

May 2016

Subject F202 — Life Insurance

Specialist Applications

EXAMINER'S REPORT

QUESTION 1

A life insurance company has just completed an actual vs. expected mortality analysis covering the term-insurance business (risk only) written over the last six years. Your manager has seen the analysis and concluded that the book has been running profitably over the period of investigation and has in fact become more profitable over time. Based on this, she has recommended a change to the EV mortality assumptions for this book of business.

The analysis is set out in the table below. The experience (set out as actual claims expressed as a percentage of the expected claims) is broken down by the policy start date (underwriting year) and calendar year.

Policy start year	Calendar year						2010 to 2015
	2010	2011	2012	2013	2014	2015	
2010	95%	95%	95%	100%	105%	110%	99%
2011		90%	90%	95%	105%	105%	96%
2012			90%	90%	95%	100%	93%
2013				85%	80%	80%	82%
2014					75%	75%	75%
2015						75%	75%
2010 to 2015	95%	92%	91%	92%	89%	87%	90%

- (i) Describe the factors that should be considered in determining assumptions in general to be used for an EV calculation.

This question was generally well answered. Some candidates wasted time going into too much detail on specific assumptions and how to go about calculating an EV.

The assumptions need to be appropriate for the purpose for which the present value of future shareholder profits is being calculated.

SAP 104 and APN107 give guidance as to how appropriate assumptions should be determined.

Assumptions should be realistic and represent best estimates of future experience.

The assessment of appropriate assumptions for future experience should have regard to past, current and expected future experience and to any other relevant data.

Changes in expected future experience should be allowed for when sufficient evidence exists and the changes are reasonably certain.

Best estimate projection assumptions should be the same as the assumptions used to calculate the SVM liabilities at the same date excluding all compulsory and discretionary margins.

Best estimate assumptions should be based on the covered business.

For a company that is open to new business, the factors to be considered to assess a 'realistic' assumption will be those that enter into the determination of the corresponding assumption in a pricing basis.

For a company that is closed to new business, the assumptions would need to be adjusted to allow for the fact that the company will not be writing new business.

This will particularly affect the expense assumptions (which need to allow for the effects of reducing economies of scale) and the withdrawal assumptions (which may need to be higher).

(ii) Discuss the analysis and include an assessment of your manager's views and any high-level conclusions that can be drawn from the results as presented.

The attempts at this question were poorer than expected. The analysis showed two year trends (calendar year and policy year) and as such the durational trend as well. Many candidates only picked up and commented on one of these in any amount of detail. In this way they missed the crux of the question in that there were trends working in opposite directions and an easy decision was not possible.

A large number of candidates assumed that the select impact would not be in the expected basis and spent a lot of time discussing this.

Many candidates did not provide an assessment of the manager's view in the end.

The manager's views at a high level are correct concerning mortality profits.

The book is showing mortality profits with an overall 90% actual vs. expected result.

The book is getting more profitable by calendar year.

- The vertical results depict the calendar years and overall these are reducing every year, from 95% to 87%.

The book appears to be getting more profitable by UW year as well.

- The horizontal results depict the UW years and overall these are also reducing, from 99% to 75%.

In addition to this:

The experience along the diagonals depicts the experience by policy duration. The experience for durations 1 to 3 appears to be improving over time.

- The experience is much better for durations 1 to 3 for policies written in 2013 to 2015 than in prior periods.

The experience seems to be worse at later durations than earlier durations.

- For the earlier UW years the experience worsens over time (as duration increases). There is not much later duration experience for the more recent underwriting years.

These are two trends working in opposite directions.

The overall improving experience by calendar year is being driven by the better performing business being written in the more recent years. The more recent experience seems to have more weight (higher exposure).

We would need to know the exposure in each cell to understand this better – or to have the new business numbers and lapse rates for prior years to know how the exposure in each cell is developing.

Based on these findings it is difficult to agree that the experience as a whole is improving.

- New business experience at earlier durations seems to be improving
- Older business experience seems to be getting worse as duration increases.

If a total basis change improvement is to be made based on only 3 years of new business experience improving, it may be difficult to justify given the prior experience worsening;

unless we can identify / isolate causes for these two trends. It may be that the product / underwriting changed three years ago and the old experience is now less relevant.

