

November 2014

Subject F202 — Life Insurance

Specialist Applications

MARKING SCHEDULE

QUESTION 1

- (i) **Describe the South African professional guidance that would be considered relevant for the calculation and set out the complications that would emerge from dealing with multiple countries.**

This question was well answered.

The actuary should consider APN 107 requirements.

APN 107 provides guidance for preparing EV disclosures for parent companies of long term insurers registered in South Africa. But due to lack of local guidance in African countries use this also for African operations.

Group EV refers to any total Group value that includes:

- Value of Covered business on the Embedded value methodology, plus
- Value of non-covered business (regardless the valuation method used.)

Although the APN 107 does not apply to non-long term insurance business (non-covered business), it does not preclude the use of the techniques and principles in the valuation of the parent company, health companies and asset management companies.

Country specific accounting and regulatory requirements may vary from one country to another and from the requirements in South Africa.

The actuary should be aware of the resulting difficulties of cross-border work.

For example, statutory valuation bases applicable in other countries may differ from the SVM in South Africa.

- (ii) **Identify the entities and contracts that will be included as covered business (with reasons), and describe the components of the embedded value of covered business.**

This question was reasonably well answered. Many candidates missed the points relating to the entities to be covered and the corresponding detail.

Covered business includes any contracts that are regarded by the regulator as long-term insurance business.

- This implies the long term life insurance companies will be included as covered business.

- But the parent company and asset management companies will not be included as covered business.
- The health companies (doing risk u/w and health admin) may be included or excluded, depending on the regulatory framework that applies in a particular country.

But it is permissible to exclude certain long-term insurance contracts from covered business. If any long-term contracts are excluded from covered, then this must be clearly disclosed.

Covered business EV includes only the profits (or losses) generated within the “entity” (the long-term insurer), rather than the total value of the insurance contracts to entities in the wider group. It excludes, for example, the profit/losses made by the asset management company from assets managed for the long-term insurer.

The main advantage of this “entity” approach is that it is only concerned with the profit that emerges in the entity issuing the contract. This is in line with the statutory profit reporting and the way in which covered business is typically managed.

Components of EV for Covered business = ANW (of covered business) + PVIF – Cost of required capital, where:

- ANW (of covered business) is the excess assets attributed to covered business but not required to back liabilities of covered business.
- Required capital (of covered business) = assets attributed to covered business in excess of the amount required to back covered business liabilities, whose distribution to shareholders is in practice restricted.
- Free surplus is the free surplus attributed to covered business = ANW (of covered business) – required capital (of covered business)
- PVIF is the present value of the future shareholder cash flows projected to emerge from the assets backing liabilities of in-force business
- PVIF calculation:

The shareholder cash flow at the end of each period represents the change in the excess projected assets over the projected liabilities of the in-force covered business.

With prescribed and discretionary margins in the statutory valuation basis the experience is expected to be more favourable than assumed and consequently operating profits is expected to emerge.

- Cost of required capital = amount of required capital less present value of the expected releases of the required capital. This should allow for the net of tax investment returns expected to be earned on the required capital. [Alternative

Definition: PV of the differences between expected projected earnings on assets backing required capital and the expected earnings on these assets at the Risk discount rate.]

- EV of covered business excludes the value of future new business.

(iii) Describe the methodology and assumptions which could be used to calculate the allowance for future parent company operating profits or losses in the embedded value of the group.

This question was poorly answered. The question was looking for the application of EV principles in a non-standard scenario. It involved the projection of fees and expenses and calculating the present value of these using suitable methods and assumptions.

The parent company is not a long-term insurance company, therefore APN 107 does not prescribe a basis of calculation. But the principles APN 107 can be applied.

Present value of in-force profits to shareholders (PVIF) = allowance for future parent company operating profits or losses.

PVIF calculation:

- Project the expected fees from life and health companies. Consider using the longer term budgets from the finance department as a starting point
- Project the expected expenses to be incurred. Consider using the longer term human resource planning of the parent (support services) company. Since remuneration is the most significant component of the expected expenses the human resource planning will give a very good indication of the level of future expenses.
- Longer term planning and budget will probably not go beyond 5 years. Consider using a sensible pragmatic approach for projection beyond 5 years. For example, project the trend of the net profit or loss (=Projected fees less projected expenses) forward.
- PVIF is after tax. Allow for tax on net profit or loss (=Projected fees less projected expenses). South African based company will probably pay company tax at 28%. Therefore, only use 72% (=100%-28%) of the profit or loss.
- PVIF = Present value of the projected fees less projected expenses discounted at the appropriate risk discount rate (RDR). Appropriate RDR = risk free rate + margin (for example 2.5%). The risk free rate can be determined from the government yield curve at the appropriate duration, for example 8 or 9 years. (Award marks for sensible alternatives.)

