

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

September 2010 examinations

Subject SA2 — Life Insurance Specialist Applications

Introduction

The attached subject report has been written by the Principal Examiner with the aim of helping candidates. The questions and comments are based around Core Reading as the interpretation of the syllabus to which the examiners are working. They have however given credit for any alternative approach or interpretation which they consider to be reasonable.

T J Birse
Chairman of the Board of Examiners

January 2010

- 1** (i) The main requirements of INSPRU relating to the calculation of mathematical reserves are as follows:
- Mathematical reserves must be established using a prospective actuarial valuation on prudent assumptions, including sufficient margin for adverse deviations.
 - Mathematical reserves must avoid any future valuation strain.
 - The reserve for an individual policy cannot be less than the guaranteed surrender value for that policy, if one exists.
 - In certain circumstances a negative reserve is permitted.
 - Regulatory basis life firms must make some allowance for future annual bonuses on with profits business; realistic basis life firms need not (since this is covered by Peak 2 for these firms).
 - When valuing non-unitised with profits business, regulatory basis life firms must hold reserves at least as high as if a net premium method had been used; realistic basis life firms have the option to use a gross premium method.
 - Both realistic and regulatory basis life firms may make an allowance for lapses in their valuation of all classes of business.
 - Valuation rates of interest cannot exceed 97.5% of the risk-adjusted yields on the backing assets, where risk-adjusted means the yield on a backing asset has been reduced for the risk of default. In respect of sums to be invested in the future at unknown rates, additional restrictions apply that are different for realistic and regulatory basis life firms.

Q1(i) was a bookwork question and most students scored well. Those who fully understood the differences between regulatory and realistic basis firms tended to score highest.

- (ii) Under Peak 1 the asset value used is the admissible value of assets backing both with profits and without profits business in the long term fund.

The assets included under Peak 2 include the admissible assets backing the with profits business. Admissible assets backing the statutory liabilities for the without profits business written in the long term fund are excluded under Peak 2.

Inadmissible derivatives will not be included in the Peak 1 asset value. However the market value of inadmissible derivatives held in the long term business fund are included in the Peak 2 asset value.

Under Peak 1 there are rules specifying the maximum amount of exposure to a single issuer of financial instruments. These limits are expressed as percentages of the company's long-term business amount, where the business amount is defined as the mathematical reserves plus the Long Term Insurance Capital Requirement (LTICR). In addition there are limits on percentages that can be counted in particular asset classes.

Under Peak 2 there is no limit placed on the level of exposure to a single issuer.

Company X may have assets that are excluded due to the exposure limits under Peak 1 or are inadmissible derivatives, but included under Peak 2. The Peak 2 asset value will include the present value of future profits arising on the without profits business written in the long term fund. This will include the release of the LTICR relating to this business if deducted from the admissible assets backing the with profits business. The Peak 1 asset value will not include any allowance for this amount.

The company described is relatively simple having with profit and without profits business being written in a single fund (LTF) and also having a shareholder fund so support assets are unlikely to be relevant

Q1(ii) was again answered relatively well by many candidates. Those who did best were those who could apply the bookwork to the question. Some lost marks by not realising the assets for non profit were not included. In addition some candidates discussed admissible assets at length whereas the question was seeking for candidates to focus on the differences and in particular the excess admissible assets.

(iii) The stress tests considered are as follows:

- A fall or rise in the market value of equities of at least 10% and no more than 20% depending upon the average level of the FTSE All Share Index over the previous 90 days relative to its current level.
- A fall or rise in property values of 12.5%.
- A fall or rise in fixed interest yields of 17.5% of the long-term gilt yield.
- An increase or decrease of 32.5% in assumed lapse rates.
- On fixed interest securities, a widening in credit spreads in accordance with formula linked to current spreads and the individual credit rating of each security. The impact of credit risk on reinsurance exposures also needs to be taken into account.

Stronger candidates were able to score full marks on Q1(iii). Some candidates lost marks where they did not state the quantum of each stretch or did not state it could be a rise or fall. Only the stronger candidates were able to fully explain the credit test.