The experience in future years would depend on how much worse the experience of the older policies gets and what the later duration experience of the newer policies turns out to be.

(iii) Discuss any additional information required to decide whether mortality assumption changes should be made and why this additional information would be necessary.

This question was reasonably well answered. Many candidates missed the easy marks regarding checking what was covered in the analysis (which term products) and the checks around the expected basis and whether this was an amounts or numbers analysis.

It would be necessary to confirm :

- The nature of the term insurance covered in the analysis. If all term covers are 10 years the analysis is more useful than if all term covers were 25 years.
- that the expected basis is the current best estimate EV basis.
- when this EV basis was last changed and how it currently relates to the other bases. Should be consistent with the SAM basis or SVM basis excl margins.
- whether this is based on claims numbers or claims amounts. It should be on an amounts basis if we are doing any sort of profitability analysis.
- whether the analysis is net of any outwards reinsurance (if on an amounts basis). This needs to be net for EV calculation & reporting but the analysis could be more useful on a gross basis when assessing appropriateness of assumptions.
- what exactly is included in the exposure calculations used for the expected basis. If any mortality benefits with accelerators attached to them are included it may result in inconsistencies between the exposure and claims included in the analysis. (e.g. does the expected basis allow suitably for the fact that the mortality experience will be lighter when there is a benefit that accelerates it)

We would need to know the full extent of EV profitability, this is only mortality profits. When looking at basis changes we need to consider this in relation to other sources of surplus as well. There may be cross-subsidies.

We would need the exposure numbers in each cell in order to determine the weights for the various cells.

The exposure would also allow us to consider the credibility of the data. The decisions based on this analysis would more than likely differ if there were 1,000 lives in the analysis or 100,000 lives.

An analysis that appears as relatively consistent as the one above would imply quite a credible data set.

A check against an external set of mortality rates could be useful (industry or reinsurer)

Checking these results against the analysis of surplus for consistency would also be useful.

We would need to understand what is driving the two trends in the analysis.

New business experience improving :

Have there been recent changes to the :

- product
- underwriting
- target market
- sales method

that would account for a change in experience?

Has there been a change in the business mix?

We may need to check the experience per rating factor, e.g. it could be that our female experience is better than male experience and we have started selling to more females.

Considering the expected future business mix is important.

Older policies worsening experience:

More claims than expected as duration increase could imply that :

- the ultimate mortality rates could be too low relative to our select rates. There needs to be a bigger differential.
- Is there a shape issue with our expected mortality basis. It could be that as one advances in age our expected basis doesn't increase significantly enough. With at most 6 years' experience it would be difficult to tell if this is the case.

The company is considering developing a new life assurance product that pays out an income to a nominated beneficiary on the policyholder's death instead of a lump sum.

(iv) Discuss the advantages and disadvantages of this product to both the policyholder and the company.

This question was reasonably well answered. Many candidates missed the marks available regarding the likely increased capital requirement.

Some candidates spent a lot of time discussing the likely annuity value at claims stage. This cover could be sold just as a lump sum is, for an agreed sum assured or monthly annuity amount.

Policyholder

This would remove the responsibility of the beneficiaries having to invest and manage the lump sum which could be viewed as a valuable feature.

If the need for the insurance is to replace future income, this would be better met by this product structure.

Depending on how the income stream is structured there could also be some sort of protection against uncertainty in the investment markets.

If the income is payable for life to the beneficiary then this also provides a guarantee that an income will always be payable.

The income could also be seen as guaranteeing and covering some of the post-retirement income if payable after retirement age.

An income stream would limit the flexibility offered by a lump sum though.

If the need for the insurance is to settle debt (e.g. mortgage) then the income stream is not appropriate.

Once the policy is issued it would probably not be possible to change the beneficiary.

This will result in issues if the death of the beneficiary occurs before that of the policyholder.

As time passes the benefit becomes less valuable as the pay-out would be for a shorter time.

Because there is a move from a lump sum to income benefit there may be tax implications.

Company

The company is able to offer another product option and this may increase its competitive position.

There could be good market reception if the product is seen to meet a particular need.

However, sales of this product may be at the expense of existing life cover and therefore it may not increase real sales numbers.

