

Actuarial Society of South Africa

EXAMINATION

27 April 2009 (pm)

**Subject SA6RSA – Investment
Specialist Applications**

EXAMINER REPORT

SOLUTION to Q1

- a) *This part of the question was generally well answered with candidates generally showing a good grasp of the scope of the required information.*

Details of policyholder liabilities

- Profile of each product type
 - o Term profile
 - o currency
 - o guarantees
 - o benefit promise nominal or real
 - o policyholder expectations
 - o open or closed book
 - o pricing assumptions
- Tax situation of policyholder funds
- Current and expected cash flow profile

Details of shareholder liabilities and investment objectives:

- Structure of balance sheet
 - o S/H capital, preference shares etc.
- Propensity to take risk and accept short-term volatility and/or capital losses
 - o The 2 sets of S/H's may have conflicting objectives given who they represent, so clarify
- Solvency position, extent of CAR cover

Current investment strategy, any IPS or guidance from board e.g.

- o attitude to risk
- o strategic asset allocation
- o regulatory constraints
- o liquidity requirements
- existing mandate(s)
 - o extent of segregation of funds (by tax fund, policy type etc.)
 - o current asset holdings
- nature of current investment arrangements
 - o who is managing the assets
 - o what structures are being used: segregated/pooled, CIS/FoF etc.
 - o past investment performance of funds
 - o current fee structure

Other company information

company strategy: rate of growth, target market, expansion of product offering etc.

PLEASE TURN OVER

- b) *Most candidates' answers to this part were very disappointing for a question where methodical application of bookwork and a little general reasoning could garner many of the marks. It was evident that some candidates did not understand the nature or purpose of shareholder funds in a life company at all.*

Nature and investment objectives of the policyholder funds

The typical characteristics of this liability group would be:

- Comprises numerous, small policies,
 - o that offer a fixed sum assured
 - o and share in terminal bonuses (probably no prior vesting bonuses)
- Low level of embedded guarantees
- Very long term on average
- Rand denominated
- Linked to funeral cost inflation as the benefit is intended to cover funeral costs

The asset portfolio backing this liability group should exhibit these characteristics:

- Capable of generating competitive, long-term, real returns
- Produce annual returns that are not markedly volatile in order to facilitate bonus declarations that meet policyholder expectations
- Compliant with the requirements of the Long Term Insurance Act
- Tax efficient within the 4 funds tax structure
- Aligned with prudent statutory capital management

Nature and investment objectives of the shareholder funds

These funds would comprise the statutory capital and free reserves of the insurer.

Statutory capital restricts admissibility of certain assets.

They are long-term, rand denominated and must be maintained at specified minimum levels.

Statutory capital must be sufficient at all times to meet requirements based on economic capital projections and stochastic scenario analysis.

The asset portfolio backing this liability group should produce optimum long-term returns within the context of the shareholders' business objectives and the constraint of their appetite for risk.

This, in turn, will be informed by the extent to which the assets exceed the required statutory minimum.

PLEASE TURN OVER

- c) *Given the lack of insight in part b) above it was not surprising that most candidates failed to obtain many marks in this part either. Once again the failure to understand the objectives of shareholder funds and their statutory requirements caused candidates to do poorly.*

Shareholder funds

The choice SAA depends crucially on the solvency position of the insurer
... and on the board's attitude to risk taking with regard to these funds.

So possible strategies could range from 100% cash and near cash (if the insurer is close to statutory solvency levels or the board does not wish to put shareholder capital at risk) to a very flexible mandate allowing high levels of equities or other risky assets (if the insurer has very high CAR cover and the board deems such risk taking appropriate to the company's strategy).

It is also possible that the shareholder funds might house strategic assets (such as the buildings occupied by the insurer's offices) that promote the growth of the business or are linked to its strategy in some way.

However the regulatory constraints concerning admissibility of assets when calculating solvency would discourage some investments such as loans

In practice the insurer is likely to take a position somewhere between these extremes
... and adopt a fairly conservative, balanced mandate such that in adverse market conditions the statutory capital is not excessively eroded at the very time when it will be most needed.

