

May 2022

Subject F202 — Life Insurance

Specialist Applications

EXAMINER'S REPORT

QUESTION 1

Due to the economic impact of COVID-19 and the lock-downs instituted in South Africa over 2020 and 2021, insurers allowed additional flexibility in their premium payment terms and conditions. This was to prevent the automatic lapsing of a policy due to non-payment of premiums. This was achieved by considering premium holidays on request, subject to certain requirements.

- i. State the factors that would need to be considered in allowing and designing a premium holiday feature into a risk product.**

This question was handled well by most candidates. Better candidates managed to cover a full range of points ranging from actual design and rules to risks posed to the company as well as considering other parties and stakeholders.

The time period - how many months of premium may be missed (e.g. 3 months).

How often the premium holiday feature can be exercised (more than once, not more than once per year?).

What happens to the cover during the premium holiday?

Does cover remain in force, fall away or something in-between?

Does the reinstatement of the policy after the premium holiday require the repayment of premiums missed during the holiday?

What will the cost of this be and could it lead to liquidity or solvency impacts?

If the company forgoes some premium but full cover remains in place there will be a cost.

What is the cost of the option relative to cost of replacing a policy? It is often cheaper to keep a policy than write a new one.

Would there need to be eligibility requirements? e.g. only certain policies like policies over a certain duration.

What would the requirements be for the ability to exercise this option? (e.g. Proof of loss of job or partial income)

Based on the book of policyholders, is there a way to estimate the expected take-up of the option?

It would need to be designed to discourage as much abuse as possible.

Would the policy reinstate automatically or require a request to reinstate?

Automatically reinstating may lessen any selection at the end-point of the premium holiday.

Can the company administer this complex new feature?

TCF issues, especially if cover is reduced in any way.

Related to this would be reputational risk. A policyholder pays premiums for many years and is then not covered for a death claim during a 3-month premium holiday.

The reverse reputational risk could also exist, the risk of not offering this option if all other companies in the market do. And if competitors are offering the option, how are they doing it.

If reinsurance is in place would the reinsurer also support the option?

Otherwise, the insurer could end up paying reinsurance premiums when it is not receiving premiums or paying claims that aren't covered.

Would this be implemented across all risk products or only mortality cover?

Would there be any impact on broker commission or claw-back?

ii. Discuss the advantages and disadvantages of the following four premium holiday options for the company's risk products. For each of these options a premium holiday of three months will be allowed during 2022 under certain circumstances:

- a. No premium payable and full cover remains in force.**
- b. No premium payable but no cover will be in place.**
- c. No premium payable but only 50% of any claim occurring during the premium holiday.**
- d. No premium payable and full cover remains in-force but a repayment of missed premiums will be required in order to reinstate the policy.**

This question was handled well by most candidates. Better candidates covered the required detail around costs, risk and potential abuse for each option as well as the potential policyholder behaviour at the end of the holiday.

This comes at a large (and highest) cost.

For each policy that takes the option the company will lose 25% of annual premium with no reduction in claims cost.

Poses little reputational risk and will be seen positively by policyholders.

There is a risk of policyholders trying to take advantage of the premium holiday if there is no cost to themselves of doing so (reduced claim or repayment of premiums).

No premium / No cover

This would be a more cost neutral option, depending on premium payment pattern.

For each policy that takes the option the company will lose 25% of annual premium but there will be no claims cost for these policies during the premium holiday.

This option comes with the highest reputational / TCF risk.

Declining a claim for a long-standing policyholder due to activating a premium holiday will be perceived negatively.

Less risk of policyholders taking advantage of the premium holiday due to the loss of cover.

No premium / Partial cover

The same advantages and disadvantages as the above two options would exist but would be moderated.

There would be a cost, though lower, and the reputational risk won't be as severe.

No premium / Full cover but repayment of missed premiums

This will come at a cost but not as much as the first option.

There is ultimately no cost for those policyholders that resume cover.

There will be a cost to the insurer for those policyholders that either claim during the premium holiday or don't resume their policies.

There will be a lower number of policies that resume cover due to the cost of reinstatement. Many policyholders would have the funds to re-start premiums but not pay the arrears.

This would exacerbate any selection at that point.

QUESTION 2

- i. **Explain the main purpose of each of the pillars in the Solvency Assessment and Management (SAM) framework.**

This question was handled well by candidates that understood the basic SAM framework.

