

Actuarial Society of South Africa

EXAMINATION

November 2015

Subject F205 — Investment

Specialist Applications

EXAMINER'S REPORT

This paper provided well prepared candidates the opportunity to demonstrate their knowledge as well as their ability to apply that knowledge to practical situations. As with previous sessions, there were a number of candidates who are clearly underprepared for this exam. This showed in both book work and synthesis type questions.

QUESTION 1

This question dealt with the matter of the advice process for a living annuity – a subject that is highly topical. It called on candidates to apply a broad base of knowledge to a practical situation. Candidates who read the question, and who provided points relevant to the question based on their knowledge did well.

There was, however, a worrying lack of understanding of a few basic concepts. Generally the relationship between a sustainable drawdown rate with the expected real return of a portfolio was not well understood. Many candidates made the error of focusing on the expected nominal returns of the portfolio. Also, the risk inherent in a living annuity was generally not well expounded, with many candidates proposing a draw down rate that would result in a zero investment pot after 25 years.

Candidates who are preparing for future exams should note that it is critical that they have a clear command of the bookwork. However, they should also make sure that they answer the question at hand and not simply regurgitate information. Points relevant to the question will earn marks. This was particularly evident in part i of this question.

i)

Defining the reasonable drawdown

- A reasonable drawdown rate would need to be sustainable in real terms for the life of the pensioner
- The rate would allow the pot to grow by inflation
- ... less a mortality credit allowed should the bequest motive not be relevant
- This means that real returns in excess of 4% would be required to sustain the pot – though the mortality credit would offset this
 - This would importantly be net of costs and tax

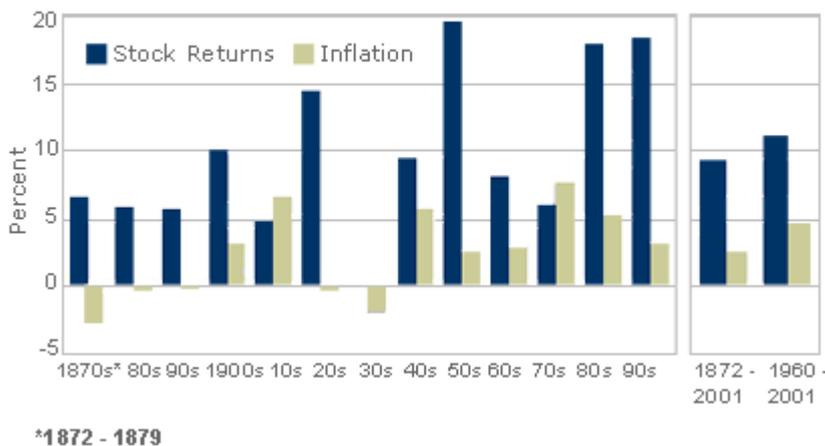
History of returns

- After an equity boom in 50's, the 60s and 70s were quite tough for equity investors in US
- Especially the 70's where equities and bonds hardly beat inflation
- but what followed was a bull market from 80's to '00s producing high teens returns
- SA and global equity returns – SA experienced similar returns especially from mid 90's