The tax treatment of shareholder funds will encourage a higher strategic allocation in equities rather than fixed interest

Depending on their natures, the two shareholders may have very different approaches to risk and to what are regarded as strategic investments.

Some cash would be required to cover new business strain. So the rate of growth of the business will drive the liquidity requirement to a large degree.

But cash will also be needed to fund regular dividend (depending on dividend policy) and tax payments

- d) *There was a wide dispersion of marks for this section with some candidates doing very poorly. Essential to a good answer was deriving the deemed allocation to shareholders so that candidates were able to see the obvious distortions and make relevant comments.*

It is a breach of regulatory requirements not to separate the assets of the P/H and the S/H.

Lack of separation makes it impossible to apply good governance to the distinct liability pools; e.g. there will be no investment policy statements or mandates.

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As a result of the mismatch between actual investment and the actuarial assumptions the shareholder assets must be derived as the residue after the deemed assets of the other liabilities have been satisfied.

This leads to an asset distribution of:

33%	Local equity	R13m
28%	Foreign equity	R11m
28%	Property	R11m
-39%	Bonds	-R15.5m
51%	Cash	R20.5m

This is obviously not an intended consequence.

Although most notable in the negative exposure to bonds,

...the percentages of foreign equity and property are almost certainly not intended to be so high. Given the high cash percentage in effect the shareholders are unwittingly engaged in a swap of bonds for cash.

As a result the return on the shareholder assets is being decided by an almost arbitrary asset allocation.

If returns of the different asset classes vary widely there could be serious inequity between P/H's and S/H's.

Lack of segregation introduces management and administration risks that are much more easily controlled with separate asset pools.

- e) *This part was very poorly answered by many candidates. It was evident in some cases that candidates were unfamiliar with the various categories of collective investment schemes or even, in a few instances, the basic concept of collective investment schemes. Some candidates also showed a poor grasp of the range of standard investment vehicles that a fund might utilise.*

The CIS's are appropriate in that:

- they are regulation 28 compliant
- they offer diversification between and within the various funds
- they have, on average, roughly the right asset mix envisaged
- they allow flexibility in the asset allocation; so managers can add value through tactical asset allocation
- they are tax efficient in that transaction within a CIS do not trigger CGT
- they access manager skills that would be too expensive to replicate in-house

PLEASE TURN OVER

But they suffer drawbacks:

- The objectives and benchmarks may differ and may not be aligned with those of the fund.
- The managers will be setting the asset allocation without regard to the fund's needs; so little control of overall asset allocation which can become skewed.
- Fees will be high unless rebates are negotiated
- Administration gets problematic with multiple managers

Possibilities for the P/H funds

Grant segregated mandates to an external asset manager.

Managers can be appointed per asset class with the asset allocation done by the board, and advisor or according to a rebalancing formula.

Can use a prudential balanced fund of funds (CIS)

Passive strategies (indexation, ETF's) would be viable for many of the building blocks

For any of these solutions the large life assurer is likely to have relevant products that could be brought to bear.

SOLUTION to Q2

- a) *The question was generally well answered.*
Few candidates mentioned the fact that one needs to take into account the investment vehicle (i.e. guaranteed or living annuity) likely to be chosen at retirement when thinking about one's risk appetite during the pre-retirement funding stage.
Many candidates confused the roles of the asset manager vs. trustees vs. members in ensuring that members are in the correct investment vehicle from a risk appetite perspective.
In particular, few candidates noted that the asset manager will not always get their views right so that one cannot rely on them to change a high risk product into a low risk product (by for example selling equities before the market crashes) – instead risk is controlled through being in an investment vehicle consistent with one's risk appetite, e.g. a fixed interest fund should one intent to buy a guaranteed annuity at retirement.

There is not much the asset manager can do to protect members close to retirement

The asset management division manages each product in accordance with the mandate provided to them. There is no indication that they breached that mandate.