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 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 to assess the insurer's system of governance.
- to require insurers to consider the entirety of the processes / 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.

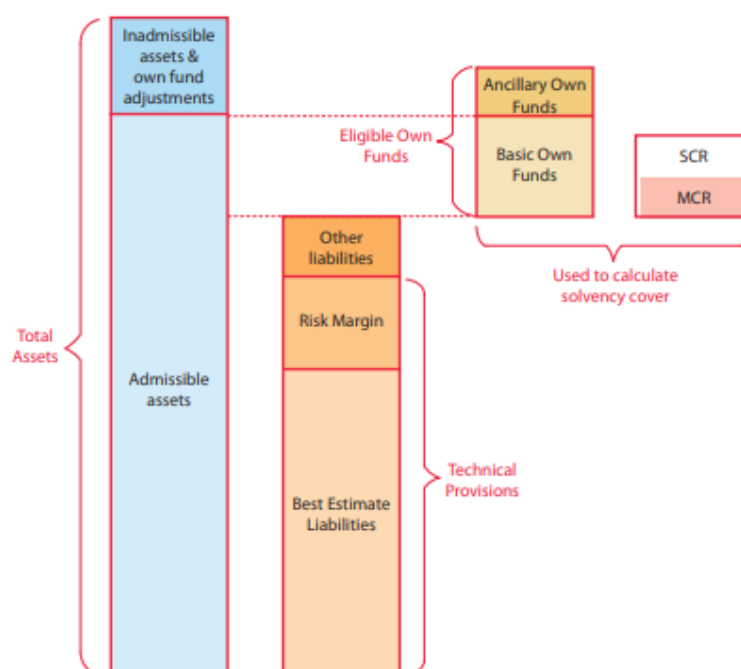
The main purpose of Pillar 3 is to require insurers to disclose how risks are managed.

A South African life insurance company has been selling unit-linked investment business and without profits immediate annuities for a number of years.

- ii. Describe how the components of the assets and liabilities within the SAM balance sheet are valued.**

This question was handled reasonably well by candidates. Many candidates however missed marks by not applying the product details in the question to the solution and as such only provided a generic answer.

The Prudential supervision balance sheet is summarised graphically below:



Assets

The valuation of assets (including the assets backing both the investment benefit and the reserves for the annuities) mainly follows International Financial Reporting Standards (IFRS), and the main requirement is that of market consistency and an economic (or fair value) valuation approach.

There are some minor deviations from IFRS with the intention of bringing the treatment of assets and liabilities, excluding technical provisions, closer to an economic valuation approach, including:

- Disallowing DAC assets;

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- Goodwill assets should be valued as zero;
- Other intangible assets should only be included to the extent that a fair value can be placed on them.

Liabilities

Best-estimate liabilities

The best-estimate liability (BEL) is determined as the discounted value of projected cash flows under each policy up to the “contract boundary”, calculated on a policy-by-policy basis. It is possible for the best-estimate liability to be negative (which can't be zeroised).

For the investment business this will be the value of the unit-linked fund for all policyholders and the PV of associated income/fees and cost/expense cash flows for all policyholders.

For the annuity business it will be the PV of the projected annuity payments and associated cost/expense cash flows for all policyholders.

The assumptions underlying the best-estimate liability should be best-estimate with no additional margins for prudence.

The best estimate liabilities can allow for future management actions (such as reviewing premiums or charges):

- that the insurer could reasonably be expected to implement.
- and which allow appropriately for expected policy behavior.

The risk-free discount rate used in the calculation of the liabilities should be the government bond curve. However, if the insurer matches the liability with swap-based assets, the insurer can apply to use a swap curve.

Since the insurer sells without profits annuities, it may allow for an illiquidity premium, subject to regulatory approval.

Risk Margin

The risk margin represents the premium over and above the best-estimate liabilities that one insurer would require to take on the obligations of another insurer.

The risk margin should be calculated by determining the cost of providing an amount of eligible own funds equal to the SCR necessary to support the insurance obligations over the contract lifetime.

In general, a third party would not pay a premium for the presence of any hedgeable risk, as any such risk could be removed from the portfolio.

The rate used in the determination of the cost of providing that amount of eligible own funds is called the cost of capital rate (prescribed at 6%).

Hence, the risk margin is calculated as 6% of the projected non-hedgeable SCR at each future year-end discounted using risk-free rates of return.

