

Actuarial Society of South Africa

November 2010

**Subject F205 – Investment
Specialist Applications**

Examiners' report

Question 1 i.

This part of the question was generally adequately answered though most candidates failed to cover the topics in sufficient breadth to do well. Surprisingly, many candidates failed to capitalise on the easy bookwork marks available and yet engaged well with the more specific issues in the question.

Careless misreading of the questions cost a few candidates many marks. When asked for "the investment strategy of the trust" some responded with investment strategy/market view of its asset manager. Likewise, a strategic asset allocation benchmark is not the same thing as a performance benchmark.

Some candidates fail to react to the instructions in the questions: thus "discuss" requires a more detailed response than "state". It is also good examination technique when asked to propose a benchmark, for example, to include reasons why you are excluding other reasonable possibilities instead of just stating the simplest example.

a) Information required

- request trust deed and statement of investment principles to understand objectives fully
- financial statements for past few years
- any restriction on buying/selling certain asset classes
- current management arrangements (to assess cost of change)
- are any holdings prescribed by the trust deed; particularly the holding in TNT
- size of trust assets
- mandates given to current managers and details of current portfolio
- valuation basis for unlisted asset(s)
- current funding position
- pattern of funding position over past 5 years
- other sources of income beside investment returns e.g. regular contributions from donors

- how reliable are these other sources of income? Annuity in nature?
- details of outgoings, total cost per student
 - what do school fees cost
 - are text books, extramurals included
- school fee inflation historically and future expected
- how many students is trust required to fund ; is number variable
- admin expenses and other costs incurred in running of trust
- tax status of fund
- regulatory requirements, if any

Choice of SAA:

- nature of liabilities. School fees are real in nature and may increase by more than inflation every year. Need to invest a portion of trust assets in real assets such as equity or private equity which will maintain purchasing power over the years
- currency of liabilities: need to invest in currency of liabilities. Need to know whether all schools are in South Africa. If not, where are the schools situated and what currency used? Even if only ZAR liabilities global equity/bonds are good for diversification etc.
- term of liabilities: high school last for 5 but assume trust will exist in perpetuity so long term in nature allowing investment in riskier assets like equity
- taxation: need to consider how trusts are taxed in South Africa. Income tax vs capital gains tax.

- income requirement: because trust is paying school fees every year, a certain amount of income is needed every year. A forecast of the future cash flow stream would indicate the income needs. Bonds may be suitable investment to meet this requirement
- liquidity requirements: beside the school fees that are paid every year there may be administration expenses to be funded. Otherwise the liquidity requirements should be minimal allowing for a long term investment strategy to be adopted.
- risk tolerance of trust: because trust is providing such an important service there is a low risk tolerance – can't have situation where can't afford to pay fees anymore. This can result from inflation and asset depletion or too aggressive investment strategy. Need to find balance between real assets for real growth and stable assets for secure income. The risk tolerance may be heavily influenced by the current funding position of the trust.

Asset allocation proposal is open to interpretation: as long as student gives justification marks will be given

assume all students are going to school in SA i.e. liabilities are rand based

-assume the trust more than adequately funded with assets > liabilities

-assume school fees and admin fees increase every year in line with inflation

-45% bonds – to generate income to pay school fees every year. Can be mixture of government bonds and higher yielding corporate bonds?

- inflation linked bonds would produce very little income up front but are a good hedge for the inflation risk going forward

-40% equity (including TNT) – need real assets to maintain purchasing power of trust assets over time

-10% - global equity – don't need to invest in other currencies as liabilities are denominated in rands but this is good for diversification, exposure to sectors not available in SA and is also a real asset

-5% - money market instruments/cash to be able to fund the administration expenses and other day to day running costs

-would not allocate to global bonds as yields are currently too low to warrant the introduction of unrewarded currency risk

- local property would produce an appropriate annuity income stream, increasing over time, though for diversification and liquidity would prefer listed property funds

If funding position is less favourable will need a higher allocation to less volatile, income generating assets like government bonds and less allocation to equity.

Question 1 ii.

This section produced a wide range of marks. It was evident that some candidates are comfortable with discussing single company financial analysis while others are woefully incapable of this and failed to comment even on the most obvious features.