Administration would be more complicated and may incur extra expenses, e.g. systems development.

This starts to resemble a pension product with the related administration issues, keeping track of beneficiary / annuitant.

Company now has extra variables in pricing / reserving for this product.

- Mortality / longevity of beneficiary important.
- Economic assumptions become more important in reserving for the annuity payout.

These may introduce significant extra risk due to the potential length of the annuity, e.g. paying an annuity for life to a young beneficiary.

Any guarantees (returns or inflationary links) also need to be priced / reserved for

As the benefit diminishes in value over time this may impact lapse rates at later durations.

Product complexity increases likelihood of miss-selling / policyholders not understanding benefits.

This product would have a higher solvency capital requirement

- The introduction of longevity risk will increase the solvency capital. This would however work in the opposite direction to the mortality risk so there would be some offset.
- The market capital required (probably interest rate) would increase through the additional reserving requirement.

The higher cost of capital for this product should feed into the pricing of the product making it more expensive than an “equivalent” lump sum product.

(v) Outline some of the measures that would limit the disadvantages to the company discussed in part (iv).

This question was reasonably answered. Too many candidates missed the points relating to limiting the term or guaranteed nature of the product.

The risks of the product result mainly from the long term nature of the mortality / longevity risk and the investment risks related to guarantees if the income stream is fixed or has guaranteed increases (either fixed or linked to CPI) as well as reinvestment risk.

As a result the risk could be reduced through

- Limiting the payout in terms of duration. This could be a fixed number (e.g 20 years) or to a fixed point (e.g. age 65).
- Adjust the product to pay a limited income (as above) but at the end of the income stream pay a lump sum. This could be seen as a hybrid product, converting some of the lump sum to an income and paying a lower lump sum at a later date.
- Limit investment guarantees. Could link the payouts to an investment index. Could also determine the annuity at claim stage and not at outset. This would make the product less useful to beneficiaries though.

Look at process symmetries with other products. i.e use pension or disability income system process once a claim is in payment.

Reinsure the annuity (or part thereof) if possible. Pay a lump sum to the reinsurer on death and they pay the annuity. This would require the annuity pricing to be agreed.

This would introduce credit risk to the company as it is still responsible for the payment to the policyholder. Ensure suitable training to prevent miss-selling.

QUESTION 2

The Solvency and Assessment Management regime (SAM) is due to become effective in South Africa from 1 January 2017.

(i) Briefly explain the main purposes of each of the pillars in the SAM structure.

This question was largely book work and well answered. Better candidates generated more relevant points.

Pillar 1 stipulates the quantitative requirements that insurers must satisfy to demonstrate that they have adequate financial resources.

The main purpose of Pillar 1 is to provide comfort to the regulatory authority (the FSB) that insurers are able to meet their obligations to policyholders and beneficiaries under a number of scenarios.

Pillar 2 assesses the effectiveness of corporate governance and risk management of the insurer.

The main purposes of Pillar 2 are

- to require insurers to demonstrate that a risk management system is embedded in key business decisions.
- to enable the regulator (FSB) to assess the insurer's system of governance
- to require insurers to consider the entirety of the processes and procedures employed to identify, assess, monitor, manage, and report long and short term risks they face.
- to require insurers to determine the suitability of own funds under Pillar 1 by developing stress tests, scenarios, reverse stress tests and risk appetite metrics to ensure that overall solvency needs are met at all times;
- and in doing so, to help insurers determine the overall level of economic capital they need.

Pillar 3 seeks to create transparency with the aim of harnessing market discipline in support of regulatory objectives.

The main purpose of Pillar 3 is to require insurers to disclose how risks are managed.

(ii) List the main components and subcomponents of the SAM SCR modular structure under the standard formula approach.

This question was book work and well answered.

The SCR consists of a Basic SCR (BSCR), Operational Risk, a SCR for participations and adjustments.

The BSCR in turn consists of Market Risk, Life Risk and Non-Life Risk.

