Actuarial Society of South Africa

EXAMINATION

27 May 2013

Subject F202 — Life Insurance Specialist Applications

EXAMINERS' REPORT

QUESTION 1

(i) **Describe and estimate the expected impact of the proposal on the statutory solvency, considering each component of CAR separately, as well as the operating profit and cost of CAR**

This was reasonably well answered. However, quite a few candidates did not cover some of the easier issues such as the movement in NAV and impact on TCAR. A number of candidates also failed to include estimates in their answers which was specifically asked for.

Estimated impact on statutory solvency :

Should consider PGN 104 (SAP 104 from 31/12/2012) requirements to determine the expected impact on:

- Value of assets and value of liabilities (i.e. impact on NAV)

- Statutory capital requirement (CAR)

Value of assets increase by R 2 000 mil to R 3 325 mil

This in a **linked policy** therefore, value of liabilities increase by R 2 000 mil to R 3 053 mil because:

- Unit reserve increase by R 2 000 mil

- Non-unit reserve (i.e. rand reserve) probably negative if insurer expects to make profit in future.

- But a conservative non-unit reserve estimate = R 0.

Therefore, the NAV remains unchanged at R 272 mil (= R 3 325 mil – R 3053 mil)

Assume no inadmissible assets (as on 31 December 2012) then statutory excess also remains at R 272 mil.

Then need to estimate the impact on statutory capital requirement (CAR) considering paragraph 6 of PGN 104.

The purpose of the Capital Adequacy Requirement is to quantify the minimum level of assets in excess of liabilities that will provide a sufficient cushion against random negative fluctuations in experience in any of the variables used in the statutory valuation.

The quantum of this cushion is set in such a manner that in the majority of cases a negative experience variation will lead to a reduced cushion rather than to a deficit under the statutory valuation.

The Capital Adequacy Requirement formula = maximum (TCAR, OCAR)

TCAR = Lapse Capital Adequacy Requirement + Surrender Capital Adequacy Requirement.

- TCAR ensures that a long-term insurer is in a position to survive a very selective "run-on-the-bank" scenario.

- TCAR: Lapse Capital Adequacy Requirement equals the amount required to ensure that no policy has a negative reserve. Assume again that the non-unit reserve = R 0. Then the estimated impact on the TCAR: Lapse Capital Adequacy Requirement is zero.

- TCAR: Surrender Capital Adequacy Requirement equals the amount required to ensure that no policy's reserve is less than its current surrender value. Assuming a zero non-unit reserve, the total reserve will be equal to the unit reserve. The unit reserve equals the value of the investment in the unitised portfolio, which is also equal to the surrender value. This means the policy's reserve equals the surrender value. Then the estimated impact on the TCAR: Surrender Capital Adequacy Requirement is zero.

- Therefore, the expected impact on TCAR is zero.

Then first needs to estimate the expected impact on each of the IOCAR elements before grossing –up the IOCAR to OCAR.

- IOCAR Lapse risk: Calculated as 40% of the amount required to ensure that no policy has a negative reserve. Assume again that the non-unit reserve is not negative. Then the estimated impact on the IOCAR Lapse risk is zero. (as for the TCAR Surrender Capital Requirement).

- IOCAR Surrender risk: Calculated as 20% of the amount required to ensure that no policy's reserve is less than its current surrender value. As for the TCAR Surrender Capital Requirement the expected impact is zero because the surrender value equals the reserve.

- IOCAR Mortality, morbidity and medical fluctuation risk: Assume no impact on this linked policy without any risk benefits.

- IOCAR Annuitant mortality fluctuation risk: Not an annuity, therefore not applicable to this policy.

- IOCAR Mortality, morbidity and medical assumption risk: Assume no impact on this linked policy without any risk benefits.

- IOCAR Expense fluctuation risk: Usually 10% of all renewal expenses in the previous year. But the direct additional expenses related to administering this linked policy are probably insignificant. Assume the impact is zero.