- TNT is not in a good financial health
- the textile industry in SA is in dire straits
 - as a result of cheap imports from the east flooding the market; dumping of second hand clothing etc.
 - labour costs low but still uncompetitive

- high debt to equity ratio and increasing over time;
 - what is industry norm?
- could be distress borrowing to fund working capital and/or dividends
- would want to know what the interest cover is and if it can service interest with ease
- details of the nature of the debt; access to further funding
- would want to see income statement, balance sheet and cash flow statement as well
- quality of earnings, is there good cash flow?
- what is ROA and trend?
 - is capital being efficiently employed
- dividends exceed earnings and trend is worsening
 - this is unsustainable
- sales are falling in real terms – not good sign
- net profit margin is falling, company becoming less profitable
 - is the profit margin above or below industry average?
 - what is causing this? – increasing input costs? Debt service costs? Etc.
- future prospects for the industry and business
 - management, industry and analyst's views and the competitive position of TNT in the industry
 - quality/experience of management; are they likely to turn TNT around
 - Must ascertain if this is the bottom of a cycle or if the business is in terminal decline

Question 1 iii.

With very few exceptions this section was poorly answered. Like many other aspects of this question it required practical thinking and an ability to grapple with a real-life problem. There is a tendency for candidates (in general, not just in this paper) to gravitate to the most sophisticated and complex solutions to a problem. But sometimes the skill is in recognising what is possible within practical constraints. In the context of a single, unlisted company postulating derivative solutions borders on the absurd.

- such a large holding exposes the trust to large specific risk
 - which would normally be diversified away in a diversified equity portfolio
- the trust has an equity exposure of 20% that it can't actively manage by virtue of it being unlisted
- given the nature of TNT's business it has further risk implications:
 - The trust is heavily exposed to an industry fraught with problems
 - The fund is heavily exposed to a financially distressed asset with a high likelihood of failure, causing the trust to lose 20% of its assets
 - The trust's income stream (from dividends) will probably drastically diminish possibly causing liquidity problems with funding regular outgoings
- if the holding in TNT is a controlling stake the trust could seek to negotiate an exit via a merger, MBO etc.
- as a minority shareholder the trust has few options available
- A majority shareholder, if one exists, may wish to buy out the holding
- could seek to sell some of the holding but very difficult as not listed
 - illiquid nature of investment (i.e. it is hard to find a buyer), so can't easily convert holding to cash
 - may incur high transaction costs to sell
 - may incur high capital gains tax liability if sell

- trust deed may forbid the sale of the shares in TNT (if, say, there is a family connection)

In any transaction agreeing on the valuation of TNT will be difficult

Question 1 iv.

This section was comparatively well answered. One aspect that was inexplicably ignored by many candidates was the terms on which the deal would be struck – surely a cardinal point in any transaction. Again this suggests an inability to approach questions with a pragmatic mindset.

Careful reading (and re-reading while you are answering – it is easy to lose the thread in mid flow) of the question cannot be stressed too strongly. One candidate turned this section into a discussion of the pros and cons of swapping shares which is not at all what was asked and did not produce an answer that captured many marks.

About the PEF:

Legal nature of structure (limited partnership etc.);

This has implications for the rights and obligations of the parties and determines the tax treatment

Existing investor profile

Remaining term of the PEF, if applicable

This is an indication of how soon the trust can expect a return of capital

Objectives of fund; must be compatible with the ethos of the trust

Modus operandi of the fund; competitive advantages; market niche exploited

Current and envisaged portfolio composition

Degree of diversification by company and sector

Exit strategies for its various investments

When they expect to return capital to investors

Want any information that indicates the types of risks the PEF takes on; what % of investments are likely to fail; will fund achieve the desired hurdle rate and what the return is likely to be

Does the portfolio distribute income? Will the trust be able to manage if income levels are reduced sharply from current TNT levels?

Ultimately the trust must assess whether the PEF is a more suitable vehicle (in terms of risk, nature, cash flow, liquidity, tax etc) than shares in TNT

Management credentials, experience, probity etc.

Their track record in securing deals and successfully managing companies. This is possibly an indicator of future success.

Past performance of this fund and similar funds managed by the same managers

Fee structure: basic fee, hurdle rate, carried interest

These are usually substantial and they must be warranted

The size of the PEF's assets and the proportion that TNT would be

About the terms of the deal:

In order to assess the fairness of the swap ratio

Valuation placed on TNT (preferably independent/audited)

Valuation basis for PEF's assets

Deal structure:

will it be a sale and purchase; This might have CGT implications

- will there be any cash paid
- what is the timing
- PEF's interest in (the rather precarious) TNT
 - Is it an asset stripping exercise? Is that in the spirit of the trust?
 - Its ultimate exit strategy for TNT
- Will the trust be expected to participate in PEF's future draw downs?

Question 1 v.

This section produced answers of highly variable quality. Many candidates latched onto the clichés of style investing (IT = “growth”; low P/E ratio = “value”) without considering all the information given. Those candidates who did well were able to demonstrate awareness that investment style is a concept that extends well beyond the value/growth labels and furthermore can involve nuances and even apparent contradictions.