Approximate methods can be used to project the non-hedgeable SCR, subject to proportionality and materiality.

In calculating the risk margin, allowance can be made for diversification benefits between different lines of business.

Other liabilities

These are non-insurance liabilities such as tax liabilities, other creditors and can include subordinated debt.

iii. State with reasons the assumptions that would be required to calculate the best estimate liability for this company.

This question was handled reasonably well by candidates. Better candidates provided a full set of the assumptions required with appropriate detail.

Best-estimate assumptions

Since the company sells unit-linked investment business and without profit immediate annuities, it will need to set best-estimate assumptions appropriate to these products.

Mortality rates will need to be set for both products, although this is not necessarily a core assumption for the unit linked product given that the best-estimate liabilities won't be as sensitive to this assumption.

Mortality improvement rates - particularly important for the immediate annuity business given the insurer is exposed to longevity risk and the best-estimate liability will be very sensitive to this assumption.

Lapse rates and partial surrender rates - only applicable to the unit linked product since immediate annuities cannot lapse.

Renewal/maintenance expenses making allowance for escalation of future expenses at an inflation rate that is consistent with the discount rate used (given it is a SAM valuation, the inflation rate is likely to be implied from the difference between the nominal and real curves provided by the Prudential Authority).

Renewal commission and clawbacks (as governed by the underlying legislation) to the extent that the products are sold through independent financial advisors or tied advisors. Clawbacks are only applicable to the unit-linked investment products since immediate annuities cannot be lapsed.

Any income fees on the investment business at a growth rate that is consistent with the discount rate used.

The risk-free discount rate used in the calculation of the technical provisions shall in general be the government bond curve. Where an insurer matches the liability with swap-based assets, the insurer can apply to use a swap curve (adjusted for credit and liquidity risk) as the basis for the risk-free curve of those liabilities.

Since the insurer sells life/immediate annuity policies, an illiquidity premium can be added (subject to the insurer meeting certain conditions set by the regulator) to the discount rate to allow for the fact that investors are able to earn a higher return by holding the underlying investment instruments to maturity.

Allowance for tax, the effect of tax should be considered separately for each of the tax funds in the insurance company.

- iv. **(a) Explain why there is the potential for circularity in the SAM balance sheet calculation.**
 (b) State the simplification that is allowed should a company not want to follow an iterative approach.
 (c) Discuss the advantages and disadvantages of implementing the iterative approach.

This question was handled well by candidates that understood the dynamics of the risk margin and SCR calculations.

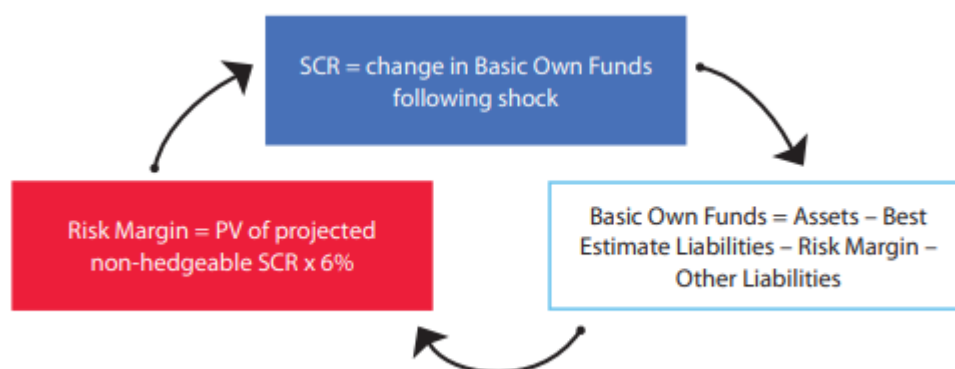
Reason for circularity

In general, for the standard formula approach, the capital requirement within each risk module is quantified as the effect on the basic own funds of a pre-specified shock scenario or number of scenarios. This typically requires a recalculation of both the assets and liabilities, as well as any own fund adjustments, allowing for the specified shock.

Hence, there is circularity because:

- $SCR = \text{change in Basic Own Funds following specified shock}$
- $\text{Basic Own Funds} = \text{Assets} - \text{Best Estimate Liabilities} - \text{Risk Margin} - \text{Other liabilities}$
- $\text{Risk Margin} = \text{PV of projected non-hedgeable SCR} \times 6\%$

i.e., the SCR is dependent on the Basic Own Funds which is dependent on the Risk Margin which is dependent on the SCR, and this creates the circularity. The above is shown below diagrammatically:



Simplification permitted

By default, a simplification is applied to the calculation of the liabilities both before and after the pre-specified shock scenario, where the risk margin is excluded from the technical provisions. This is to avoid circularities that occur as a result of the risk margin being based on the SCR.

