

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

September 2013 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 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.

D C Bowie
Chairman of the Board of Examiners

January 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 will tolerate bullet point style responses, handwriting that is too poor to assess will lose marks. Likewise “text speak” abbreviations will not be accepted.

Comments on the September 2013 paper

This paper showed a welcome improvement in the quality of answers, with a corresponding higher success rate than in recent diets. It is hoped that this will continue in the future. 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 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 the later parts of Questions 11, 12, 13, 14 and 17.

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.

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.

- 11** (i) (a) A repo (or repurchase agreement) is a form of secured lending whereby an investor buys stock from a dealer who, in turn, agrees to buy the stock back again at a later date at an agreed price. Such deals are of a short-term nature. The repo market is very liquid.
- (b) RPI swaps (swapping fixed rate for “index” return).
- (c) Currency coupon swaps. (Exchanging a fixed interest rate in one currency for a floating interest rate in another currency. This is a combination of an interest-rate swap and a currency swap.)
- (d) Dividend swaps (exchanging the dividends received on a reference pool of equities in return for a fixed rate).
- (e) Volatility swaps (exchanging a fixed rate in return for the experienced volatility of price changes of a reference asset).

General characteristics of swaps were also credited (once) under (b)–(e):

- illiquid
- principal not exchanged
- OTC deals that introduce counterparty risk

While most candidates demonstrated a reasonable knowledge of these asset classes, many did not recognise that one leg of the swap contracts provides a fixed return.

(ii) Risks

Losses due to the counterparty defaulting
Liquidity risks when trying to disinvest
Rapid changes in interest rates leaving investors out of the money and unable to make collateral call
Cross-hedging risk
Basis risk
Risk of changes to the (external) index used as the basis for the swap

Mitigation

Only deal with high quality counterparties
Regular credit review of counterparty exposure
Diversification of counterparties
Regular collateral call to make sure that cover any in-the-money amounts
Invest only in more liquid end of RPI swaps curve
Ensure adequate modelling carried out to understand maximum collateral requirements.

Some candidates suggested incorrectly that RPI swaps could be “exchange-traded”, with clearing house credit risk cover. Similarly, any suggestion that credit default swaps could be arranged were not awarded marks.

12 (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

Well answered by most candidates

(ii) The financial markets will probably benefit from tighter regulation but the extra regulation will incur additional cost.

The new regulation is likely to reduce the size or at least the growth of the financial industry – due to financial services companies moving to more “friendly” countries.

The tighter regulation could be considered to be prudent – but all virtues taken to extremes become vices.

The new regulation is likely to hinder new entrants and probably reduce levels of competition.

The new regulation may result in some forms of moral hazard effect on the financial industry.

The new regime may inhibit the creation of new financial products.

The new regime may create a competitive disadvantage for local companies selling on international or foreign markets.

Improvement in reputation for prudence of local financial industry.

The regime may possibly reduce any information asymmetry in the market.

It may include a switch from Principles based regulation to Rules based – currently most financial markets have a significant emphasis on principles based regulation, more rules based regulation may moderate this somewhat.

One of the main rules in political economics is not to shock the system – a significant change from “friendly” to not very “friendly” regulation could be considered to be a “shock”.

The question asked for “possible implications of this change in regime”. Many candidates wasted time by exploring potential details of the new regulations.

13 (i) Advantages of top down

Top down approach is generally better for controlling risk of portfolio (e.g. by the use of load ratios or load differences) as it offers a more balanced diversified portfolio than bottom up.

Can be argued that more return comes from differences in asset allocation rather than stock selection.

Top down offers a big picture analysis of markets rather than getting lost in individual stocks as bottom up does.

Top down strategies can be implemented using cheap instruments such as futures rather than owning physical securities compared to bottom up.

Top down better for ensuring that liabilities are matched.

Advantages of bottom up

Bottom up focuses on individual stocks so seek companies with stronger returns rather than just holding a selection of stocks in a portfolio.

Bottom up allows more focus on absolute return investing rather than following more market returns in a top down approach.

Generally more sustainable than top down, less influenced by external factors that are hard to predict.

Generally well answered.

