

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

April 2017

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 pertaining to the date that the examination was set. Candidates should take into account the possibility that circumstances may have changed if using these reports for revision.

Luke Hatter
Chair of the Board of Examiners
July 2017

A. General comments on the *aims of this subject and how it is marked*

1. The aim of this Finance and Investment Technical A subject is to instil in successful candidates the ability to apply, in simple situations, the principles of actuarial planning and control to the appraisal of investments, and to the selection and management of investments appropriate to the needs of investors.
2. A mix of questions styles is used, covering *knowledge* of the material set out in Core Reading, *application* of this in calculations and case studies and *higher order skills* such as synthesis and collation of recommendations. Marks are awarded for the constituent elements of calculations, not just for the final answer generated. Scenario appraisal will similarly provide credit for evidence of the issues considered, not solely for the conclusions reached.
3. Candidates who give well-reasoned points, not in the marking schedule, are awarded marks for doing so.

B. General comments on *student performance in this diet of the examination*

1. The performance of students was above the historical average. This was a relatively straightforward paper and the fact that there was no question requiring numerous calculations meant that candidates were probably less pressed for time. This was reflected in a higher pass rate. There were still a number of students who either failed to read the question carefully, or, having read it answered a different question they would have preferred.
2. In numerical questions candidates should show their working and also define what their nomenclature means. If workings are shown the examiners can see where errors are made and follow the calculation through, thus resulting in the candidate receiving some marks rather than no marks.

C. Pass Mark

The Pass Mark for this exam was 65.

Solutions

Q1 (i) It will be necessary to review the suitability of the bond as part of both short term and long term planning. A first step would be to understand the financial objectives of the individual. [1/2]

In the short term, the individual will need to consider the need for liquidity / short term cash as the bond provides no income. [1]

What are the regular income and out goings for the individual? [1/2]

It would also be appropriate to consider the cash flows for the individual through employment and existing assets/liabilities, both now and in the future. [1/2]

Longer term, the suitability will be influenced by the individual's other assets, [1/2]

and in particular whether the bond investment would form a large part of his total assets. [1/2]

The individual's liabilities should also be considered, e.g. does the payoff from the bond match any expected liability in 5 years' time. [1/2]

The attitude to risk of the individual would influence the suitability of the bond. [1]

For example planning should assess the quality of the bond and the ability of the individual to withstand a capital loss if the bond were to default. [1/2]

Does the individual have the investment experience to understand the investment? [1/2]

Any dependants of the individual should also be factored in to the financial planning, as should the general health of the individual. [1/2]

The analysis should consider the impact of tax on the investment compared to alternative investments, [1/2]

and whether the investment diversifies the overall investment portfolio. [1/2]

There is a guaranteed minimum payment – how valuable is that? [1/2]

Alternative assets that could provide a similar risk / return profile should be considered. [1/2]

How will inflation impact the final payout. [1/2]

How marketable is the bond. [1/2]

Sensitivity analysis can help to demonstrate the suitability of the bond by considering different economic scenarios. [1/2]

[Max 7]

(ii) It would be appropriate to redo the financial analysis, [1/2]
considering in particular the difference in outcome should the bond be cashed in early compared to being held full term. [1/2]

The change in taxation would increase the attractiveness of bonds in general, if held full term. [½]

The impact on any allowances and the tax treatment of future capital losses would need to be factored in to the analysis. [½]

The market may invent new products that were not previously available under the old system which would need to be included in the planning. [½]

It may also cause more bonds to be issued. [½]

[Total 3]

[Total Max 10]

The question was reasonably well answered though a number of candidates failed to note that the investor was an individual and therefore offered inappropriate solutions e.g. ALM or stochastic analysis; this did not gain them any credit. Part (i) was answered better than part (ii).

- Q2** A company may relocate its tax base to a country with lower taxes. Multinational companies can move earnings from countries with high tax rates to countries with lower tax rates by financing arrangements. [½]
- For example, debt can be raised in the low tax rate regime and transferred to finance operations in the high tax regime. [½]
- Interest will be charged on this debt, [½]
- possibly at high (and uncommercial) rates. [½]
- These interest payments would be offset against earnings in the high-tax country, [½]
- thereby minimising the taxable profits in that country. [½]
- This will result in high levels of net interest receipts in the low-tax country. [½]
- Earnings can also be transferred through transfer mis-pricing. [½]
- The group supplies goods and services from the subsidiary in the low-tax country to its operations in the higher-tax regime, [½]
- and sets prices for these inter-group transactions which are inconsistent with market rates. [½]
- This, again, reduces taxable earnings in the high-tax regime. [½]
- A particular example of this is the levying of high charges for the use of 'intellectual' property [½]
- such as trademarks. [½]
- The practice is also used for the provision of services [½]
- such as administration, accounting or IT support. [½ for a suitable example].

