduces the cost of frauds but costs more than that saving is not a good framework.

People risk is one of the most important as Dorset Insurance's human capital will be a key driver of profitability. People risk can be managed through the employment of a sufficiently skilled human resource team that oversees:

- recruitment processes designed to ensure the right people are recruited
- performance management and remuneration to ensure the right people are promoted and retained
- training to ensure the people have the necessary skills to carry out their work
- cultural aspects to ensure the organisation encourages openness and diversity
- alignment to the needs of the many stakeholders in the business

Legal risk can be managed through the employment of a central legal team, along with the use of external legal teams on areas of contention, so that appropriate legal counsel is sought on areas of concern.

- (v) (a) Assuming the operational risks for the three insurance companies are independent we can employ the simple square root of the sum of squares in order to assess the diversified capital charge for the subsidiary utilising the standalone capital requirements from part (ii).

The diversified capital charge for the subsidiary is calculated as follows:

$$110,560 = \sqrt{82,852^2 + 65,091^2 + 33,499^2}$$

- (b) Hence, the diversification benefit is calculated as follows:

$$39\% = 100\% - 110,560 / (82,852 + 65,091 + 33,499)$$

Or may express it as an absolute figure

$$= 70,882 (= 82,852 + 65,091 + 33,499 - 110,560)$$

- (c) This emphasises the fact that assessing the insurance premium on a standalone basis is prudent since the cost of capital could be considered too great once you allow for some diversification when calculating the capital requirement.
- (d) The assumption that the operational risks of the three insurance companies are independent is unlikely to be the case in practice. The three insurance companies may operate in differing countries and sell differing products. However, where there is commonality in these

aspects, there is the risk that operational risks crystallise in several of the insurance companies at the same time. This would occur, for example, where the sales processes for each of the three insurance companies are similar so that all three insurance companies are exposed to the same risk of mis-selling.

*Part (i) – Most candidates received the full mark. Some candidates' answers were based on the context of the remainder of question 3. It is always the case that the answer to a question relies solely on the context and questions PRECEDING the question. No knowledge of following descriptions or questions is required. Hence the required answer to 3(i) was a generic one.*

*Part (ii) – Many candidates scored full or near full marks for this question.*

*Part (iii) – Many candidates scored marks for the advantages and disadvantages of each approach but most candidates did not make a sufficient number of points regarding how the calculation could be improved.*

*Part (iv) – Many candidates made several good points in their answers. A number of candidates made points which were not relevant to the mitigation of operational risks and so received no marks for these points.*

*Other valid points included finding cheaper insurance elsewhere.*

*Part (v) – The calculation approach in (a) is quite commonly used but was not known by many candidates. Marks were awarded for other reasonable approaches. Sub-questions (c) and (d) were mostly well handled although as with the preceding question some candidates failed to contain their answer to operational risks only.*

- 4** (i) Market risk encompasses risks arising from changes in investment market values or other features correlated with investment markets, such as interest and inflation rates. This would include the consequence of investment market value changes on liabilities, and may also include the consequence of mismatching asset and liability cashflows.

And it can refer to the risk of lower sales or profit margins resulting from changes in market conditions, where "market" is interpreted as the market into which the products or services of that entity are sold.

- (ii) The level of prepayment risk will be heavily influenced by the level of interest rates, i.e. if rates fall customers would be more likely to refinance their homes and prepayments to ABC would increase.

So closely related are they that from a quantitative perspective it may be impossible to separate the impact of the change in interest rates from the customers' propensity to prepay. As a consequence the two risks are likely to be considered as one exposure by management.

- (iii) DEF has a higher credit rating and is therefore likely to be considered a better credit risk than ABC. DEF's borrowing costs are therefore lower than ABC's.

Assuming the combined entity retains the higher credit rating the cost of funding (i.e. of borrowing funds to finance the mortgages) will fall. Thus the profit margin can be expected to increase.

