

# INSTITUTE AND FACULTY OF ACTUARIES

## EXAMINERS' REPORT

April 2016

### Subject SA6 – Investment Specialist 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.

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.

F Layton  
Chair of the Board of Examiners  
July 2016

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

1. The aim of the Investment Specialist Applications subject is to instil in successful candidates the ability to apply knowledge of the United Kingdom investment environment and the principles of actuarial practice to the selection and management of investments appropriate to the needs of investors.
2. Candidates are reminded to ensure that their answers are sufficiently detailed to demonstrate understanding, as there were instances where inadequate explanations led to candidates scoring less well on questions than they might have done. The model solutions are intended to reflect the level of detail provided by a high scoring candidate. For many questions there are more marks available than the question requires to achieve full marks. This reflects that the examiners will give credit for valid alternative solutions, particularly in questions focussed on higher level skills.

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

This paper was relatively well answered. Candidates in general demonstrated a good grasp of Core Reading and were able to apply this knowledge in familiar situations. A number of candidates struggled to score well in parts of questions where higher order skills were being assessed, particularly where questions needed to be approached from “first principles”, or numerical analysis was required.

**C. Comparative Pass Rates for the past 3 years for this diet of examination**

<i>Year</i>	<i>%</i>
April 2016	45
September 2015	46
April 2015	62
September 2014	23
April 2014	28
September 2013	25

**Reasons for any significant change in Pass Rates in current diet to those in the past:**

It should be noted that the number of candidates sitting this exam is very low and so a reasonably stable Pass Rate should not be expected.

**D. Pass Mark**

The Pass Mark for this exam was 60%.

## **Solutions**

### **Q1 (i)**

- contributions are granted tax relief at the investor's marginal rate
- there is no tax on income or capital gains within the fund
- part of the fund may be taken as a tax free lump sum on retirement; and
- life assurance can be provided from contributions to the fund.

### **(ii)**

- investment trusts (including real estate investment trusts)
- exchange-traded funds
- unit trusts, open-ended investment companies (OEICs)
- structured products
- contracts for difference
- life insurance savings policies
- individual savings accounts (ISAs)

- (iii) As funds accumulate, life-style strategies typically try to reduce risk over time, by moving from growth to matching assets, avoiding high levels of risk close to retirement, when the savings are highest.

Additionally, younger participants typically have a higher risk appetite, as they have a longer time horizon for investment and higher human capital via future earnings.

A constant allocation to risk over time would imply a higher risk strategy is required in the early years when the asset value is low.

Conventional unleveraged funds may not provide sufficient risk to meet the risk appetite for younger participants

- (iv) The two main linear equity derivative based approaches that could be used are:

- Total Return Swaps on equity indices.
- Listed futures on equity indices.

Given the leverage objective, physical replication plus financing would not be practically possible.

The portfolio would most likely be constructed using cash collateral, invested in a cash fund to generate income and an overlay of equity derivatives.

- (v) Total Return Swaps on equity indices are traded OTC, introducing counterparty risk.

Other risks are roll risk, liquidity risk and the risk of financing costs increasing.

Listed futures on equity indices will have higher margin requirements compared to OTC derivatives and this increases the risk of not having sufficient collateral to maintain leverage.

Futures also introduce basis risk to the underlying and implicit roll costs. Additionally futures only available on price indices increasing basis risks due to dividends not being captured.

- (vi) Leverage management has the difficulty that due to variation margin and contract rolls, the fund's leverage ratio will fall in rising markets and it will increase in falling markets. This leads to a need to scale back exposure after a price fall or scale up exposure after a price rise. This may mean the fund ends up "buying high and selling low". Additionally there will be increased rebalancing costs.

There will also be "cash drag" due to the need to hold cash for margin calls.

When investing during the calendar month, the exposure may not be in line with the 3 times objective as leverage will vary during the month.

- (vii) A less frequent leverage management process will mean that leverage ratios drift further away from the 3 times objective before rebalancing.

Whilst there may be benefits in terms of reduced transaction costs, a further consequence is that it may not be possible to wait as long as 12 months before there is in particular a need to reduce leverage.

The manager would need to make a cash call or deleverage the fund by scaling back exposure, and this would need to happen as soon as relevant thresholds such as leverage limits are reached.