(iv) As Company X is a realistic reporter then it does not need to calculate a Resilience Capital Requirement (RCR)

Minimum Capital Requirement (MCR) = MAX(BCRR, LTICR)
Where, Base Capital Resources Requirement (BCRR) = €3.2m
So MCR = MAX(€3.2m, £35m) = £35m

Regulatory excess capital = Peak 1 Free Assets – LTICR
= [£850m – £750m] – £35m = £65m

Realistic excess capital = Peak 2 Free Assets – RCM
= [£870m – £760m] – £38m = £72m

With Profits Insurance Capital Component (WPICC) =
MAX(0, Regulatory excess capital – Realistic excess capital)

$$\text{MAX}(0, £65\text{m} - £72\text{m})) = £0\text{m}$$

$$\begin{aligned}\text{Enhanced Capital Requirement (ECR)} &= \text{WPICC} + \text{LTICR} \\ &= £0\text{m} + £35\text{m} = £35\text{m}\end{aligned}$$

$$\begin{aligned}\text{Capital Resources Requirement} &= \text{MAX}(\text{ECR}, \text{MCR}) \\ &= \text{MAX}(£35\text{m}, £35\text{m}) = £35\text{m}\end{aligned}$$

So Peak 1 bites.

Candidates scored well on Q1(iv) being able to apply their knowledge well. Some lost marks through only writing a bare minimum and not fully explaining their calculations. Given the number of marks available candidates were expected to provide a logical flow and demonstrate understanding of how the different elements of the calculation fitted together.

- (v) For Peak 2 to become more onerous, the level of the realistic excess capital would need to reduce by more than any reduction in the level of regulatory excess capital, so that the realistic excess capital is now less than (rather than higher than) the regulatory excess capital.

For this to happen, then any number of the following would need to occur:

Asset movements

- Switching “excess admissible assets” into unconstrained admissible assets would increase the value of Peak 1 assets but leave Peak 2 assets unchanged.
- Improved diversification of the assets held may remove or reduce any restriction on asset values from the exposure limit.
- Selling any inadmissible derivatives would similarly increase the value of Peak 1 assets, but would not increase the value of Peak 2 assets. Alternatively a reduction in the value of inadmissible derivatives would reduce the value of Peak 2 assets without impacting the Peak 1 value. Similarly a reduced value of excess admissible assets would reduce Peak 2 but not Peak 1
- The PVFP would reduce without impacts elsewhere if, for example, the discount rate was increased due to a perceived increase in risk that is already reflected in (or not relevant to) the Peak 1 valuation basis.

Liability movements

- The value of Peak 1 liabilities would reduce if there was a change to the Peak 1 valuation basis, perhaps through a reduction to the level of margins held or through release of a global contingency reserve.
- If the change is to weaken the Peak 1 with profits valuation basis then there would be no impact on Peak 2, since Peak 2 with profits liabilities are calculated either using asset shares on a retrospective basis or ‘best estimate’ assumptions on a prospective basis.
- If the change is to weaken the Peak 1 without profits valuation basis, then there is a second order impact on the Peak 2 assets (being the difference between the immediate release of margins to assets now, compared with

the discounted value of the release of margins in the PVFP previously) but the overall impact would be less than for Peak 1.

- Any increase in the asset shares due to an increase in the value of assets under both Peak 1 and Peak 2 that is not reflected in the guaranteed benefits (e.g. strong equity market growth) will increase the Peak 2 liabilities but not the Peak 1 liabilities since the latter do not allow for terminal bonus. The increase in asset shares would be partly offset by a decrease in the cost of guarantees but nevertheless, total Peak 2 liabilities would be expected to increase by more than the Peak 1 liabilities.
- If a prospective method is used to calculate the Peak 2 liability value then any revision to assumptions that are used in Peak 2 but not in Peak 1 (e.g. best estimate lapses, if the company does not allow for lapses in its Peak 1 with profits liabilities) may increase the value of the liabilities.
- Alternatively if the company were to start to allow for lapses in its Peak 1 liabilities then this could reduce the level of Peak 1 liabilities and thus also the level of the LTICR.
- An increase in the implied volatility of assets would be reflected in the value of future policy related liabilities under Peak 2. Increased volatility could lead to higher costs of any guarantees and financial options but would not impact the Peak 1 liabilities.
- Similarly investing the assets backing the with profits liabilities in a higher proportion of (volatile) equities could increase the Peak 2 cost of guarantees, but this may not have a significant impact on Peak 1 reserves (depending on the valuation rates of interest used).
- A change in the shape of the yield curve could result in an increase in Peak 2 cost of guarantees that may not be reflected in the Peak 1 liabilities.
- If the company were invested in assets that were shorter than the guarantees on the with profits business they were backing, then an increase in yields would result in an increase in Peak 1 surplus (as the reduction in the liability would be greater than the reduction in the asset value). However under Peak 2 the assets and the liabilities (if using a retrospective approach) would move in line with each other; the only effect would be a second order impact on the cost of guarantees.
- The company could reassess the extent to which it allows for management actions in its Peak 2 liability calculations (e.g. due to strategic decisions); if it reduces this allowance then this could cause Peak 2 to start to “bite”.
- Increases in reversionary bonus rates would also impact Peak 2 as bonus reserve would increase but Peak 1 may be unaffected if margins exist in basis
- Changes in smoothing methodology may also impact Peak 2
- The company may decide to increase the allowance for estate distribution in terminal bonus which would increase the cost of planned enhancements in Peak 2 but not impact on Peak 1. For example, if it closed to new business it would be a requirement to include distribution of all the estate in Peak 2.
- The company may introduce financing arrangements e.g. securitisation that increase Peak 1 available capital but have no impact on Peak 2.