Companies may reach an agreement with a Government under which they are charged a lower rate of tax compared to the standard rate. [1/2]

In return the company will create employment in the country. [1/2]
[Max 6]

Other relevant mechanisms described were also given credit.

In the main this was poorly answered despite the publicity given to a number of multinational companies who have been accused of minimising the tax they pay by adopting various strategies.

Q3 (i) The uses of futures and options can be classified under four headings:

- **Hedging** [1]
(i.e. using futures to reduce risk on an investment portfolio). [1/2]

- **Speculation** [1]
(i.e. taking high risk positions with futures with the aim of making large profits). [1/2]

- **Arbitrage** [1]
(i.e. making profits by exploiting anomalous pricing between the financial future and the underlying investments). [1/2]

- **Portfolio management** [1]
(i.e. using futures to alter the characteristics of a portfolio without disturbing the underlying assets). [1/2]
[Max 4]

(ii) Margin is the **collateral that each party to an exchange traded derivative must deposit with the clearing house.** [1]
It acts as a cushion against potential losses which the parties may suffer from future adverse price movements. [1/2]

When a transaction is first struck, initial margin is deposited with the clearing house. [1/2]

This is changed on a daily basis through additional payments of variation margin. [1/2]

This variation margin ensures that the clearing house's exposure to counterparty risk is controlled. [1/2]
[Total 3]

(iii) The producer could **short 100 two month futures contracts.** [1]
If they closed out the position in two months' time they would have **locked into a price of 92 per tonne.** [1]
[Total 2]

- (iv) The futures price would be close to the spot price in two months' time. [½]
The producer would therefore **receive 103K from the sale of the coffee** [1]
and would **lose 11K from the short futures position.** [1]
The loss from the futures position would have been collected over time
through initial margin and then variation margin over the two months. [½]

Regardless of the spot price at expiry, the producer would receive 92K for the coffee as they have locked into that price. [½]

Any adviser/broker fees would be paid in addition. [½]

[Max 3]

[Total Max 12]

Parts (i) and (ii) were well answered, however the answers to parts (iii) and (iv) were much more mixed with some candidates doing very well and others showing a lack of understanding.

Q4 (i) The uses to which investment indices can be put include:

- A measure of short-term market movements.
- Providing a history of market movements and levels.
- As a tool for estimating future movements in the market, based on past trends.
- As a benchmark against which to assess the investment performance of portfolios.
- Valuing a notional portfolio.
- Analysing sub-sectors of the market.
- As a basis for index funds which track the particular market.
- To provide the basis for the creation of derivative instruments relating to the market or a sub-section of the market.

[½ each, max 3]

(ii) There are a series of indices that cover the whole quoted UK Equity Market:

FTSE 100 Index

Consists of the 100 largest quoted companies by market capitalisation [½]
accounting for about 80 per cent of the total UK equity market capitalisation.

[½]

FTSE 250 Index

This index covers the 250 companies ranking below the top 100 companies by market capitalisation. [½]

FTSE 350 Super sectors Index

This index combines the 100 and 250 indices. [½]

FTSE SmallCap Index

This index covers all companies below the top 350 companies with a market capitalisation greater than a certain limit [½]

and whose shares are actively traded. [½]

It currently represents around 2% of the UK market capitalisation. [½]

FTSE All-Share Index

This comprises the 350 and the SmallCap indices. [½]

It accounts for around 98-99 per cent of the total overall market capitalisation. [½]

FTSE Fledgling Index

This index consists of the remaining, sufficiently marketable, quoted companies which are too small to be included in the SmallCap index. [½]

FTSE AIM Index Series

This series of indices covers companies traded in the UK Alternative Investment Market. [½]

These are companies which are too small or too new to apply for listing. The indices are calculated on a free float basis.

[½ for each index listed]

[Max 8]

- (iii) Clearly, the index adopted for benchmarking should reflect the objectives set out in the manager's mandate. [1]

If the mandate is unrestrictive regarding the equities that can be held, [1]

then an index reflecting the overall UK market would be appropriate. [½]

The best choice would probably be the FTSE All-share Index. [1]

If the mandate restricts the fund manager to the largest quoted companies, [1]

possibly for reasons of liquidity [½]

then the **FTSE 100 Index** [1]

would be an appropriate benchmark.

