

Actuarial Society of South Africa

EXAMINATION

1 November 2011 (am)

Subject F205 – Investment Specialist Applications

EXAMINERS' REPORT

The standard of scripts was better overall than in the recent past in that most candidates were able to make a credible attempt at all the questions. However, there was still plenty of evidence of the common shortcoming of failing to tackle all, or even most, of the facets of a question. In addition some candidates put themselves at a disadvantage by failing pay close attention to the questions asked and consequently producing answers that were irrelevant or poorly focused.

Question 1

a)

Pure bookwork – but very disappointingly answered.

The law stipulates various Fit & Proper requirements:

- Sound financial security (may not be un-rehabilitated insolvent)
- Honesty and integrity
- Operational ability
 - o fixed business address, adequate communications ability, adequate storage
- Competence as evidenced by experience and qualifications

b)

A very straightforward, if unusual, question that was well answered by most candidates. Some, however, failed to capitalise on the easy marks available.

INCOME / ASSETS

Need to know all sources of income

- o and understand how secure they are
- o whether and when they will grow, shrink or cease

- Current income from employment.
- Security of employment. Is she self employed?
- Other sources of income
 - o Maintenance payments? How long will this last? How much?
 - o If her husband passed away, did she receive a lump sum benefit or spouse's pension?

 - o Investment income: split of dividends, interest, rental etc.
 - o Other future sources: inheritance, trust funds, State grants
- What are her current assets/savings?
 - o Property ownership, mortgages
 - o Does she contribute to a company pension plan or other retirement vehicles?

 - o Current asset allocation and investment vehicles used
 - o Term and expected returns for these investments

- Any other protection products
 - o Medical aid, life insurance, disability cover, short term insurance

EXPENDITURE

Need to analyse current spending...

... and project future spending

Differentiating between what is discretionary/non-discretionary

This would include

- Current expenditure broken down into detail
- Current debt levels? House, car, credit card
- Cost of education,
 - o Current and projected costs, inflation impact
 - o Does she envisage study abroad; does she want to include residential accommodation?

PERSONAL CIRCUMSTANCES, LIFESTYLE, GOALS & ATTITUDES

- At what age does she want to retire? Can she work for longer if needed?
- What level of income is needed in retirement? What is “an adequate standard of living”? What replacement ratio is she targeting? Can she downscale?
- Any once offs planned eg house renovation
- Time horizon: education is medium term 3-8 years (tertiary will make this even longer), retirement is longer term 25+ years
- Attitude and willingness to take investment risk
 - o Possibly need to probe this as investors (especially inexperienced ones) often have naïve notions about their own risk appetite
- Special circumstances such as health issues, other dependents etc.
- Current tax situation, average tax rate

c)

More easy bookwork marks that most candidates were able to do well on. A few candidates demonstrated very little knowledge of the local savings industry and squandered this opportunity to bank easy marks.

- Approved pension/provident/preservation fund
 - o Contributions below the limit are granted tax relief at the investor’s marginal rate
 - o There is no tax on investment income.
 - o There is no tax on capital gains within the fund (yet).
 - o Part of the retirement benefit may be taken as a tax-free lump sum.
 - o Life assurance can be provided from contributions to the fund.
 - o Pensions paid from the fund are taxed as earned income but assets attributable to pensioners are not subject to tax in the fund

- Retirement Annuity for retirement savings
 - o Contributions tax deductible up to certain limits of taxable income
 - o No income or capital gains are taxed
- Life insurance savings policy
 - o Such as endowment policies for children’s education,
 - o Can’t touch for 5 years but tax free payout
 - o Income taxed at IPF rate on (I-E) so often <20%. Beneficial if this is less than her marginal rate
 - o Similarly for CGT
- Preference for capital gain rather than income – only taxed at 25% of the gain
- So avoid interest generating vehicles like money market funds. Rather equity type.
- For liquid assets use the alternative type of CIS that invests in prefs. etc rather than interest
- Dividend income is not taxable so investment in equity type savings vehicles will be more tax efficient in general
- Collective investment schemes are not taxed on trading and hence defer CGT for the unit holder until units are sold
- A modest amount can be invested at favourable rates in Fundisa, the state assisted education savings scheme

d) i. & ii.