Since they are incentivised over rolling 3 year periods, they may not be too concerned with short-term volatility.

The risk/return profile of each product is defined by its mandate. In many instances this asks for good returns relative to a benchmark and not absolute returns.

Presumably the suite of products was designed to cater for most combinations across the risk/reward spectrum

Ignoring the nature of the liabilities, the risk/return spectrum of the products is as follows (from least to most risky):

- Money market
- Fixed Interest
- Smooth bonus
- Linked Balanced

Members must ensure they are in the appropriate product, taking into account their specific circumstances and risk appetites. A default portfolio would assist in this.

The trustees must stress that it is up to individual members to get help from professional financial advisers to assist them in selecting an appropriate product suitable to their needs

Risk appetite is not just a function of duration to retirement (age)
It also depends on the investment vehicle selected at retirement

PLEASE TURN OVER

For example, a linked balanced fund may be appropriate if the member's aim is to buy a living annuity at retirement, but inappropriate for a member wanting to buy a guaranteed annuity

The asset management division is not always going to get their views right, so members must not choose their product on the assumption that downside risk to, for example equities, will be removed by the asset manager reducing equities before they drop in value.

In any event, the asset management division is incentivised on rolling three year performance

... and on relative performance, whereas close to retirement, depending on how the proceeds will be applied (living vs. guaranteed) absolute performance may be more important

- b)** *This question was generally well answered with most candidates achieving a level consistent with a pass grade.
Again, few candidates considered the importance of the post retirement annuity choice in deciding on the appropriate pre-retirement asset mix.*

The amount of investment risk an investor can afford to take tends to reduce as an investor approaches retirement.

Younger investors should have a bigger exposure to high risk assets, such as equities as over time these investments tend to outperform lower risk investments, such as bonds and cash.

... and they can afford to ride out market falls / take advantage of market falls to purchase more units with monthly contributions

However, close to retirement many investors cannot afford the downside risk associated with the higher risk assets

... which means that they should reduce their exposure to high risk assets and increase their exposure to lower risk assets

... depending, of course, on the investment vehicle they will choose at retirement,

... i.e. living annuity, guaranteed annuity or with profits annuity.

PLEASE TURN OVER

(... that is, risk should be defined in the context of the appropriateness of the pre retirement asset mix visa vi the post retirement annuity choice)

Also need to take into account their financial position, including other sources of income/assets

Life staging investments use an algorithm to change the risk profile of the product over the period from joining the scheme to retiring from the scheme. Typically it may start with a 75% allocation to equities at a very young age, reducing it to a very low percentage (0%) at retirement.

Advantages

Changes risk profile of members based on algorithm – no longer responsibility of members to move from one product to another to cater for changing risk appetite

Members are not always financially sophisticated and these products deliver broadly the right solution (since no two individuals are the same, financially speaking)

Arguably will improve retirement position of the average member

The need for consultation and assistance to members will be removed / greatly reduced

... reducing the cost of advice to members (no / limited need for financial advisers)

Trustees have a fiduciary duty to ensure funds are invested appropriately – having a credible and proven transitioning process helps trustees discharge this duty.

Disadvantages

Algorithm does not allow for specific circumstances of each member; rather for the circumstances of the average member (no two members are identical, financially speaking) and exact retirement age is often not known

No single correct algorithm for transitioning process

PLEASE TURN OVER

The way the risk profile changes over time to retirement should depend on the solution applied at retirement (i.e. with profits, conventional, life annuity)

Arguably risk profile adopted for retirement funding should take into account the other assets member has outside retirement provision – difficult to build algorithms allowing for these

Rules will be insensitive to timing the market, e.g. increasing exposure to equities when perceived to be inexpensive and vice versa.

Cost of running the product could be a disadvantage due to higher level of admin required.