It may, therefore, be necessary to use a combination of the published indices [½]

to mirror the planned asset allocation [½]

set out in the Statement of Investment Principles. [½]

Alternatively, the equities held could be sub-divided into classes, [½]
 and each benchmarked to an appropriate index. [½]
 [Max 8]
 [Max Total 19]

Again candidates showed that they had learnt the core reading and did well in part (i), however when it came to applying that knowledge in part (ii) many did seem to struggle.

Q5 (i) Portfolio Manager

- **Anchor and adjustment –** [1]
 the portfolio manager would have formed a view as to the original view of
 the stock (anchor) [½]
 and then has been adjusting away from it as the price drops, [½]
 to have a revised position that still confirms their view. [½]
- **Overconfidence, Confirmation bias–** [1]
 people will tend to look for evidence that confirms their point of view [½]
 (and will tend to dismiss evidence that does not justify it). [½]
 Portfolio manager will ignore market consensus [½]
 and look for news articles which back his point of view. [½]
- **Regret aversion –** [1]
 holding the stock may minimise the possibility of regret. [½]
 The manager might be thinking the stock could recover [½]
 and does not want to miss out on the rise. [½]
 [Max 4]

Investor

- **Regret aversion –** [1]
 by retaining the existing arrangements, people minimise the possibility of
 regret. [½]
 Investor might be thinking the performance could turnaround [½]
 and does not want to cash in and miss out on the rise. [½]
- **Status Quo bias –** [1]
 people have a marked preference for keeping things as they are. [½]
 Investor might not want to change his current portfolio composition [½]
 so keeps this holding, to keep it the way things are. [½]

- **Overconfidence, confirmation bias –** [1]
 The investor might believe that he knows the portfolio manager better than other investors [½]
 and reads material that supports his point of view for retaining the manager. [½]
 [Max 4]
 [Total 8]

Any other sensible suggestion with reason should be given credit.

- (ii) **Primary effect** [1]
 – point of view that people will **select the first option that is presented to them** [1]
 [Total 2]
- (iii) The head of sales' strategy might be **sensible if they have some direct evidence** [1]
 that they get more business when they present first [½]
 rather than other positions. However, there is research that **people tend to pick the final option,** [1]
 known as Recency effect. Finally, there is further evidence to suggest that **an intermediate position is most successful.** [1]
 The head of sales must make a judgment based on experience or fact [½]
 not just an instinct. [½]
 [Max 4]
 [Total Max 14]

Other relevant strategies were also given credit.

In part (i) the question asked for TWO potential behaviours so those candidates who decided to give more than two only gained marks for the first two they mentioned with any other behaviours gaining no further credit. Overall this question was reasonably well answered.

- Q6** (i) Given the quarterly returns, the annual performance can be calculated as:

$$R = (1 + r_{q1}) * (1 + r_{q2}) * (1 + r_{q3}) * (1 + r_{q4}) - 1$$

This gives (rounded to 2 decimal places)

<i>Manager</i>	<i>Annual return</i>	<i>Outperformance relative to index</i>	<i>Rank</i>
A	15.24%	4.87%	3 (beat benchmark) [½]
B	8.59%	-1.79%	4
C	24.26%	13.88%	1 (highest performer) [1]
D	18.66%	8.29%	2 (beat benchmark) [½]
Index	10.38%		
	[1 for the column]	[1 for each]	

[Max 6]

- (ii) The Jensen measure is:

$$J = R_p - R_b$$

where $R_b = (r_f + \text{Beta}_p (r_m - r_f))$.

The covariance of the managers with the index and the standard deviation of the index can be used to find the beta of each manager as:

$$\text{Beta}_p = \text{Covariance (index, manager)} / \text{Variance (index)}.$$

Given that $r_f = 4\%$, this gives:

<i>Manager</i>	<i>Beta of portfolio</i>	<i>R_b</i>	<i>J</i>	<i>Rank</i>
A	1.02	10.51%	4.74%	3
B	0.61	7.90%	0.68%	4
C	1.51	13.63%	10.63%	1 (highest performer) [1]
D	0.71	8.55%	10.11%	2
	[½ each]	[1 each]	[½ each]	

[Max 9]

- (iii) The charity is risk averse so would prefer a lower risk manager. [½]
 The lowest risk manager is manager B. [½]
 However, the charity is looking to add returns from active management and manager B has underperformed the benchmark [½]
 so would not be suitable. [½]
Both manager C and D have delivered the highest risk-adjusted return [1]
 with the highest narrowly produced by manager C. [½]

However D has a much lower beta which may appeal to a risk adverse investor. [1/2]
[Max 3]

- (iv) Use of standard deviation rather than beta.