- IOCAR Investment risk: Since this is a linked policy with a reserve equal to the market value of the underlying assets, there is no statutory capital required to allow for any exposure to investment risk. The estimated impact is zero.

- IOCAR Credit risk: Since this is a linked policy the credit risk is also borne by the policyholder. No statutory capital required to allow for this risk. The estimated impact is zero.

- IOCAR Operational and other risk: The Statutory Actuary must ensure that an appropriate level of capital is held to cover operational risk.

- Operational risk is defined as "the risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events". Operational risk CAR is probably the only additional CAR required if this policy liability is added to the balance sheet of this insurer.

- But PGN 104 does not provide any details on how such a calculation should be performed. See below for one possible approach.

- Assume that operational risk statutory capital requirement for a linked policy is 25% of annual renewal expenses.

- This is based on Solvency II/SAM proposals, although the basis has not been finalised yet. [Award marks for any sensible approach proposed by candidates]

- For Operational risk IOCAR calculation we assume that annual renewal expenses equal the proposed fee of 0.30% per annum. So the annual expenses are 0.3% x R2 000 mil = R6mil.

- Operational IOCAR: 25% x R6mil = R1.5mil

- The Operational risk IOCAR ("i" in the CAR formula) is not under the square root. Therefore, the total impact on IOCAR is an increase of R1.5 mil.

The OCAR needs to allow for the effect of a fall in the fair value of the assets backing it, so that a sufficient level of capital is maintained even after such a fall in asset values. The grossing up of IOCAR allows for this.

Assume the grossing up factor is 0.7, this allows for a 30% fall in equities and a 100% equity exposure. [This is a conservative assumption. Award marks for any sensible approach]

Grossing up IOCAR impact to OCAR impact: R1.5 mil / 0.7 = R2.14 mil.

Therefore, the CAR increase by R 2.14 mil to R105.14 mil

CAR cover reduce from 2.64X to 2.59X (=272/105.14), which is not a significant impact.

Estimated impact on operating profit:

- Fee income will increase by R 6 mil (=R2 000mil x 0.3%) per year.

- Assume administration expenses of the linked policy will be small, say R 0.2 mil per year. The asset management and the asset administration will be performed by the asset manager at their own cost. [Award mark for any sensible approach].

- Assume no valuation strain since reserve equal the unit reserve.

- Operating profit expected to increase by R 5.8 mil (=R 6 mil – R 0.2mil) per year.

Estimate the impact of the cost of the additional CAR of R 2.14 mil:

- Interest assumptions: Risk free return = 7.00% ; Risk discount rate = 9.50% ; Return on statutory capital = 5.0% [Award marks for any sensible assumptions]

- Therefore, the gap between the return required by shareholders (the risk discount rate) and the return on statutory capital is 4.5%. It is this gap that is driving the cost of CAR.

- Estimated annual additional cost of CAR = R 0.096 mil (=R 2.14 mil x 4.5%)

(ii) Discuss the factors that the insurer should consider in assessing this proposal.

This again was reasonably well answered but many candidates did not cover some of the more obvious points such as a comparison of profit vs. cost for the proposal or the tax impact. Very few candidates mentioned potential impact under future SAM / IFRS changes.

The operating profit is estimated to increase by R 5.8 mil per annum, while the annual cost of CAR is estimated at only R 0.096 mil. From this it seems that it is worthwhile accepting the proposal. But these numbers might be misleading due to the following.

The operational risk CAR is a new area of development and the calculation methods is very crude.

The insurer should be concerned about operational risks such as unit pricing errors. For example: The asset administrator make one unit price error of 0.5% on R 2000 mil.

If the insurer needs to compensate the policyholder for such an error to avoid reputational risk issues, this will then cost the insurer R 10 mil. and it will take the insurer 2 years (at R 5.8 mil pa) to recover such a loss.

Legal risk: The insurer's legal team should be comfortable the policy contract, the asset management agreement, the asset administration agreement etc.