QUESTION 2

Describe the checks (incl high level calculations, questions for the valuation actuary and any potential reasons for deviations from the previous 12 months) that will be performed in the review.

This question was very poorly answered. The practical application nature of the question seemed to get the better of most candidates. There were many easy points available by stepping through the report line by line and commenting on the change (both quantum and direction) and comparing this to what one would expect. Many candidates then also missed the potential reasons for the changes. These were the harder points to obtain though.

Check start EV values (on 01/01/x+1) is equal to end EV values (on 31/12/x) of the previous period.

- End ANW = Start ANW, which is correct.
- But Start PVIF is R 25 mil (=16227 -16202) more than End PVIF of previous period, this is a significant difference.
- Cost of required capital start value R 1 mil (=1713-1712) more than end value, this is probably a rounding issue. Ask valuations actuary to ensure that start values equal end values of previous period.

Check the value of new business for the last period (6 months) vs the previous period (12 months).

- VNB for last 6 months is 64% (=121/190) of the VNB for previous 12 months. It seems high, would expect approximately 50% for a mature company.
- Check if new business premiums increased to the same extent.
- Any changes in the mix of new business or new products launched which explains the apparent high VNB.
- Did the business plan for growth to this extent?
- The new business strain (Transfer from ANW) for last 6 months is 74% (=200/270) of the new business strain for previous 12 months. The same ratio for VNB is the 64%. This may indicate a change in the mix of business or a significant re-pricing exercise. [Award marks for any sensible comment comparing the relationship between ANW, PVIF and total EV on the VNB line.]

Check the Expected return (Unwinding of risk discount rate) for the last period (6 months) vs the previous period (12 months).

- PVIF unwinding is 51% ($=857/1685$) of the previous 12 months.
- Expect this to be slightly higher, because the start PVIF is higher for the 12 months. Increase in start PVIF is 6% ($=16202/15320-1$). Therefore, expect PVIF unwinding for the 6 months to be closer to R 900 mil ($893=1685*1.06/2$)
- This estimate ignores changes in the risk discount rate. [Award marks for any sensible reference to the potential impact of RDR changes.]

Check the Expected profit transfer from PVIF to ANW for the last period (6 months) vs the previous period (12 months).

- Expected profit transfer from PVIF to ANW is 53% ($=902/1702$) of the previous 12 months.
- This is in line with expectation, since the increase of start PVIF is 6% ($=16202/15320-1$). Check : $50\%(\text{allowing for 6 months}) \times 106\%(\text{allowance for PVIF growth}) = 53\%$.

Check the Operating experience variances (relative to opening assumptions) for the last period (6 months) vs the previous period (12 months).

- Operating experience variances can be volatile from one year to the next. There may not be a clear relationship between the operating experiences of one year with the next year.
- Operating experience variances (transfer to ANW) for the 6 months (R 200 mil) seems high vs R 312 mil for the previous 12 months.
- Request the valuations actuary to quantify (with reasons) the positive experience variances.
- A potential reason can be risk decrement profits. [Award a mark for any reasonable arguments.]
- Consider whether this is a once-off experience variance or whether this is a trend that needs to be monitored.
- Other operating experience variances (PVIF and Cost of required capital) are approximately 50% of the previous 12 months. These numbers are less significant in the total EV-build up.

Check the Operating assumption and model changes for the last period (6 months) vs the previous period (12 months).

- There may not be a clear relationship between the operating assumption and model changes of one reporting period with the next reporting period.
- Any operating assumption changes should reflect the trends in operating experiences variances.
- The positive impact of the operating assumption and model changes is consistent with the positive operating experiences variances. But checking the size of the changes is not possible without more information.
- Request the valuations actuary to quantify (with reasons) the operating assumption and the model changes.

Check the Expected return on ANW for the last period (6 months) vs the previous period (12 months).