Possible benefits from economies of scale

Possible benefits from tax synergies

- (iv) Examples include:

- Foreign exchange risk: ABC is likely to operate in a different currency to DEF
- Strategic risk: acquisition may fail
- Agency risk: DEF has no familiarity with the new territory and market so will have to rely on ABC's management whose incentives may not be aligned to the overall entity
- Operational risk: similar to the above issue (familiarity of DEF senior management) plus management distraction due to the acquisition process
- Political, legal, regulatory risks: new territory has new rules and regulations
- Economic risks: new economy, potentially involved in a new industry
- Credit risks: increased borrowing to sustain ABC's business model
- Liquidity risk: acquisition may reduce available cash
- Reputational risk: DEF has "lent" its brand to ABC
- The aggregate risk position of the combined entity will include diversification credits which were not there prior to the acquisition in DEF Bank.

- (v) A slowdown in the world economy could act to increase borrowing costs while at the same time weakening the housing market and reducing demand for mortgages.

*Part (i) – This question was handled well by most. The question came after a brief description of ABC Mortgages and so the answer should be made within the context of the preamble above it.*

*Part (ii) – Candidates either knew that prepayment risk was linked to interest rate changes or not. Hence, the candidates either scored well or no marks.*

*Part (iii) – This question was handled well by most.*

*Part (iv) – This question was handled well by most.*

*Part (v) – This question was handled well by most. Many candidates lost marks for not suggesting a scenario that would clearly affect both ABC's domestic business and DEF's international operations.*

5 (i)

<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none"> <li>• Likely to be more cost-effective than going to the retail market as the direct market reinsurers at least in part large risks to reinsurers anyway.</li> <li>• Also a certain level of claims are virtually inevitable. Cash can be retained in the captive to meet these claims which reduces the cost of the reinsurance premiums.</li> </ul>	<ul style="list-style-type: none"> <li>• Captive is subject to regulatory requirements – so there will be additional costs / regulations.</li> <li>• The internal administration costs of the captive may not be less than the savings in the expense loading in the direct premium.</li> </ul>
<ul style="list-style-type: none"> <li>• May be the only way XYZ can get cover for all its employees through a single scheme.</li> </ul>	<ul style="list-style-type: none"> <li>• May be an industry that XYZ does not have existing internal expertise in.</li> </ul>
<ul style="list-style-type: none"> <li>• Affords XYZ a degree of control over the level of benefits and servicing requirements which may not be available through a retail arrangement</li> </ul>	<ul style="list-style-type: none"> <li>• May not provide adequate protection for extreme events</li> </ul>
<ul style="list-style-type: none"> <li>• Possible tax benefits</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>

- (ii) Reinsurance will transfer the insurance risk. However, this is replaced by a new credit risk exposure to the event that the reinsurer defaults.

In addition, the risk exposure is so concentrated in the event of a catastrophe – for example, a single event could trigger a large number of claims from staff in a single location such as a head office – it may not be possible to arrange sufficient reinsurance and some risk will have to be retained.

At the very least, this could mean that the credit risk exposure is not insignificant.

Further, claims from this event may create a liquidity constraint while XYZ waits to recover from the reinsurer.

Insurance risk events may trigger risk events in other categories. For example, in the extreme scenario the loss of a large number of staff will not only have financial but also operational consequences.

For direct insurance there is one contract between the company and the insurer. In the case of the captive there is a contract between the company and the captive and then another contract between the captive and the reinsurer. This gives rise to potential basis risk between the two contracts leaving the company in the position that it may be exposed to claims that are not covered under the reinsurance.

(iii) Examples include:

- Investment in physical measures to improve safety, for example better fire prevention measures or security at office buildings
- Health and safety screenings of all suppliers (e.g. canteen operators)
- Regular medical examinations for staff
- Encouragement of healthy lifestyle e.g. healthy food options in the canteen
- Or provision of sports/gym facilities to encourage exercise
- Have some degree of underwriting, particularly for higher sums assured
- Exclude pre-existing conditions from insurance cover
- Other exclusions e.g. claims due to hazardous hobbies
- Have robust and active sickness management policies, e.g. regularly following up those off work due to sickness
- Have rehabilitation policies, e.g. allowing employees to return to work part-time after a long illness
- Staff training programs to reduce the risk of accidents in the workplace
- Reduce amounts of cover provided
- Limit cover to a subset of staff