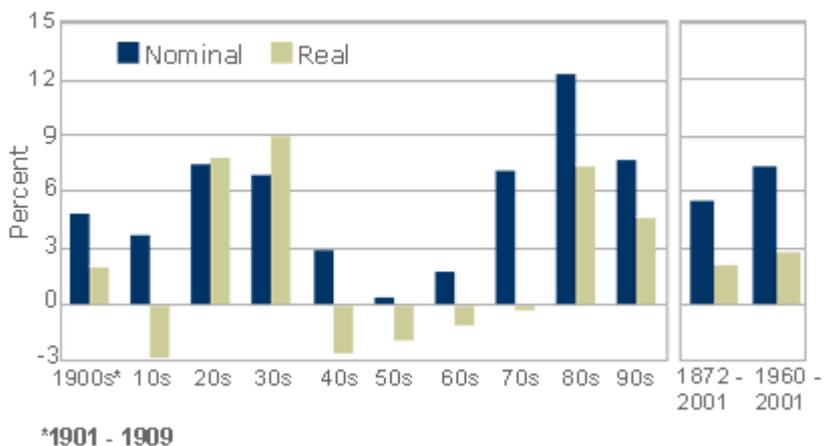
- as increasing globalisation and economic reform and Emerging Market economies grew
- Similarly in the US, bond returns in the 80's and 90s through 2000's were quite high
 - given accommodative monetary policy and a narrowing of credit spreads
- At the same time inflation in the US ranged between 2 and 7 %
 - So real yields were well in excess of 5% for such a portfolio over most of the periods - even for FI component alone
- For a portfolio earning returns in excess of 5% real, even given some volatility, it is clear that a 4% drawdown, increasing with inflation will be safe.
- The periods which failed are likely to relate to the 1960's starts
 - and even 70's portfolios where poor returns at the start of the drawdown period eroded the portfolio beyond which it could not be recovered later.

For context:

Stock Returns and Inflation by Decade



Nominal and Real Bond Growth by Decade



ii)

Model considerations

- Model is backward looking and is based on historic returns - Past returns are not a reliable indicator of future return expectations
 - Particularly given the low risk free rates globally
 - ...and the muted outlook for returns over the next period
 - Risk premia are not constant; they have fluctuated widely in the past so using a point estimate derived from past data is unwise
- Rule does not take into account level of markets at retirement –
 - if equity markets are at very high price levels (high PE) then investors should be more cautious and perhaps apply lower drawdown rates
 - if equity markets are very low a higher withdrawal rate could be sustainable.
- There is also a risk of drawing down too little and struggling during retirement only to leave a huge pot at the end.
- This also introduces what is known as sequence risk – if pensioner draws from portfolio following a significant downward correction in the early years this can have a huge impact on the value of the pot and sustainability of the drawdown rate later on
- Also the implicit mortality credit that takes into account the fact that not all capital needs to be preserved at death
- Model does not take into account impact of fees – is based on index returns
 - Cannot even earn these returns passively without some expenses

Investment strategy and starting “Funding level”

- Model does not take into account the actual Investment strategy – or propose an appropriate investment strategy.
- Does not consider other asset classes – eg ILB’s
 - For example a strategy focused more toward cash or fixed income may require a lower drawdown rate
- Alternatively a higher equity strategy may imply higher returns and a higher drawdown rate – but this will to a large extent be countered by sequence risk and volatility (above)

- The drawdown amount is fixed (aside from CPI) after retirement and does not take into account actual experience or allow to change with performance
- With a potentially significant amount allocated to equities, some volatility should be expected. Should this volatility be reflected in income levels?

Characteristics of investor

- Model does not take into account current age of improvements in Longevity – was based on a fixed 30 year period which is likely to be too short – since people may be retiring earlier and /or living longer
- The model does not take into account other sources of income – e.g. social security payments
- Pensioner vs general inflation may be quite different. Over time increasing income with CPI may leave the pensioner worse off in real terms
- Does not take into account the profile of Spending needs in retirement
- In real terms expenditure usually quite high at the start of retirement, then tapering off slightly
 - to become very high at closer to death as the pensioner may incur large medical and care expenses
- If the “funding level” relative to the retiree’s expectations of post retirement income of the LA at retirement. If under-funded, shouldn’t drawdown be deferred as much as possible?

iii)

General Considerations

- The drawdown and investment strategy should be decided in tandem, perhaps in an iterative process using some kind of stochastic model
- As balance between tolerance for volatility vs increased returns is tested at various levels of drawdown
- Regulation 28 and tax regulation for investment strategy and drawdown rate would need to be considered – though this will asset allocation not be in danger of breaching that
- Will the portfolio be rebalanced periodically and will tactical asset allocation be used going forward?