Expected tax impact:

Consider whether the policy will be in the IPF, UPF or CPF.

Consider the impact of investment income generated by the underlying assets on the "I" in the I-E tax formula for IPF and CPF policyholders.

Consider the impact of changes in dividends, foreign dividends and investment income generated by the underlying assets on the allowable expenses ratio in the I-E tax formula for IPF and CPF policyholders.

Consider the impact that the proposal will have on the insurer in a SAM/Solvency II environment.

SAM: Statutory capital requirements may be more due to more severe shocks in the proposed SCR (standard formula) calculations (vs the CAR shocks)

SAM Internal model: Unlikely to be developed for a small insurer. But if the company considers developing an internal model, the model should cater for this additional business.

Expanding the scope of such a model may have cost implications for a small insurer.

Consider the expected impact of accounting standards such as IFRS on the income statement and balance sheet if the proposal is implemented.

QUESTION 2

(i) **Contrast the product's attributes and compare the investment and mortality risks posed to the company through offering these products.**

This was well answered. Candidates who did not score well simply did not cover enough of the points required. Some candidates missed the fact that the mortality risk depends on Sum at Risk and not Sum Assured. Not many candidates covered the issues of anti-selective lapses, catastrophe / pandemic and concentration risk impacts on mortality.

Products have very different durations:

- WOL is long term cover

- Group life cover is typically written covering the lives of a group for a year

- Term life cover can cover anything but in practice likely to be 5 to 20 year term.

WOL and term cover typically valued prospectively and group life retrospectively

WOL and term cover are likely to have more guarantees attached to them, e.g. guaranteed premium rates.

All three likely to have options attached to them, e.g. option to convert term cover to WOL at the end of the term or group cover to individual cover.

WOL and term will have various options in terms of

- premium patterns / increases

- cover increases.

Group cover will have a premium calculated annually for a set level of cover (usually relating to salary).

WOL and term cover involve the selection of a cover amount.

WOL and term will be strictly underwritten and the level of underwriting will usually depend on cover amount and age. There may also be financial underwriting.

Group life cover has a free cover limit below which no underwriting occurs. This is due to the fact that risk of anti-selection is reduced for group life cover.

WOL and term premium rates will be tailored to the individual taking out the cover and based on risk factors such as age and gender.

Group life premium is based on a sum assured weighted average risk / mortality rate across the group and the same rate is paid by all members of the group. There is an element of cross subsidization.

None of the products are savings products, but a WOL policy could have sizable reserves that build up with the eventuality of a payout occurring.

Term and group covers only cover the probability of death over defined period and as such there is very little or no reserve build up.

Term and group cover will not have any lapse or surrender payouts.

WOL could have surrender value but not necessarily.

Investment Risk

There would be some investment risk on WOL policies, even if it is a risk-only policy with no surrender value.

This would be dependent on the duration of the policy as sizable reserves would build up over time and introduce an investment risk.

Premium pattern and cover increases are also important in this regard. These patterns would affect the reserve build-up over time and as such the investment risk that develops.

Term and group products do not have savings components and reserves would remain low. As such investment risk is very low.

Mortality Risk

The most significant risk for all the products is the mortality risk.

This risk is related to there being more claims than expected in the pricing basis.

Under a WOL product the mortality risk would also depend on duration and the value of the reserve built up or asset share.

The sum at risk influences the magnitude of the mortality risk. Risk is reduced to the extent that it can be covered by the reserve built up.

The mortality risk would be highest for term and group covers which are pure protection policies with little reserve build-up.

Mortality risk could also arise through the underwriting process not resulting in the correct mix of lives in the insured pool. (requirements not correct)

Mortality risk could also arise from the underwriting loadings not being correct and as such allowing too many lives into the standard rating pool. (loadings not correct)

Mortality risk would also exist in terms of a once off shock to mortality such a catastrophic event.

Mortality risk would also exist in terms of shocks to mortality that may cause longer-term impacts than a catastrophic event, such as new epidemics (HIV, Avian Flu etc).