This part required application of knowledge and general awareness of the pitfalls that accompany many of the unregulated schemes offered to private investors. Key to a good answer, which surprisingly few candidates accomplished, was recognising that the offered rate is implausibly high unless it is associated with very high levels of risk which calls into question the value of the “guarantee”. Many candidates made the unwarranted assumption that the scheme mentioned in the question is also the property developer and wasted time discussing at length the risks that pertain to property development.

- Currently the risk free rate is about 6% per annum.
- Any return in excess of this can only be earned at the cost of taking risk
- In general the higher the return the higher the perceived risk being accepted
- High risk does not mean every investment will fail; only that the probability is higher
- Readily available high-income investment opportunities like bonds and property stocks currently yield much less than 12%
- The fact of some investors already having earned high returns is no indication that this will continue
 - o Past performance is not necessarily in indication of future performance
 - o The track record may be fraudulent.

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- Many of these are pyramid - or so-called Ponzi - schemes where new investors’ money is used to pay the returns promised to existing investors
- Naturally this is unsustainable for any length of time and will result in the loss of all monies of the final investor cohort

- There could be substantial credit risk - “Guarantees” are meaningless unless the guarantor is capable of meeting them in all circumstances
 - So she needs to know who the guarantor is and details of their financial position
 - If the guarantor is financially strong, why would it need to borrow money at 12% per annum rather than from a bank at close to prime, or raising equity capital?

- Almost certainly this scheme is being aggressively marketed
 - Who are the people involved and what are their credentials
 - Are they FAIS accredited?
 - Is the scheme known to the regulators? Are the licensed or registered in any way?
 - If funds are being pooled by what mechanism? (Only very few are permitted by law and all are regulated)
 - Is the scheme acting as a deposit taking institution? If so, it must be licensed

- If the client still wishes to investigate the opportunity further she could:
 - Obtain all legal documentation involved in the investment and have them vetted by a legal expert
 - Trace the cash flows: whose account will she be paying money into, where does it go from there, where are the returns made, how are they channelled back to investors
 - Evaluate how the current and expected economic and industry environment could pose threats to the scheme
 - Determine what restrictions exist on terminating her investment
 - Evaluate the transparency around the scheme; if she cannot explain it she should not invest in it.
 - Investigate the background and probity of all individuals involved, remembering that a clean history is not a guarantee, but a chequered one is cause for alarm
 - Investigate the structure of all the companies involved with special emphasis on ownership, directors and interrelationships.
 - Obtain financial statements for all entities
 - Ascertain what commissions are being paid; the higher the more cause for concern

- But stress that she must find compelling reasons before investing given the decidedly implausible risk/return premise.

- And an investment in this scheme should form a small part of her assets with the remainder suitably adjusted down the risk curve

Question 2

a)

This part was generally adequately answered though candidates usually failed to cover the breadth of the topic. A few candidates pointlessly threw away marks by failing to give a recommendation as required by the question.

i. Cost:

There is an extra layer of cost in outsourcing in the margin to the insurer.

There is a cost saving in that the fund does not need actuarial valuations, audit reports anymore.

ii. Flexibility / control over bonus declarations / increases:

When transferred the increases will be according to a formula

The trustees and employer have no control over these increases

Cannot adjust levels of pension with ad hoc increases

iii. Control over the assets:

If fund stays on balance sheet, trustees and employer have control over asset manager selection, asset allocation, etc

If transferred, assets belong to insurer who invests according to its risk profile

A mandate between the fund and insurer could specify some guideline as to how assets could be invested and with whom.

iv. Relationship with the pensioners:

If transferred trustees and employer lose this relationship, which might be an issue for some pensioners who wants to look to the employer to look after them in retirement

Insurer takes over full responsibility and reputational risk

v. Mortality / longevity risk:

in transferred model insurer carries the risk that pensioners live longer than assumed in valuations

Part of the added cost of outsourcing as insurer needs to cost for this risk

Big part of the benefit to employer to be released from this risk

On a with-profit type product / basis of outsourcing some of this risk is shared by the pool of participants as future increases may be adjusted to allow for this.