(ii) (a) Mining stocks

Investment strategy focussed on one sector although the mines could be focussed on different areas, such as consumables such as coal or iron or areas such as gold and diamonds.

The best investment strategy would involve both a top down and bottom up strategy. It is important to focus on economic factors that will drive demand for the various mined products, i.e. is there likely to be higher demand for gold.

Having used top down to look at mining sectors that look most favourable then use bottom up to select the best stocks in each sector.

(b) Investing in classic cars

With an area as bespoke as classic cars the real return on the portfolio will be the cars chosen as an investor would gain very little benefit from analysis on economic conditions as this will impact the market as a whole.

Therefore, bottom up approach seems most appropriate to choose the right cars that will generate the return.

(c) Fund exploiting differences in exchange rates

The factors that drive the differential in interest rates are economic factors not company specific factors.

Therefore, top down analysis would be used to determine pricing differentials and potential returns.

Many candidates discussed the efficiency of foreign exchange markets and the fact that anomalies would quickly disappear, but still recommended a “bottom up” approach despite this.

(d) Fund investing in fitness centre shares

This is a specific sector of the market so it would be expected that the focus would be on stock picking so bottom up analysis.

Although it would be a strongly bottom up approach there will be a top down element to it as the fund manager will need to decide which countries will offer the higher returns in the fitness sector industry.

Share prices of fitness centres are influenced by the amount of disposable income of people and also the perception of fitness in each country (both of which are top down factors).

Generally well answered.

- 14** (i) The principal function of custody is to ensure that financial instruments are housed under a proper system that permits investment for proper purposes with proper authority.

The custodian is thereby able to account independently for any financial transactions.

Custodians are usually banks or other regulated institutions. Fund management firms, who would at one time have included custody within their function, are increasingly outsourcing such activities. Custodians offer not only custody of documents but also a range of services such as:

- income collection
- tax recovery
- cash management
- securities settlement
- foreign exchange
- stock lending

Also, the custodian will often exercise voting rights on behalf of the manager or trustees. However, the custodian has no duty to investigate the *propriety* of instructions which appear to be in order (unless a specific monitoring function has been agreed).

Administration of investment activities in overseas markets is often a vital element of the custodian's role. Although the basic process of acquiring and disposing of an asset is essentially the same the world over, processes are very different in different markets. The infrastructure, payments system, clearing house and banking / settlement arrangements in many markets place the investor at varying degrees of risk.

Generally well answered.

- (ii) Eliminates one link in the settlement chain making process more efficient.
Eliminates the potential for sub-custodian error.
Provides securities lending and borrowing.
Carry out repo settlement.
Reduces administration.

Many candidates struggled to identify relevant points.

- (iii) It is likely that prior to the requirement that many investors, particularly larger institutions, will maintain their own custody and record keeping functions as internal departments.

Smaller investors will use third party providers as they lack the scale and internal expertise to operate such functions in-house.

To move to the new environment will mean that internal teams will need to seek regulatory approval, or that the activity they carry out will need to move to external firms.

This will be disruptive in the short-term during the transitional period and result in setup costs for investors, and potentially a higher ongoing cost.

It is likely that both the regulator and institutions will need a considerable period to achieve a smooth transition.

The introduction of regulation may result in moral hazard (e.g. lack of scrutiny).

There may not be sufficient numbers of regulated custodians available.

Again, many candidates found difficulty in applying their knowledge to this scenario.

15 Maximum that could be held in non cash assets

Maximum that could be held in non domestic assets

They might prohibit investment in a particular asset class completely

Might impose the maximum that can be held in any one security or asset class/sector

Prohibit the use of some asset classes, such as using derivatives for speculation rather than hedging or the use of private or unquoted equities.

Impose various liquidity constraints

Ethical or social limitations

Compulsory investment in registered investment schemes (which themselves have strict guidelines such as well diversified portfolios and risk controls).

Require minimum levels of wealth or cash before non-cash assets can be used.

Restrict short selling.

Require minimum holding / investment period.

Generally well answered, although some candidates suggested “standard” points such as requiring the use of financial advisers or using tax systems to encourage specific investments. The question specifically asked for “restrictions on the type of investments that can be held”, so these answers were not given credit.

