

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

September 2014 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

December 2014

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 accept bullet point style responses, handwriting that is too difficult to read will lose marks. It should also be stressed that “text speak” abbreviations are not appropriate for professional communications, including exam solutions, and will not be accepted.

Specific comments on the September 2014 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/practical application of theory to current or unusual issues in investment. Most candidates seemed to identify and understand the key issues being examined and 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 4 and 5, and the later parts of Questions 3 and 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.

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) The term risk budgeting refers to the process of establishing how much investment risk should be taken and where it is most efficient to take risk in order to maximise return. [2]
- (ii) A “feasible” set of asset classes that could be included in the portfolio (subject to any constraints specified in the mandate / investment agreement) are first analysed. This will consider the expected returns, volatilities and the covariances between asset class returns.

Some risk / return optimisation process is then used to select an initial asset allocation between the asset classes. A Value at Risk assessment will be used to determine the total risk budget – the risk tolerance in respect of the exposure to potential loss on the portfolio. The total risk budget is then allocated between strategic risk and (total) active risk, and finally the total active risk is allocated among the various asset managers.

It is important that the developing position of the chosen portfolio is monitored to assess risk exposures (increases and decreases in the value of the positions) and changes in volatilities and correlations. The portfolio will need to be rebalanced in the light of such changes, in order to keep the overall portfolio risk at the level defined as tolerable. [5]

[Total 7]

In answering part (ii), weaker candidates did not pay sufficient attention to HOW the risk budget would be determined. Instead, they focussed on how the budget would be administered once it had been determined.

2 (i)

<i>Portfolio relative to:</i>	<i>Published Indices</i>	<i>Other Portfolios</i>	<i>Benchmark portfolio</i>
<i>Pros</i>	Easy to do Data readily available, and accurate	Gives an indication of the cost or benefit of a strategy, relative to those adopted by other funds Shows relative manager skill in stock / sector selection	Benchmark portfolio can be constructed to reflect fund objectives Can be helpful in aligning fund manager's interests with liability requirements

<i>Cons</i>	Index may be inappropriate for investor's objectives	Comparison may be inappropriate if other funds have very different objectives or are exposed to very different conditions Lack of available data	
<i>General cons</i>	All methods look at past performance only, so are not a reliable guide to the future		
	Assessments do not take account of risks taken by managers		
			[6]

Candidates who suggested the use of risk-adjusted performance measures were also given credit.

(ii)

	<i>Year 1</i>	<i>Year 2</i>	<i>Total</i>	<i>Actual-Expected</i>
<i>Actual</i>	7.50%	5.50%	13.41%	
<i>Index return</i>	6.00%	5.50%	11.83%	1.58%
<i>Average return for similar funds</i>	6.00%	5.00%	11.30%	2.11%
<i>Benchmark</i>	4.40%	6.00%	10.66%	2.75%

[5]
[Total 11]

Candidates who analysed stock and sector selection performance attribution were also given credit.

Most candidates scored well on this question. However, it was very disappointing to see that some candidates added together the annual performance returns in order to calculate the two-year result.

3 (i) The principal aims of regulation are:

- to correct market inefficiencies and to promote efficient and orderly markets
- to protect consumers of financial products
- to maintain confidence in the financial system
- to help reduce financial crime

[2]

(ii) Specific issues within this scenario include:

“A new investment product”. The new product will need to comply with the existing legislative framework. As this is a new product there will need to be appropriate documentation describing the purpose and operation of the fund to investors.

“Returns linked to the global equity market”. This objective must be clearly set out and defined. Precisely what measure of global equity market performance will be used to determine the return on the new product? Will this be a “capital only” or a “total return”? Will it be gross or net of tax – if so, at what rate?

The treatment of income earned needs to be set out. Will the product provide regular income payments, or will these be reinvested?

Will the product be issued for a specified term, or in “open-ended” form? What will the charges be on early redemption?

What overall charges (initial and recurring) will be levied? Will there be any performance guarantees?

“Customer assets to be pooled centrally”. What arrangements will the bank make for the proper protection of customer assets (e.g. by segregation and identification of those assets)?

“Use derivatives”. Are there to be any limitations on the use of derivatives? How will associated risks (e.g. counterparty risk) be addressed? How will any associated margins and collateral payments be funded? In the event of losses (relative to the global equity market returns that the product will track), how will these be recouped? Does the firm have adequate financial resources (now and in the future)?