Understanding the algorithm may be difficult for the average member and member may shy away from life staging option

Admin complexity may mean that only one migration option may be provided eg cash only or life annuity only

- c) *This question was generally well answered with most candidates achieving a mark consistent with a pass grade.
Few candidates made mention of the fact that investing in emerging markets provides diversification against country specific risk.*

Reason for investing in emerging markets is to get exposure to higher growing economies, and or to get diversification benefits.

However, the performance of the financial markets of emerging countries is often highly correlated

Partly because developed market investors regard emerging markets as an asset class and tend to buy and sell them at the same time

The benefit to SA investors is that can invest in higher growing economies than South Africa (yielding better returns) and also perhaps in industries not present in SA (ditto). Market inefficiencies may also provide higher alpha than in developed markets.

Also, do get diversification against country specific risk (but not against “emerging market risk”)

PLEASE TURN OVER

However, may not have the required skill levels to invest in these markets (other than SA) so that these benefits are diluted or negated

But can outsource the management to specialist emerging market investors, including investing in pooled funds or possibly emerging market ETFs.

There will always be an element of exchange rate risk introduced. Emerging market exchange rates are often very volatile and not be easy to hedge..

Can also reduce total emerging market equity risk by having a reduced allocation to SA equities – but this must will be at the cost of using some of the limited foreign allowance

So probably OK provided small % allocated to emerging markets and/or SA equities reduced to take account of emerging market exposure ex SA

d) *This question was poorly answered with not a single candidate achieving a mark consistent with a pass grade.*

Few candidates seem to have been aware of the fact that any model one builds will by its very nature be an imperfect representation of the real world. The key to answering this question was to look for features of the real world that would be difficult to build into a model thereof, e.g. the possibility (through human error) of your asset manager under-performing the benchmark it is managing to by a significant margin.

Chairman correctly points out that you would expect the funding level to fall below the 90% level roughly 2.5 years in every 100 assuming a normal distribution

So question is whether the fall in the market was really a 2.5/100 year event or whether there are other explanations?

Does the modelling assume normality? This would understate the probability of extreme events.

Is the mandate of the underlying asset portfolio aligned with the bonus distribution policy?

Funding levels are driven by both bonus rate declared and performance of underlying portfolio

What was the funding level before the fall in the market – perhaps bonus declarations have been too aggressive (i.e. too high)

Large withdrawals at full value while funding level was below 100% would exacerbate the situation.

PLEASE TURN OVER

Long run returns and variability thereof are driven by strategic benchmark allocation specified in mandate,

... as well as the degree of latitude given to portfolio manager to apply tactical asset allocation decisions

... and the skill the asset manager brings to the tactical asset allocation process “hit rate”

... as well as how well they perform within each asset class relative to the specified benchmark “stock selection”

E.g. the higher the specified allocation to equities in the strategic benchmark allocation, the more volatile the returns on the portfolio, and assuming a high degree of smoothing applied in the declaration of bonus rates, the more volatile the funding level

Stochastic modelling would indicate, given the specified mandate and bonus declaration policy, whether the mandate and bonus philosophy are aligned

... taking into account the fact that the asset manager is incentivised on three year performance whereas the objectives of the product is perhaps more short term?

And whether the assumptions regarding volatilities, cross correlations, returns and bonus declaration function were appropriately specified; dependent on historical data etc. that may not be pertinent

- e) *Some candidates scored very well in this question, whilst some scored very poorly. Not a single candidate mentioned under the ad hoc approach that a rule based approach may assist in overcoming the “fear and greed” nature of human decision making. Whilst all candidates recommended an approach to hedging, almost across the board the rationale provided for the chosen approach was poor.*

Permanently hedging:

Removes the risk of not having a hedge in place when you need it.

Usually will hedge when don't need to, i.e. at time when cost of hedging is lower (i.e. lower volatilities)

This approach ignores the funding level. And it adds another (redundant?) smoothing mechanism over and above the bonus smoothing not envisaged in the product design.

PLEASE TURN OVER

But because you are always hedged even when you don't need to be is quite expensive => provides a permanent drag on performance of equity portion of portfolio of between 3-4% p.a.