16 (i) The return over a given period for an investor subject to income tax is:

$$\frac{I_2 - I_1 + (1 - T)(XD_2 - XD_1) - T(ACC_2 - ACC_1)}{I_1}$$

where I_1 , XD_1 and ACC_1 are the index number, the ex-dividend adjustment to date and the accrued interest respectively at the beginning of the period. Similarly I_2 , XD_2 and ACC_2 are the respective figures at the end of the period, T is the rate of tax.

The formula for the equity total return index

$$TRI(t) = TRI(t-1) \frac{I(t)}{I(t-1) - [XD(t) - XD(t-1)]}$$

was awarded half marks (since the question referred specifically to a gilt index).

$$\begin{aligned} \text{(ii) Return on day 2} &= [(171.86 - 172.52) + 0.8 (170.85 - 168.82) \\ &\quad - 0.2 (1.904 - 1.892)] / 172.52 \\ &= 0.005574 \end{aligned}$$

$$\text{TRI}(2) = 2797.01 \times (1 + 0.005574) = 2812.60$$

- 17** (i) The clean price is the price of a bond excluding any interest that has accrued (since issue or the most recent coupon payment).

The dirty price is the price of a bond *including* the accrued interest.

Thus clean price = dirty price – accrued interest.

*The treatment of accrued interest must be **explicitly** specified.
Generally well answered.*

- (ii) The “dirty” price of bond per 100 face value is found by discounting the net coupons and the redemption amount. No adjustment is made to exclude accrued interest.

$$\begin{aligned} \text{So, dirty price} &= 102 / 1.0715 + 0.7(2.5 / 1.0100 + 2.5 / 1.0403 \\ &\quad + 2.5 / 1.0715) \\ &= 95.1919 + 0.7 \times (2.4752 + 2.4031 + 2.3331) \\ &= 100.24 \end{aligned}$$

*Any suitable day count was acceptable in determining the discount factors.
Some candidates struggled with this “basic” evaluation. Errors encountered included calculating the coupon using the redemption value, omitting to net down coupons for tax, applying the income tax charge to the redemption value and failing to allow for the frequency of coupons.*

- (iii) The investor has sold an option to the issuer.

Investors should assume that the issuer will exercise their right if this is beneficial to the issuer.

Since the bond is identical in all other respects, this bond will have a lower market value than the original bond.

*Many candidates failed to recognise that the **issuer** had the option to extend.*

- (iv) The difference in price between the two bonds will reflect the likelihood of the option being exercised (driven by interest rate volatility and time to expiry)...

...and the value to the issuer in exercising the option (driven by the forward interest rate relative to 5%)

Therefore near to expiry the main reason why the price differential would be volatile is due to high interest rate volatility, and the forward interest rate being close to 5% (the interest rate applying to the extension).

Supply / demand for each bond.

Threat of changes in future tax treatment (in the extension period).

Some candidates had difficulty applying the basic "Black-Scholes" assessment to the scenario given.

- 18** (i) To improve future performance
Comparison of the rate achieved relative to a target rate of return
Comparison of performance against other portfolios or index

Well answered.

- (ii) Calculate and show outperformance or underperformance for:

- (a) total portfolio return compared to total benchmark return

	<i>Period 1</i>	<i>Period 2</i>	<i>Combined</i>
Benchmark return	12.70%	8.55%	22.34%
Total portfolio return	12.00%	8.93%	22.00%
<i>outperformance</i>	−0.70%	0.38%	−0.34%

- (b) portfolio return for each sector compared to benchmark sector return

Sector return	<i>Period 1</i>
Industrials	12.5%
Benchmark	12.0%
<i>outperformance</i>	0.5%
Utilities	9.2%
Benchmark	10.0%
<i>outperformance</i>	−0.8%
Financials	13.2%
Benchmark	15.0%
<i>outperformance</i>	−1.8%

- (c) attribution from stock performance at the total fund level

	<i>Period 1</i>	<i>Period 2</i>	<i>Combined</i>
Total Fund – stock	−0.85%	0.50%	−0.35%
	12.85%	8.42%	

- (d) attribution from sector performance at the total fund level

	<i>Period 1</i>	<i>Period 2</i>	<i>Combined</i>
Total Fund – sector	0.15%	–0.13%	0.02%

Some candidates failed to recognise that both managers contributed to “stock” performance.