Movement in RCM or LTICR

- If the company was to change the proportions of fixed interest, equities and property assets held, this could result in an overall increase to the impact of the stress tests performed under the RCM.
- A change in strategy on fixed interest securities could increase the RCM. If the company decided to invest its fixed interest portfolio more in corporate bonds and less in government backed gilts then this would increase the impact of the widening credit spreads stress test (but would have limited impact in the Peak 1 calculations if credit spreads are not taken into account in the valuation rate of interest).
- The company could enter into a reinsurance deal which has broadly the same overall impact on Peak 1 and Peak 2 assets and liabilities, but which reduces the LTICR and thus has a greater relative improvement in the Peak 1 balance sheet.

Removing any hedging of (say) cost of financial options could reduce excess capital under Peak 2 more than Peak 1.

A previous calculation error may have been corrected.

Tougher peak 2 stresses applied by regulator would also impact peak 2

In addition changes in mix of new business over time may impact peak 2 relative to peak 1 e.g. writing less capital hungry business

Q1(v) differentiated the strongest candidates from the rest as few gained many marks on this question part. Those who went methodically through various events and considered how this impacted all aspects of the assets and liabilities under both peaks scored highest. Few candidates identified impacts from higher volatilities or changes in yield curve.

Marks were not lost in this part for getting the wrong peak biting in Q1(iv) provided the explanations given here fitted the answer given in part (iv).

- 2** (i) Using profit test cash flow model as base would mean all other product features would already be included.

The cashflow projections would have to allow for a high sum assured for the first ten years, reducing to the minimum guaranteed level for the rest of the term.

Original profit test would have been set up for model points with new business volumes, but quoting for individual policies will require individual data

Or the company may produce calculations for model policies and interpolate between them to create rating tables to apply across all policyholders

Need to obtain key detailed data for the policyholder

e.g. age, sex, smoker status, premium level, premium frequency

Need to obtain any likely rating details e.g. additional premiums or additional mortality ratings.

Given that this is a policyholder projection – and not a profit test – assumptions regarding expenses, withdrawals – are not required.

As it is important to ensure policy values do not get a negative value it is likely that assumptions used would be prudent

Investment return assumption may be lower than expected to incorporate a margin. In addition an assumption for inflation may be required for any charges expressed in monetary amounts that contractually change in relation to an inflation index and may be set prudently

For maximum cover the unit fund must be sufficient to cover mortality charges over the full lifetime of the contract.

If the charges are based on current mortality levels, then there is an element of prudence if mortality is assumed to continue to improve.

The company would have to consider whether the assumed unit growth rate should allow for the selected fund, or whether it would be based on the expected weighted average of all the funds offered.

The level of maximum cover would be that at which the unit fund was always above a target amount – which could be, but is unlikely to be, zero depending on the prudence built into the parameters.

Because this is a whole life policy, the company may decide to set a maximum age (e.g. 100) below which it is permissible for units to fall below zero.

This question part was poorly answered by most candidates. Very few candidates read the question properly and identified that the model was being adapted for point of sale quotes and consequently scored very few marks in the regurgitation of a standard profit test. .

