# INSTITUTE AND FACULTY OF ACTUARIES

# EXAMINERS' REPORT

April 2015 examinations

## Subject ST5 – Finance and Investment
## Specialist Technical A

**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.

The report is written based on the legislative and regulatory context at the date the examination was set. Candidates should take into account the possibility that circumstances may have changed if using these reports for revision.

F Layton
Chairman of the Board of Examiners

July 2015

## General comments on Subject ST5

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 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 questions.

Whilst the examiners will tolerate bullet point style responses, handwriting that is too poor to assess will lose marks. Likewise "text speak" abbreviations will not be accepted.

## Specific comments on the April 2015 paper

Comments on individual questions are incorporated in the solutions below.

Many questions represented opportunities to demonstrate higher level skills in terms of non-standard or practical application of theory to current or unusual issues in investment. Most candidates seemed to identify and understand the key issues being examined and so appreciated the general content of solutions that the examiners were looking for – however those that were unsuccessful will find their solutions lacked sufficient (and often the most basic) detail or application of knowledge and scored lower accordingly. Thus, weaker candidates found difficulties with Question 1 and the first part of Question 7.

Whilst some candidates are too narrow in their responses, a greater number still 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. Time and priority management are key skills actuaries need to have.

Weaker candidates often fail to respond to the *specific* issues included in the question. Instead, they regurgitate a *generic* answer based on the syllabus topic. More care needs to be given to crafting answers that directly address the points raised in the question. Question 4 part (i) was an example of this.

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 alongside the approach outlined below.

**1** (i) **Ratings agencies apply a mix of qualitative and quantitative analysis to make an assessment of the credit quality of a bond or an issuer of bonds.**

Provided an investor has confidence in the process applied by a ratings agency, an investor can place a certain degree of reliance on bond and issuer ratings, rather than carry out their own credit analysis independently.

**The cost of independent credit analysis is a particular barrier to smaller investors placing funds in the fixed income markets.**

**Therefore, bond issuers have found that by employing ratings agencies to maintain a credit rating for them, they are more successfully able to raise funds.** Arguably secondary market liquidity for their bonds is also improved.

*Some candidates discussed the purpose and practice of credit rating, rather than the role of the rating agencies (as required by the question).*

(ii) **If investors had less confidence in credit ratings, then they would need to carry out their own credit analysis** to understand the credit quality of the bonds they purchase.

Alternatively they might demand a higher risk premium as compensation for credit uncertainty. There may be a 'flight to quality' with less demand for higher-risk bonds.

**This would lead to higher direct costs for credit investors**, particularly smaller investors.

Over time we might expect increased use of independent credit research.

Some investors may be comfortable to trade or own bonds on the basis of market price, without doing or purchasing detailed credit analysis.

**Legislation and regulations may also remove references to credit ratings**, if confidence reduces sufficiently.

Going forward this is likely to lead to falling revenues for credit rating agencies. Possibly fewer bonds will carry ratings and fewer bonds will be issued.

*Generally well answered, although not many candidates considered the references to credit ratings in legislation and regulation.*

**2** (i) Projection of past results – **past performance is not necessarily a good guide to future performance**, but it is typically (erroneously) used as such a guide in an over-simplified manner. Measures may be unduly influenced by the impact of cashflows.

Risk – **past performance is likely to be impacted by the amount of risk taken** – which may not be comparable to the risk to be taken in the future.

Timescale – needs to balance assessing performance frequently enough to stop problems but not too frequently that it encourages short-termism.

Differing fund objectives – **funds with differing objectives may not be directly comparable.**

Impact on investment manager's behaviour – the frequency and method of performance measurement may negatively impact the behaviour of the investment manager – e.g. by encouraging short-termism.

Cost – there is always a cost / benefit trade off with performance measurement.

(ii) Projection of past results

Use of a caveat – stating that past performance in not a guide to future performance.

Avoid using performance measures that are influenced by cashflows (e.g. MWRR).

Risk

Using a risk-adjusted performance measure.

Timescale

Use a number of performance measure measures and/or manage the internal use and handling of short-term published performance measures to keep focus away from, and interests not aligned to, short-termism.

Differing fund objectives

Only measure against funds with similar objectives – or adjust comparison based on the differing objectives.