Transferred in non-profit product leaves all the risk with insurer vs on balance sheet where increases are always a target and not fixed, ie some offset for mortality allowed

This gives pensioners more certainty

- vi. Administration:
If transferred the employer and fund does not have to do any admin again, ie paying members, reconciling payments, tax certificates, etc.
Even though the insurer will cost for it, it might still be a cost saving as well, because of scale benefits
Admin around proof of life, i.e. only paying pensioners that are still alive falls on insurer, and benefits pensioners if done effectively – reduction in risk for employer
- vii. Understanding the pensioner liability:
Need to differentiate between contractual liability and PRE
Is it a closed group?
Are there different categories of pensioners in which case only some may be transferred?
- viii. Size of the fund especially relative to size & strength of the employer:
Pensions is not part of core business of the employer, but forms big part of balance sheet liabilities if kept
A big fund / large employer could take some of the risks on balance sheet
Less chance for a small fund to get suitably diversified assets
And bigger effect of mortality
Prohibits investment in items like property
Size of pensioner liability vs company balance sheet also important - if smaller percentage company may be less worried about out-sourcing
- ix. Investment risk / opportunities:
Removed from employer and fund if transferred
Less so for DB funds as employer balance sheet backs liabilities
- Types of investments available through scale in insurer much wider than fund alone
Assets in insurer partially constrained because of risk of matching, capital and other regulatory constraints vs own fund
Derivatives and other sophisticated non-standard assets can be invested in by an insurer with more expertise and balance sheet backing it
What are current market return expectations and to what extent (given cost) can hedging be done within fund?
Are there currently any illiquid assets?
Funding level of scheme sufficient?
- x. Trustee involvement: No need if transferred; if wanted, keep on balance sheet
- xi. Employer: Risk totally removed if transferred
- xii. Pricing of transfer:
Margin to insurer

Assumptions used in calculations
Capital cost of guarantees
Fund/employer might not have enough money to transfer
Surplus exercise done, finalized

Recommendation + justification

b) i. & ii.

Answers to this section were very disappointing in the main. Few candidates were able to articulate a clear description of cash flow matching and its challenges and even fewer demonstrated a solid understanding of the use of swaps.

Cash flow matching

- invest assets to match the liability exactly i.e. the profile and incidence of pension payments
- which is not the same as immunization/duration matching
- assets needs to have same or at least similar cash flows
- and behave the same in different market movements
- which implies the $PV(A) = PV(L)$
- in stressing the interest rates all along the curve for parallel and non-parallel movements for both assets and liabilities

Liability is series of guaranteed existing pensions in payment long into the future

May increase in fixed terms, with CPI, equity related with guaranteed minimum

Will decrease with members dying or inflators less than demographic/economic assumptions

Assets invested to deliver cash flows similar to incidence of pension payments

Through coupon payments and bond maturities (including inflation linked bonds)

Bonds managed in right maturities and exposure to achieve the cash flows desired

Can also be done by using swaps to swap existing portfolio cash flows for the desired ones

Payments happen monthly

Decrements happen continuously

Government bonds and other high quality liquid bonds have varying maturities not covering every cash flow

Coupons get paid every 6 months

Can group a series of payments together and match those with the appropriate cash flows.

With swaps you can match more closely - government bonds may not exist or have required cap/collar features

You can construct the term and size of each payment through swaps

Can use a combination of bonds and swaps

Counter-party risk different between bonds and swaps

If matching with bonds the fund will always be fully exposed

With swaps it may vary over life-time of swap

Swap yields differ to bond yields

Although highly correlated, they often move out of line from each other, because of liquidity, bank vs government risk, demand vs supply

If the liabilities are valued off the bond curve, you will run a basis risk if the actual assets are invested in swaps and vice versa.

Swaps have the following advantages above bonds, though:

- More accurate matching
- Swaps allow greater flexibility
- You do not have to lay out cash for the exposure, ie it is effectively an overlay derivative transaction
- Cash can therefore be invested to deliver higher returns, while the desired cash flows are matched by using swaps
- You can swap fixed cash flows for floating cash flows as well
- The cash returns can be enhanced by adding credit assets to the underlying investment instead of the pure cash

Currently swap yields are well below that of bond yields

This means that the return from swaps will not be adequate to cover the liabilities or rather that bonds are cheaper

Equity linked type increases require a different approach:

- With an underlying guarantee that pensions cannot reduce
- Valued using stochastic modelling, sophisticated methods
- To reproduce the payoff closely
- Finding the right balance of cash flow matching and equity type investments

c)

This question dealt with some of the most fundamental problems of institutional investment: choosing asset strategies for a given liability structure and the trade-off between risk and return. In the light of this, the general quality of answers was disturbingly weak. Even many of the better candidates overall failed to address this question comprehensively.