- active – as evidenced by the turnover and an unconventional portfolio profile
- contrarian – performance very different to benchmark over most time periods
- contrarian – very high exposure to IT industry which is a very small part of ALSI
- does not hug benchmark – high tracking error
- value style – low P/E relative to market
- not a trader; possibly takes a long-term view on stocks – average holding period of 3 years is not excessive

- appropriate: yes
- would tend to have a high income yield; good to provide liquidity for outgoings
- real asset portion of fund is long term in nature. Short term underperformance as can be expected from contrarian can be tolerated and should result in long term real growth.
- low turnover => low trading costs

- appropriate: no
- a trust like this might be too risk averse to consider a contrarian manager with high level of specific risk

Other similar characteristics, consistent with a value/contrarian bias, could be:

- preference for high dividend paying stocks
- stocks paying out high proportion of earnings (high payout ratio)
- stocks with high ROE
- periods (even long periods) of underperformance relative to the market

Consistent with high IT holdings:

- preference for stocks out of favour in the market
- small cap bias

Question 2

This question was (intentionally) more challenging than Question 1. It required candidates not only to understand the dynamics of pension plans and life offices' smoothed bonus funds but to be clear about the roles of the two in a relationship that is both symbiotic and yet at arm's length. Very few candidates were able to do this consistently. Some were initially successful and then started to confuse the pension plan and its issues with those of the insurer's smooth bonus fund. (A few even began to forget that the plan in question is a defined benefit plan!)

- i. *This section was poorly answered. The vehicle described in the question is unusual but the analysis requested required no more than a thorough understanding of how smoothed bonus funds operate. Seen in this light candidates performed poorly.*

Smoothed bonus funds pool the investment risk across all participants.

Pooled funds work best when the nature of the participating funds is similar.

If a fund experiences very different patterns of leavers/joiners, for example, this can result in large cross-subsidies that are inequitable.

The fact that this fund is very large means that such distortions could be quite material in relation to the other participants.

All smoothed bonus funds feature cross-generational subsidies; some may prefer to keep those within a single large fund than spread it across multiple funds

A segregated plan can customise its arrangements in areas like:

Investment policy; specify exclusions, special constraints (provided these do not impair the insurer's ability to provide the underwriting)

Policy conditions; e.g. extent to which MVA's are applied to mass leavers

It will require more effort from the trustees who will have no fellow participants

But the fund will shoulder the burden of managing its funding level alone given that the insurer is unlikely to give onerous guarantees to a single plan fund.

For example, a standalone fund experiencing mass retrenchments at a time when funding levels are low would get no cross subsidy

The termination conditions are likely to be more onerous as the insurance risk will be higher for a single fund.

Smaller funds benefit from better asset diversification in pooled vehicles

Even a large fund may have higher concentration of risk in a standalone fund

There will be greater transparency of the internal workings of the fund

- ii. *This section was one of the best answered in the whole paper. Since it essentially requires candidates to pin down the role of each participant in the scenario it was critical in crystallising candidates' understanding of the question. The examiners were at a loss to understand how candidates seemed confused in answering other sections having demonstrated their grasp of the situation here.*

Sponsoring employer.

- Low return on smoothed bonus product in future will put him under pressure,
- he may have to provide capital
- and/or increase the contribution rate

- Most of the risk lies with the employer.
- But at this stage there is no balance sheet impact (the asset represented by the investment in the SB fund retains its full value)
- unless non-vesting bonuses are removed.

The DB plan and its trustees

- Even though the fund's liabilities are matched by the insurance contract, in terms of the smoothed bonus product the plan may experience a long period of low or zero bonuses from now on
- and corrective action may be required
- May have to decrease benefits or increase contributions in future if situation does not improve and returns make current structure unaffordable.
- The trustees do not carry any of the financial risk
- However, as they are responsible in law for the fund's investments they will be very anxious to resolve the underfunded position
- In particular they will want to re-evaluate the appropriateness of the investment strategy and the investment manager(s)
- They cannot easily move the assets to another provider; will forfeit the guarantee, because the insurer will apply a market value adjustment as a result of the underfunding, and so crystallise the losses.
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Members.

- None immediately as their benefits are fixed,
- but may have problems if employer cannot afford them anymore
- and if all remedies fail may see a reduction of benefits in future especially discretionary benefits like increases for pensions in payment
- This may impact more on active members future prospects than existing benefits in payment and could cause changes to prevent new members joining on the current terms.

Insurer.