The appropriate measure of risk for an investor to use, within the MPT framework, depends on **whether the portfolio being considered represents all his assets or just a part of them** [1]

Where the portfolio represents the whole of the investor's wealth the appropriate measure is the standard deviation. [1/2]

If it is a subset of his assets, the appropriate measure is the portfolio beta. [1/2]

The reason for this is that the beta of a portfolio is a measure of its risk relative to a well-diversified portfolio [1/2]

and adjusting the return using beta tells us how good the manager is at picking out-performing securities, [1/2]

given the level of systematic risk assumed. [1/2]

Using standard deviation to adjust the return allows us to measure how well diversified [1/2]

the whole portfolio is as well as how good the manager is at picking individual stocks [1/2]

which produce an excess return relative to their betas.

[Max 3]

[Total Max 21]

In terms of average mark this question was the best answered, with part (iv) being the only part that seemed to cause any problems. The lack of complexity in the calculations in parts (i) and (ii) meant there were fewer errors.

Q7 (i)

- Market risk [1/2]
is the risk relating to changes in the value of the portfolio [1/2]
due to movements in the market value of the assets held. [1/2]
- Credit risk [1/2]
is the risk that a counterparty [1/2]
to an agreement will be unable or unwilling to fulfil their obligations. [1/2]
- Operational risk [1/2]
is the risk of loss due to fraud or mismanagement [1/2]
within the fund management organisation itself. [1/2]

- Liquidity risk [½]
is the risk of not having sufficient *cash* to meet operational needs at all times. [½]
It is related to market risk in as much as the liquidity of the overall portfolio must taken into account in portfolio selection.
- Currency risk [½]
is the risk incurred when investing in assets that are denominated in currencies other than the investor's own currency. [½]
- Relative performance risk [½]
is the risk of underperforming comparable institutions [½]
[Max 6]

(ii) **Hedge Fund**

- Operational risk – [½]
the risk of fraud or mismanagement in the funds/managers in which they are investing. [½]
The firm could reduce risk by carrying out operational due diligence [½]
on the managers in which they are investing/invested [½]
to analysis fraud and mismanagement risk [½]
Operational risk within the fund itself is also relevant [½]
- Liquidity risk – [½]
the fund is investing in illiquid strategies [½]
which means it might not have cash available if there is a run of redemptions [½]
- Could reduce risk by changing investment rules to include more liquid strategies. [½]
The terms and conditions of the fund of funds could be changed to have long redemption periods [½]
to match liquidity of underlying investments.

LDI

- Credit risk – [½]
most of the portfolio is invested in derivative contracts which are written with a counterparty [½]
The contracts are normally long-term. [½]
Should think about having the contracts collateralized. [½]
- Liquidity – [½]
If markets have moved in the wrong direction [½]
the investor will be out of the money [½]
which will fall due at a point in time [½]
Can implement controls such as frequent valuations [½]
so as to budget for cash flows as they fall due [½]
Another option is to collateralize [½]
so payments are spread over time [½]

Equity

Market –	[½]
risk that equity markets fall	[½]
and value of assets decrease. Not much that can be done in respect of the equity fund alone,	[½]
unless an options strategy is put in place to limit losses [½].	
Ensure that the investment manager has varied asset classes	[½]
so revenue not reliant on equity markets alone.	[½]
Relative performance –	[½]
at the moment the portfolio is unconstrained,	[½]
which could mean performance could be substantially different to benchmark-aware global equity funds.	[½]
Could instigate tracking error ranges	[½]
to benchmark or maximum and minimum deviations	[½]
from individual stocks in the benchmark.	

[Max 12]

Credit was also given for other relevant points raised.

[Total Max 18]

Most candidates made a reasonable attempt at this question though some failed to consider what type of fund they were discussing in part (ii) and gave answers that were not appropriate. However, the fact that there were three types of fund given in part (ii) meant that candidates had opportunities to gain marks that were independent of the answers they had given elsewhere.

END OF EXAMINERS' REPORT