(ii) **Data and assumptions**

The company will require policy data including policyholder age, sex, smoker status, their chosen sum assured and current fund value

Economic assumptions, e.g. unit growth would need to be set based on expected future investment returns

Mortality assumptions would be based on recent experience allowing for any trends into the future

Customer expectations

The company needs to take into account any relevant regulations, e.g. TCF or equivalent.

Reviews will have been mentioned in the marketing literature, sales process and policy conditions.

Policyholders are therefore entitled to a robust review at the stated times, and the company needs to ensure that its process is consistent with what was originally described.

Administration

The process will require significant administration to implement and hence costs will rise.

The process is likely to give rise to a lot of policyholder queries.

The cost of the systems development (as described in part (ii)) also needs to be taken into account.

Investment Risk

There is a possibility that unit funds are not sufficient to cover mortality charges – but cover is guaranteed for at least 10 years.

The level of maximum cover offered is very sensitive to the unit growth assumption.

Policyholders choose the funds in which they are invested. Those who choose risky funds (i.e. with more volatile returns) are more likely to have a negative result from a review.

Mortality Risk

As well as the risk of making an inaccurate mortality assumption when determining the maximum level of cover, there may be anti-selection risk arising from not having further underwriting. Those in poor health could be more likely to opt for the maximum cover, which needs to be reflected adequately in the pricing.

Lapse & Re-entry

Consideration needs to be given to current contract design – a review may prompt a policyholder to cancel their policy and take up a new policy

Policyholder communications

Policyholders may not be expecting a reduction in the level of cover.

There may be an increase in withdrawals if policyholders are dissatisfied.

Mis-selling complaints may be made involving regulators.

Need to develop various options for contracts that have negative unit funds, or where policyholders wish to increase their cover at a review.

Policyholder communication could be difficult to draft.

Profitability

The additional costs – systems and administration – need to be included in the original profit tests

Assumptions regarding withdrawals at review points need to reflect potential increases.

Further, building the review process into both profit tests and reserving calculations could be difficult.

The company would also consider the likely views of the regulator or ombudsman in considering the review process

Candidates also found Q2(ii) difficult but this proved a better differentiator as some provided a good discussion in some areas. A number were alert to the issues from the lack of underwriting and showed awareness of the customer perspective. Others were able to pick up marks considering issues regarding the data and assumptions required.

- (iii) The fact that the maximum cover level has decreased does not mean that the policyholder has been unfairly treated.

The policyholder takes most of the investment risk under this contract.

The fact that investment returns have been poor and are expected to continue to be lower than assumed when purchased is the main reason for the decrease in cover.

The company would consider whether it had multiple complaints or if this was the only one. It would consider the position of the regulator or ombudsman in similar cases. If there were a number of cases the company would consider proactively contacting the regulator and would consider the cost of compensation versus reputational damage from possible adverse publicity if not compensating the customer.

Key to the policyholder's complaint will be to review the marketing material and the sales process.

The company needs to check that it was clear from the marketing literature that the investment risk was taken by the policyholder and that it may lead to increases in premiums relative to benefit levels

And that the sales process ensured that the policyholder received all the relevant marketing literature.

The company needs to consider whether the sale was via a company controlled channel (e.g. direct sales force) or through an intermediary.

If the former it needs to check whether records are still kept of the advice given, in order to see what information was provided. This may help support or deny the policyholder's position.

If the sale was via an intermediary, then it is less likely that this information will be available.

The company should consider whether there has been a larger than normal number of complaints from customers, who had been sold products by that intermediary.

The company also needs to consider whether the investment fund selected matched up with the policyholder's risk profile.

And whether this policyholder is within the target market for this contract, or whether there was an alternative contract (e.g. conventional whole life) available that would have been more appropriate.

The company should consider whether there was anything in the relationship with the advisor (whether internal or external) that would encourage the

advisor to give unsuitable advice (e.g. promote this contract over a more suitable contract).

And it should check whether there was a process at the point of sale that identified a cover level that might be supportable throughout the policyholder's life, as claimed by the policyholder.

If so, it should also check whether the cover level selected by the policyholder corresponded with this process.

It may be that investigations into the above are unable to discover what went on due to the period of time that has elapsed.

However, it is likely that the burden of proof rests with the company and so failure to provide evidence to support the company's position could well be in the favour of the policyholder.