Advantages of iterative approach

Using an iterative risk margin approach is a more accurate representation of the risk profile of the company which would lead to more alignment between their Pillar I and Pillar II calculations.

Implementing an iterative risk margin approach will lead to a reduction in SCR and increase in Own Funds which will lead to an improvement in the coverage ratio of an insurer.

Higher coverage ratios are perceived to be good in the market as it demonstrates a higher level of resilience from the insurer.

A reduction in SCR would lead to a reduction in Cost of Capital which will be beneficial for the shareholders and allow more flexibility in the redeployment of that capital for other business cases.

Disadvantages of iterative approach

Using an iterative approach is significantly more complicated and time-consuming than the non-iterative approach (it requires a projection of elements of the SCR using risk drivers under different shock scenarios).

It requires additional training, upskilling and communication to key internal personal as well as other stakeholders such as the Board.

There is a strict governance process required to implement the iterative risk margin approach which requires Prudential Authority approval.

Since the iterative approach uses proxies/drivers, a regular independent review of the proxies and their appropriateness needs to be conducted which increase costs.

Insurers will need to demonstrate the robustness of their projected SCR and that the iterative approach converges for both the risk margin and the SCR.

Given the complexity of the approach, there is more scope for errors and there may be convergence issues in certain cases where books are closed to new business and the book is in run-off.

QUESTION 3

When considering the value of a life insurance company, stakeholders may have various objectives for requiring a realistic valuation of the company.

- i. (a) List the stakeholders.**
- (b) State the possible reasons for requiring a realistic valuation of the company.**

This question was handled well by candidates.

Stakeholders

Current owners (or shareholders)

Prospective owners (or shareholders)

Investors

Industry analysts

Management

Board of directors

Reasons

Determining share price when undertaking a listing

Mergers and Acquisitions

Ongoing monitoring of company performance by management, shareholders and industry analysts

Used for setting management's bonus incentives i.e. by placing notional internal value on a company

ii. Describe how the goodwill of a life insurance company is calculated.

This question was handled reasonably well by candidates. A reasonable number of candidates provided too little detail for the marks required and gave very a high-level description of the calculation.

The Present value of future new business (PVFNB) is often referred to as the ‘goodwill’ value of the company.

The PVFNB is a very subjective value as assumptions on future business volumes needs to be made.

It is therefore common to produce a range of appraisal values based on different levels of future new business.

One method of calculating the PVFNB is to look at the VNB written over the last 12 months.

The PVFNB can then be estimated by using a multiple of the VNB.

The VNB should be calculated as per APN 107.

The multiple used in calculating the PVFNB will depend on:

- the company’s tax position
- expected future new business growth
- the risk discount rate (RDR)
- It is also common practice to use a higher RDR in calculating the PVFNB than for the VIF.

For products where insufficient business volumes were sold or new products that have not been launched yet, alternative methods can be used.

One possible approach is to project:

- the number of expected new policies during the next five years and discount the shareholders’ cash flows to the current date.
- All acquisition costs and costs of capital requirements should be taken into account.

iii. Discuss the relationship between the market capitalisation and the published embedded value of a life insurance company.

This question was handled reasonably well by some candidates but very poorly by others. Surprisingly, many candidates did not understand market capitalisation and as such could not get to the issues being considered by the question. Even for those who did understand market capitalisation, many then struggled to comment on the relationship.

Definition

Market capitalization refers to the total value of all of the company's shares.

It is calculated by multiplying the share price by the total number of issued shares. For example, a company with 20 million shares selling at R5 a share would have a market cap of R 100 mil.

The published embedded value is part of the appraisal value of a proprietary life insurance company. It represents the value of the future profit stream from the company's existing business together with the value of any current net assets separately attributable to shareholders, less the cost of required capital.

The embedded value excludes the value of future new business.

The embedded value is calculated based on a set of assumptions regarding future expected experience of the business. These assumptions are proposed by management, endorsed by the head of the actuarial function and approved by the board of directors of the company.