Cash

The current cash allocation covers the drawdown of even 4% for over 2 years.

- This could be reduced in favour of higher yielding, but still liquid, assets

Real Assets

- He is 65 and could potentially live as long as 40 years
 - a higher allocation to real assets may be appropriate – up to 65%
 - Which is higher than MrX's proposed 60%
 - Though 20% of that is inflation linked bonds – which have very low yields
 - So could consider increasing the equity portion at the expense of bonds (ILB and fixed)
- The Client's risk tolerance would affect this decision
 - Which will depend on the relative size of the investment value to his expected required budget
 - And whether his spouse also has retirement account
 - And other sources of income
 - If this is the only provision for the couple, then there is more than likely not a lot of room for downside
 - Which could explain the lower allocation to risky assets.
- If there is a factor that reduces this timeframe significantly – such as a significant health problem – then he could consider moving to less volatile assets
 - But this depends on his spouse's situation – whether she will be required to live off the assets post the clients' death
- This would introduce further volatility increasing the potential impact of sequence risk
 - Equity markets current pricing fair to high
 - PE of 17 vs long term average of 14. Initial drawdown rate could take some cognizance of this.

Alternative classes

- May consider allocating to offshore assets
 - as a diversifier and rand hedge for inflation protection
 - Although this is quite expensive in terms of fees
- May also consider alternative asset classes with the appropriate risk profile – hedge funds which focus on beta diversification

iv)

Affordability and prudence

- The overriding consideration will be what level of drawdown could the investment fund sustain after costs
- Currently in a lower return environment than historically.
 - Given a significant portion of the assets will be invested in fixed income, and we are in a global low interest rate environment, this will serve to reduce overall returns compared to historically
 - Even though there are signs of entering a rate hiking cycle both locally and in certain economies abroad (US) this is expected to be a long slow process and SA is unlikely to see the kind of risk free rates enjoyed in the previous decade or 2.
 - Current equity market is expensive, taken on a PE basis
 - Protracted low commodity prices will likely place a dampener on South Africa's commodity driven economy and commodity companies make up a significant component of our equity market.
- Expected real yields on these asset classes are :
 - Equities – 4-5%
 - ILB and Bonds – 1-2%
 - Cash – 0 to negative
 - Property – 2-4%
- The expected returns do not allow for alpha but are also before fees – which would reduce them further
- This cannot be expected to provide a real return of 4% in aggregate – which is the minimum required to support the drawdown rate
- Given current market levels and the potential term of the drawdown period a lower drawdown rate of 2.5% - 3% or less may be appropriate

v)

- Absolute performance measurement figures
 - both for the whole fund and for individual asset categories within each fund
 - to ensure that the return assumptions are being met; and that the asset allocation strategy is still valid
- Return relative to the respective benchmarks – after costs

- to ensure that active management is adding value
- Return relative to assumptions in the planning process – after costs
 - to ensure that assumptions are valid in current market conditions
- Tracking error against the benchmark, and reasons for divergence
 - to ensure that mandates have been appropriately set and that managers are complying with mandated parameters.
- Efficiency analysis – risk adjusted return, including
 - to ensure that only rewarded risks are being taken.
 - (e.g. Jensen measure, Sharpe ratio, Sortino ratio),

vi)

- The existing model relies a single simulation of a single portfolio over 30 year periods using assumptions based on historical data.