In more volatile markets, rebalancing will be more frequent.

Question 1 was the best answered question on the paper. Parts (i), (ii) and (iii) were well answered although only a few candidates achieved close to full marks despite these parts being largely knowledge and application based. Parts (vi) and (vii) were relatively poorly answered, and many candidates incorrectly assumed that the fund had the ability to request cash from or return cash to investors.

**Q2** (i) Fund proportions:

$$\text{Area A} = 40\% (400/1000)$$

$$\text{Area B} = 30\% (300/1000)$$

$$\text{Area C} = 15\% (150/1000)$$

$$\text{Area D} = 15\% (150/1000)$$

Local Index at 31/12/2014:

$$\text{Area A} = 100/5.5 = 18.1818$$

$$\text{Area B} = 100/1 = 100$$

$$\text{Area C} = 100/1.4 = 71.4286$$

$$\text{Area D} = 100/54 = 1.8519$$

Local Index at 31/12/2015:

$$\text{Area A} = 110/5 = 22$$

$$\text{Area B} = 112/1 = 112$$

$$\text{Area C} = 105/1.4 = 75$$

$$\text{Area D} = 110/60 = 1.8333$$

Benchmark return – N1:

$$\text{Area A} = (22/18.1818 - 1) * 0.5 = 10.5\%$$

$$\text{Area B} = (112/100 - 1) * 0.2 = 2.4\%$$

$$\text{Area C} = (75/71.4286 - 1) * 0.2 = 1\%$$

$$\text{Area D} = (1.8333/1.8519 - 1) * 0.1 = -0.1\%$$

$$\text{Total} = 13.8\%$$

Currency return:

$$\text{Area A} = (5.5/5 - 1) * 0.4 = 4\%$$

$$\text{Area B} = (1/1 - 1) * 0.3 = 0\%$$

$$\text{Area C} = (1.4/1.4 - 1) * 0.15 = 0\%$$

$$\text{Area D} = (54/60 - 1) * 0.15 = -1.5\%$$

$$\text{Total} = 2.5\%$$

Fund return:

$$\text{Area A} = (440/400 - 1) * 0.4 = 4\%$$

$$\text{Area B} = (360/300 - 1) * 0.3 = 6\%$$

$$\text{Area C} = (250/150 - 1) * 0.15 = 10\%$$

$$\text{Area D} = (150/150 - 1) * 0.15 = 0\%$$

$$\text{Total} = 20\%$$

N2:

$$\text{Area A} = (22/18.1818 - 1) * 0.4 = 8.4\%$$

$$\text{Area B} = (112/100 - 1) * 0.3 = 3.6\%$$

$$\text{Area C} = (75/71.4286 - 1) * 0.15 = 0.75\%$$

$$\text{Area D} = (1.8333/1.8519 - 1) * 0.15 = -0.15\%$$

$$\text{Total} = 12.6\%$$

$$\text{Outperformance} = \text{Fund return} - \text{benchmark return} = 20\% - 13.8\% = 6.2\%$$

$$\text{Stock selection performance} = \text{Fund return} - N2 = 20\% - 12.6\% = 7.4\%$$

$$\text{Asset allocation performance} = N2 - N1 = 12.6\% - 13.8\% = -1.2\%$$

Assumptions:

No tax, no cash flows during year, currency unhedged, no transaction costs or fees.

*Candidates were also awarded attempt marks where the method used was correct. A method separating asset allocation from currency performance was awarded full marks if properly calculated.*

- (ii) The fund has outperformed its benchmark – but due to performance derived from stock selection profits rather than asset allocation profits.

This is only one year of returns and performance should also be assessed over longer time intervals. However, the asset allocation performance is not only significantly less than the stock selection performance it is also negative. This is contrary to where the fund manager states that they are likely to create outperformance and it is inconsistent with their marketing literature.

More detailed analysis may be desirable to establish which investment decisions led to the asset allocation underperformance.