There is a particular risk posed on group life insurance related to concentration risk. The mortality risk is increased through the individual risks not being totally independent of each other, i.e. the members of an employer group could all work in the same building or travel together.

Group cover is particularly susceptible to multiple losses from catastrophic events.

Anti-selective lapsation is also a risk that impacts on mortality. This is the risk that the lapses from the portfolio will on average be healthier lives leaving the mortality of the remaining portfolio worse off.

This will not be an issue for group business and a small risk for term covers. It would be a risk for WOL products. This risk increases as the duration of the policy increases, as such no risk on group and little risk on term.

Any guarantees would worsen the risk. E.g. Premium guarantees would limit company's ability to deal with any changes to mortality that were not originally anticipated.

Any options would also worsen the risk. E.g. A guaranteed insurability options introduces the risk of anti-selection again at the point where the option may be exercised.

There would an AIDS mortality risk in that this has not been allowed for correctly in either the pricing or at UW stage and the anticipated AIDS deaths are higher than expected.

(ii) Describe how the HIV / AIDS risk differs between the individual life policies and group life policies and how these are managed.

This was reasonably answered. Candidates that did not score well did not cover enough of the points required. Some candidates did not specifically state that HIV risk is either priced for or underwritten out and a few did not seem to understand the Free Cover Limit concept. Very few candidates covered the different demographics affecting the HIV risk or the external forces impacting the HIV risk, such as government intervention.

The risk is that there are more AIDS related deaths than anticipated in pricing. This applies to all the products.

In South Africa the risk is managed by either testing for HIV status at underwriting stage or allowing for it in pricing.

HIV/AIDS exclusion clauses have not been allowed for all new business with effect from 1 January 2005.

WOL and term life insurance policies will be underwritten at inception and as such only HIV- lives will be accepted into the pool of insured lives.

There is a risk of HIV infection after policy inception and as such will increase as the policy duration increases.

AIDS related claims are explicitly priced for group life insurance policies as they are not underwritten out.

There is some underwriting above the free cover limit but this would only apply to a small proportion of the total risk.

Due to the fact that AIDS related claims are priced for in group life insurance policies means that the trends in HIV infections rates and AIDS mortality rates will be reflected in the insurance experience. The movements in these rates from year to year need to be priced for correctly.

The HIV infection rates and AIDS mortality rates in a large book of group life insurance business are likely to reflect that of the SA population aged 20 to 64 (working population). This is currently an HIV prevalence rate of +-18%.

For WOL and term policies the HIV prevalence rate should be 0% at policy inception and will then increase but not to national levels due to the fact that a higher socioeconomic class would be buying the WOL and term policies.

There would be a greater risk in any insurance portfolio if the demographics of the portfolio imply greater AIDS risk. A greater risk would be associated to a portfolio which is more heavily weighted towards younger ages (<35)

- Females

- Lower socio-economic groups

- A particular region (KZN being highest risk and WC lowest risk)

There is an external impact on AIDS deaths through the further developments and roll-out of anti-retroviral therapy (ART).

The SA government's roll-out of ART as well as the changing requirements for qualification for ART (currently CD4 <350) will impact the level and trends of AIDS related deaths in the population and a group life insurance portfolio. There is a risk of not allowing for these changes or anticipated changes in pricing.

The Actuarial Society of SA has established an AIDS Committee to assist the profession in dealing with the impact of HIV/AIDS.

The AIDS committee has released models to assist actuaries in modelling the impact of the epidemic, this includes the ASSA2008 National Model and the Select Model. The AIDS Committee also issued PGN/APN105 that describes the minimum requirements for allowing for extra HIV/AIDS mortality.

QUESTION 3

(i) Discuss the implications and likely consequences of this tax change on the policyholders and the life company?

This was poorly answered. Many candidates simply did not understand the practical implications of the change and as such answered incorrectly. A common error was not understanding that unit prices would drop. Many candidates did also not consider fair treatment across generations of policyholders and potential surrender and repurchase. Not enough points were covered for issues related to the life company.