Stochastic models

- A stochastic model is a tool for estimating probability distributions of potential outcomes taking into account both assets and liabilities by allowing for random variation in one or more inputs over time.
- This would reflect the variation inherent in the key assumption that would influence the allocation and drawdown decisions, namely investment returns
- Run thousands of times - the model uses random variations to determine possible outcomes under different investment conditions.
- The results of these 1000's of simulation are then summarised to provide a profile of the distribution of results
- For example “a strategy could be expected to deliver an average expected real return of 3% over a 40 year period with 90% probability” or “An initial drawdown rate of 3% is expected to deliver a positive portfolio value after 40 years in 95% of the simulations”

Assumptions required

- Assumptions for level and variability of expected returns, as well as correlations between asset classes need to be determined
- Other economic variables such as expected inflation and exchange rate would also need to be assumed
- These could be determined using historical returns and forward looking assumptions
- The model could incorporate past returns as a starting point but also apply reasonable forecasts for expected returns and model the related uncertainty appropriately

- The model should take into account variability of assets classes and model or test for the impact of extreme/outlier events as well
- The model should also take into account the level of expenditure each year

Model features

- should be able to be run over various measurement periods
- should take additional asset classes and allow for or model different investment strategies
- And allow for tax and investment expenses and perhaps alpha

The model could therefore be used in two ways

- To determine an appropriate withdrawal rate given a particular strategy and risk appetite for a client – the parameters could be changed to model different drawdown rates
- Or given a required income and level of risk appetite, to model or suggest a range of appropriate investment portfolio
- The model could be expanded to allow for variable drawdown amounts/rates
 - as well as different strategies through retirement such as deferred annuitisation and timing thereof

vii)

- The model still - although more robust - relies on assumptions and forecasts based on historic returns - which may not be accurate
- The client should made aware of the risks inherent in any investment
 - Particularly the volatility of equity prices
 - And the potential for extreme “black swan” type events causing capital loss such as 2008/2009
 - But also potential price volatility of the bond holding
 - And to a lesser extent, the credit risk of bond and cash funds
- It relies on information provided by the client to be correct
- The estimation of expenses is also highly susceptible to error; large, unexpected calls on finances are, by definition, unpredictable.
- The results of the model should not be applied as a once off at retirement but should regularly be revisited to allow for changes in assumptions, and circumstances

viii)

- Hedge funds can have a low correlation to other asset classes depending on the strategy
- And hence can increase the return on a portfolio for a given level of risk
 - Particularly over longer timeframes
- Though there may be an inherent risk of capital loss
- The term “hedge funds” covers a very wide variety of investment strategies with hugely differing return signatures;
- ...so the suitability of each strategy needs to be assessed individually
- There is limited data (especially locally) on returns over long periods and do modelling the impact of inclusion of hedge funds
- ... making assumptions about returns, correlations etc. even riskier than when long data series are available.
- Minimum investment in these vehicles is typically high
- And the South African environment is largely unregulated
 - And opaque from a risk perspective
 - And therefore should be treated with caution and the appropriate level of due diligence
 - The regulation is improving with revised Reg 28 guideline which limits certain activities by hedge funds on retirement fund space
 - Limited to 10% exposure for an SA retiree – Reg 28
- They may not, however, match the liquidity needs of pensioners looking to drawdown parts of their book
- ... and the investor must have a strategy to reduce exposure in synch with regular drawdowns or risk having the illiquid funds dominate the remaining fund.
 - So should be held as longer term assets when considering matching

QUESTION 2

Question 2 called on candidates to demonstrate an ability to analyse the implications of a credit downgrade and demonstrate an ability to synthesize a lot of information into a relevant answer. This is a key skill for an actuary to master. Planning of answers was crucial for candidates to do well, particularly in part iv. Exam technique let many down here, as the scatter gun approach led to repetition of the same point. Well structured answers generally did better.

i)

Issued by:

- Public corporations (e.g. Eskom, Transnet, Telkom, TCTA (Trans Caledonian Tunnel Authority, representing the Lesotho Highlands water project), Rand Water Board)
- Government enterprises (e.g. National Road Fund)
- Local authorities (e.g. municipalities (are these included in the definition?), regional services councils, regional water supply corporations, local water boards)
- Sundry public-sector borrowers (e.g. Land Bank, Development Bank, financial public enterprises, universities)