Relationship

Investigations into the relationship between the embedded value and the market capitalisation of insurance companies found that there exists a strong positive correlation between these two measures.

Furthermore, it appears that the extent of this correlation prior to the release of the embedded value information is as strong as that after the release of the embedded value information, indicating that information released may have already been incorporated into the share price.

However, there is no formal link between share price and the embedded value per share.

The share price can be higher or lower than the embedded value per share.

Generally large listed South African insurance companies trade at a discount to embedded value.

Other factors that might influence the relationship between the market capitalisation and published embedded value are:

- The tax position of the life insurer and the tax position of the potential investor.
- Any restrictions that may apply to the potential transfer of shareholder assets, held within the life insurer, to the current or prospective owners.
- The embedded value calculated is dependent on the assumptions used. Therefore, it would be sensible to consider a range of EV sensitivities (as opposed to just one point estimate)
- Any subsidiaries held by the insurer which are not considered as part of covered business, but may ascribe a higher market valuation by the industry.

iv. Give reasons for the share price of the company being higher or lower than the published embedded value per share.

As with part (iii). this question was handled reasonably well by some candidates but very poorly by others. Many candidates didn't get that goodwill potentially formed a large part of any difference. Too many candidates focussed on the share price being a function of demand and supply and therefore not having a strong relationship and ignoring the other fundamentals.

Reasons: Share price > Embedded value

Due to a significant value being placed on the goodwill of the company.

This may be based on a significant volume of expected future new business.

Which might be a result of new innovative products expected to be launched or very high margin new business expected in future.

There may be significant value in the non-covered business.

Pending offer from another insurer for a merger or acquisition transaction. The buyer might offer more than embedded value due to expected synergies with existing business, which will unlock value.

These synergies may include expenses savings due to consolidating administration systems and functions.

Synergies may also include more efficient use of capital because of lower aggregate solvency requirements due to added diversification benefits.

The share price is subject to market shocks and demand / supply dynamics which could also have a positive or negative temporary impact on it.

Reasons: Share price < Embedded value

Investors require a higher return on capital than the risk discount rate assumed in the embedded value basis.

This might be because of the higher perceived risk of investing in the particular company or the insurance sector in general.

Other assumptions in the embedded value basis are more optimistic than the view of the investors. For example, the EV basis excludes losses (or expenses) in the holdings or service company.

The inadequate allowance for the cost of options and guarantees embedded in life assurance contracts.

Potential mismatching profits that may arise from investing in riskier assets.

Value of new business is negative due to high relative expenses.

Pending offer from another insurer for a merger or acquisition transaction.

- Buyer deducts the cost of integration of this business into its existing businesses from the transaction price.
- The buyer's view of the cost of capital is higher than the allowed for in the embedded value calculation. This might be due to inefficient capital management applied by the insurer. Embedded value only allows for minimum capital as opposed to the appropriate level of capital.
- The buyer demands a discount to embedded value due to poor historical experience of the share price performance.

QUESTION 4

A listed South African life insurer writes only whole life non-profit risk and unit-linked endowment business. The non-profit risk policy offers lump sum mortality benefits. The policyholders have a choice of a level or compulsory growth premium pattern.

Each year the company analyses the change in embedded value. It also projects the expected transfers between the policyholder funds and the shareholder fund.

The actual transfer from the policyholder's funds to the shareholders' fund in recent years has often differed considerably from that predicted at the start of the year.

- i. Discuss the possible causes of these differences and the extent to which they can be mitigated by the company.**

This question was poorly answered. Many candidates answered generally and didn't consider the differences between the risk and endowment business. Candidates answered the mitigation part of the question particularly poorly. Many had a very narrow focus on one or two mitigation options.

It is difficult to predict accurately what the transfer will be the next year.

In calculating the embedded value, it will be assumed that all emerging profit is immediately transferred to shareholders.

The expected cash flow is therefore the net cash flow at the year-end on assumptions made at the beginning of the year.

The differences between the actual and the predicted transfer will be due to actual experience during the year being different than the assumed experience on the valuation basis at the start of the year.

This transfer will reflect both the cash flows relating to existing business and those relating to new business.

Non-profit risk business

Deviations of the actual experience from the expected experience can be a significant contributor to the difference observed.

For example, mortality experience being higher than assumed, has been a significant contributor to lower transfers to shareholders during the last 2 years, due to excess deaths (i.e., COVID-19 excess mortality)

Persistency experience being different than expected will have an impact on the actual transfers.

