

Actuarial Society of South Africa

EXAMINATION

20 October 2014

Subject F205 — Investment

Specialist Applications

EXAMINER'S REPORT

This paper was generally very poorly written. Candidates not only failed to demonstrate an ability to apply knowledge to a given situation in a structured way, but also cost vital points in bookwork. In many instances, candidates wrote copious points but did not answer the specific question – which wasted time and gained very few marks.

Candidates who wish to attempt this exam again should work hard to ensure that they have a solid understanding of the bookwork, practical understanding of the various syllabus areas and exam technique.

QUESTION 1

This question was a large part of the marks and tested Liability Driven Investments (LDI) extensively. To do well in this question, candidates had to have some grasp of what LDI is. Those that didn't did not do well. Also, the ability to weigh up key points is important here. I.e for instance asked for principal risks, so comments on obscure minor risks were not awarded.

i)

- The primary risk is that the Funding level falls or becomes eroded – thereby diminishing the Fund's ability to meet the liability obligations as they fall due.
 - This can occur due to the mismatch between the nature or duration of the assets and liabilities,
 - or due to longevity risk.
- This will occur if the growth in the value of the assets is not in line with the liabilities (as per the valuation basis).
 - Fund liabilities grow in line with inflation and are determined by discounting the liabilities at market-based medium term real bond net yields.
- Fund's assets are invested in a balanced portfolio– strategic asset allocation in line with Reg 28 guidelines.
 - Bulk of assets will likely be in SA equities and bonds with some cash for liquidity
- Strategy could allow for some risk given the funding position and
 - will also depend on the sponsor's ability and willingness to fund a potential shortfall or the extent to which other assets/contingency reserves are available
- There is also a risk of not meeting the Pensioners Reasonable expectations of increases
 - Which can either originate from low returns translating to low pension increases
 - Or from a funding shortfall brought about by a mismatched position
- Principle risks with investment strategy are therefore :
- Equity Market Risk – a fall in the market value of the assets relative to the value of the liabilities.
 - This risk is particularly high for the equity component of the assets. Given the volatility of equities this can be a significant risk for the Fund

- Interest Rate risk – the risk that a change in interest rates (bond yields) increases the liability, but that the assets do not respond to this change in a similar way.
 - This risk is somewhat mitigated by the allocation to bonds, but the equity and cash allocation could intensify this risk.
 - Even with a portfolio of bonds, a change in interest rates could still cause the liabilities to change to a greater degree than the assets if their duration or interest rate sensitivity is not similar
 - A change in interest rates at different points in the yield curve could also cause a portfolio of bonds to behave differently to the liability.
- Inflation risk- This is the risk that the assets do not keep up with inflation over the shorter (or longer) term which would inhibit the ability to afford full inflation pension increases going forward.
 - Equities are expected to perform in excess of inflation over the very long term, but market price variability can introduce this risk over the short to medium term.
 - Nominal bonds do not provide inflation protection – particularly in the case of unexpected higher inflation.

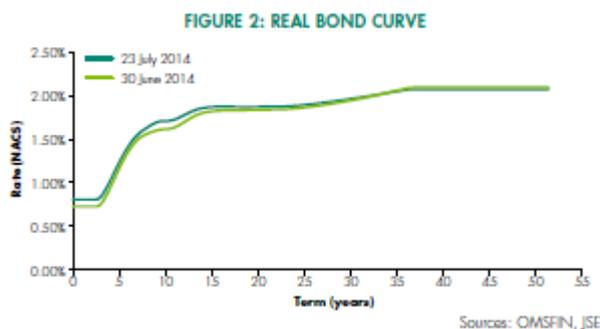
ii)

- The objective would be to match liability cashflows as and when they fall due
 - LDI approach seeks to ensure that assets are invested in such a way to match the liability profile
- This strategy would directly seek to reduce the exposure to interest rate and inflation risk
 - These are risks that are unrewarded, which means that the investor is not rewarded for taking on these risks with a commensurate return premium
- This strategy would reduce exposure to equity market risk, since it would in all likelihood reduce or eliminate the exposure to equities.
- Assets would be invested in a portfolio of inflation linked bonds to hedge against inflation risk
 - The portfolio would need to be constructed in such a way that the assets moved in line with the value of the liabilities as real yields moved and/or the yield curve changed shape.
 - This would best be achieved by structuring the portfolio of ILB's such that the duration matched the duration of the liabilities. This would protect against parallel changes in overall yields.
- Exposure to changes in the shape of the real yield curve is also an issue. Would therefore need to ensure that the portfolio protects against this