The company should consider whether there have been any reviews of the marketing literature or sales process since launch resulting from possible previous complaints or because that they were felt to be misleading, which would give extra credence to the policyholder's view.

The company has an ongoing responsibility to ensure that policyholders are provided with clear information and kept suitably informed throughout the life of the contract.

Therefore the company must consider what information has been provided to the policyholder since the policy was sold.

Presumably, annual unit statements have been issued. It must check whether these gave any indication to the customer that the performance of the fund had been less than expected and the likely impact that this would have on subsequent reviews of life cover.

It should also check whether any alternative suggestions were offered that were intended to help the policyholder meet their objectives for the policy, such as seeking further financial advice, considering whether the fund selected still met their risk profile or allowing the level of cover to be maintained by increasing premiums.

The company must also ensure that it treats its customers fairly at the point of any complaint.

It must be clear to the policyholder how to make a formal complaint, the escalation process available (e.g. to an ombudsman or equivalent).

The complaint process should not include any unreasonable barriers. The company would also seek to validate if the policyholders facts are correct before responding

It would also review its processes to try to avoid a recurrence in future

Q2(iii) was not particularly well answered by the majority of candidates. Whilst many identified the core issue regarding what the customer was told at point of sale in general the candidates did not provide enough depth to score well. In addition very few considered what communications the customer may have received since the sale, for example in statements, and whether any updates were provided on the performance of the investment.

3 (i) (a) Credit risk

Credit risk arises when a firm is exposed to loss if a counter party fails to perform its contractual obligations, including failure to perform them in a timely manner.

Credit risk may, therefore, impact on a life insurance company's ability to pay claims as they fall due.

Examples of credit risk might include:

- exposure to the default of a 3rd party where the insurance company holds corporate bonds issued by that 3rd party. The risk is that the 3rd party defaults on the payment of coupons (and/ or payment of the principal when it falls due);
- exposure to banks defaulting whilst holding cash investments;
- exposure to the default of a reinsurer, where the insurance company has reinsurance treaties in place with that reinsurer.

A company is likely to have an internal system of controls to monitor its exposure to credit risk.

This will enable the company to restrict its exposure to different counterparties and assets to prudent levels that are consistent with local regulations, its own risk appetite and capital resources and to ensure that those exposures are adequately diversified.

A further way to control credit risk relating to corporate bond exposures is through the use of derivatives.

(b) Market risk

Market risk is the risk that as a result of market movements, a firm may be exposed to fluctuations in the income from, or value of, its assets, or the amount of its liabilities.

Sources of market risk include:

- movements in interest rates
- movements in the market value of equities

- movements in exchange rates
- movements in real estate prices

None of these sources of risk is independent of the others.

Giving due consideration to these correlations is an important aspect of managing and controlling market risk.

The insurer will have a system of internal controls in place that allows adequate monitoring of exposure to market risk.

Management information will contain information relating to the exposures to market risk by tallying e.g. the assets invested in each broad asset type by geography.

Controls will include the definition of the governance arrangements and authorisation levels around investment management decisions, management's understanding of the sensitivity of the liability calculations to movements in market values (i.e. matching considerations) and the definition of management actions in the event of movements in the level of key market indicators.

A further way to control market risk is through the use of derivatives.

The company may also change its asset mix to reduce volatility by investing in more stable asset classes

In addition controls to manage either risk may be imposed by the regulator through restrictions placed on insurers

Q3(i) well answered by many candidates. Most were able to give provide a number of examples of both risks and gave a good discussion of a number of different controls and management actions.

- (ii) Risk of default of counterparties significantly increased during the year, reflected in widening credit spreads, though there may be arguments put forward that some of credit spread widening is due to illiquidity rather than credit risk.

Some counterparties may already have defaulted, and it could well be that actual default experience has been in excess of that estimated in the economic capital calculation a year ago.

There will also likely have been downgrades within the portfolio. e.g. an overall portfolio that was on average A rated at the end of previous year, may now have a far lower average e.g. BBB- depending on the downgrades experienced by the portfolio.

The company should consider the extent to which its specific bond holdings have been affected, and whether there are any specific indications of further defaults e.g. corporate bonds put on credit watch by ratings agencies.