- (iii) Outperformance

$$\text{Hedge Fund X} = 11\% - 7\% = 4\%$$

$$\text{Hedge Fund Y} = 12\% - 7\% = 5\%$$

Betas (= correlation coefficient \* stdev fund / market stdev)

$$\text{Hedge Fund X} = 0.75 * 17/12 = 1.0625$$

$$\text{Hedge Fund Y} = 0.35 * 20/12 = 0.5833$$

Treynor Ratio (= (return on fund – risk free return) / Fund Beta)

$$\text{Hedge Fund X} = (11\% - 1\%) / 1.0625 = 9.412\%$$

$$\text{Hedge Fund Y} = (12\% - 1\%) / 0.5833 = 18.86\%$$

Sharpe Ratio (= (return on fund – risk free return) / Fund stdev)

$$\text{Hedge Fund X} = (11\% - 1\%) / 0.17 = 58.82\%$$

$$\text{Hedge Fund Y} = (12\% - 1\%) / 0.2 = 55\%$$

[Credit also given for net information ratio]

$E[R]$  using CAPM = risk free return + fund beta \* (market return – risk free return)

$$\text{Hedge Fund X} = 1\% + 1.0625 * (7\% - 1\%) = 7.375\%$$

$$\text{Hedge Fund Y} = 1\% + 0.5833 * (7\% - 1\%) = 4.5\%$$

Jensen measure – outperformance

Hedge Fund X = 11% – 7.375% = 3.625%

Hedge Fund Y = 12% – 4.5% = 7.5%

$E[R]$  using pre-specified standard deviation = risk free return + fund stdev \*  
(market return – risk free return)

Hedge Fund X = 1% + 0.17 / 0.12 \* (7% – 1%) = 9.5%

Hedge Fund Y = 1% + 0.2 / 0.12 \* (7% – 1%) = 11.0%

Pre-specified standard deviation – outperformance

Hedge Fund X = 11% – 9.5% = 1.5%

Hedge Fund Y = 12% – 11.0% = 1.0%

*Candidates were also awarded attempt marks where the method used was correct.*

(iv) **Commentary**

Hedge Fund X (HFX) outperformed the HFoF Index by 4% and Hedge Fund Y (HFY) outperformed by 5%.

The Treynor and Jensen measures are more suitable risk measures for parts of a portfolio, rather than a whole portfolio, in which case the Sharpe and Pre-specified standard deviation measures are the most suitable.

The Treynor and Jensen measures show HFY as performing better than HFX. Conversely the Sharpe and pre-specified standard deviation measures show HFX as performing better.

This indicates that if you looked at each individually HFY would be the clear preference, but if looked at as part of a portfolio, the difference is much less significant and HFX might be preferred.

HFX appears to derive a larger proportion of its total returns from market returns (“beta”), whereas HFY has more idiosyncratic returns (“alpha”).

**Limitations**

The results are based on past performance. Past performance is not necessarily a guide to the future.

The frequency of the performance assessment is important – it needs to be short enough to spot a problem and long enough so as not to be spurious.

The two hedge funds might have different objectives – so a direct comparison may not be appropriate.

The costs and benefits of performance measurement must be weighed in a similar manner so that the cost does not exceed the benefit.

Question 2 was reasonably well answered. Candidates with clearly set out reasoning scored well on parts (i) and (iii). Few candidates scored highly on part (iv).

**Q3 (i) Practical operation and investment characteristics**

Under a TRS an investor (the receiver in the TRS) will receive the total rate of return on the reference security.

The reference assets can be indices, bonds, loans, equities, property receivables, lease receivables, or commodities.

At the end of the defined swap term, or at pre-arranged interim periods, the receiver in the TRS receives the difference between the price of the security and the original price.

In return, the receiver makes on-going payments to the payer of the TRS. These payments are referred to as floating rate payment, or the funding cost to the receiver. The floating rate payment is often expressed as a spread to LIBOR.

TRSs are off-balance sheet transactions. Therefore they allow hedge funds and banks to synthetically increase (or reduce) the size of their balance sheet, whilst aiming to improve their rate of return on capital.

High cost borrowers who seek financing and leverage, such as hedge funds, are natural receivers in TRSs. Lower cost borrowers, with large balance sheets are natural payers. Consequently, the new hedge fund would be more of a natural receiver.

The payer is the legal owner of the reference asset, and generally holds it on its balance sheet.