- This reflects the expected return on the ANW (as opposed to the actual return) based on the valuation assumptions. These assumptions relate to the assumed asset allocation of the assets backing required capital and the expected return per asset class.
- Expected return on the start ANW is 3.5% (=260/7439) for the 6 months. This seems a reasonable after tax return for a prudent investment mandate of assets backing required capital.
- It is also 50% of the expected return on the start ANW of 7% (=529/7553) for the previous 12 months. This seems reasonable ignoring any economic basis changes. [Award marks for other reasonable arguments on the reasonability checks]

Check the Investment return variances on in-force covered business for the last period (6 months) vs the previous period (12 months):

- PVIF: This reflects the impact of the actual return (vs the expected valuation assumption returns achieved on policyholders assets) on the PVIF.
- PVIF: It was positive (R 153 mil) in the previous 12 months and negative (-R 162 mil) in the last 6 month. This indicates an over and under performance relative the valuation assumptions in the two periods considered, which may be reasonable.

- PVIF: Ask the valuation actuary to quantify (with reasons) the extent of the over and under performance. It seems like a small (approximately 1%) over and under performance compared to a PVIF of approximately R 15 500 mil to R16 500 mil.

Check the Investment return variances on ANW for the last period (6 months) vs the previous period (12 months):

- This reflects the impact of the actual return achieved vs the expected valuation assumption returns on assets backing the ANW.
- As for the policyholder assets described above it seems that the ANW outperformed (R 76 mil) the expectation in the previous 12 months and underperformed (- R 74 mil) the expectation for the last 6 months.
- Ask the valuation actuary to quantify (with reasons) the extent of the over and under performance. It seems like a small (approximately 1%) over and under performance compared to the ANW of approximately R 7 500 mil.

Check the Effect of economic assumption changes for the last period (6 months) vs the previous period (12 months):

- All products are prospectively valued, as opposed to retrospective valuations. Therefore, economic assumption changes will have impact on both ANW and PVIF.
- The decrease in ANW (- R 543 mil) in the previous 12 months, indicates a decrease in the valuation discount rates. This would result in an increase in prospective reserves, which will explain the decrease in ANW.
- The increase in ANW (R 150 mil) in the last 6 months, indicates an increase in the valuation discount rates. This would result in a decrease in prospective reserves, which will explain the increase in ANW.
- The increase in the valuations rates in the last 6 months seems to be in the region of 30% of the decrease in the previous 12 months. For example a 0.3% increase in the last 6 months vs a 1% decrease in the previous 12 months. Check this against the valuation discount rates.
- The change in the PVIF of between 10% and 20% of the ANW impact, but in the opposite direction seems sensible. These changes in PVIF represent the value of valuation margins being released or created when the reserve is being released or created.

Embedded value earnings of R1 444 mil for the last 6 months translates into a Return on EV of 6.6%, which is 13.6% on an annualised basis. This is higher than the 12.1% of the previous

12 months. The main reason for the higher ROEV is the fact that the negative economic basis change for the previous 12 months (R 480 mil) did not recur.

The dividends paid in the last 6 months are zero because dividends are paid only annually.

QUESTION 3

- (i) **Explain how the assumptions to be used in the pricing exercise would be determined, highlighting any additional investigations required.**

This question was well answered. Candidates that did not perform well simply did not generate enough points.

Given that the new product structure and benefits is broadly similar to the existing product, most of the assumption can be set based on the experience of the existing product.

The risk experience assumptions would be set based on the historic experience of the existing product. These would be in respect of:

- Mortality experience
- Disability incidence rates
- No recovery rates required as this is a lump sum benefit.

Careful consideration needs to be given the impact of Aids on the risk experience.

Aids would impact both the mortality assumption and the disability incidence rates.

Consider the recently published ASSA aids investigations paying particular attention to the change in Aids infection rates over time.

Due to the fact that Aids experience has changed materially over time, this would require an additional mortality investigation to determine the impact of this. Cannot merely use the previous Aids loadings as is and assume these will still be valid for the new product.

As the cash back benefit is based on survival, subject to no claims, there are no additional assumptions required; this would merely involve modelling the benefit correctly.

Only changes needed for the risk experience compared to historic experience would be:

- To remove any once off experience variances that are not expected to reoccur, although there should be very little need for this in respect of the risk experience.
- Changes to the Aids basis as discussed above.
- In addition to change in AIDS experience, look at any other trends (eg. general mortality improvements)
- Expected changes in the target market that could impact on risk experience. Could approach the reinsurers for information on this if need be.

