**Actuarial Society of South Africa**

# EXAMINATION

6 October 2009 (pm)

## Subject SA6RSA – Investment Specialist Applications

EXAMINER'S REPORT

**Question 1**

(i)

> *The range of marks obtained for this section was very wide, reflecting the varying ability of candidates to cover the diverse aspects involved. A common shortcoming was the mention of "reasonable policyholder expectations" without examining what that would mean for a smooth bonus product.*

We need an indication of what the bonus philosophy will be, in particular the mix between vesting and non-vesting bonuses

The higher the level of vesting bonuses, the greater the guarantees imbedded in the product hence the greater the exposure required to less volatile assets such as cash and bonds

Assuming a similar bonus distribution strategy to the one applied in SA, the asset allocation benchmark for SA product may be a starting point

Allowing for any obvious differences resulting from regulatory environment such as bigger allowed off-shore allocation, statutory capital requirements, prudential investment limits, taxation

Ideally need historical data on past performance of different asset classes in country X (including returns: real and nominal, volatilities and correlations), so can build stochastic model

But unlikely to be available in sufficient detail

Given high inflation environment need to ensure asset mix is such that can produce real returns over time, suggesting low allocation to cash and bonds perhaps

Are similar products offered in market – if so will have to ensure can declare similar bonuses over time which suggests asset allocation not too different from competitors?

What is the required return on equity the group requires on Smooth Bonus products?

The capital to be held against the product will depend crucially on the asset allocation benchmark specified in the mandate

New and growing fund; new flows will automatically stabilise the funding levels so no need to be too conservative on growth assets provided inflows are steady

The liquidity requirements and the implications of poor marketability of certain assets must be considered

The size of the fund will probably preclude asset classes like direct property

 

(ii)

*Again candidates' responses varied widely in quality. Some candidates failed to make even the most obvious points about the difficulties of duration matching in the environment described.*

Main issue is whether one will be able to match the immediate annuity liability with appropriate assets, especially duration matching given the lack of longer dated government bonds available in the market

The scarcity of local bonds could also result in high bonds prices and low yields

The fact that the bond market is not well developed means that will be unlikely that will be able to solve this problem by investing in corporate bonds

Could consider investing in longer dated bonds denominated in other currencies, but then exposed to currency risk. Could consider hedging the currency but the cost associated with doing this (a function of interest rate differentials) will almost certainly be prohibitive

Entering into swaps with an investment bank is a possible solution, but unlikely except on costly terms

So likely outcome is that the duration of the assets backing the liabilities will almost certainly be much shorter that that of the liabilities. This means that the assets will be less sensitive to a change in interest rates than the liabilities resulting in a loss should the yield curve shift downwards

May consider other options e.g. unlisted property and/or equities which are both long duration assets, but will be far from perfect hedge therefore not advisable

The company will need enough capital to withstand adverse market movements and should price very conservatively

Advise against long-dated or growing annuities which will have longest duration

(iii)

*This section was generally not well answered and poor examination technique was often to blame. Firstly, the question clearly states "Explain how…" so merely mentioning A consequence was not sufficient; candidates were required to give insight into the <u>mechanism</u> that would produce that effect. Secondly, the question asks for an explanation covering four asset classes over the short and long terms. Candidates who did not systematically cover all eight areas gave away marks needlessly. Thirdly, a few candidates ignored or misconstrued aspects of the question. For example the question says most* *of the bonds are shorter dated; this should not result in answers ignoring long dated bonds altogether.*

*Many candidates were successful in identifying the macroeconomic consequences and the resulting impact on performance of assets but few were attuned to the likely behaviour of asset prices as a consequence of changing valuation parameters and sentiment.*

In all cases important to differentiate between nominal and real return aspects of performance; e.g. though nominal returns fall, real returns may or may not.

<u>Cash</u>
Short Term:
Higher returns as inflation generally squeezed out restraining the demand side of the economy through higher short rates

Long Term:
Lower returns available on cash as once inflation is under control interest rates can come down
But real returns will be positive and possibly higher than currently

<u>Bonds</u>
Short Term:
Initially the increase in short rates likely to result in an upward shift at the short end of the curve resulting in a capital loss at the short end and hence lower returns

The longer end of the curve likely to shift downward, provided the market believes that the government will be successful in bringing down inflation over time, resulting in a capital gain at the long end of the curve and hence higher returns

The longest dated bonds should provide the largest capital gain and therefore highest return

Long Term:
Short rates will reduce on the back of lower inflation which may result in capital gains at the short end of the curve until the low inflation environment is fully discounted after which the short end will start responding to cyclical changes in the inflation and short term interest rate environment

Long rates likely to keep on adjusting downwards in response to the secular change in inflation resulting in capital gains for a number of years given the fact that perceptions are sticky (i.e. slow to change in response to changes in the environment), So it will take a while for people to start to believing the permanency of the lower inflation environment

Lower real rates will encourage more bond issuance by governments and possibly corporates changing the supply/demand dynamics and hence returns over time

<u>Equities</u>

 

Impact on equities is through impact on earnings and impact on P/E multiples

Short Term:
*Earnings:*
Higher short term rates generally negative for economic activity and therefore earnings.