The staff responsible for the investment decisions related to the product should be adequately trained and properly supervised through well-defined compliance procedures.

“Marketed as a savings product”. The product appears to be marketed ambiguously as a savings product but could have a high level of risk attached, which needs to be clearly explained to potential customers.

“Marketed via the internet”. To market via the internet means that customers do not necessarily receive appropriate advice. This means firms should seek information from their customers about their circumstances and investment objectives. How will the bank seek this information from customers? How will information be provided to customers in an ongoing, comprehensible and timely way? What additional advice services will the bank offer to customers (and what charges will be levied for this)? How will the bank monitor against fraud, money-laundering and tax avoidance by customers? Customers should be allowed a ‘cooling-off’ period to withdraw from the contract.

“Marketed via direct selling”. The staff responsible for speaking to potential customers should be adequately trained and properly supervised through well-defined compliance procedures.

“...incentivised through commission.” How will possible conflicts of interest be avoided? How will the bank/sales team demonstrate that it is acting with due skill, care and diligence? What arrangements will be made for ensuring that the staff are suitable, adequately trained and properly supervised?

Within all the above points there should be an overarching principle that the firm should act with integrity and observe high standards of market conduct.

[11]

[Total 13]

As with most “case study” questions, candidates were required to use the specific information given in the question to frame their answer. Some candidates, however, produced a “generic” answer on the general subject of financial regulation with little reference to the points set out in the question.

- 4** (i) Recommend placing the correct answer as the 1st (or possibly the 2nd answer) because the last answer is probably most likely to be chosen (assuming the individual is attempting to read each answer).

If candidates are randomly choosing answers without reading them, then behavioural finance may not be very relevant. [2]

- (ii) Recommend placing the correct answer as the last answer because the first answer is probably most likely to be chosen (assuming the individual is attempting to read each answer).

If candidates are randomly choosing answers without reading them, then behavioural finance may not be very relevant. [2]

- (iii) The reasoning is based on the primacy effect, recency effect, anchoring and the effect of options.

Primary effect – people are more likely to choose the first option presented

Recency effect – in some instances, the final option that is discussed may be preferred.

Anchoring is a term used to explain how people will produce estimates. They start with an initial idea of the answer (“the anchor”). They then adjust away from this initial anchor to arrive at their final judgement.

A greater range of options tends to discourage decision-making.

In (i) the candidate's “anchor” could be considered to be the first answer, assuming that he/she read each answer and guessing, but they are likely to adjust away from it with each successive answer, making it less likely to be chosen.

The primary effect may be worn-off from this adjusting away. With the number of options being five, and with each requiring significant consideration due to the detail in each, it is likely that the effect of the greater range of options will discourage decision making – further reducing the primary effect.

This might leave the recency effect to be dominant – and result in candidates who read each answer and just make a guess, choosing the last answer. So placing the correct answer towards the start is likely to minimise the chances of the candidate just guessing the right answer.

In (ii) the candidate's “anchor” could again be considered the first answer shown – assuming that he/she read each answer and was guessing. There is only one further answer so the effect of adjusting away from the answer will be smaller than in (i). There is a lower number of options compared to (i) – this would mean decision making will be discouraged to a lesser extent – so impacting to a lesser degree on the primary effect and the anchoring effect.

The recency effect is likely to encourage the candidate to choose the last answer. However, the combined effect from both the primary effect and anchoring is likely to outweigh it, consequently the dominant bias would probably be to choose the first answer.

So placing the correct answer at the end is likely to minimise the chances of the candidate just guessing the right answer.

Other answers that showed application of the principles of behavioural finance were also awarded marks (e.g. regarding negative answers being less likely to be chosen, imaginable answers being more likely to be chosen, answers involving change being less likely to be chosen etc.). However, only points relevant to the described scenario were credited. For example, the question stated that the options “were all outlined in considerable detail”. Thus, references to “framing” were not generally relevant.

[9]

[Total 13]

- 5** (i) It is more likely that the pension fund and/or their investment managers will have the experience and expertise to invest in corporate bonds than to invest in credit derivatives. However, they might not have the expertise to directly invest in corporate bonds, e.g. they may not have individual corporate bond stock-picking expertise, and instead be relying on investing in a corporate bond fund.

Direct investment in corporate bond could be regarded as being easier to understand and cheaper to manage.