Impact on investment manager's behaviour

Have remuneration policies for the fund manager based on longer-term performance measures.

Cost

Avoiding overly short-term measurement and/or any subjective measures.

*Other sensible answers were also accepted. Generally, this question was well answered, although weaker candidates needed to 'describe' the limitations identified in part (i) more fully.*

**3** (i) Pension fund investment managers are increasingly employed on a "specialist mandate" basis to invest in a single asset class, rather than on a traditional "balanced" or "multi-asset" mandate. This requires them to make operational decisions in relation to stock selection (unless a "passive" index-tracking approach is to be adopted). Managers will therefore need to be given instructions regarding any restrictions to be applied.

The purpose of such restrictions can be seen as threefold:

- **To limit the risk they are taking**
- **To comply with regulations/legislation**
- **To keep portfolio in line with strategic asset allocation**

(ii) A pension scheme's investment restrictions might limit exposure to hedge funds because they**:**

- **restrict use of derivatives**
- **restrict short selling**
- **prohibit investment in non-regulated entities**
- **introduce an excessive level of risk**

(iii) Specific issues that might concern the trustees regarding hedge funds are:

- **The fees charged are excessive when compared to other investments**
- **Trustees don't believe they have the necessary knowledge to make an investment on behalf of the Scheme**
- **Scheme might be de-risking and therefore will be invested primarily in bonds**
- **The scheme may have previously had a bad experience with hedge fund investments (e.g. Madoff) and is therefore very cautious about investing in Hedge Funds again**
- **Dealing cycles for investment / disinvestment of hedge fund are too infrequent for Defined Contribution schemes**

Lack of transparency regarding underlying assets may make valuation difficult.

*In marking, credit was given equally for issues raised in parts (ii) and (iii). Comments regarding hedge fund liquidity were also given credit.*

**4** (i) **Yield differences**

A switch from the 4¾% stock to the 3¾% gilt would generate an additional redemption yield of 0.13%. However, a better approach would be to consider the *trend* in yield differences, over time, to determine whether the current differential is likely to be maintained.

**Price ratios**

The ratio between the prices of the bonds (113.84/107.88 = 1.05525) should again be compared to historic values.

**Price models**

The theoretical price of each bond could be calculated using an "approved" model. This might be the discounted value of the cash flows determined at some pre-specified discount rate. The theoretical price is then compared to the actual price to determine whether an anomaly exists.

*Most candidates failed to 'demonstrate' the approaches identified by making explicit reference to the data provided. Weaker candidates did not consider the need to consider trends in the values.*

(ii)

- **Authority and advice to switch – are approvals in place/required**
- **Are there portfolio/mandate constraints on the changes that can be made?**
- **Problems of switching a large portfolio of assets**
- **Tax treatment of coupons (and capital gains)**
- **Costs incurred in exercising the switch**
- Costs of reversing the switch at some later date if the switch resulted in a move away from the neutral portfolio allocations or if a change in market conditions eliminates the anomaly.

(iii) The investor could:

- buy the asset which is believed to be under priced and short sell a similar asset which is correctly priced or overpriced, or

- buy the asset which is believed to be under priced and sell a derivative linked to the benchmark bond for the market.

Examples might also involve the use of Total Return Swaps.

*Credit was given for other suitable methods proposed, provided that it was shown that these were 'market neutral'.*

**5** The table below shows the results:

| | *Fund Wt* | *Index Wt* | *Fund Return* | *Index Return* | *Asset Alloc* | *Stock selection* | *Total* |
|---|---|---|---|---|---|---|---|
| Index Linked | 50.00% | 40.00% | 76.24% | 61.67% | **1.29%** | **7.28%** | 8.58% |
| Domestic Equity | 25.00% | 40.00% | 35.20% | 38.72% | **1.50%** | **–0.88%** | 0.63% |
| Overseas Equity | 25.00% | 20.00% | 42.95% | 42.96% | **−0.29%** | **0.00%** | −0.29% |
| Total | 100.00% | 100.00% | 57.66% | 48.75% | 2.51% | 6.40% | 8.91% |

Assumptions: No rebalancing. Ignores taxes, transaction costs and cashflows. Fund and index are consistent in respect of treatment of dividends received and currency hedging.