- This can be achieved by breaking down the portfolio of ILB's so that sufficient representation is achieved at various points along the yield curve – in line with the liabilities.
- This can be achieved by breaking the liability profile down into buckets and matching the value and duration of each bucket with a sub-portfolio of ILB's of the same duration as the bucket.

iii)

- ILB's were first introduced in 2000
- Issuance by Government via weekly auctions (around R 800m) has
 - grown significantly since then- across the curve allowing for a more fully developed real yield curve
- SA Government has 9 inflation linked bonds in issue – ranging in maturity from 3 to 37 years.
- Coupons and maturity linked to inflation - Inflation pick up has a three month lag
- Market was initially very illiquid, but is improving.
 - Still some illiquidity in “off the run” bonds and the very short or long dated bonds.
 - Long dated bonds mostly strategically held by PF and insurer and are irregularly traded - most liquidity therefore in the middle of the curve
- Some corporates issue ILB's as well, naturally with higher yield
- Real yield curve is published by JSE
 - Real yields are historically quite low – following global trend after establishment of stimulatory policies around the world.
 - The current SA real yield curve is upward sloping (see below). Real yields range from under 1% at the shorter end to just over 2% at the longer end of the curve



- Some difficulties in establishing LDI portfolio :
- Not that many bonds in issue – so may not be able to achieve sufficient “granulation” of the asset portfolio to protect across the whole yield curve.
 - Matching “buckets” may need to be very wide/big thereby removing the efficiency of the hedging
 - Will be looking for mostly medium and longer dated bonds to implement strategy described above
 - Depending on size of Fund liability, may take some time to accumulate the required bonds given the relative lack of liquidity
 - Illiquidity at shorter end of curve means may need to keep significant amount of assets in cash to meet short-dated liabilities.(Pensions due over first few years)
 - Longest dated bond is 37 years – while the longest dated liabilities can be expected to be far longer in duration. Do not have bonds of long enough duration to fully hedge the long dated liabilities.
 - Three month CPI lag may introduce timing differences with the increase in liabilities relative to assets
- Yields are historically low which means that this is a costly solution for the fund to implement
 - particularly if the statutory valuation discount rate is significantly higher than the real yields can get on the bonds
 - A sacrifice which may be unwarranted given the positive funding position of the fund which allows for some risk

iv)

- The trustees could apply a portion (representing the earlier dated liabilities or a slice of the liabilities) to the LDI solution and invest the rest (including the surplus) in growth assets such as equities.
- Expand the portfolio from government bonds to include Credit (inflation linked)
- In recent years, a market in non-Government ILBs has also developed, with a number of banks as well as state owned enterprises also issuing ILBs and therefore enhancing the market further.
 - These instruments carry credit risk for which the investor receives an additional return in excess of government real yields.
- Enter into repo agreements using the underlying ILB’s in order to earn additional return.
 - This approach will also introduce certain risks such as credit risk, mismatch risk

- Consider implementing a hedged strategy using inflation linked swaps rather than bonds – if pricing is more favourable.
 - Swaps are issued by major banks. The swap agreement may be fully or partially collateralized (introducing credit risk)
- Actively manage the portfolio.
 - The ILB market is quite actively traded for medium dated bonds.
 - Potential mispricings and opportunities may arise to take temporary positions away from the hedged position in order to earn additional returns.

v)