Direct investment in corporate bonds may be limited by restrictions, e.g. based on foreign ownership.

Administration arising from investing using credit derivatives is likely to be more involved and require additional administrative expertise, e.g. setting up an ISDA agreement.

The indirect investment using credit derivatives could in theory be carried using a pooled vehicle which invested directly using credit derivatives, e.g. an ETF. Alternatively, cash could be invested in government bonds with a credit derivative overlay to provide the required credit exposure.

Investing directly in corporate bonds, will likely result in a regular income in the form of coupon payments – investing in credit derivatives will usually not result in such cash flows. This may be an advantage or a disadvantage depending on the cash flow requirements of the pension fund. Where the pension fund does not require the cash flow, it may necessitate coupon reinvestment. The same consideration applies with regard to a government bond / credit derivative overlay structure.

Investing directly in individual corporate bonds may result in less diversification than investing using credit derivatives, unless the credit derivatives are also based on individual corporate bonds. Smaller pension funds may not be able to achieve adequate diversification directing investing in corporate bonds and instead may opt to invest in corporate bond funds for diversification reasons. The minimum unit size of the latter is likely to be significantly lower.

Alternatively, investment in corporate bonds may allow greater choice and diversification of exposure.

In recent years, marketability and liquidity in credit derivatives markets has been better than in the underlying corporate bond markets – making them more attractive from this perspective.

The greater marketability and liquidity is also likely to mean that transaction costs (bid/offer spreads etc.) are lower for investing using credit derivatives. If short-dated credit derivatives are used, any necessary rollover of contracts is

likely to result in additional costs. However, longer dated contracts are more likely for a pension fund.

Using credit derivatives would result in an additional counterparty risk – versus direct investment in corporate bonds. The size of the counterparty risk is linked to the credit rating of the intermediary involved.

Credit derivatives may enable longer durations to be available which might be more attractive for a pension fund with liabilities of long durations.

Credit derivatives may be short term in nature and be exposed to “roll risk” – due to the costs and risks associated with ‘rolling’ the positions.

There may be tax implications depending on the country of origin of the pension fund and could result in either strategy being advantageous over the other from a tax perspective.

Credit derivatives may be subject to more onerous regulation than direct investment in corporate bonds.

Credit derivatives can allow gearing and leverage – but may not be desirable for pension funds. The investment mandate may not allow use of credit derivatives due to say restrictions on the use of derivatives.

Over-the-counter credit derivatives could be customised to suit the specific requirements of the pension funds investment strategy – e.g. regarding duration.

In general, indirect investment is particularly suitable for small funds, although even large funds can sometimes benefit from vehicles investing in specialist areas which are outside the funds' own areas of expertise.

[12]

The question related explicitly to the new asset class. Some candidates discussed the use of derivatives in managing transitions between asset classes, but this was generally irrelevant, as was any suggestion that it was planned to reverse the switch in the short term. It was not generally appreciated that the use of credit derivatives in this scenario was to ADD credit exposure e.g. to a core holding in government bonds, in order to replicate the returns that would be expected from a portfolio of corporate bonds.

- (ii) The gearing and leverage available from using credit derivatives is likely to be of more interest to a hedge fund than to a pension fund. This is because the pension fund has underlying funds to invest, while hedge funds typically attempt to leverage their clients' funds.

Since investment mandate of the hedge fund clients is likely to be less restrictive than that of the pension fund investing in credit derivatives may be more feasible.

OTC customisation could be regarded as less important to a hedge fund than to a pension fund – unless it was part of a hedging strategy or as part of an arbitrage trade. [3]
[Total 15]

- 6 (i) As contributions and investment income all occur on last day of each quarter, the index returns need to be calculated on a similar basis using the yield at the end of each quarter. Assumptions underlying the calculations relate to the impact of tax, dealing costs and the accuracy of the data used.