But not all sectors will be impacted equally e.g. those companies where most of the demand is external to country X (e.g. some of the Resource companies) will be less impacted. Also, companies with ST debt on their balance sheets will pay more in interest thereby impacting earnings negatively. Banks' and credit retailers' earnings tend to decline when interest rates rise because of more bad debt, falling asset prices

*PE multiples:*
Difficult to know what exact impact on PE multiples will be. Some sectors should not be impacted at all. E.g. some of the resource companies where prices set internationally and bulk of demand external to country X. Banks and retailers: either no impact or perhaps higher PE multiples given forward- looking nature of markets

Long Term:
*Earnings:*
Generally when economies move to low and stable inflation environments economic growth improves as such an environment is more stable from a macro-economic environment perspective, which encourages risk taking, impacting economic growth positively and thereby earnings growth of companies.

Will have a bigger impact on companies whose demand is mainly local as opposed to Resource companies where demand is more external to the country

As interest rates follow inflation lower, companies with ST debt on their balance sheets will benefit from lower interest bill

*P/E multiples:*
These should expand over time, boosting returns from equities on the back of:

- Higher expected earnings growth resulting from higher economic growth
- Lower bond yields reflecting a lower inflation environment
- Lower real rates observed in low inflation economies
- Lower equity risk premium as result of more stable macro econ. environment
- Lower discount rates applied to the predicted earnings stream

Again, some sectors will be impacted to a greater extent from this than others, e.g. Resource companies because arguably their earnings prospects are less impacted since less dependent on local demand

Stable inflation good for currency; will stimulate foreign demand for shares driving P/E's higher

<u>Property</u>
Short Term:

 

Higher interest rates negative for economic activity and hence rentals
Also, higher interest rates negative for companies with ST debt
Generally higher interest rates result in lower property values due to higher discount rates, lower turnover rentals and eventually declining demand

Long Term:
As interest rates come down, earnings positively impacted because of:

Lower interest on ST debt
Greater demand resulting from higher economic growth

Higher earnings and lower real rates mean higher property values, boosting real returns on property

Some long leases with high built-in escalations could be very profitable – or become non-viable if tenants cannot afford high real increases. This will also make tenants reluctant to sign long leases unless escalation clauses are linked to inflation.

Property sector also benefits from more stable currency which encourages foreign investors

(iv)

*This section was extremely poorly answered. It would seem that candidates are not comfortable with absolute return funds and/or the derivative strategy described.*

If expect equities to re-price upwards in response to a move to permanently lower inflation, arguably should not cap out equities by writing a call at higher levels

But this depends on short-term considerations too as the hedges will be for a year or less and the effect on the equity market may take years to emerge.

Also, arguably less downside risk, so less need to buy puts for protection.

Given nature of absolute return product, unlikely to invest in equities without downside protection (because one can never be 100% sure), but should consider buying less protection, maybe only 10 or 20%

Structure no longer zero cost – will have to pay for put spread instead of having it financed by the sold call and put.

Can perhaps also make a case for investing in nominal bonds, as they should perform well during the transition period to low inflation

Also property which benefits from upward revaluation during a secular fall in rates

Will get most bang for buck from long duration assets

 

Once in a low inflation environment, will have to revise inflation + 6 % target, as will be extremely difficult to achieve as positive real returns are lower in a low inflation environment over the long term.

**Question 2**

*This section was well answered by some candidates (in particular those who achieved an overall passing grade), adequately by others and very poorly by a few. The last group tended to fixate on parts of the problem (e.g. concentrating only on derivatives) and consequently ignored whole areas of risk. Since the question explicitly states the functional areas in the company that will be involved there was no excuse for failing to consider the risks that these areas would be involved in assessing or managing.*

i) Risks for consideration:

- Appropriateness for the fund mandate given the objectives of the fund and the nature of the investment
- Often these assets will have multiple investment risks and each needs to be considered:
    - Credit risk is usually a feature and may arise from many sources counterparty risks, settlement risks etc some of which might not be immediately apparent.
    - Liquidity is often very limited for such assets; even if some secondary market exists, it tends to dry up at the first signs of market stress
    - Market risk and the nature of the instrument's payoff profile
        - Maximum loss, losses possible with varying degrees of likelihood etc.
        - Extreme risk can be quite different for a derivative-based asset and the underlying
        - In many cases it will not be possible to hedge market risk effectively if at all, increasing the riskiness of the investment over time
        - Effect of optionality on market pricing of an asset during its lifetime. (Even protected products may show sharp losses before pull to par takes effect)
    - Leverage risks and exposure to gearing
    - Some of these investments are base on quantitative models giving rise to model risks
    - Rollover risks when derivatives are assumed to be renewed over the life of the investment
    - Cash flow risks where drawdown or margin calls arise
    - Cross hedging risks
- Legal or regulatory constraints – e.g. Reg 28 for life funds – that prohibit investment
- Tax could be complex and may have to obtain expert opinion on treatment
- Ethical risks: conflicts of interest, breaching codes of conduct, fraud
- Some investments will involve long and complex legal agreements.

 

    - Need to ensure that the content is aligned with what the client believes she is buying
    - No hidden or disguised clauses that would impair the client's return prospects
- Operational risks also take many forms
- Valuations can pose problems where there is no market price discovery
    - Would prefer an independent source of valuations but this is not always possible
    - Even if have independent source must have capability to perform a reasonability check on the numbers provided
    - If models are used these are subject to assumption error
    - If model is not industry standard, risks of model error are higher
- Conventional portfolio construction methods and systems will not easily accommodate non-vanilla assets; this increases the risks in this area
- Trading and accounting for non-vanilla instruments introduces more complexity and even a need for new administration procedures
    - The physical trade cycle – the confirming and settling of deals – will probably not fit with existing procedures and new processes and controls will be required
    - The existing asset accounting systems may not accommodate complex new instruments or accurately reflect all facets of their make-up
    - This could lead to workarounds that are produce undesirable consequences – say on tax reporting or IFRS accounting
- Reporting and compliance risks arise if systems or processes cannot cope with exotic instruments. E.g. this could result in:
    - Incorrect classification or tax treatment of instruments
    - Failure to aggregate risk exposures correctly

ii)

*With few exceptions this section was poorly answered. This was not surprising for those who failed to identify the risks in part (i). But it was careless and costly for those who had, not to deal with all of them in this section.*

*Roles:*

Each area must do a risk assessment for those risks that they typically are responsible for managing. They must then communicate the risk assessment and risk management processes to a central point – probably the investment risk manager, though it could be the CIO or MD depending on the organisational structure – for a final decision on whether to invest or not. In particular:

*a. The fund manager must do/produce:*

- Collate all the legal and other relevant documentation
- An initial analysis that includes confirmation that:
    - The investment is suitable for inclusion into the proposed portfolios, specifically with reference to the appropriateness of the risk in the investment relative to the portfolio risk profile, the investment

mandate and the legal (regulatory) environment in which the fund operates.
        - The appropriate risk management tools are in place and form part of the portfolio management process
        - The investment documentation to which the client will commit adequately represents the business understanding of the investment
        - The tax treatment of the new investment has been considered
- Document the mechanics of the investment to enable the other areas, like compliance and administration, to assess their responses to it
- A detailed description of the valuation method and how valuations will be obtained
- Proposed pricing mechanism and frequency
- Detailed description of the investment risks and investment process risks and the processes in place to account for these
- Information relating to the trading of the investment or the supply of a contact person at the counterparty (or other relevant party)

*b. The asset administration function must do/produce:*

- Assess the extent to which there are operational processes in place to ensure that the risks arising from the trade cycle (including confirmation, settlement and pricing) are minimised including:
    - How the physical trade cycle will be managed including which details of the investment should be confirmed
    - How the instrument will be accounted for on the investment system (administered) including notifying the client of the tax nature of the instrument as per information from the fund manager
    - Whether the instrument can be properly and independently priced
- Communicate the results of the risk review to Compliance in writing as input into the non-vanilla instrument review process
- Update trade cycle process documentation and control documentation as required
- Update the valuation policy where new non-vanilla instrument results in application of new valuation methodology
- Update the pricing policy documentation (including how the instrument will be captured on the system) where new non-vanilla instrument is priced using a new method.
- Must be able to do performance attribution on new instruments/assets
- Update reporting templates and processes
- Update or acquire systems where necessary

*c. The compliance function must do/produce:*

- Confirm mandate compliance
- Evaluate the impact of the investment in light of regulatory limits and requirements. Consideration will be given to the investment-related requirements of, for e.g:
    - SA Reserve Bank; Long-term Insurance Act; Pension Funds Act; Collective Investment Schemes Control Act; Medical Schemes Act

 

