INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

September 2012 examinations

Subject SA6 – Investment
Special Applications

Introduction

The Examiners' Report is written by the Principal Examiner with the aim of helping candidates, both those who are sitting the examination for the first time and using past papers as a revision aid and also those who have previously failed the subject.

The Examiners are charged by Council with examining the published syllabus. The Examiners have access to the Core Reading, which is designed to interpret the syllabus, and will generally base questions around it but are not required to examine the content of Core Reading specifically or exclusively.

For numerical questions the Examiners' preferred approach to the solution is reproduced in this report; other valid approaches are given appropriate credit. For essay-style questions, particularly the open-ended questions in the later subjects, the report may contain more points than the Examiners will expect from a solution that scores full marks.

D C Bowie
Chairman of the Board of Examiners

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General comments

Candidates are reminded of a bias in the paper towards recognising higher level skills and practical application – this is intentional and will continue. Likewise the examination system does properly allow for prior subject knowledge to be assumed. Investment is a necessarily practical subject and, at this level, the examiners expect candidates to demonstrate a breadth and depth of competency as would be expected from a recently qualified actuary or senior student in a frequently evolving discipline. Hence simple regurgitation of bookwork will never be sufficient to ensure a Pass grade – and this was evident from the dispersion of candidates' responses in the more differentiating parts of questions.

Whilst the examiners will tolerate bullet point style responses, some candidates' handwriting made assessment difficult and they may have lost marks. Likewise "text speak" abbreviations will not be accepted.

In order to succeed, candidates must ensure they familiarise themselves with the prevailing investment issues and the general market background facing institutional investors in the 12–18 months preceding a diet, particularly the solutions (and sources of) being debated by the various stakeholders.

Given the greater volatility in recent years and globalisation/integration of markets and economies, delivering an acceptable return from a long term strategy against a focus, disclosure regime and political/regulatory backdrop that have become steadily more short term in nature has become an increasing challenging for investors. A clear trend has been the move towards solutions that balance risk and reward appropriately given the sophistication of the investor. Investors have also focussed on different legal structures to gain exposure to asset classes which will blur the traditional equity/debt allocation divide.

Given an overall appraisal framework of "quality, security, profitability and liquidity", candidates need to be able to explore the trade off each opportunity represents. In addition they should be able to assess any new types of risk (such as reputation, operations, liquidity, credit, model and counterparty) and conflicts of interest incurred that justify new ways of regulation, monitoring (and against what benchmark) and management. As actuaries move into wider fields, the examiners are likely to focus on the practical application of core skills in what may appear unfamiliar situations. However, better candidates should be able to identify the key principles and considerations that a solution demands, since this should be a regular feature of their "day job".

Specific comments on September 2012 paper

Another generally poorly answered paper consistent with recent diets, although a slight improvement on the last exam. The average mark remains much lower than the examiners feel ought to achievable by candidates. This is premised on an assumption that candidates are likely to be working already as advisers or asset managers in this most practical of fields rather than transfer from another discipline. If candidates don't have this practical experience, they will struggle in the application and higher skills parts of questions.

Whereas previous papers had looked to examine capital market or government policy detail, this paper in many areas reflected some of the very practical challenges and conflicts faced in trying to source returns and interactions between sponsors and the funds they sponsor in mutually challenging times.

Candidates typically answered Question 2 better than the other two (albeit foregoing more than half of the marks available) with Question 3 attracting the worst response with average scores of around a quarter of the 16 available marks.

Those candidates who were unsuccessful will find their solutions lacked sufficient (and often the most basic) relevant detail or application of knowledge and scored lower accordingly. Whilst this deficiency was caused by being too narrow in some cases, a greater number tended to deviate from the topic and include irrelevant material or over emphasise minor points – although candidates will not be explicitly penalised for this, it gives an impression of a lack of understanding and, more importantly, wastes limited time. Where candidates made relevant points in other parts of their solutions, the examiners have used their discretion as to whether to recognise these answers or not. Likewise the examiners share and agree alternative possible solutions to questions during the marking process.