Cash deposits may also have been impacted by any banks defaulting

Depending on levels of new business versus offs, the life insurer may have been a forced seller of some credit risky assets during the year (at a time of low corporate bond prices).

Investment mix changes due to market movements may cause a change in exposure going forward. In addition the company may have also have changed the asset mix in response to the conditions which will have further changed exposure going forward.

Also the shape of the corporate bond portfolio may have changed e.g. credit spreads may have widened more for some sectors than others, which may have shifted the balance of the portfolio, in terms of market value, towards particular sectors.

Further, depending on the company's solvency position, the regulator may have required the insurer to reduce credit exposure in particular markets or in particular sectors.

Note that in some countries where the insurer operates, the regulations may not permit investment in corporate bonds (e.g. may be restricted to investment in government bonds) or there may not be a well developed corporate bond market to invest in – hence credit risk will not have changed evenly across all countries.

Aside from corporate bond exposure, the insurer may also be exposed to credit risk due to increased risk of reinsurer default to the extent that reinsurance is used to support its business.

Need to consider whether exposure to reinsurer default has increased, as a result of a change in value of liabilities (as a result of market movements). In addition a derivative provider may default.

Also need to check whether the risk of default of reinsurers has increased, by looking at their latest credit ratings.

The insurer also has counterparty exposure in relation to its government bond holdings (not all governments will be AAA rated and there may be increased risk of government defaults).

It will be possible to assess this by looking at how the yields on government bonds have changed over the year versus other instruments such as swaps.

Q3(ii) was poorly answered by most candidates. Most candidates identified the actual investment mix had changed and this impacted the risk in future. Few however recognised that the relative change in yields demonstrated a change in the markets view on risk and that this was likely to have been accompanied by downgrades or defaults that may have had impacts on the company.

(iii) Factors to take into account:

First need to define the stress tests likely to be included in economic capital calculation for market risk.

e.g. $x\%$ fall in equity markets, $y\%$ fall in interest rates, change in shape of yield curve etc. ($+/- z$ no of bps at different terms)

Need to define these for each of the geographic locations in which the company operates, although the company is likely to concentrate on those territories where the economic capital is material in size (in relation to the whole group of companies).

Need to consider whether the size of the shocks should change from those used at the previous year end.

This might depend on the relationship between the stress tests carried out at last year end compared to the market movements.

If last year's experience was worse than the "1 in 200 stress" used in last year's economic capital calculation then the company might have to consider that a 1 in 200 year event may be worse than had previously been allowed for.

Alternatively, if it believed that what occurred was in fact a 1 in 200 year event, then the company will have to consider the likelihood of another 1 in 200 year event occurring again this year. It may therefore be suggested that lower shocks should be used this year, on the basis that the base capital currently contains an element of shocked capital.

The insurer will need to consider which market risks are now its most significant exposure, since both the value of the insurer's assets and liabilities will have changed significantly in the last year.

Looking at management information regarding market exposures will help to identify the most important market shocks for the insurer at this year end.

The insurer will need to consider management actions and the extent to which these are adequately reflected during the shock,

For example the company may change asset mix dynamically with market movements

Given the economic downturn and the combination of events that occurred over the last year, the company may want to consider whether calculating shocks for each type of market risk in isolation and aggregating them is sufficient, or whether multiple variables should be shocked during a single run, which may give a more realistic picture of the impact on the company.

In either case, the correlations between the different types of market risk (and other types of risk) need to be reconsidered.

As would the relationships between stresses extreme situations.

It may also be possible to demonstrate that the aggregation of certain events provide a higher answer for market risk capital than an aggregated run (the “non-linearity adjustment”).

The company would also consider available industry guidance

Candidates also found this question part difficult. A number of candidates concentrated on how to model the stress rather than considering setting what the stresses should be and how the situation given in the question that the company had experienced may influence the stresses applied.

- (iv) Regardless of the outcome of any economic capital calculation, a life insurance company has to meet its regulatory capital requirements – so in each country in which this life insurance group operates, the local life insurance entity will need to hold sufficient capital to meet the local solvency capital requirements.

Hence the director's suggestion, to hold the greater of economic and solvency capital will generally result in either no change to or an increase in capital requirements at the local country unit level.

In some countries in which the life insurance group operates, the solvency regulations may closely mirror an economic capital type calculation. The director's suggestion would have little impact on the overall capital requirements in those countries.