Market Risk consists of

- Interest Rate risk
- Equity risk
- Property risk
- Spread and default risk
- Currency risk
- Concentration risk

Life Risk consists of

- Mortality risk
- Longevity risk
- Disability/Morbidity risk
- Lapse risk
- Expense risk
- Retrenchment risk
- Catastrophe risk

Non-Life Risk consists of

- Premium and reserve risk
- Lapse risk

- Catastrophe risk

(iii) The FSB's Board Notice 158 requires insurance companies to have a Risk Management Function and an Actuarial Function. Outline the different responsibilities of these two functions.

This question was surprisingly poorly answered. Many students seemed to not have a good grasp on these two concepts and provided very generic answers based on the titles of the two functions.

The responsibilities of the Risk Management Function are:

To identify the risks the insurer faces.

To assess the identified risks effectively in order to gain and maintain an aggregated view of the risk profile of the insurer at an enterprise-wide and individual business unit level.

To evaluate the internal and external risk environment on an on-going basis in order to identify and assess potential risks as early as possible.

To conduct regular stress testing and scenario analyses, including in respect of outliers or matters with low probability but high potential impact.

To regularly report to the management and the board of directors on the insurer's risk profile, and the actions taken to mitigate the risks.

To help ensure that the risk management framework is maintained and improved, which includes conducting regular assessments of the risk management function and the risk management system to identify improvements that are needed.

To document and report material changes to the insurer's risk management system

The main responsibility of the Actuarial function is to provide assurance to the board of directors regarding the accuracy of the calculations and the appropriateness of the assumptions underlying the insurance liabilities and the capital needed by the insurer.

The following functions should be performed:

Ensuring the appropriateness of the methodologies and underlying models used and assumptions made.

Assessing the sufficiency and quality of the data used in the calculations.

Comparing best estimates against experience when evaluating liabilities.

Informing the board of directors of the reliability and adequacy of the calculations.

Overseeing the calculations in the cases where, due to insufficient data of appropriate quality to apply reliable actuarial method, approximations were used in the calculation of liabilities and capital.

Expressing an opinion on the asset-liability management policy and the underwriting risk management policy.

Expressing an opinion on the reinsurance and other forms of risk transfer policy and the adequacy of reinsurance arrangements.

Expressing an opinion on the actuarial soundness of premiums, benefits, and any other values thereof, including the awarding of bonuses to policyholders.

QUESTION 3

You work for a large South African life insurance company selling a wide range of products. For IFRS reporting purposes, the insurance liabilities are calculated on the Financial Soundness Valuation (FSV) basis. Negative reserves are zeroised, and the reserve for savings products is the unit fund with an allowance for Deferred Acquisition Costs (DAC).

The insurer has drawn up its financial position on the current IFRS/FSV basis and the proposed SAM basis:

R'm	IFRS/FSV (per AFS)	SAM
a Total assets	136 402	135 373
Less liabilities	-117 316	-108 988
b Policyholder liabilities	-112 695	-103 407
c Deferred Tax liability	-	-1 986
Subordinated debt	-1 026	-
Other long-term and current liabilities	-3 595	-3 595
d Shareholder funds/Own funds before adjustments	19 086	26 385
e Prudential regulatory adjustments	-8 822	-5 018
f Subordinated debt	1 026	-
g Available Statutory Capital/Basic Own Funds	11 290	21 367
h Capital Requirement (CAR/SCR)	2 975	10 117
i Capital cover (times)	3.8	2.1

(i) Explain the reasons for the differences in the values (between the FSV and SAM bases).

The total assets (a)

The policyholder liabilities (b)

The prudential regulatory adjustments (e)

The Statutory Capital and Basic Own Funds (g)

(include comments on the magnitude and direction of the differences)

This question was reasonably answered. Most students seemed to have an understanding of the basics (best estimates and capitalising profit). Better candidates could fill in more of the details and implications around the basics. Only a few candidates could generate points under the “adjustment for prudential regulatory purposes” section.

Asset value differences

Under both IFRS and SAM, the starting point for the value of assets is the market value of assets.

However, IFRS assets also include DAC in respect of investment business and intangible assets such as goodwill.

Under SAM, a DAC asset is not allowed, goodwill should be valued as zero, and other intangible assets should only be included to the extent that a fair value can be placed on them.

SAM assets allow subordinated debt allowed in balance sheet.