- Consider how the change in product could change any policyholder behaviour that would impact mortality, e.g. if lower withdrawal rates are expected we could expect lower anti-selective lapses which could improve mortality.

Another important assumption would be the withdrawal rates. Again, as the product is broadly similar, the experience on the existing product can be used as a starting point.

However, consideration should be given to how the experience may vary for the new product as this is an update of the existing product.

The market may experience and perceive the new product differently resulting in different withdrawal behaviour.

Consider performing focus groups of prospective clients to test their reaction to the new product. If more positive than the existing product, consider lower withdrawal rates than experienced with the existing product.

The expense assumption would again be based on the experience observed on the existing product.

Split the expense assumption between initial and renewal, making appropriate allowance for:

- Inflation over time.
- Any once-off expenses that are not expected to recur.
- Any specific additional expenses expected to incur in the marketing and distribution of the new product.
- Expected new business volumes of the updated product.

A detailed expense investigation would be required to split the expenses between renewal and initial, which would form the basis of the assumptions.

An assumption in respect of claim cost is also required. As this is a similar product, other than changes in internal processes that impact on cost, a similar claims cost assumption can be used.

Again, making sure an appropriate allowance is made for historic and future inflation.

The 3 assumptions that would not be based on the experience of the existing product, would be the risk discount rate, interest rate and inflation rate assumptions.

These need to be set based on expected future market conditions in respect of inflation and interest rates.

The risk discount rate would need to be set based on the shareholder's current requirements, whilst at the same time maintaining consistency with the interest rate assumption.

(ii) New expense assumptions are higher than existing assumptions. Discuss why this might be the case.

This was one of the easier questions but was poorly answered. Many candidates missed all the points relating to the in-force book being different due to withdrawal experience being different or new business volumes being different to that expected. These points constituted half the marks for this question. Most candidates got reasonable marks for the actual expense level and inflation points.

There are 4 main items that would impact on the expense assumptions being higher than before. These are:

- Actual expenses being higher than anticipated when originally pricing the product.
- New business volumes being below expectation, despite actual expenses being in line.
- Withdrawal experience being higher than expected.
- The impact of inflation over time.

Actual expenses being higher than anticipated when originally pricing the product

If the actual expenses were higher than anticipated then the new expense assumptions would need to reflect the higher expenses.

This would need to occur even if the business volumes and withdrawals were in line with expectation.

Unless the company is able to cut-back expenses and reduce these to be in line with the level supported by previous premium rates, the assumption would need to remain at the higher level.

The company would need to assess whether this variance is for initial and renewal expenses or one or the other before changing assumptions or deciding a course of action.

New business volumes being below expectation, despite actual expenses being in line

If new business volumes were not at the level anticipated when originally pricing the product, then the per-policy expense would be higher.

This would be the case even if the actual expense incurred was in line with expectation.

The main reason for this is that not all expenses vary purely on volume of new business (like commission).

There will be a large element of the expenses of the company that are fixed, or only semi-variable (e.g. CEO salary, IT infrastructure, etc.)

Lower new business volumes would therefore result in both the initial and renewal expense assumption being higher.

Withdrawal experience being higher than expected

Worse than expected withdrawals will have a similar impact to lower new business volumes.

Assuming all the other assumptions were in line with expectation, a higher number of withdrawals will result in a smaller in-force book to spread the expenses over.

The result would be higher renewal expenses per policy (i.e. same amount of admin expense divided by a smaller in-force book).

The impact of inflation over time.

Even if experience was in line with all the assumptions previously priced for, the renewal and initial expenses would have been subject inflation over time. Depending on which set of premium rates the Finance Director is comparing to, this could have a significant impact.

However, as the premium rates should be updated at least annually to allow for expense inflation, this should not result in a significant increase in expense assumptions year on year due to normal inflation.

(iii) Discuss how the company could reduce withdrawals.

This question was reasonably well answered. There were a lot of points that could have been generated. The candidates that fared better generated more points as well as a broader range of points.

The first step would be to try and understand the reasons for the increase in withdrawals. This would require a range of investigations, involving at least the following:

- Identifying trends by looking at various different dimensions of the data. E.g. age, duration of the policy, distribution channel, geographical area, etc.

{or any two reasonable examples}

- Looking into any possible “external” links, e.g. could recent changes be due to an economic downturn?