For example if the group operates in the UK then the internal economic capital may be similar to the ICA capital requirement, since it is calibrated similarly

However, in other countries it is likely that the solvency capital rules are based on fairly crude factor based approaches, which are not sufficiently sensitive to the economic risks that the life insurer is running.

In these countries, it is likely that the economic capital required may be quite different to the capital required under the local solvency rules – the economic capital may be substantially higher or lower than the capital required by the local solvency rules. If the former then this would imply a need to increase capital held under this suggestion

However, for companies in some EU countries this might simply be pre-empting an increase in regulatory capital requirements that will be necessary under Solvency II, and hence the proposal might help those companies prepare for the implementation of this

One factor the insurance group may wish to consider, in response to the director's suggestion, is the measure of security (and level of security) that the company is targeting when setting its economic capital compared to the level of security targeted under the local solvency regimes.

The extent to which diversification is allowed for within the insurance group's economic capital results must be considered.

E.g. the company is likely to have considered the impact of diversification between country units, within country units across products etc. At a group level, the diversification allowance for diversification of risk across country units will have acted to reduce the economic capital overall. It is not clear whether, at a group level, the economic capital is greater than solvency capital, especially after taking diversification into account.

The group will consider issues around fungibility of capital, and how the group's total economic capital is calculated.

For example, in calculating the total economic capital requirement across the group, the company may look at the relationship between economic capital and solvency capital in each country and use the difference between economic capital and solvency capital, in those units where economic capital is greater, to offset the difference between solvency capital and economic capital in those countries where the economic capital is less than the solvency capital.

$$\text{i.e. } \underset{\text{across all country units}}{\text{Max}} \{0, [\sum (\text{economic capital} - \text{solvency capital})]\} + \underset{\text{across all country units}}{\sum} \text{ solvency capital}$$

This may still lead to the economic capital requirements of the group being greater than the solvency capital requirements of the group, but not to the extent that may be anticipated if the following formula had been used:

$$\sum \underset{\text{Max from each country unit}}{\text{max}} (\text{economic capital, solvency capital})$$

The insurance group will consider e.g. to what extent rating agencies and analysts expect the company to tie up capital in excess of solvency capital – and whether taking such action would e.g. have a favourable/unfavourable impact on the credit rating and share price.

The insurance group will consider what its peers are doing in setting capital requirements. It may be possible to get this information from published reports (e.g. annual report or embedded value report) – if peers are simply holding solvency capital requirements, then the company is unlikely to want to put itself out of line by increasing its capital requirements compared to its peers.

In considering the director's suggestion, the insurance group is likely to consider the current basis on which capital is held. The insurance group may target holding sufficient capital to achieve a particular credit rating e.g. AA, from the credit rating agencies (S&P, Moody's etc). It may target holding capital at a set percentage in excess of local regulatory requirements in order to provide an additional cushion to ensure that the minimum regulatory requirements are met at all times. Hence comparisons of the current capital requirement versus the director's suggestion are likely to be done.

In considering whether to adopt the director's suggestion the company needs to understand the current extent of free capital in the company and the size of the additional required capital that this suggestion would generate. Whilst the director's suggestion is sensible, in that it will allow the company to withstand the economic shocks included in the economic capital calculation, it is unlikely to be feasible if the company has limited free capital.

The insurance group may consider raising additional capital, if required, to implement the director's suggestion, but this is likely to be difficult currently given the recession and the tightening of the credit markets.

The group also needs to take into account the practical difficulties in ensuring that the economic capital calculation is performed consistently across each of its companies. It would not be realistic for the group to prescribe a fixed calibration basis (both for "shocks" and correlation coefficients) for all companies, since the risk conditions and volatilities in each country will differ. It will therefore be difficult to ensure that the level of security is the same across all countries.

The group would have to define carefully the overall methodology required, e.g. the extent to which new business should be allowed for, in order to minimise inconsistencies.

This question part differentiated the strongest candidates from the rest with only a few scoring well. Many candidates identified some positives from the suggestion in particular in terms of the security provided. Many however failed to identify the adverse consequences from tying up more capital. Only the strongest candidates discussed the practicalities of the group and either the likely diversification benefits that would be missed in the director's suggestion or the practical difficulties in applying a common approach to a multinational company.

END OF EXAMINERS' REPORT