*Not all candidates stated the underlying assumptions (as required by the question).*

(i) **The fund has outperformed its benchmark by 9%, having returned 58% against the benchmark's 49%**.

*Some candidates failed to reflect that 'the fund manager did not rebalance over the three year period'. As a consequence, their results were incorrect.*

(ii) (a) **Stock selection made a positive contribution of 6.4%** whilst **asset allocation gave a positive contribution of 2.5%**.

(b) See table above.

(c) The main area of underperformance was the decision to overweight overseas equity. **It would be appropriate to reconsider the weighting given to overseas equity**. Domestic equity stock selection also contributed some underperformance, so **the quality of analysis in this area might be reassessed**. **Alternatively, it might be more suitable to adopt a passive approach to equity investment.**

*Credit was given for appropriate attempts to calculate the required measures, although full marks were only awarded when the correct results were produced. Credit was given for comments in part (c) that reflected the candidate's results in parts (a) and (b). Few candidates identified the possible adoption of a passive approach.*

**6** (i) Issue a bond to investors
Bank loan
- Term loan
- Evergreen credit
- Revolving credit
- Bridging loan

Commercial paper
Private loan (private debt financing)

Use cash on balance sheet
Share sale / dilute ownership
Venture Capital

*Generally well answered.*

(ii) **Why does the company need to borrow**?

Growth – is the growth realistic, have the costs been correctly accounted for.
Acquisition
Capital Expenditure - how much of the raised finance is required to set-up the restaurants and how much for initial operating expenses

**What is the expected source of repayment**?

Cash flow of company – has the owner done a cashflow projection to ensure can payback as restaurants are cashflow intensive in opening months
Possible sale of assets – what are the tangible assets to back the loan i.e. freehold of restaurants
Refinancing – is this a one off tap for liquidity or will the owner be refinancing

**What are the risks**?

Economic – what is the wider view of an economic recovery
Are the restaurant sites identified suitable for the type of restaurant, what is the likely footfall?

**What is the structure of the bond and the payment profile**?

How does it compare to similar issues?
Is the coupon payment sufficient for the risk being taken compared to similar investments?
Does it meet the requirements for the investor?

**Management issues**

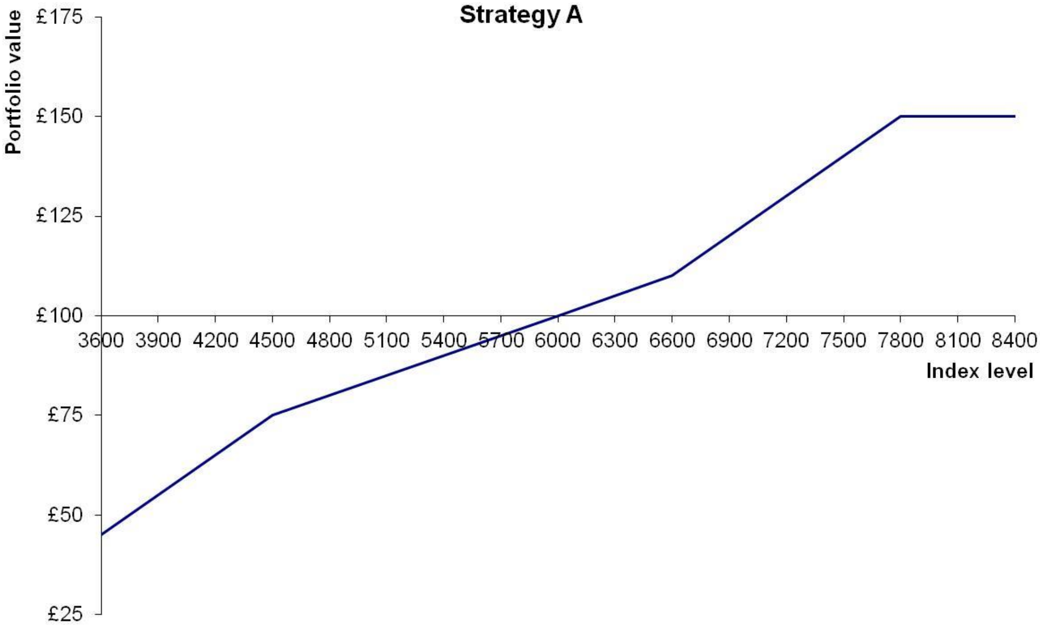
Quality of management running the company
Future business plans and prospect of further borrowing