- Comparing these to other products sold by the company, to see if this is specific to the product, or the company.
- Further comparing these to the industry. Is this specific to your company, or an industry wide phenomenon?
- Performing consumer insight workshops or focus groups. This would help understand the reasons why policyholders are terminating their policies.

Once you understand the trends and reasons for termination better, it would be easier to determine what actions to take to change the behaviour.

Insurance, and in particular risk insurance, is something that consumers terminate cutting back on expenses. It is therefore important to deal with policyholder relationship / education early on in the policy life.

This is particularly true for lower income policyholders as the recent slump in the economy has resulted in lower disposable income for these individuals.

The intention is to build a solid service relationship with the policyholder, to ensure that they maintain their policy for longer. Actions that could be taken include:

- Make sure that all administration functions (including policyholder queries) are performing optimally.
- Turnaround times of all admin functions, and in particularly claims, should be as short as possible.
- Improve the communication with policyholders. More regular communication highlighting the benefits of the product could be introduced or enhanced.
- Create loyalty schemes to create affinity to the brand. This needs to be done carefully to avoid contravening any regulations etc.
- The company could invest in general education around the need and value for insurance. This may be seen as beneficial to the market as a whole and build brand loyalty longer term.

If the increased withdrawals are specific to a certain distribution channel, need to understand why this would be the case. Carefully analyse the selling methods of the distribution channels.

In the extreme, it may consider terminating a sales channel all together for this product to improve the withdrawal experience.

Make sure there is no miss-selling happening, which causes the increased withdrawals. Make sure the commission structure does not encourage miss-selling of products.

By changing the commission to an as-and-when basis, could improve persistency.

Look at methods of premium payment, do those with debit orders have different experience to the rest of the book. Could maybe require a certain payment method.

Look at how many withdrawals are initiated by the policyholder (request to terminate) vs how many are forced to terminate through non-payment of premiums.

If there are many forced withdrawals the company may want to consider some mechanism whereby the policy doesn't automatically lapse and that there is a "grace" period during which to repay or recommence payment of premiums. This needs to be relatively short to limit anti-selection.

In this market something like premium payment date could have an impact. Deducting premiums closer to start of month / salary pay date could result in less forced lapses.

Churning of business should be carefully monitored, and eradicated as far as possible.

The product benefits themselves could result in increased withdrawals, especially if they are not valued or perceived to address the needs of the target market.

By adding specific benefits that address the needs of the target market, persistency may improve.

The product already has a cash back benefit, however, may consider increasing the value of this benefit. However, care needs to be taken that the product still complies with insurance regulations.

If the cash back benefit becomes a significant benefit, the product may fall into the ambit of schedule 5 of the act and attract minimum surrender values.

If these are not priced for appropriately, then the company may make losses if withdrawals start improving beyond a certain threshold.

If the product has increasing premiums, carefully consider the impact of these on the affordability of the product after a few years for this type of market.

(iv) Discuss the options available to achieve the reduction in premium rates, highlighting the risk associated with each of the options.

This question was well answered. While most candidates generated the options available, the associated risks were not considered to the same degree.

Reduce some of the benefits, e.g. pay a partial lump sum disability benefit.

Remove the cash back option.

Remove any guarantees that may be on the product.

However, if these benefits are perceived to add real value they may result in the product not selling as well as expected.

With reduced volumes the benefit of less benefits, may well be outweighed by the increase in per policy expenses.

Longer term the withdrawal experience may also be worse than expected as the product does not address the needs of the policyholders. Again, countering any benefit from removing benefits.

Accept lower profit margins on the product. This could only be done if the shareholders are happy with the lower margins.

There will also be limited scope in reducing the profit margins as they often contain some element of risk margin in, to protect the company from worse than expected experience.

If the margins are significantly lower than all the other products, there is a risk that you sell “too much” of this product class, bringing the overall margin for the company below acceptable levels.

By building in compulsory premium increases the initial premium could be lower. However, this will need to be clearly indicated to potential policyholders to limit future withdrawal issues.

To the extent possible, need to manage expenses better. There may not be enough scope to do this.

In addition, the pricing would then be based on the promise of lower expenses, which if not realised, will result in losses on the product. Again, merely delaying the problem.

If there is scope in paying less commission, this would be an effective way of managing costs down.

However, if the commission levels are too low, you may not sell sufficient volumes of the product, leading to lower volumes than anticipated, pushing up the per policy expense and negating the benefit of the lower commission could have on the premium rates.

END OF MARKING SCHEDULE