The payer in the TRS has created a short position in the market risk for the reference asset and the credit risk for the reference asset, and vice versa for the receiver.

**Uses**

1. The primary use of a TRS is leverage/financing.
2. Balance sheet management / increasing the size of off-balance sheet activities to improve the organisation's rate of return on capital.



### 3. Efficient Portfolio Management

An organisation that cannot short a security may be able to hedge a long position by paying the return away via a TRS.

Deferring losses on an asset without risking further losses may also motivate a payer to use TRS.

Total Return Swaps allow:

Receivers to gain access to assets they may not be permitted to hold directly or able to source.

Receivers gain potential to earn a higher return on capital (but also risk earning a lower rate of return on capital due to the extra risk taken).

Receivers can reduce the administrative costs of buying loans, effectively outsourcing the administrative work to those with a comparative advantage in the field, e.g. outsourcing to the banks who initially made the loans.

Receivers can access entire asset classes via an index exposure, overcoming issues of size, complexity etc.

#### **Counterparty and liquidity risk**

Total return swaps are over-the-counter instruments.

Procedures for when any default on the reference asset occurs are included in the agreement, including whether or not the overall agreement terminates in this circumstance. Typically ISDA agreements will be signed between the receiver and the payer.

Counterparty risk is always an issue, but less so with high rated counterparties. It is more of an issue for the counterparty when the TRS has a significant positive value due to market movements (if uncollateralised).

TRS are typically collateralised, and variation margin will be required to cover mark to market movements. In some cases initial margin will also be required.

The relative liquidity of a TRS compared to trading in the underlying asset will depend on how developed the TRS market is in that asset. For relatively undeveloped markets liquidity will be lower than the underlying asset and vice versa. Similar factors apply to dealing costs.

(ii) **Factors to consider when setting up a new hedge fund**

***Business plan***

The former traders will need to put together a business plan to demonstrate credibility to potential investors and as part of prudential due process.

The business plan will enable a structured assessment of the commercial feasibility of the venture.

Ultimately the hedge fund will need to generate profits even if it is employee owned.

Consideration will need to be given to any potential to get seed capital for potential investors.

The group will need to be careful not to break any confidentiality clauses from their previous investment bank contracts, and this may restrict somewhat the potential clients who they can approach.

However, unless some clients of the bank have indicated an interest in investing in their venture, they would probably not have considered the idea in the first place.

Their investment track record in the investment bank will be important for attracting investors. It may be difficult to strip out their contribution to the track record of the investment bank. They may also be constrained by confidentiality agreements.

They need to consider whether they have sufficient expertise to run the new venture or whether there is a necessity to hire in additional expertise, e.g. marketing professionals, risk managers, compliance officers.

Some of these functions might be outsourced to a prime broker or other external party.

They are likely to need to investigate any financing (direct and indirect) that might be available to them. The direct financing is what might be available from banks / other institutions, including their former employer. The indirect financing will be necessary to use certain types of derivative products.

They need to consider the jurisdiction in which to establish the business and also the location of their office(s). The regulatory regime of different jurisdictions will need to be considered.

***Business strategy***

They need to consider their business strategy. Are they going to target retail or institutional clients or both? This will influence the back office and

marketing requirements on the business. They may look to outsource some of their back-office functions. The retail investors targeted are likely to be high net worth individuals.

They need to consider the range of funds within the hedge fund that they will offer to clients, or whether they will also have bespoke funds for larger clients. For example, will they be offering equity products only, or a limited range of asset classes, or multi asset funds, and/or structured products based funds.

They need to consider their fee structures. Initially they may need to offer attractive terms to get their initial clients on board.

### ***Business development***

They need to have a business development team that will be focused on winning new clients. This will likely involve interacting with investment consultants and other investment advisors.

Their initial track record will likely be important – achieving poor initial performance might be very detrimental for the business.

They will need relationship managers to manage relationships with clients and interactions with investment consultancies and investment advisors.

### ***Ongoing operation***

They need to consider the various ancillary business management tasks – for example portfolio management, regulatory compliance etc.

### ***Investment factors***

Decision needed on the type of hedge fund strategy to be followed (e.g. event driven, quantitative, equity long-short, etc.).

An investment process will need to be developed, including the formulation of trades, portfolio construction approach, and ongoing management approach.