*Part (i) – A straight-forward question that was well handled by many.*

*Part (ii) – Another straight-forward question that was well handled by many.*

*Other valid points include:*

- *reinsurance cover not being 100% (e.g. retention limit and/or upper limit).*
- *There may be some form of currency risk, depending on how the reinsurance is set up.*

*Part (iii) – This question was well handled by most.*

**6** (i) Solvency II comprises three pillars.

### **Pillar 1: Quantitative Requirements**

Solvency II prescribes the minimum amount of capital that must be set aside based on the estimated aggregated financial risk of the company.

The calibration of the Solvency Capital Requirement (SCR) is a 99.5% level of confidence over a one year time horizon.

The aggregated financial risk is either modelled using an “internal model” or is calculated using a prescribed standard formula.

In order to estimate or calculate the aggregated financial risk it is necessary to identify and model many types of risk including market risk and credit risk.

If an internal model is used, it must meet a number of criteria including the “use test”, and be approved by the regulator.



There is also a Minimum Capital Requirement (MCR) below which the company would lose its authorisation.

As for ERM, the requirements call for complete and up to date documentation and back testing to evidence the appropriateness of the results.

### **Pillar 2: Qualitative Requirements**

Assessing risk through the other business practices including corporate governance, health and safety, business plans, management experience and expertise. Plus regulatory scrutiny of overall strategy and business models.

### **Pillar 3: Disclosure**

Seeking to encourage the full disclosure of risks in order to encourage companies to fully identify, monitor, measure, mitigate, transfer etc, keeping net risks which are in line with the stated company's objectives.

(ii)

- Non-life underwriting risk
- Life underwriting risk
- Health underwriting risk
- Market risk
- Counterparty default risk
- Operational risk

(iii) Underwriting risks

- Risk aggregations (sum insured)
- Split for example by region, peril/product type, distribution channel
- New business levels by similar splits
- Reserve strengthening/release

Market risk

- Value at Risk (VaR)
- Stress and scenario test results

Counterparty default risk

- Counterparty credit quality and diversity for assets and liabilities – credit rating analysis

Operational risk

- Analysis of key risks (operational risk profile)
- Internal audit results
- IT downtime
- Staff turnover rates

(iv)

- Audit Committees – To monitor material financial risks and mitigation of those
- Executives – To review risk information for completeness
- Managers – To review risk information for completeness and changes in risk profile or control effectiveness
- Risk Owners – To update risk information and escalating changes in likelihood, impact or control effectiveness as required
- Control Owners – To update status of treatments for controls that they are responsible for
- Internal Audit – To reviewing the effectiveness of internal control measures
- External Stakeholders – Reviews by supervisory bodies for regulatory solvency purposes
- Credit Rating Agencies – As part of their credit rating monitoring and review process

(v) KPIs are used to monitor the performance of the organisation. They are therefore associated with the return side of the risk-return equation and wouldn't strictly be an indicator of the risk exposure.

However, to the extent that both KPIs and KRIs use proxies for the underlying risk and return drivers, they may well be the same.

For example, a life company selling unit-linked policies may use an equity index as a KPI (to proxy changes to the level of fund management charges it expects to receive) and as a KRI (to proxy changes in market risk capital).

The key difference between the use of a metric as a KPI and KRI is the interpretation which is applied to it and the subsequent set of actions / responses it will result in. For example, KPIs will result in actions by the Finance function, while KRIs will result in actions by the Risk function.

*Part (i) – A straight-forward question which was well handled.*

*Part (ii) – A straight-forward question which was well handled.*

*Part (iii) – Most candidates who tried to answer the question scored good marks. There were many nil responses indicating that many candidates had not previously thought about specific risk measures.*

*Part (iv) – Most candidates were able to list a number of internal and external stakeholders and explain why they would be interested in monitoring the company's KRI's.*

*Part (v) – This question was answered poorly by most. Most candidates were unable to distinguish between the purpose and use of KPIs and KRIs and hence were not able to answer the question.*

## **END OF EXAMINERS' REPORT**