The details of the calculations are set out in the attached schedule.

(a)	<u>Portfolio return</u>	<u>Sector portfolio</u>	<u>Stock portfolio</u>	<u>Total</u>
	0	100	100	200
	1	$(15 \times 1.1) + (20 \times 1.15) + (10 \times 1.12)$ $+ (15 \times 1.06) + (20 \times 1.2) + (20 \times 1.02) = 111.0$	$100 (0.25 \times 1.12 + 0.25 \times 1.10 + 0.50 \times 1.15)$ $= 113.0$	+12.0% 224.0
	2	$111.0 (0.15 \times 1.1 + 0.2 \times 1.2 + 0.1 \times 1.1)$ $+ 0.15 \times 1.15 + 0.2 \times 0.02 + 0.2 \times 0.02) = 121.6$	$113 (0.3 \times 1.15 + 0.3 \times 1.1 + 0.4 \times 1.02)$ $= 122.4$	+ 8.93% 244.0 + 22.0%
	<u>Benchmark return</u>	<u>Period 1</u>	<u>Period 2</u>	
		$0.35 \times 0.12 + 0.25 \times 0.1 + 0.4 \times 0.15 = \mathbf{12.7\%}$	$0.35 \times 0.15 + 0.25 \times 0.1 + 0.4 \times 0.02 = \mathbf{8.55\%}$	= +22.34%
	<u>Outperformance</u>	<u>Period 1</u>	<u>Period 2</u>	
		$12.0\% - 12.7\% = \mathbf{-0.7\%}$	$8.93\% - 8.55\% = \mathbf{0.38\%}$	+0.34%

(b)	<u>Period 1</u>	<u>Benchmark</u>	<u>Diff</u>
Industrials	$(15 \times 1.1 + 20 \times 1.15 + 25 \times 1.2) / 60$ $= 67.5 / 60 = \mathbf{12.5\%}$	12.0%	+0.5%
Utilities	$(10 \times 1.12 + 15 \times 1.06 + 25 \times 1.1) / 50$ $= 54.6 / 50 = \mathbf{9.2\%}$	10%	-0.8%
Financials	$(20 \times 1.2 + 20 \times 1.02 + 50 \times 1.15) / 90$ $= 101.9 / 90 = \mathbf{13.2\%}$	15%	-1.8%

“Average” sector weighting × sector benchmark performance

<u>Period 1</u>	<u>Period 2</u>	<u>Total</u>
$((25 + 35)/200 \times 1.12 + (25 + 25)/200 \times 1.1$ $+ (50 + 40) / 200 \times 1.15) - 1 = 12.85\%$	$((30 + 35) / 200 \times 1.15 + (30 + 25)/200 \times 1.1$ $= (40 + 40) / 200 \times 1.02) - 1 = 8.43\%$	

Attribution from stock performance $12\% - 12.85\% = \mathbf{-0.85\%}$ $8.93\% - 8.43\% = \mathbf{+0.5\%}$ $\mathbf{-0.35\%}$

(d) Sector attribution – balance of difference
 $-0.7\% - (-0.85\%) = \mathbf{+0.15\%}$ $0.38\% - 0.50\% = \mathbf{-0.13\%}$ $\mathbf{+0.02\%}$

- (iii) In period one the portfolio underperformed the benchmark. This was driven by stock underperformance, especially Stock F. Sector performance provided a positive contribution in period one but was not enough to make up for underperformance of stock selection.

In period two the stock performance was positive whilst the sector performance was negative. Overall, the stock performance outweighed the sector underperformance which lead to positive return to benchmark.

For the total period the sector manager was in line with benchmark performance whereas the stock manager underperformed the benchmark. Overall, the sector manager was more successful than the stock manager over the period, although the fund would have performed better in a passive strategy.

Credit was given for any relevant comments based on the candidate's answer to part (ii).

END OF EXAMINERS' REPORT