The fact that the SAM assets are less than 1% lower than the IFRS assets indicates that most of the assets are valued at the same market value, and that the DAC and intangible assets included in the IFRS value are small in relation to the assets that are valued at market value.

Policyholder liability differences

The policyholder liabilities under SAM are about 7% lower than IFRS policyholder liabilities, which is a much bigger difference than the difference in asset values.

Under SAM all liabilities are calculated prospectively, so for savings business the SAM reserve would differ from the unit fund under FSV.

Future fund charges are likely to be higher than future expenses, which means the prospective reserve for SAM is likely to be less than the unit fund, i.e. savings policyholder liabilities are lower for SAM than for FSV.

Under SAM non-economic assumptions (expenses, decrement rates, etc.) are best estimate assumptions with no margins, whereas under FSV prescribed margins are added to the best estimate assumptions for calculating prospective reserves.

Under SAM contract boundaries will be relevant.

Under SAM negative reserves cannot be zeroised as is the case with the FSV reserves.

The margins and zeroisation of reserves means that the liabilities for prospectively valued policies will be higher for FSV than those under SAM.

So both the savings and risk business will have a lower reserve under SAM than under IFRS, which explains why the policyholder liabilities are significantly lower under SAM than under IFRS.

In addition to the SAM best estimate liabilities, a risk margin needs to be calculated for each line of business. In essence 6% of the Solvency Capital Requirement (SCR) at each future year end should be determined and discounted using a risk-free rate of return to calculate the risk margin. The fact that the liabilities under SAM are still lower than the FSV liabilities shows that this risk margin is lower than the prescribed and second tier margins under FSV

Further differences arise from the fact SAM liabilities are discounted on a market consistent basis (projecting and discounting using forward rates from a yield curve). FSV liabilities are discounted at a best estimate valuation rate, which need not be a yield curve, though it is not clear whether this will result in higher or lower liabilities.

Adjustment for prudential regulatory purposes

Under the FSV valuation, there are restrictions on the value that can be placed on certain assets. There are also limitations on the value of certain assets for solvency purposes.

For SAM, participation in subsidiaries, associates and joint ventures should be valued at tangible net asset value, less any regulatory capital requirements for regulated financial institutions (in line with the percentage holding of the participation).

The adjustments for SAM are lower than for FSV because, for instance, SAM does not place a limit on the percentage holding of group undertakings, whereas this is limited to 20% under FSV.

The Statutory Capital and Basic Own Funds

The Statutory Capital and Basic Own Funds differ as a result of the differences between asset values, liability values and prudential regulatory adjustments.

The critical difference is that under SAM, future profits are capitalised and so the Basic Own Funds include an allowance for future profits, which means that unrealised profits can be taken into account for solvency purposes.

The Basic Own Funds are therefore substantially higher than the FSV statutory capital.

However, the higher Basic Own Funds should not be seen in isolation, as they correspond to a higher capital requirement. Whereas FSV placed restrictions on certain assets SAM requires more capital to mitigate the risk of these assets.

Once SAM is effective the insurer will continue to use the IFRS/FSV basis for its published financial statements.

(ii) Explain why the company would not use the SAM basis as a reporting basis

This question was poorly answered. Most students missed the points surrounding the Acts and accounting standards. Many students also missed the points relating to how the SAM basis would contradict some of the accounting principles (e.g. prudence).

Life insurance companies prepare regular financial statements in accordance with the Companies Act and are guided by (amongst others) various accounting standards such as IFRS4 and IAS39.

The company will want to ensure continual compliance with these standards by maintaining its current published reporting basis.

The company will have existing accounting policies in force, which would regulate the way in which profits are released.

To ensure consistency between reporting periods, it may not want to change these accounting policies.

Performance measurement targets, etc. may be based on profits calculated on the current valuation basis and the company may not wish to change these.

The taxation of profits is likely to be more closely linked to an accounting basis than solvency basis.

SAM has been developed first and foremost as a solvency basis, so would not necessarily be suitable for use as a profit recognition basis.

The actual profit from a policy is not known with certainty until a policy terminates (as a result of death, maturity, surrender, etc.). The profit reporting basis does not change the total profit that arises from a policy, but it does affect the emergence of the profit.