- Capital at risk to the extent that the low funding level cannot be repaired within the terms of the product;
- reputation to the extent that the investment policy is seen to have been inappropriate to the objectives of the product.
- May have to take such corrective action (e.g. remove non-vesting bonuses) as is permitted by the contract to restore funding levels; this will not be well received

Asset manager.

- Reputation.
- If the underperformance is as a result of poor performance relative to mandate the asset management agreement might be terminated

The regulator

- If certain critical funding levels have been breached the regulator will require that management implement actions to restore the balance and will monitor progress

iii. *This section was generally very poorly answered. It was evident that very few candidates were sufficiently conversant with the dynamics of smoothed bonus funds to suggest relevant solutions.*

- (a) Inject capital to rectify the underfunded position.
Change the asset manager to one with a better track record
Change the asset allocation by making it more aggressive to make up the shortfall when the markets recover by increasing equities.
This carries a lot of risk for the insurer, and it may make the smoothed bonus product more expensive.
It also carries a lot of risk for the employer as the shortfall could increase at a time when he can least afford it
Change the bonus formula to repair the funding level before declaring bonuses again or by declaring lower bonuses, if permitted
Remove non-vesting bonuses, if any
Introduce Market Value Adjustments for leavers, if allowed

- (b) Decrease bonus declarations (especially vesting) in future
Change the product when fully funded to another provider or multiple providers
Change the product to another type of product/asset solution
Change the asset allocation by making it more conservative:
 - Reduce equities, decrease volatility to provide more certainty and stability in uncertain times. This might lead to lower expected returns in future and might not be within policyholder reasonable expectations
 - Reduce offshore holdings, reduce currency risk
 - Introduce other asset classes to increase diversity and reduce volatility, ie ILB's, Property, Hedge FundsIntroduce a hedging strategy to prevent further falls in funding levels

- iv. *This section elicited particularly weak answers. Some candidates showed only a very sketchy notion of what asset liability modelling entails. But even those who knew more generally produced garbled answers that would have benefited greatly from more planning and a clearer and more logical exposition of the process they were asked to describe.*

Asset Liability modelling enables one to understand the value of a fund's assets relative to its liabilities in more detail, and how these could vary under different market conditions.

The aim of the exercise would be to investigate the range of possible asset allocations and establish the long term strategic allocation with the highest probability of meeting the objectives of the product.

Start by defining the liability, i.e. the rules of the smoothed bonus product, and modelling its components.

A major part of this is developing a bonus algorithm i.e. rules that determine the level of bonus that would be declared in specific circumstances taking into account funding levels, market conditions, returns, policyholder expectations etc.

Give specific attention to the guarantee of no negative bonuses and the bonus philosophy

These bonuses depend on the performance of the underlying assets

Further liability related inputs that may be included in the model are the withdrawals, mortality, contributions and new entrants.

However avoid needlessly complicating the model with variables that will not have much impact on the asset allocation and use simplifying assumptions where possible.

Cash flows will however play a role in considering liquidity constraints.

The existing funding level will play a major role if the intention is to model a recovery strategy, but if the exercise is to determine a long-term strategic asset allocation a fully funded portfolio should be taken as the starting point

Secondly build an asset model.

The insurer might consider buying a well tested and proven model in the market.

It is imperative that the asset projection is as realistic as possible.

This model would typically use returns, volatilities and correlations of all asset classes being modelled.

Parameters affecting asset class returns and correlations between them include: the yield curve / interest rates, inflation, dividend yield, dividend growth, equity risk premium, property returns / rental yields, exchange rate.

Parameters are usually deduced from historic values

Using a period long enough for credibility, short enough for relevance

Most models use the mean variance optimisation method.

Parameters like inflation, returns and others could be defined as variable stochastic inputs, by defining a probability distribution function with a mean and variance for them and the cross correlations between them vs. deterministic, mean value assumptions.

The model must be internally consistent; no arbitrage; be applied equally to assets and liabilities

It should be calibrated to ensure that it produces meaningful results

The starting point of the different asset parameters, which is defined by the historical build-up in the model, is an important determinant of the future outcomes from the

stochastic scenarios and care should be taken that this makes sense. One can model from a starting point of current market parameters or use average parameters over time.

The model needs to be constrained to incorporate regulatory restrictions, availability of asset classes, costs, tax etc.

Then one runs thousands of scenarios for a number of years into the future building up the asset class returns and the liability.

One needs to define a measure of risk against which the optimal asset allocation will be selected. This is naturally relates to the risk of the assets not meeting the liability.

This could be: minimise the probability of being underfunded, ie what is the best AA in order to maximise returns with the least chance of being underfunded.