- The objective of the portfolio is to hedge against inflation and interest rate risk thereby ensuring the value of the assets performs in a consistent way with the underlying liability.
 - In this the measure of good performance would be indicated by how closely the assets track the value of the liabilities (so the tracking error between the asset portfolio and the liabilities as above should be as small as possible)
 - Excluding the effect of decrements
- The benchmark should therefore be related to the portion of the liability being hedged
 - And not against a traditional benchmark made up of indices
 - this would be the expected liability cashflows either increased for expected inflation and discounted at the risk free nominal yield curve
 - or (preferably) real expected cashflows discounted using the risk free real yield curve.
- A reasonable degree of tracking error could be expected and allowed for given the limitations described earlier :
 - Limited number of bonds
 - Liquidity in the market
 - CPI lag.
- Should the mandate include the use of alternative instruments (as described above) to enhance performance, this could be incorporated in the benchmark,
 - however this additional performance would typically be rewarded relative to the risk free real benchmark described above.
- The time-horizon over which the measurement is taken should long enough to negate the effect of short term fluctuations

- Given that ILB market is relatively illiquid, manager will take a while to populate portfolio with suitable instruments.
 - Time taken will depend on current composition of asset portfolios

vi)

Organisation and People

- Size of organization – staff and AUM
- Corporate ownership structure
- BEE credentials (for Reg 28)
- How long has the firm been in business, particularly doing LDI
- Number of clients and client concentration (LDI team and whole organization)
- Number of Clients lost/gained over 3 years
- Growth in AUM over last 3 years
- What other products are offered
- Size of LDI Investment team
- Sales support – separation of marketing and investment functions
- Do they have the relevant specialist expertise in the LDI space
 - Years in industry – relevant experience
 - Qualifications of key investment professionals
- Staff turnover – leaver/joiners in last 12 months
- Succession planning/retention strategy
- Remuneration policies (alignment with clients and risk management)

Process – investment process

- Robust investment process – must be clearly document and able to understand
- Decision making process – how are decisions reached –
 - consensus or individual – where does accountability for performance ultimately rest.
 - has it been consistently applied
- Process should be relevant across the market cycle
- Description of investment risk management processes and systems –
 - eg. Credit vetting

Governance and compliance

- What internal governance procedures and policies in place
- Who is compliance officer – who do they report to
- Management of Conflicts of interest eg Fair dealing, Chinese walls
- GIPS compliance – reporting standards

- Any event of fraud or misconduct in last 3 years?
- Confidentiality of client info?
- Are portfolios Regulation 28 compliance –
 - how do they check as far as is possible /relevant ?

Process - Operations and Admin

- Is investment administration in house or outsourced
 - if outsourced who is doing it, if in house how big is the department responsible
- Reporting standards – copies of reports to be provided. Frequency, detail of reporting
- Accessibility of information – eg holdings

Performance

- Track record of past performance for LDI portfolios/mandates
- Specifically LDI tracking error
- Important to consider risk adjusted performance numbers
- Important to investigate performance against an appropriate benchmark
- Through the economic cycle and against backdrop of economic or market events
- In this case the performance of existing portfolios must be examined with reference to the type of mandate awarded

Fees

- What are the fees and TER compared to industry standards for this type of mandate
- Fee basis – performance based or flat fee

QUESTION 2

A fairly straightforward question on economic/market history made up the bulk of this question. Candidates should ensure they use the mark allocation as a guide to the detail of their answers – answer planning is critical for questions like this. Many candidates focused too strongly on one minor aspect of economic history and did not score well. Part ii and iii were answered better.

i)

Background to strong equity returns:

- 2003 was bottom of the bear market that resulted from the bursting of the tech bubble of the late 1990's
- After trading at very high valuation multiples in the late 1990's, SA financial and certain industrial shares (IT shares) fell to low levels in 2003
- 2003 was a low base for share prices
 - Valuations were low: PE, DY...
- Consumer was relatively under-geared:
 - Debt: disposable income ratio was low
 - Over the next decade there was a boom in credit extension (both regular and unsecured credit)
 - Banks and microlenders lent out a lot (sometimes recklessly to consumers)
- Bad debt fell to very low levels from 2003-2007
 - and then blew out in 2008-2009
- Unsecured debt grew rapidly, to R170bn at the end of 2013
 - Despite the introduction of the National Credit Act
- The growth in credit found its way into retailer's tills which boosted margins and profits
-
- Retail shares (supermarkets, clothing retailers, furniture retailers) soared.
 - So did other consumer discretionary shares like brewers, cigarette manufacturers and cell phone network operators, food producers, luxury good manufacturers
- Increase in government grants also boosted consumer spending which benefitted retailers and consumer discretionary companies
 - As with the rise of the black middle class