Risk

- Government agency which means that the risk of default is comparable to that of government bonds
 - To the extent the government has given an explicit or implicit guarantee
 - Though explicit guarantees are often absent
 - but there may be a reasonable expectation gvt will step in – though that assumption will only be tested when it is too late
 - ... at times this leads to massive uncertainty about whether an issue is actually gilt-edged and backed by government, or “junk”
 - And the agency is ultimately responsible for repayment, which means in the first instance default risk needs to be assessed on its own merits
- Liquidity will also be less than for government bonds, particularly at specific maturities.
- The market would then expect a premium for these risks in excess of risk free rate

Issuance

- The securities issued include fixed rate bonds (sometimes with similar features to government bonds),
 - commercial paper,
 - promissory notes,
 - occasionally inflation linked bonds
 - call bonds and,
 - in the case of public corporations, foreign bonds.
- They are usually issued directly through taps
- Or indirectly via syndicated private placements or dealer panels

ii)

- Although different methods have been used in the past, the primary method used now for public offerings of conventional gilts is the auction.
- Bids are ordered by competitiveness of yield
- and an auction clearing yield is set such that all bids up to and including bids at the clearing yield total an amount equal to or greater than the amount on offer.
- In a conventional (English) auction, bonds are allotted to these successful bidders at their bid yield.
- In a Dutch auction, Bonds are allotted to these successful bidders at the clearing yield.
- In either case, if necessary bids at the clearing yield are prorated down to match the bonds allotted to the auction size.
- In a conventional auction, all successful bids other than those at the clearing yield suffer from the so-called "winner's curse" in that they are allotted bonds at a yield below the bids at the clearing yield. The most competitive bidders regret not having bid at the clearing yield.
- Because the average yield at which bonds are allotted is below the clearing yield, it
 - could be argued that conventional auctions result in the cheaper funding for the issuer than a Dutch auction.
 - However there is evidence that bids are more aggressive in a Dutch auction because there is no winner's curse. Some investors, content to purchase bonds at the auction-clearing yield, may bid for (limited amounts of) bonds at very low levels knowing they will certainly be allotted bonds.

- The US Treasury switched to the Dutch auction system some years ago after a study showed that it resulted in more aggressive bidding and consequently cheaper funding.
- Some issuers also distribute their bonds at auctions via appointed primary dealers
 - while others use a book building methodology whereby they actively go out and seek buyers.
- Primary dealers that have submitted successful bids at an auction may take up the equivalent of 10% of their bids up to 24 hours after the auction has closed.
 - These bonds are sold at the average yield of the auction.
 - This is in effect a 24-hour bond option, commonly termed the ‘non comp’ in the market.

iii)

- The implications will be directly linked to the size of the holding in relation to the rest of the fund – though is described as significant
- Ultimately the Moody’s assessment is the view of one agency,
 - Which may or may not be correct
 - However, it is an informed view that market players regard as a source of information
- BUT Baa3 is the lowest investment grade (prime) rating
 - Anything lower would be considered to have substantial credit risk and “speculative elements”

Value of bonds

- The value of the bonds would certainly decrease as the extra risk premium is worked into the yield
- Which would have a negative impact on the fund’s next valuation

Policy Statement

- What is outlined in the investment policy in terms of acceptable ratings for bonds?
- Is there appetite for the trustees to amend the investment policy if they believe that they can accept the risk?