Part of the problem appeared to be a lack of rigour in approaching the question. Candidates failed to consider all consequences of the asset choice for every option. They might, for example, mention the impact on the employer’s balance sheet of one strategy and then ignore that risk for several others.

The suitability of each strategy will depend on the trustees' priorities, for example:

- What trade-off between certainty and low return vs. risk and potentially higher returns are they comfortable with?
 - What explicit or implicit promises have been made to members?
- i.** Balanced Fund with 60% equity exposure
- not a good match for guaranteed liabilities
 - volatile results relative to liabilities, problem for employer who will have to take these through the income statement
 - equities give very volatile returns in absolute terms
 - high equity exposure will behave differently to guaranteed liabilities which are influenced by interest rates
 - high equity exposure should give real return over time
 - good long term link to inflation
 - should outperform liability over longer period, thus providing higher increases for the pensioners
 - risk appetite of the trustees and sponsoring employer will affect the propensity to take mismatching risks
 - degree of surplus will influence the ability to take mismatching risks
 - volatility of pensioner increases might be a problem
- ii.** Absolute Return Type portfolio
- not a good match for guaranteed liabilities
 - interest rate risk not matched as assets will not move in tandem with DCF of the liabilities as interest rates move
 - this will have an impact on the funding levels
 - the target relative to CPI will determine the riskiness and volatility of the fund, ie CPI +3 or CPI+5?
 - higher fixed interest exposure will provide some hedge against interest rate exposure of guaranteed liability
 - will still have a duration mismatch
 - there is usually less volatility in returns in absolute terms
 - does have some link to inflation as AR funds have inflation targeting
 - degree of investment in CPI bonds also critical here as it varies greatly amongst different funds
 - lower expected long term returns than i
- iii.** Guaranteed cash flows matched
- Less interest rate exposure as most part hedged
 - Low risk option for employer

- Will need a big part of assets to match the guaranteed liability
 - Which leaves little left to provide growth for future increases
 - Very little link to inflation so increased inflation risk
 - Biggest risk is matched so can be quite aggressive with remaining assets to provide growth/increases
 - Actual mortality experience and other movements will impact the future matching program, which does leave some reinvestment risk
- iv. Full matching
- Very low risk option for employer
 - Will be the most expensive option, so might need additional funds at inception
 - No upside for pensioners as inflation increases effectively guaranteed through matching strategy
 - Matching might not be perfect as very few inflation linked bonds in issue
 - Could be the most desirable outcome for trustees, shareholders and remaining members as risk of inadequate assets is lowest
- v. Partially matched
- moderately low risk option for employer
 - reinvestment risk exists if only the early part of liability hedged
 - some interest rate exposure will exist and make assets relatively volatile against liabilities
 - more assets left over for growth and future increases
 - good compromise between options i and iii
 - choice of remaining assets critical to provide growth
 - link to inflation not clear and direct, will depend on growth assets, some risk exist

Question 3

a)

Question 3 was, intentionally, the most difficult of the paper. Yet even this section that provided the easiest marks was very poorly answered. Many attempts were so tentative as to indicate that candidates were overawed by the subject and disinclined to engage with it. Of the rest most failed to consider the specific requirements of the product in formulating their answers.

- The SA market in credit is not large and often lacks liquidity and transparency
- If using corporate or parastatal bonds, matching is very difficult as little choice of term, coupon etc.

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- In this instance we are further limited to instruments with terms or durations that fit with the product term of 5 years
- Much of the available paper is issued by banks and parastatals which offer limited yield pick-up
- Paper of lesser quality is seldom rated
 - o And could be against corporate investment policy
- Building a diversified credit portfolio is hampered by paucity of names and concentration in industries

- Can use swaps and invest the cash in higher yielding credit assets
- Benefit of this is that credit can be selected on credit quality and availability and not duration only
- This could introduce some basis risk, though limited because of short term
- {Swap yield} minus {bond yield} could negate credit pick-up

- Some instruments like Credit Linked Notes introduce new risk factors (equity market risk) that are not appropriate for guaranteed product
- If managed unwisely a single default can wipe out years of profit for this product
 - o And will impact directly on earnings

- Lack of liquidity means it is difficult to actively manage a portfolio of credit or even impossible to take action if the prospects for a name deteriorate
- The insurer will require expertise in managing a credit portfolio which will only be feasible for a large book (typically such skills reside in banks more than insurers)
- Introducing credit risk will increase the regulatory capital requirements and reduce the return on capital for the product
- Regulatory limits (especially as per the new Reg. 28) can be restrictive

b)

The section was by far the worst answered of the whole paper. True, it examined a very problematic scenario the analysis of which required a combination of theory, market knowledge and pragmatism. Yet the fact that most of the points in the model solution were mentioned by at least some of the candidates shows that the knowledge and reasoning required were not unreasonably obscure.