- The rise of Chinese demand for commodities exploded. China landed up consuming more than half of the globe's iron ore exports, copper, nickel etc
- Commodity prices were low in 2003 and Chinese demand pushed prices much higher
- This boosted the profits of resource shares that had languished in the latter part of the 1990's
- Stable inflation and credible central bank policies throughout the period to control inflation created benign environment for business
- Interest rates were cut significantly following the 2008 crisis and remained low
- world cup led infrastructure building boosted construction and related industrial co profits
- Foreign buying: emerging markets became popular with investors once again following the Asian crisis of 1997
 - Low yields in developed countries following the 2008 financial crisis caused investors to seek higher returns in emerging markets
 - This demand boosted SA shares and many shares landed up being owned more than 50% by foreigners (think retailers)

Why might be dangerous to extrapolate into future

- Past performance is not a predictor of future performance
- SA shares look expensive
 - PE = 18x (only exceeded this level a few time in history)
 - History has shown that buying SA shares on high PE multiples results in lower return in future years
- Some commodity prices may be unsustainably high
 - Chinese demand may not last and new supply of commodities will depress prices
 - This will hurt commodity producers which make up a large part of the SA equity market
- Consumer is now distressed and over-indebted
 - Large number of citizens receiving government grants now in the base. Might be difficult for government to be able to grow these disbursements by more than inflation
 - Unsecured credit disbursement are sharply down (even before African Bank's failure)
 - Ability to spend is curtailed and the tailwind given to consumer spending is over
 - Retailers are struggling to grow revenue in real terms and margins are falling

- Banks may struggle to grow lending books. Credit growth has already slowed
- Interest rates are being raised by Reserve Bank
- This will increase bad debt which will harm banking profit and share price performance
- Rand recent weakening will bring inflation which will necessitate rate hikes, further hurting consumer
- Other constraints to growth
 - inflexible labour becoming less productive and a divisive labour / business relationship
 - lack of electricity supply to grow production
 - fast rising govt wage bill might crowd out investment spend
 - this, amongst other things, has led to a tight fiscus, increasing govt debt
 - and might lead to higher tax, which means less for consumer to spend
- Quantitative easing in US is being cut back which may result in less money searching for high return assets (as some SA shares and bonds are perceived). This may cause capital outflows and depress share prices
- Many SA companies generate a significant proportion of their revenue and profit outside of SA. A weak outlook for the wider global economy would be negative for these companies

ii)

- What asset classes are available to him
 - Mandate of the fund – any specific restrictions
 - Regulatory issues – reg 28 only allows 10% in hedge funds and 2.5% in derivatives
 - And Regulation 28 also disallows any leverage through derivatives i.e. the application of the derivative strategy should not expose the fund to potentially losing more than what it could in the absence of the strategy
- Appetite for risk of the fund
 - How overweight is he in SA equities
 - Is he hedging against a drop in SA equity prices relative to international equity prices, or in absolute terms?
 - Such a strategy may negate the reasons for being overweight in SA equities in the first place.
 - Is there any allocation in the benchmark to hedging assets
 - What has been communicated to investors about the managers approach to managing volatility and downside risk
 - What level of counter party risk is acceptable?

- Considerations of the structure
 - Cross hedging risk should be minimized – which is the risk that the underlying assets of the instruments used do not match the funds' assets
- Cashflow requirements of initial and ongoing margin requirements
- Cost of the hedging strategy relative to the benefits
 - Ultimately there is no way to simultaneously retain upside and hedge downside without a cost
- Internal capacity
 - Internal expertise on managing alternative assets
 - What systems are in place

iii)

[Name and description of each option gains 1 mark each. Advantages and disadvantages up to 2 mark for each option. Marks will only be awarded for 2 structures. Reasonable structures (other than those mentioned here) that are well supported will be accepted]