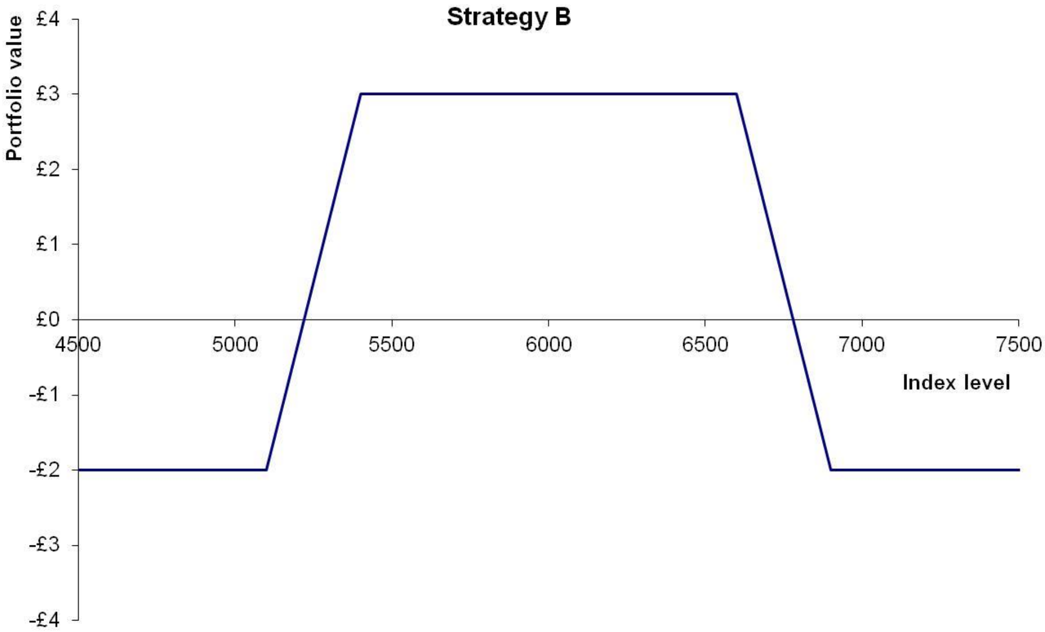
**Ability to service debt**

Current and future promised debt obligations
Financial health of company – review accounts

*Other sensible points regarding the risks of the business and the potential for default on a bond issue were given credit. Candidates were expected to 'describe' the analysis with suitable references to the scenario set out in the case study*

**7** (i)




*Credit was given for correct identification of appropriate elements of the portfolios, even if the aggregate diagram was incorrect. Thus credit was given for identifying ranges over which portfolio values increased / decreased / held steady and for points of inflection. However, some candidates struggled to translate the information provided into relevant charts.*

(ii) **The investor may feel that the options markets are underestimating scope for positive equity returns** and **overestimating scope for negative returns over the next year.**

*Not all candidates registered that they were only required to comment on Strategy A. Few realised that the rationale for adopting the strategy involved comparing the market premium with the investor's assessment of likely outcomes.*

(iii) **Because value at risk focuses on outcomes at or around the chosen threshold level (e.g. 1 in 20 confidence level), it ignores the impact of events in less likely scenarios which may increase losses in a nonlinear manner. It is frequently calculated assuming a normal distribution of returns, and so may be misleading if the actual distribution is 'fat-tailed' or skewed.**

**Other measures of risk such as conditional VaR (also known as tail VaR) are better able to capture the losses in tail scenarios. Alternatively, investigation of the entire distribution of gains and losses would reveal the risk characteristics of the strategy.**

**8** (i) Investment objectives should:

(a) **seek to maximise returns subject to the trustee's best judgement of what is necessary to meet the liabilities**

(b) **take account of their attitude to risk**

(c) **consider a "socially responsible overlay" to address the environmental objective**