Legislative

- Regulation 28 is silent on bond ratings
 - But does direct the board to consider the risk profile of individual assets and the fund as a whole
 - And directs Trustees not to rely solely on credit ratings to assess the risks

Increase in risk

- To the extent that the trustees agree with Moody's on their assessment, there is an increased default risk that caused the downgrade in the first place
- Do the trustees have the risk appetite for this extra risk
 - Which may depend on funding level
 - And how other factors have affected it in the same period

Disposal

- Should the fund decide that it would now need to dispose of or reduce the holding , there are a number of issues that would present
 - It would have to review its matching strategy and ensure availability of alternatives at the relevant terms
 - Particularly if it wants to move into bonds other than government bonds – with some kind of yield pickup
 - But are similar issues hitting other parastatal debt?
 - In disposing of them, finding buyers may be a challenge at large volume
 - Which would mute prices
 - Particularly given that there may be similar institutions looking to offload these assets
 - And phasing out should be considered

iv)

- The risk of a further downgrade would be assessed by understanding Moody's view on the current risk of default,
 - Focus specifically on the tolling and debt issuance issues
 - What other specific triggers do they mention
 - as well as your own objective assessment of default risk

Governance and Management

- Is the board competent to navigate the company through this critical time
 - Relevant expertise and experience
 - Is there sufficient support from Government as the sole shareholder
 - . . . and the political will to face down the e-tolling revolt
 - Especially given the fact that the roads agency is likely to be viewed as a critical strategic asset
- Has the company got good quality management in place
 - Particularly its financial management competency

Balance sheet strength

- More than likely a thin layer of current assets, and predominantly funded by debt.
- The duration profile of the debt would be key
 - As well as the ability to roll it forward by issuing new debt
 - Particularly given the fact that SANRAL needs to increase debt issuance
 - Should a large new financing round be required, the yield will more than likely be higher than previous
 - Which could put the agency into the downward spiral of more expensive debt meaning greater financial pressure which only exacerbates the situation
 - And given the potential for downgrade, appetite for SANRAL debt may be waning in the market place
 - Leaving the potential for further debt auctions to not be fully subscribed

Revenue considerations

- What are the terms of the government grant
 - Is this contractual/legislated to increase, or a specific allocation out of the annual budget
 - When does this get paid – as timing is likely to be a factor
 - Is it in any way related to performance in carrying out SANRAL mandate
 - Is there provision for any extraordinary grants to be paid
- What are the expectations for tolling over the coming years
 - What proportion of tolling revenue makes it to SANRAL – as opposed to concessionaires

- The GFIP is key given the fact that it makes up such a large proportion of debt and revenue.
 - Is it expected to pick up to expected levels?
 - How might the already-bad public sentiment towards e-tolls change for better or worse?
 - Are the systems in place to be able to enforce collection and take on debtors – evidence to date suggest not despite threatening noises from SANRAL
 - And the political will to back such a heavy handed approach
- What are the expectations for other tolling initiatives?
 - Given that they are likely more mature and stable, growth would be muted
 - But more certain

Cost structure

- What are current and future maintenance cost obligations of the road network
 - Presumably the maintenance cost of non-tolled roads would be the full responsibility of SANRAL
 - Is the government grant sufficient for those purposes
 - What is the state of the road network, and could this lead to increased requirements for maintenance
 - What proportion of maintenance costs of tolled roads would be SANRAL's responsibility vs the concessionaires
- What are the requirements for capital expenditure on the roads network
 - On tolled roads, is it linked to traffic volume and hence matched to a degree by increased revenue

Guarantees

- What are the circumstances that would trigger the guarantee?
- Cognisance will have to be given to the ability of government to stand in for its guarantee
 - South Africa is running a not insignificant fiscal deficit and has 38% debt to GDP ratio
- Having said that... SANRAL will be viewed as an absolutely critical agency to the future economic wellbeing of South Africa

- And SANRAL debt is a very small proportion of the total National Debt (Even though large)
- Though the guarantee is already given and the govt would have many options before default: re-allocation expenditure, raise taxes, issue bonds.
- Obviously Moody's have made assumptions that have led to their rating; a key one would have been the likelihood of Government guarantees/assistance beyond the contractual ones. It is difficult to substantiate a different view on such qualitative issue and yet the guarantee/no guarantee scenarios lead to massively disparate outcomes.