Policyholders:

Policyholders will expect to see a drop in their unit prices after 1 March 2012 to incorporate the new tax basis.

There will be a higher tax charge on unrealised gains in the IPF and CPF. No impact on the UF.

This change will result in an unfair treatment of different generations of policyholders.

- An existing policyholder that took out a policy recently will see an immediate drop in their unit values at the effective date even though they didn't share in the capital gain of the underlying funds.

- Policyholders that have been on the books for a longer period of time and who intend to sell their units before 1 March 2012 will be taxed on the old effective CGT rate. Their unit prices will not reflect the tax on the new basis even though they shared in the return from unrealised capital gains.

The manner in which different generations are currently dealt with will also have an impact.

After the announcement on 2 February, many individual and corporate policyholders may decide to surrender their policies to be taxed on the old rate before the effective date of 1 March 2012.

Policyholders (or their advisors) need to compare surrender penalties against the impact of the new tax on their unit prices to decide whether to surrender their policies before the effective date.

With unit prices expected to drop after 1 March, these policyholders may decide to re-purchase the 'cheaper' units at the lower price after 1 March.

Other new potential policyholders will delay the purchase of new units until after 1 March.

There will be no impact on pension fund business.

 Life company:

Unrealised gains in the shareholder funds will be taxed on the new rate after 1 March 2012.

Monitor unit price risk. The company will have to ensure that there are no discontinuities in the unit prices with the implementation of the new tax and with the allowance for capital gains tax going forward.

The company may decide to delay realisation of capital gain to offset part of the gains against future capital losses.

Delaying the realisation of capital gain will spread the impact of the tax change over more generations or a wider base of policyholders.

This may dampen the impact of the tax change on recently joint policies, but will increase the risk of inequitable treatment across different generations of policyholders.

A sudden increase in withdrawals will put an administrative strain on the life company.

The life company will experience operating losses from early withdrawals if they haven't recovered their acquisition expenses yet.

The company will see a drop in their VIF as there will be a loss of future profits from the higher withdrawals (to the extent that their surrender penalties do not recover expected future profits)

After the implementation of the new tax, the lower unit values may result in the company's charges not meeting expenses.

This will result in an increase in non unit reserves. Charges will have to be reviewed to meet future expected expenses where possible.

The company will have to review the surrender values and surrender penalties going forward to avoid future losses on surrenders.

The higher non unit reserve will have CAR implications, e.g. resilience CAR

Changes in the non-unit reserves without reviewing the surrender benefits will have TCAR implications.

The lower net future return and potential higher charges might impact new business volumes going forward as investors might decide to look for other investment opportunities.

There may be a switch to higher income yielding funds (as opposed to funds with a higher expected capital gain)

The company will have to review the appropriateness of their asset mandates, benchmarks and unit fund asset strategies after the tax change.

(ii) Describe the impact of this proposal on the policyholders and shareholder?

Candidates that struggled with part (i) also performed poorly here. An issue not picked up by many candidates was that fair treatment across generations of policyholders would be improved under this scenario.

This proposal has no impact on the unrealised gains tax in the shareholder funds.

This will result in a more equitable tax allowance between different generations of policyholders that reflect their share of the unrealised gains in the underlying fund.

There will be a large tax amount payable in the next year of assessment. This may result in a cash or liquidity strain for the company.

As a result of this, National Treasury included in the proposal that capital gains be spread over three years (current year and following three years)

Tax will be more volatile from one year to the next, but if tax losses are carried forward it may be used to offset future gains.

There will be an increase in unit prices after the proposal as the realised gains before 1 March will still be taxed on the old rates.

The same considerations will be required with regards to the non-unit reserves, surrender penalties and future charges as the first part of the question but to a lesser extent.

The asset allocations and investment mandates may need to be reviewed to incorporate the impact of the new tax on benchmarks, policyholder and shareholder funds.