This could again be defined as the least number of times the fund went underfunded, or the amount by which it went underfunded/severity.

Once a quantifiable measure of risk and of return is established, it is possible to derive an efficient frontier of investment portfolios or asset class combinations which, for a given level of risk gives the maximum expected returns or for a given level of expected returns gives the minimum level of risk.

Not all the fund's objectives can be optimised at once as there is an inherent conflict in the desire for high returns while maintaining funding levels. Various investigations will have to be done to determine how sensitive the outcomes are to the specific variable being optimised

The time horizon over which the modelling is done is important in order to not forfeit accuracy of results, but see enough data.

The number of simulations in the exercise is important and will depend on the objective.

- v. *This section was very badly answered. Fatigue may have played a role since the question itself introduces only a one new angle (the focus on pensioners) to what should by now have been a familiar scenario. Candidates frequently displayed ignorance of the mechanism of benefit payments from a smoothed bonus fund and how this affects funding levels of the fund as opposed to the situation of the pension plan.*

Some candidates did not confine themselves to the question asked and proceeded to suggest alternative arrangements. Others focused on the suitability of the underlying assets even though the question asked about suitability of the investment vehicle.

The pensioner liability has a long time horizon.

the increasing nature makes the duration of the liability especially long (but usually shorter than active members/deferred pensioners)

and so a more volatile balanced fund could work as there is enough time for smoothing out returns and recouping possible losses in early years.

The smoothed bonus fund has a balanced fund of underlying assets and this is what could be reasonably expected for increases by the pensioners over time.

A balanced fund of this nature could deliver inflation matching returns over the long run.

The guarantees or non negative bonus on the smoothed bonus product gives a capital guarantee which is well suited to the pensioner liability as the pensions can also not be reduced.

Because the SB fund dampens market volatility the impact of big changes on the sponsor's balance sheet is reduced

The pensioner liability has monthly cash outflows in the form of pension payments. A smoothed bonus product is not designed for this.

It also could have negative funding levels at which time it is not good to disinvest to pay pensions

Inflation increases are guaranteed and although inflation could be achieved over the long term, in the short term it could mean a lot of volatility and a big mismatch

A liability like this needs to be matched to some extent from an interest rate perspective.

The guaranteed part of the pensions is just fixed payments in the future (after taking into account mortality), so interest rates have a big influence on the value of the liability, which implies that interest sensitive assets should be used to match it.

But assets of sufficiently long duration are not readily available in the SA market

The term of these cash flows is very long and the duration of the assets is therefore also an important consideration.

The inflation guarantee is a big liability and just investing in a balanced fund leaves the sponsoring employer with a huge potential mismatch on a year to year basis.

This could lead to big balance sheet movements if the assets underperform inflation.

If the employer is able to carry this risk, the mismatch could provide extra returns over time as equities are expected to reward investors over the long term.

Cross subsidies between active members and pensioners not good thing.

- vi. *Although the average mark attained was relatively high, this section was the most clearly divided into those who scored well and those who appear to have given up at this stage of the paper. Those candidates who thought the issue through were able to produce creditable answers that evidenced their understanding of the often tricky considerations involved in changing (and timing the change of) the fundamental investment basis for a particular liability.*

Inflation,

when high and increasing, difficult to replicate with other asset classes except index linked bonds

Compare real yields with implied yields in nominal bonds, do not want to move to ILB's when expensive relative to other asset classes.

Driver for local interest rates

Nominal yield curve / interest rates, level of interest rates compared with guarantees, implied real yields

Generally, if interest rates are high and are expected to come down, more matching needed as the increase in liability should be offset by an increase in the value of the assets and putting a matching strategy in place is then relatively cheap

Equity market levels:

after a run in equity, fund will have more assets to buy matched strategy provided this does not coincide with interest rate levels that are too low.

Generally when equity markets are low, its better to wait for some recovery before implementing matching, can go hand in hand with funding level

Funding level,

The funding level should not be negative as this could mean that the fund does not have enough money to hedge the liability and that the members leave some of their guarantee behind with the insurer in the SB product

Foreign interest rates,

where are they in their cycle and what would be the effect on their markets? This affects the offshore component of existing assets and also the movements in local market.

Exchange rate,

this influences your offshore asset component – high and chances for it to reduce: good time to switch to matching.

Also a driver for local interest rates

Availability of suitable assets, investment vehicles

Supply of assets like inflation linked bonds can be variable

In general, a decision to match is more about removing risk than making money, but important to take timing into consideration, when moving.

Look at it as if buying certain assets and selling others – ie is it now a good time?