1 (i) The fund already has a 5% holding in diversified property and no infrastructure related investments, therefore is below the target exposure.
A REIT is a closed ended investment trust that is listed on a registered stock exchange.
Corporation tax and capital gains tax are not paid by the REIT, provided the REIT only engages in property investment rather than development or other activities.
A broad based REIT is unlikely to provide much exposure to infrastructure related assets.
An infrastructure REIT provides equity ownership of infrastructure assets, but due to the distribution requirement will tend to own high yielding infrastructure investments such as power stations or highways where the development phase has been completed.
Typically the holdings will be relatively immature as infrastructure assets often require redevelopment or significant capital expenditure for upgrades towards the end of their working lifetime.
Many non-REIT infrastructure vehicles will tend to focus on the development stage of new projects or upgrades to existing assets as they are not subject to the same distribution requirements. As such they will often have higher risk levels, although risk-adjusted returns may be similar.
However they may also be able to invest in similar assets to infrastructure REITs.
From an investor perspective an infrastructure REIT may be preferable to an unlisted fund due to the secondary market liquidity provided by the listing.
Most other infrastructure vehicles will be highly illiquid and can only be unwound at the manager's discretion or with difficulty as a private transaction.

(ii) The sponsor feels this is an attractive investment, and by co-investing with the pension fund it will have a larger stake in the project and a larger controlling interest than would otherwise be the case. This may also avoid the need to add another investor, which will streamline governance.
Additionally, the pension fund will be an investor with a long time horizon and no meaningful liquidity constraints or funding requirement to participate.
A further advantage of the pension fund holding the asset is that at a Group level, the Group will capture a larger proportion of the economic benefits of the project than otherwise. This is only relevant if other opportunities cannot be sourced on similar terms or without ceding control, else this would represent a concentration risk.
The sponsor may also feel that by directly investing in an infrastructure asset with expert assistance from the sponsor, without ceding returns to intermediaries such as asset managers, the pension fund will be able to capture higher returns than otherwise.
In some cases the income stream will be inflation-linked which may offer a positive correlation with liabilities.

(iii) **Due diligence**

This type of investment requires careful due diligence as it is a large single investment (£75m, or 1.5% of fund assets) and therefore represents an undiversified exposure.

The due diligence process would need to cover the following aspects:

- Legal review of agreements governing the ownership of the wind farm and associated rights
- Legal review of electricity supply, purchasing and support agreements
- Legal review of bank lending agreements, including any covenants given
- Tax analysis to understand if any taxes will be incurred
- Corporate financial analysis to place a value on the expected income stream, probably with scenario analysis to understand sensitivities and drivers of value

It may be possible to share the costs of carrying out the due diligence work with the fund's sponsor, and possibly the third party investor.

Investment characteristics

Having completed the detailed due diligence, the fund will need to form views on the following:

- Impact on the fund's risk level, and expected return
- Liquidity position of the wind farm asset – both in terms of the initial investment, and in terms of any future investment requirements e.g. to cover redevelopment costs or upgrades
- Correlation with sponsor's financial risk profile

Negative views or sentiment on any of these aspects is likely to mean that the pension fund will not be able to participate in the transaction.
Particularly interesting features of the risk/return profile, from the fund's perspective, are whether there are any diversification benefits with other assets held by the pension fund, and whether the income stream is correlated with the pension fund's liabilities (e.g. inflation linkage).

Management aspects

The fund will also need to consider how it ensures that its interests are represented. A typical solution would be to appoint non-executive directors to the Board.
The appointments may be shared with the sponsor, in which case the fund will want to understand the sponsor's management style and commitment to the project over the long-term.
The fund would want to know if the sponsor has any commercial supply or purchasing agreements in place with the wind farm. If there are such arrangements, this is potentially a source of risk in the event of a change of control.

In a business as usual context, the fund would want to understand if there are any conflicts of interest – particularly with regard to the third party investor. If the sponsor has an objective of selling on its interests within a few years, the fund is likely to want the option of also selling its interest. In such a scenario the fund will need to become comfortable that an appropriate sale price can be achieved with a moderate level of certainty.

Having considered the above aspects, the CIO is likely to need to present a proposal to the pension fund's investment committee or board for their approval. Once these steps have been carried out, and subject to any legal advice requirement, the fund should be able to invest.