Expense experience differences are likely to have less impact than mortality and persistency.

Valuation basis changes at the end of the year may have significant impacts.

This may include:

Mortality basis changes may have a significant impact on a non-profit risk policy.

Persistency basis changes, with significant impact from level premium pattern policies.

- For example, higher persistency (i.e., lower lapses) assumed will increase reserves significantly for level premium pattern policies.
- This will result in lower actual transfers to shareholders than expected at the start of the year.

Economic basis changes, with significant impact from level premium pattern policies.

- For example, a decrease in long term interest rates will result in significant increase in reserves.
- This may be due to the long duration of the liabilities being backed by shorter dated assets, due to a lack of longer dated assets available.
- A decrease in interest rates will result in a more pronounced increase in liability than in the assets.

Unit-Linked Business

The difference due to actual experience deviating from expected, will be less significant than for the non-profit risk business.

This is mainly due to the policyholder benefits being linked to the assets backing the liability. This implies significant lower mismatch risk from a shareholder perspective.

Therefore, the actual transfers will differ from the expected due to the 2nd order impact of the following actuals being different than assumed.

- expenses, lapses
- mortality, investment returns

The expected cash flow will also reflect an assumption about the reserves which are required to be held at the end of the year. The actual valuation basis may differ from that assumed at the start of the year.

New Business

New business tends to have a negative cash flow in the first year.

Thus, even if this new business is profitable and will increase the shareholder value, it will reduce the transfer to shareholders in the year in which it is written.

So, if actual new business volumes differ from those expected, the transfer to shareholders will differ from that expected.

Mitigation of deviations

The company can minimise its exposure to variations in mortality experience through the use of reinsurance.

The company has limited control over variations in withdrawal experience although keeping service levels constant should help.

The company can obviously control, to an extent, expense levels and therefore reduce variations from this source.

For whole life non-profit risk policies, the company can limit the exposure to level premium pattern business by limiting the new business volume of these policies.

For whole life non-profit risk policies with a level premium pattern, the company can aim to achieve better cash flow matching of the liability with longer dated assets.

For unit-linked business, the company can reduce fluctuations in profits due to investment return volatility by setting monetary and charges rather than fund related charges, although this is likely only to be possible for future new business.

Other than reducing premiums, which might not be viable from a profitability point of view, the company has little control over variations arising from lower volumes of new business than expected due to competitive pressures.

It could restrict variations due to selling more new business than expected by setting a maximum volume of business for the year.

But, assuming that business can be written on profitable terms, an increase in shareholder value might be preferable to reduced volatility of the transfer to the shareholder's fund, subject to new business strain.

Over the last year there has been a significant increase in the yields available on fixed interest securities and equities. Assume this economic environment is expected to continue for the foreseeable future.

- ii. Explain the impact that this might have on the analysis of the change of embedded value over the year for the whole life non-profit risk business and the shareholder assets only.**

This question was relatively poorly answered. Again, many candidates didn't consider the differences between the two products. Not many candidates were able to effectively demonstrate that they understood the impact of a change in economic environment on the EV.

Risk Discount Rate

The risk discount rate is based on the return on risk-free assets, increased to reflect the extra risk involved in writing the particular business.

Thus, an increase in expected long term gilt returns will lead to a higher risk discount rate. This will act to reduce the present value of future profits (VIF).

Therefore, the EV will reduce due to this change of the economic basis.

When the risk discount rate is changed, this is likely to be the most significant impact of the change in investment conditions.

Value of whole life non-profit risk

It is unlikely that the expected assets cashflow will match the expected liability cashflows exactly.

The duration of the fixed interest securities (backing the liabilities) is probably shorter than the duration of the liabilities.

Therefore, an increase in valuation discount rate (based on the higher risk-free rate) will result in a mismatch profit for the portfolio. [The higher discount rates reduce the liability values more than the asset values due to the longer duration of liabilities]

Therefore, the EV will increase due to the higher ANW(due to the mismatch profit)

However, the assumption about future renewal expense inflation will also be increased which will tend to decrease the present value of future profits.

Change in Value of shareholder assets

As the yields have increased over the year, capital values will have decreased so the actual investment return in the year is likely to be lower than predicted at the start of the year.

Thus, the reduction in shareholder value relating to the investment return earned on the free assets is likely to have been greater than what it would otherwise have been.