- Evaluate all aspects of investment-related legal contracts with special attention to the following:
  - Defensibility of any contracts
  - Content: that the major clauses in the contract convey instrument parameters that are consistent with the understanding of the manager purchasing the instrument
  - Limitation of liability to initial investment
- Confirm fund manager interpretation of tax opinion
- In general, legal review requirements are significantly less onerous for global standard contracts. The contracts of listed derivative instruments would not generally require Compliance review.
- Ensure no conflicts of interest
- Implement compliance controls where existing will not suffice
  - Including pre-trade compliance procedures
- Highlight compliance risks in a document for the CIO and MD
- Compliance area may coordinate responses from all areas for consideration by CIO and MD

*d. The investment risk management function must do/produce*

- Conduct a review of the investment related risks (or review the fund manager's assessment)
  - Assess level of credit risk associated with the investment
  - Assess extent & nature of market risk associated with the investment
  - Assess extent to which the investment is subject to liquidity risk and the circumstances that might influence this
  - Review the strategies in place to manage any identified high risk areas
- Assess the extent to which the choice of investment is based on the output of a model
  - Review the risks associated with the model
  - Assess extent of downside risk associated with the investment and how this will be managed
  - Review the strategies in place to manage any identified high risk areas
- Assess whether the instrument it has been demonstrated that the instrument will be valued in accordance with market conventions
- Review the methods that will be used to include the instrument in a new or existing portfolio to ensure that the resulting portfolio has a risk and return profile commensurate with the stated profile of the of the fund (the client offering).
  - This includes evaluating the suitability of the investment from a liquidity and absolute riskiness (including extreme risk) point of view
  - This should include proposed limits for the investment as part of the overall fund exposure and which conditions might impact the size of the limit proposed.
- Affirm that the investment documentation to which the client will commit adequately represents the business understanding of the investment
- Communicate the results of the risk review to Compliance in writing as input into the non-vanilla instrument review process addressing the above elements.

 

*e. The Chief Investment Officer must do/produce:*

- Review the fund manager's analysis and challenge, if necessary
- Review the risk manager's assessment and proposals and challenge
- Stipulate any limits on the investment (size, pricing levels etc.)
- Sign off on the final decision regarding the investment or escalate the decision directly to the client

**Question 3**

*This section was well answered in general with candidates showing a good understanding of the issues.*

a)

- Trade unions are sometimes sensitive about foreign investments since they believe that taking capital overseas constrains the local economy which will then produce fewer jobs
- This argument is not well founded.
  - SA has a very open economy and the pool of local investment is one of the smaller influences on growth and job creation
  - In fact, forcing local investment can result in unproductive use of capital and may even crowd out jobs as oversupply of capital makes labour intensive enterprises unattractive.
  - This happened when highly protectionist policies were implemented by the apartheid regime
- Trade unions may also feel that foreign investment is contrary to BEE/SRI considerations since capital that could foster those aims is not being deployed locally
- They may also feel that since members' liabilities are ZAR based foreign assets are a serious mismatch
- This is not entirely true either
  - in an economy as open as SA's, members will be exposed to the price of imported goods
  - foreign investments hedge against imported inflation and weakening the currency
- The funds are already greatly exposed to currency risks through shares on the JSE like resources stocks which are very geared to currency movements
- It is more efficient to seek the best (risk-adjusted) returns in all markets and allow market forces to create equilibrium
- Denying members access to foreign investment would be to their disadvantage since it could impair the investment returns
- This arises from:
  - Diversification benefits
    - By market, geography, industry, currency etc.
  - Access to industries and asset types not available locally
- The purpose of the fund is to protect and grow the members' retirement savings. This should not be compromised and is best achieved when the asset composition is optimised across all available sources of return, including foreign assets.

b)

*This section was not well answered. Many candidates failed to show an understanding of what constitutes an optimal asset allocation to foreign assets and how it might be arrived at.*

- From a risk/return optimisation point of view the optimal level of foreign exposure will be that which delivers the maximum return for a given level of risk or the lowest risk for a given return target.
- Funds invested to the previous maximum (15%) because it was well below the level that was found to be optimal under most stochastic modelling
- This does not mean that the new limits will also be
- Optimal foreign asset allocation will depend on the objectives of the fund and its risk tolerance and so differ from product to product
- Typical stochastic optimisations do indicate levels of foreign assets as high as 35%
- Most foreign investment has been in listed equity. Higher limits on foreign exposure might permit investment in more asset categories that previously would have been too small a proportion to warrant the effort
- Optimisations are not gospel; they are based on assumptions that are subject to error; given some trustees' sensitivity to the issue of foreign investment it would be wise to take a more rather than less cautious approach to increasing the mandate limit.
- Should also consider practical aspects such as costs of realignment and market timing (perhaps have a phasing in period) and member communication