Liabilities calculated on the SAM basis, and therefore the profits, are likely to be more volatile than those calculated on the FSV basis.

Because the SAM basis values policies prospectively and does not use margins on assumptions, profits will be capitalised up front.

If the experience does not unfold as expected then these profits may not materialise in the future, and losses may be recorded (despite the existence of the risk margin).

The SAM basis caters for this risk of future losses in the SCR calculation, but the profitability of products is not influenced by changes in capital requirements.

By using the SAM liability basis for published financial statements, profit would be recognised much earlier and this might be in conflict with the concept of prudence.

Recognising profits upfront by using the SAM basis for a new prospectively valued investment policy would be in conflict with the IFRS rules that prevent profits being recognised on day 1.

New IFRS standards for insurance business are still being finalised (IFRS4 Phase 2).

The company would want to avoid changing its accounting basis twice in a relatively short period of time – to cater to SAM and then for the new IFRS requirements.

(iii) Outline the likely impact on the company's embedded value be once SAM is effective.

This question was reasonably answered. The question assumed that the IFRS basis would be retained for the EV calculation. Marks were however awarded for either the IFRS or SAM basis being assumed.

The components of the embedded value (EV) are Adjusted Net Worth + Present value of future profits from in force business (PVIF) – Cost of Required Capital.

IFRS basis

The Adjusted net worth in published statements will not change if the published statements continue to use the existing IFRS liabilities.

The Present value of future profits will also not change due to the fact that the release of profits does not change.

If the SCR is higher than the existing required capital, which is likely to be the case, then it should replace the required capital in the EV calculation (though the increase would be absorbed by the free surplus so that the adjusted net worth is unchanged)..

The Cost of Required Capital would therefore change because of the change in the face value of the capital.

There may be an additional effect if the asset composition of the assets backing the capital changes.

A change in the composition of the assets will change the future expected investment return to be earned on the required capital, which will in turn affect the cost of the required capital.

SAM basis

The components of the embedded value (EV) are Adjusted Net Worth + Present value of future profits from in force business (PVIF) – Cost of Required Capital.

If SAM balance sheet is used, the ANW will rise because of the lower liabilities (Technical Provisions).

The Present value of future profits will drop to a value close to zero, because the planned margins are already discounted. There could still be a PVIFP because policy terms different to the contract boundaries are used.

If the SCR is higher than the existing required capital, which is likely to be the case, then it should replace the required capital in the EV calculation (though the increase would be absorbed by the free surplus so that the adjusted net worth is unchanged)..

The Cost of Required Capital would therefore change because of the change in the face value of the capital.

The change in PVIF would also be different to the change in ANW because the discounting of future profits might have been done at a different rate

The usefulness of EV might drop as the value might be close to the ANW on the SAM basis.

The Finance Director has queried the difference between the CAR cover of 3.8 and the SCR cover of 2.1. She is concerned that this shows that the company is not in as strong a financial position as previously thought.

(iv) Compare the CAR and SCR calculations and comment on the Finance Director's observation about the strength of the company's financial position

This question was well answered. Candidates that scored well understood that the underlying position of the company was unchanged and that it was only the measure that was changing.

CAR and SCR are both calculations to determine the amount of capital that the company needs to be protected against a range of adverse circumstances over a one year time horizon.

The SCR calculation covers a wider range of adverse circumstances and the stresses are more severe than the CAR calculation.

The SCR also allows for market risk on all assets, including free assets, which means that the more own funds a company has, the larger the SCR becomes.

The CAR calculations were developed with a target confidence interval of 95%, whereas the SCR is calibrated to a 99.5% confidence interval.

The SCR will be higher than the CAR, due to the extra risks considered and higher confidence interval targeted.

CAR cover and SCR cover are the ratio of the statutory assets to the CAR and SCR respectively.

Although the assets allowed under SAM for regulatory purposes are higher than those allowed for under CAR (and future profits can be capitalised), the CAR cover will in most cases be higher than the SCR cover.

CAR cover and SCR cover, however, are only a measure of a company's solvency.

The company's actual financial strength is determined by the actual assets it holds, and the nature and profile of its liabilities. This does not change when the mechanism used to measure it changes.

END OF EXMINER'S REPORT