It is likely, therefore, that this fund will need to meet liabilities that are **increasing due to inflation** (not just underlying price inflation but the higher rates due to additional demand for care from an ageing population and the need for medical coverage). The liabilities are therefore "super-real" in nature. **They are (relatively) short-term compared to a typical long-term investor** as care needs will generally only persist for 8 to 10 years. They are likely to be **denominated in domestic currency** for each group of beneficiaries (although the global nature of the charity's operations suggests that some degree of exchange rate risk can be withstood). **Alternatively, it is possible that the liabilities are denominated in many currencies if the charity provides care in many counties**. This would need a global investment objective covering the appropriate countries (or currency hedging) to minimise currency risk. The tax status of the charity should also be considered within the objectives.

**The trustees are otherwise likely to be highly risk-averse**, since the charity will need to be able to continue care provision irrespective of market conditions.

Additionally, **their wish to have "minimal impact on the environment" will impose additional restrictions on the investment activities**, the extent of which will be driven by the charity's commitment to environmental issues. The charity may have other social and ethical restrictions on what can be invested in.

All of these considerations should feature in the investment objectives.

*Generally well answered. Alternative suggestions were given credit provided that they aligned to the scenario set out in the case study.*

(ii) Infrastructure assets are generally characterised by high development costs (high barriers to entry) and long lives. They are generally managed and financed on a long-term basis.

Infrastructure assets tend to be single purpose in nature (such as gas pipeline, toll road or hospital). The private investor's participation in the asset is often for a finite period although the assets themselves are characterised by their long lives.

One of the key characteristics of infrastructure assets is that they tend to be, or **exhibit the characteristics of, natural monopolies**. Firms operating in a natural monopoly, protected from new competitors by the high barriers to entry, may be **able to earn abnormal profits by charging higher prices**. Infrastructure assets therefore tend to be subject to varying degrees of government regulation. This is not necessarily to the detriment of investors in infrastructure, as it provides a level of certainty regarding the income streams that will flow from the asset. There may also be liquidity and/or diversification features to the investment that can be attractive to investors.

Although infrastructure assets vary in terms of the level of regulation they face, this regulation generally results in **income streams that exhibit low growth**. To compensate investors for this, infrastructure investments tend to be **higher yielding than equity investments**. In terms of capital values, this stable, high yield results in infrastructure assets displaying a lower level of price volatility than equity investments over the longer term. It also acts as a support to the price of infrastructure assets in periods of poor returns in the broader equity market. As such, infrastructure is often referred to as a "defensive" asset.

*Generally well answered, although some candidates wrongly characterised the asset class as risky and volatile. Not all candidates recognised that a secondary market for infrastructure assets is now developed.*

(iii) The general characteristics of infrastructure investment suggest that this could be a **suitable asset class for the charity**. Forecast returns from individual infrastructure investments vary depending on the characteristics of the underlying asset, its maturity, risk and taxation treatment in the context of the prevailing macro environment. Over the longer term, as industry structures and regulatory regimes mature, the listed infrastructure sector will most likely behave like a hybrid between an equity and a bond. **Returns will therefore be real in nature** which will meet the charity's needs. Assets of a suitable term should be available. The focussed nature of the investment should preclude exchange rate risk.

Clearly, it will be necessary to **assess the likely environmental impact of each investment project to determine whether it will be suitable for the charity**, particularly due to the assets typically being large capital projects. Even here, though, there is scope for debate: for example, traditional environmental thinking tended to avoid involvement in nuclear projects, but with the increased focus on climate change and reduction in carbon emission, such projects are seen as more environmentally friendly. This might be less acceptable in the case of highway development, though.

*Alternative arguments were given credit if appropriately justified.*

(iv) Trustees should agree an explicit written mandate covering agreement between trustees and managers on:

- **an objective, benchmark(s) and risk parameters that, together with all the other mandates, are coherent with the fund's aggregate objective and risk tolerances**
- **the manager's approach in attempting to achieve the objective**
- **management fees to be charged**
- **clear time scales of measurement and evaluation**

The mandate should not exclude the use of any set of financial instruments without clear justification in the light of the specific circumstances of the fund (noting the specific environmental aspects relevant to the charity).

## END OF EXAMINERS' REPORT