[Credit for other valid points.]

(iv) Key differences between this scenario and the previous scenario are as follows:

- Larger size – this investment would represent 5% of total fund assets, which could be considered excessively large for a pension fund investor from a concentration risk perspective.
- Correlation – as the sponsor is a supplier to the infrastructure sector, the board of the pension fund should be wary of making an allocation. In the event of a downturn in the power generation sector, for example due to rising input costs or falling power prices, the pension fund may find itself with an asset that is falling in value at the same time as the sponsor is finding the business climate challenging.

For both of these reasons it is unlikely that an investment of this size would be considered acceptable. At a smaller size e.g. £25m, it may be deemed acceptable despite the sponsor correlation risk if the income stream provides a similar profile or high correlation with some of the liabilities (e.g. inflation linkage) and also if there are diversification benefits with other assets held by the pension fund.

2 (i) (a) 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.

(b) 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

(c) 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.

(d) 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

(e) Mortality / longevity risk:

Insurer carries this risk in transferred model 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 of 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

(f) Administration:

If transferred the employer and fund does not have to do any admin again, i.e. 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 in insurer, and benefits pensioners if done effectively – reduction in risk for employer

(g) Size of the fund / employer:

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

(h) Investment risk:

Removed from employer and fund if transferred
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
Less so for DB funds as employer balance sheet backs liabilities
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?

(i) Trustee involvement:
No need if transferred
If wanted, keep on balance sheet

(j) Employer:

Risk totally removed if transferred
Comment on accounting liabilities versus buyout, cost of capital, VAR impact on balance sheet and P/L and cash contributions.

(k) Price 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
Core business of employer
Pensions is not part of core business of the employer, but forms big part of balance sheet liabilities if kept
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?
Recommendation + justification

(ii) Cash flow matching

- invest assets to match the liability
- liability is the profile and incidence of pension payments ie is not the same as immunization/duration matching
- assets needs to have 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 projected cash flows
Similar to incidence of pension payments
Through coupon payments and bond maturities
Bonds managed in right maturities and exposure to achieve the cash flows desired
Can also be done by using swaps to swap existing cash flows for the desired ones

(iii) Payments happen monthly
Increases annually
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, i.e. 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:

- 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

(iv) 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?

(a) 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 account for and fund the shortfall
  - equities 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

(b) 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, i.e. 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 1

(c) 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

(d) 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 at all durations, especially ultra long
- Could be the most desirable outcome for trustees, shareholders and remaining members as risk of inadequate assets is lowest

(e) Partially matched

- 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 1 and 3
- choice of remaining assets critical to provide growth
- link to inflation not clear and direct, will depend on growth assets, some risk exist

3 Points that could be made:

Social unrest is likely to be negative for financial markets in the short term, resulting in poor asset performance

Uncertainty regarding the new economic policies will be bad for economic growth in the short term

Will there be changes to tax and legislative incentives to take out life insurance or to contribute to a pension fund?

How will any changes that negatively affect richer policyholders be offset by changes that positively affect relatively poorer policyholders.

If income inequality is reduced, the median income should increase, possibly moving more individuals into the income brackets where they can afford life insurance and/or set up private pension provision.

Will there be greater taxation of corporations and less taxation on individuals?

Will the distribution of sum insureds for life insurance policies change? What impact will this have on policy charges? Any other impacts?

Will the distribution of the sizes of individual pension funds change?

Will the new government introduce incentives for poorer people to take out pensions? More private pensions, but of lesser values??

Changes in taxation may impact the likely preferences for income over capital gains. Capital gains may be taxed more and income less

Will any of the life insurance and pension funds move offshore? What will the government do to hinder this.

Will foreign insurance companies find the country more or less attractive?

What are other countries doing? Did they implement similar policies? Are they going to change their policies also?

Will the new government set up some centralised insurance provider for poorer people and or central pension provision for poorer people?

Should life insurance companies and pension funds revise their long term investment strategies?

Will the policies result in improved economic growth in the medium to long term?

What other changes in social policy by the new government will be introduced. How will they impact?

Points about extreme capitalism versus moderate capitalism

Any other sensible relevant points would be accepted

END OF EXAMINERS' REPORT