Decisions will also be needed on the following, which are inter-linked:

- Return target
- Leverage
- Tracking error / risk budget

A liquidity management framework will also be required to ensure that there is sufficient collateral to meet foreseeable margin calls and liquidity to meet cashflow requirements.

The process will also need to consider how access to dealflow or origination is ensured.

(iii) (a) **Reasons for regulation**

Maintain confidence in the financial system  
Counterbalance asymmetry of information  
Correct market inefficiencies and promote orderly markets  
Help reduce financial crime

(b) **How this is achieved**

This is typically achieved through the following statutory oversight mechanisms:

Minimum capital requirements to reduce likelihood of funds having insufficient resources to meet their or their investors' liabilities

Other regulatory requirements (e.g. investor protection and conduct)

Powers to investigate and address systemic risks

There may also be voluntary codes of conduct alongside statutory regulation.

(iv) **Challenges facing regulators**

Misalignments of interest and other dis-functionalities need to be considered that might cause problems and damage confidence in the system.

For example: the regulator should foster professional ethics rather than just seeking mere compliance.

Misalignments of interests among hedge funds and their clients should be considered and addressed.

Misalignments of interest in the regulator are also important, as a dysfunctional regulator will not likely be effective in the performance of its duties to the general public.

The breadth and range of regulation needs to be considered.

The costs and benefits of regulation need to be considered, and weighed against each other, both generally and for individual elements of the regulations – and from the point of view of the general public, the regulator and the hedge funds themselves.

Furthermore, the likely limited resources of the regulator need to be considered.

Regulation should result in an improvement in the average level of functionality in the system, and in particular significant improvements in hedge funds with poor current levels of functionality.

Both minimum requirements and best practice guidelines should be considered to achieve these two aims.

The risks from setting minimum requirements too low and too high need to be considered.

Professionals are supposed to generate a trusting relationship with their clients. Functional trust is generated from competence, honesty and care. Each of these factors should be considered when assessing the likely levels of trust that will be achieved from any regulations.

The regulator needs to adhere to the principles of courage, strong benevolence and justice if they are to credibly achieve their goals and competently protect the public interest.

The regulator needs to consider the political economics of introducing new regulations and how they can deal with the hurdles that typically need to be overcome when implementing progressive reforms, namely (a) don't shock system, (b) protect the establishment and (c) don't disrupt or upset the balance of power.

Recognition that poor regulation can act against the public interest – in other words any increased, albeit not thought-through, regulations can result in unnecessary red tape, increased bureaucracy and unnecessary costs.

The regulatory regimes for hedge funds in other jurisdictions need to be considered. There is likely to be competition between regulatory regimes to attract better hedge funds to their jurisdictions. Smarter and more user-friendly regulations are most likely to make jurisdictions more attractive to hedge funds.

Hedge fund regulations should not unnecessarily hinder the comparative advantages of hedge funds, both generally speaking and for particular groups of hedge funds.

The absence of a global regulatory framework for hedge funds is likely to be problematic as many regulator issues are probably best addressed at a global level to avoid any race to the bottom among regulatory regimes.

The activities of hedge funds are likely to be more complex than those of other financial organisations – adding to the difficulties mentioned above.

Furthermore, derivatives markets which hedge funds are mostly likely to be using are mostly unregulated and have grown rapidly in depth and range in the last decade.

Global imbalances that are likely to have been produced by very low interest rates and QE for the last 6 years are likely to be problematic for financial

markets in general. They are likely to have an even larger impact on hedge funds given their likely greater use of leverage

The exponential growth in the size of derivatives markets (currently about \$700 trillion in size, about 20 times the size of the US economy) and the dominance of about 18 banks worldwide in these markets creates market imperfections which can spill-over – and again are mostly likely to impact hedge funds due to their greater than average use of leverage.

Some regulators have also attempted to impose limitations on short-selling, in an attempt to reduce market volatility.

Question 3 was reasonably well answered. Candidates generally scored well on parts (i), (ii) and (iii). Part (iv) was poorly answered, and many candidates struggled to generate a sufficient number of points in their answers despite credit being given for a wide range of relevant remarks.

## **END OF EXAMINERS' REPORT**