But will always be in place over financial reporting (interim and year-end) periods, which will assist in amount of capital need to hold

But to whose benefit (client or shareholder)? Is it fair to expect the P/H to bear the cost in addition to smoothing fee?

Ad hoc

This could form part of the tactical asset allocation strategy.

May be forced to hedge – this will typically be when hedging is quite expensive due to high volatility in the market

But hopefully this will only happen once every 2/3 years which means that over time it will still work out cheaper than option above

However, given human condition of fear and greed may hedge at exactly the wrong time, e.g. not hedging when you should in the hope that the equity market will improve and then being forced to hedge at the bottom of the market

Both when volatilities are high and when the level of the market is so depressed that there is very little downside risk to the market

Therefore important that use a rule based approach, within a risk management framework, where equity exposure will be hedged at a pre-specified level.

This level should not be too low given the fact that markets can move quite quickly and it may take time to implement the hedges.

Recommendation

Ad hoc

Provided have risk management framework in place whereby will hedge at specified funding level

The sacrifice in returns is less; it is unreasonable to expect that a permanently hedged portfolio will produce returns comparable to unhedged equities; the return is more likely to resemble that of bonds.

{Marks awarded for alternative conclusion provided it is well motivated.}

PLEASE TURN OVER

- f) *This question was poorly answered, with few candidates knowing that shorter dated options are more sensitive to market movements than longer dated options, and that the most appropriate choice will depend on what one is trying to achieve.*

European options only payable at maturity.

Nine month options protect for a longer period of time

And are therefore more expensive than three month options (this could typically be 5.2% vs. 3.7% under normal circumstances)

However, three-month options will be more effective hedges against market dips than nine-month options, since they are more sensitive to market movements.

E.g. a 10% drop in the equity market on day one could result in the three-month put option returning 4.1%, while the nine-month put option might return 3.4%

Answer depends on what one is trying to achieve

Crucially, are you trying to protect funding levels at a specific date

E.g. at year-end (because of CAR requirements) ... if so most effective hedge would be one maturing on or just after year-end (because optionality is close to one, assuming it ends in the money)

Do you have a strong view that market will fall in short term that you are trying to hedge against?

Again, shorter dated options better are more sensitive to falls in market, whereas with nine-month options market may have recovered at maturity and less sensitive to short term movements in market (in case want to cash option in)

There is generally more liquidity in short-term options. But they would have to be rolled more frequently at prices that are uncertain. Longer dated options lock in the price now.

- g) *This question was better answered than f) above, with most candidates achieving a mark consistent with a pass grade. Few of the candidates mentioned that single stock options can be used to reinforce a strong view one may have of a particular stock, but that this doubles up the risk of the manager's view being wrong.*

Objective is to minimize tracking error relative to actual portfolio

PLEASE TURN OVER

To increase effectiveness of hedge

Most managers manage to SWIX, so possibly best to hedge the benchmark and manage the risk of deviation from it

But need to analyze actual equity portfolio especially if it differs from the benchmark significantly. Index hedges would not cover exposure to emerging market equities, for example.

A combination of indices might mimic the portfolio better

Also take into account liquidity of hedging instrument, SWIX options are highly liquid

Single stock options are administratively complex. And they are more expensive because volatility of individual stocks is far greater than that of indices or portfolios.

Difficult to obtain options on the smaller stocks (i.e. much beyond the ALSI40)

Only hedging the largest stocks can introduce big tracking error

There is a concentration of Resources stocks in the top 40, so the unhedged stocks would be mainly from industrials & financials

The performance of these sectors often diverges widely. This could cause the tracking error to widen since only largest stocks are hedged.

Single-stock option could play a role if the manager has a strong view on a stock and want to add value to the portfolio by betting on that view

... but this doubles up the risk of the manager's view being wrong

... and negates the intention of being hedged against unforeseeable risks

END OF EXAMINER REPORT