- Zero cost collar
 - Buy put at strike price lower than spot
 - Fund this put by writing a call at a strike price higher than spot
 - Advantages: very low or zero cost but
 - Drawback: lose some upside
 - Depending on how much downside protection is desired one can adjust the floor level but this will have the effect on the upside cap as well (assuming the cost of the collar is kept to a minimum). There is a tradeoff
 - As Tom is very bullish on equities he can set floor (strike price of the put bought) far below spot which will allow the cap (strike price of call written) to be to be set far above spot, allowing upside gains in equity movements
 - Also basis risk as Tom's fund and the index on which option based will be different as Tom's fund is actively managed
- Option 2: simply buy put options
 - This protects downside

and leaves upside completely unhindered (barring the cost of the option)

 - But this cost is likely to be expensive which is not what Tom desires
- Option 3: put spread strategy
 - buy a put at the current spot and sell one with a lower strike

- gives protection for a fall within the range between the higher and lower strikes.
- This will be less costly than an outright put but limit the downside exposure / but retain full upside less premium.

General points:

- Any premium paid in a strategy requires upfront liquidity and would expose the fund to credit risk if purchased from a bank or to the exchange if transacted as such
- Considerations should be given to margining should a position move out of the money e.g. on the zero cost collar if the market moves above the call strike then the fund may need to post margin which must be funded
- Considerations should be given to the term of the options which should correspond to the close out of the index every 3 months as this provides the most liquid opportunity to transact.

QUESTION 3

i)

*This question required candidates to use the information supplied to answer the question.
This question is non standard and candidates who applied their minds did well.*

a)

- ABC fund has a high active share (85%)
- This is because 85% is towards to the top end of the Active share scale of 0 to 1
 - Considering that an overlap of 1 would mean zero overlap with the benchmark
- The weight of each share in the fund will be different to the weight of that share in the benchmark.
 - Meaning ABC Fund has a low overlap with its benchmark

b)

- The active share is falling with time

- This means that ABC is becoming less and less active over time
- And is looking more and more similar to its benchmark

Size of fund

- ABC might be growing into a very large fund with a high AUM
- The question mentions that the fund has been “successful” which usually implies strong inflows from investors
- This might mean that it could be becoming increasingly difficult to differentiate ABC Fund from the benchmark as
- Large caps make up an increasingly larger proportion of the benchmark than small caps
 - When a fund is small, it can invest in small caps and avoid large cap stocks
 - Under such a scenario, the overlap with the benchmark is low and active share is high
 - When a fund gets very big, it is more difficult to only invest in small caps stocks and as more of the fund is invested in large caps, the overlap with the benchmark will increase, generating a lower active share.
 - Investment in small caps presents an increasing challenge as fund size increases due to issues of liquidity
 - Most stocks in the S&P 500 are very liquid so this would not be an issue except if the fund was truly gargantuan

Active decision by manager

- The change could be as a result of an active portfolio management decision, independent of the size of the fund
- For example, large cap stocks may be more attractive on valuation basis and hence the fund is investing in these stocks which make up a larger part of the benchmark
- Similarly the fund may have been extremely overweight a particular sector in the past (due to attractive valuations) but the manager may now be rebalancing the fund more evenly relative to the benchmark
- There could be a change in ABC’s investment policy/mandate eg new policy requires closer tracking of the benchmark to minimise the risk of underperforming other funds
- A new manager/co-manager could have taken over managing the fund and he/she now has a different style

ii)

- I would expect XYZ Fund to have a high Active Share in absolute terms
- This is because the fund is “contrarian” and value oriented
- A contrarian fund is by definition unlikely to reflect the benchmark closely

- However R100bn is a very large size for an SA equity unit trust fund
- Importantly... the ALSI is far more concentrated than the S&P500
 - S&P500 contains 500 shares vs 168 for the ALSI
 - And top 10 shares of ALSI comprise more than 50% of the ALSI whereas top 10 shares of S&P comprise less than 20% of the S&P500
- Hence, all things equal, a fund benchmarked to the ALSI will have a lower Active Share (and seem more passive) than a fund benchmarked to the S&P
 - Eg if XYZ invests only in 3 of the top 10 ALSI shares, its Active Share is likely to be below 80%
- For these two reasons (large size and high benchmark concentration), XYZ's active share might be lower than ABC's
- This could be the case even if XYZ is a more concentrated (and therefore more active) fund than ABC

QUESTION 4

i)

Candidates who were equipped with knowledge of the tax regime did well in this question.