- In theory the yield uplift in credit instruments serves to compensate for taking increased default risk
- The shareholders are bearing all the default risk, consequently they should receive whatever risk premium there is
- However, in practice the yield uplift encapsulates more than just default risk
- Credit assets are often less liquid than risk free assets e.g. corporate bonds vs. government bonds so there may be an element of liquidity risk premium in the yield

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- This can be passed on to policyholders since they bear the risk of low values on early surrender
- The extra yield can be decomposed so that the proportion attributable to default risk is quantified and given to shareholders
 - o using assumptions (usually past default rates based on rating bands)
- There is also the possibility that credit risk is mispriced (such as when credit spreads “blow out” during times of crisis)
- Some part of this mispricing can be shared with policyholders without compromising the shareholder risk/return equation
- Similarly it can be argued that the higher yields on bank paper, for example, exaggerate the default risk and can therefore be shared with policyholders
- But both arguments are fragile and fly in the face of the proposition that the person taking no risk should not benefit from the risk premium
 - o And offer no guidance on how the sharing might be quantified
- However, shareholders may be willing to countenance this for the sake of collateral benefits (premium growth, market penetration, brand building etc.) which will enhance their long-term returns

c)

Both this section and the next were largely of a technical nature and required clear thinking about the mechanics of the instruments involved. Both were very poorly answered and it was evident that most candidates were not comfortable with the workings of swaps and forwards. No candidate realized that periodic coupon payments converted to ZAR would add to the value of the structure.

Currency Swap

- As the ZAR fx level strengthens relative to its level at inception, there is a positive mtm effect on the currency swap and vice versa.
- As the interest rate differential between the ZAR and USD interest rates narrows relative to the differential at inception, there is a positive mtm on the currency swap and vice versa.

ZAR value of Bond

- The ZAR value of the bond will reflect the USD value of the underlying paper and the ZAR fx level relative to its level at inception. As the ZAR fx weakens, the ZAR recovery value of the bond will increase.
- The above mtm sensitivity is the opposite of the fx level effect on the currency swap
- and in non-default scenarios provides a significant offset to the mtm movement under the currency swap.

USD CDS spread

- As the spread on GECC widens relative to its level at inception, the USD CDS position will incur a negative mtm and vice versa (reflecting the same risk position as on local ZAR paper held per local credit moves).

Series of ZAR interest rate forwards:

- As interest rates in the South African market widen relative to inception levels, the forwards will incur a negative mtm and vice versa (as for local credit paper held).
- However the accrued coupons (converted to ZAR) will have the effect of progressively stabilizing the valuation as the structure moves to maturity.

d)

The value will be equal to

- Bond recovery amount (converted to ZAR)
- + Coupons
- + Swap mtm
- +Forwards mtm

The bond recovery amount

- There is usually some % of value recovered at default (usually contractually determined).
- For the purposes of estimation assumptions can be made from analysis of historical data per rating band
- The ZAR value would depend on prevailing fx rates

The accrued coupons

- Paid coupons are already converted to ZAR and would be unaffected

Cross currency swap

- There will be +ve or -ve movements on this position at the time of default; the extent of these will depend on
- Movements in USD and ZAR yield curves
- Changes in USD/ZAR fx rates

ZAR interest rate forwards

- There will be +ve or -ve movements on the ZAR interest rate forwards
- These will be driven by changes to the ZAR yield curve

Minimum value

Since the recovery rate is somewhere between zero and 100% there will be a mismatch between the currency swap and the value of the USD bond.

- If the other elements of the structure have very little value – and especially if the recovery value is close to zero and
- If the swap has moved into negative value

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- It is possible that the total structure may have a negative value.
- This is only likely near the beginning of the term
 - o before the coupons have built up their value as they are secured in ZAR once earned
- And will require a combination of fairly extreme currency movements and a low recovery rate