Time weighted return (%)

Q1	Q2	Q3	Q4
(1.56)%	11.67%	6.49%	(5.51%) 10.61%

Money weighted return (%)

The quarterly returns are the same but the annual return is derived from

$$3,600(1+i) + 56(1+i)^{3/4} + 30(1+i)^{1/2} + 187(1+i)^{1/4} = 4,252$$

This can be approximated by

$$3,600(1+i) + 56(1+3i/4) + 30(1+i/2) + 187(1+i/4) = 4,252$$

(1.56)%	11.67%	6.49%	(5.51)% 10.23%
---------	--------	-------	----------------

Index time weighted return (%)

$$R(t) = ((I(t) * (1 + Y(t)/4)) / I(t-1) - 1) * 100$$

where $R(t)$ = total return for period t
 $I(t)$ = index value at time t
 $Y(t)$ = yield on index at time t

8.01%	11.96%	2.17%	(5.53)% 16.72%
-------	--------	-------	----------------

[9]

Not well answered, in general. The question explicitly specifies that “contributions and investment income all occur on the last day of each quarter” but some candidates ignored this and made alternative assumptions. Many failed to appreciate that the fund values given in the question therefore included the income items.

- (ii) Money and time-weighted are same for each quarter because cash flows occur at the end of each quarter, but annual is different and reflects time of cash flow v market movements.

Both under performed the index by a considerable amount.

The first quarter is the period accounting for all the under performance.

There is strong out performance in Q3.

Given the difference in income, capital return for the fund has been very poor. [3]

- (iii) Assuming that investment income is received at the end of the quarter (as specified in the question):

<i>Period</i>	<i>Fund Income</i>	<i>Index Income</i>	
Q1	52	41.4	<i>[3,600*1,603/1,500*0.043/4]</i>
Q2	60	41.9	
Q3	60	40.0	
Q4	68	44.2	
Total	240	167.5	

[2]

Again, this part of the question was not well answered. Weaker candidates applied the ANNUAL dividend yield to calculate the index income for the QUARTER. Few candidates calculated the quarter-end fund value based on the index performance in order to project the income.

- (iv) As can be seen the fund was invested in stocks that yielded 40% more than the average for the index.

It is likely that high yield stocks under performed in the year in question as overall the fund under performed the index by a considerable margin.

The fund manager may have a yield requirement. If this is the case then perhaps a different index should be used to monitor performance.

[3]

[Total 17]

7

- (i) Illiquid
Large size
Each property is unique
Non-exchange traded
Expensive to purchase and dispose of
Difficult to value
Purchase prices are often not disclosed
Requires a lot of on-going management
Provides real returns
Offers diversification from other asset classes

Risk of voids
Risk of obsolescence

[4]

- (ii) Direct – buying property outright
Investing in specialist property fund e.g. REITs
Investing in a property index (passive) fund e.g. ETF
Equities where underlying company has significant exposure to property (i.e. property developer)
Structured product with link to property returns
MBS
ABS
Swaps

[8]

(iii)		<i>Commercial office block</i>	<i>Residential housing block</i>	<i>Hotel rooms</i>
(a)	<i>Overall characteristics</i>			
	Liquidity	Illiquid	Most illiquid (non-prime)	Depends on location
	Size	Sizeable	Sizeable	May be resold in smaller lots – more marketable
	Uniqueness	Not particularly	Driven by location and infrastructure factors	Very location dependent (local transport links, visitor attractions)
	Expensive to trade	Less high (unless a high tax economy)	Highest	Lower purchase costs
	Difficult to value	Stable (stronger demand / more stable economy). Better price data available	Less stable (developing economy). Less reliable price data.	No actual physical property. Volatile
	Stability of value	Most stable – stronger demand / stable economy	Less stable	Driven by economic environment – more volatile
	Real returns	Yes	Largely, but depends on local conditions	No – volatile returns

	<i>Commercial office block</i>	<i>Residential housing block</i>	<i>Hotel rooms</i>
Risk of voids	Professional / company tenants – most stable	Retail tenants – greater risk of voids	Volatile / unpredictable. May be seasonal (and weather dependant)
(b) <i>Stability of income stream</i>	Most stable. Long leases with upward rent reviews	Will depend on location and economic conditions. Shorter leases. May be affected by political considerations.	Affected by local and international economic conditions (including exchange rates). Least stable.
(c) <i>Ongoing management</i>	Least expenditure needed – mainly maintenance of shared services.	Significant. Estate management costs plus resale / reletting of empty units.	Considerable expenditure needed to maintain quality and standards. Most expensive (but this may be borne by the hotel chain).

[12]

[Total 24]

Part (iii) was not well answered by weaker candidates, who failed to apply many of the characteristics identified in part (i) in assessing the alternative investments. There was insufficient appreciation that the portfolio of hotel rooms represented a source of rental income (akin to sale-and-leaseback) rather than a physical property investment.

END OF EXAMINERS' REPORT