The bulk of candidates, however, demonstrated poor knowledge of this key aspect of the syllabus.

a) Charities

- Recognised charities are exempted from income and capital gains tax
 - But only for recognised public benefit activities and not commercial activities
 - Investments are usually regarded as non-commercial (in supporting the objectives of the PBO) unless deemed by SARS to be in an active manner such as the advancing of interest bearing loans at market related rates
- Income taxes deducted at source can be claimed back from SARS
 - withholding tax on foreign investments cannot be recovered

- other than in situations where South Africa has a treaty with the foreign country in question

b) Pension Funds

- Pension funds are exempt from tax on interest, rentals and capital gains as well as dividends earned within the fund
- Similar considerations to Charities exist for foreign withholding tax.

c) Life Assurance Companies

- Life Assurance Companies operate on the so-called “four fund” tax approach, with different classes of business allocated to each fund
 - Each fund is taxed at a different rate and has different allowed expenses
 - Untaxed Policy Fund which is not taxed

and is for annuities, charities and non-taxable institutions

- Individual Policy Fund which is taxed at a rate of 30%

With CGT at a rate of 7.5%

- Company Policy Fund which is taxed at the corporate rate of 28%

With CGT at 14%

- Corporate Fund which is for internal shareholders funds and taxed similarly to Company Policy Fund.

d) Unit trusts

- Authorised unit trusts do not pay company tax or CGT
- Income is reported in the hands of the unit holders on a look-through basis
 - Interest components and CGT are reported separately by the provider for inclusion in the individuals tax return.
 - CGT only paid on disposal of units and not on individual trades within the account

ii)

General considerations

- High net worth individuals will have income taxed at the highest marginal tax rate (currently 40%)

- There is an exemption for interest income of R22 300 but this will more than likely be exhausted or negligible for this market
- Dividend withholding tax deducted by the “agent” at 15% before being paid to the individual
- They also pay CGT, with an inclusion rate of 33%
 - With an exclusion of R 30 000 exemption
 - Along with an allowable deduction of accumulated capital losses from previous years
 - Though given the market, it is likely that this exemption will be exhausted by other investments (and is negligible in any case)

a)

- Unit trusts are taxed in individuals’ hands
- Which means that any interest income and capital gains will be taxed at the marginal rate of 40%
 - Which means an effective tax rate on capital gains of 13% (given the 33% inclusion rate)
- Which provides no tax relief to these individuals
 - To the extent that the individual still has any exemptions (interest or CGT) available, a relatively small deduction will be available to the individuals
 - Though it does defer CGT to disposal of units

b)

- A private company will be taxed at a rate of 28% internally
 - Dividends earned by the company are tax exempt
 - Interest earned by the company would be taxed at 28%
 - And capital gains earned by the company will be included at 66%

Which means an effective tax rate of $66\% \times 28\% = 18.65\%$ for Capital Gains

- However, the value would be distributed in two ways, either by dividends or capital gains in the value of the company
 - Dividends attract a dividend tax at a rate of 15%
 - Capital gains of the share price will be included at a rate of 33% in the hands of the investors, resulting in an effective tax rate of 13% given the customer profile

- Which means that if all returns are paid out as dividends by the company and it is valued at NAV
 - the effective tax rate on interest earned off investments would be $1 - (1 - 28\%)(1 - 15\%) = 39\%$,
 - the effective rate on dividends earned off investments would be tax neutral (as dividends tax would be paid once)
 - the effective rate on capital gains would be $1 - (1 - 18.65\%)(1 - 13.3\%) = 29.5\%$
- Given that both the effective income tax and capital gains tax are higher than the individuals' tax rate, this is decidedly tax inefficient.

c)

- A life assurance policy owned by clients would form part of the Individual Policy fund,
 - Interest earned would be taxed at a rate of 30% which is lower than the marginal income rate
 - Dividends tax would be applicable at 15% of dividends.
 - Capital gains tax is levied at 7.5% which is lower than the effective personal rate
- Though individuals would not enjoy the interest and CGT exemptions available, these would be negligible
- This would therefore represent the most tax efficient tax structure of the three.