

# EXAMINERS' REPORT

*November 2014 examinations*

## **Subject F105 — *Finance and Investment Principles* Fellowship Principles**

### **INTRODUCTION**

The attached report has been prepared by the subject's examiners. General comments are provided on the performance of candidates on each question. The solutions provided are an indication of the points sought by the examiners, and should not be taken as model solutions.

### **QUESTION 1**

#### **Examiner's comments**

*Well-prepared candidates had no difficulty with this straightforward bookwork question.*

#### **Solution**

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 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).

## QUESTION 2

### Examiner's comments

*This question resulted in a wide variation in marks. Those candidates who knew the basic formulae obtained full marks, or very close. Those candidates who appropriately applied general reasoning were also awarded credit. The remaining candidates struggled to earn marks. Please note that if alternative formulae are provided, the examiners are guided by the core reading, although, for this example, alternative formulae would not have resulted in different answers.*

### Solution

$$100 = [(100 * 100) + (1000 * 10) + (10 * 1000)] / B(0)$$

$$B(0) = 300$$

$$I(1, \text{cum}) = [(110 * 100) + (800 * 10) + (20 * 1000)] / B(0)$$

$$I(1, \text{cum}) = 130$$

$$I(1, \text{ex}) = \{[(110-10)*100] + (800*10) + [(20-5)*1000]\} / B(0)$$

$$I(1, \text{ex}) = 110$$

$$110 = \{[(110-10) * 100] + (800 * 15) + [(20-5) * 2000]\} / B(1)$$

$$B(1) = 472.7273$$

$$I(2) = [(120 * 100) + (100 * 15) + (30 * 2000)] / B(1)$$

$$I(2) = 155.4808$$

$$TRI(1) = I(1, \text{cum})$$

$$TRI(2) = TRI(1) * I(2) / I(1, \text{ex})$$

$$TRI(2) = 183.75$$

Alternatively, using the formula:

$$xdA,1 = 100 * 10 / B(0)$$

$$xdA,1 = 3.3333$$

$$xdB,1 = 0$$

$$xdC,1 = 1000 * 5 / B(0)$$

$$xdC,1 = 16.6667$$

$$XD1 = xdA,1 + xdC,1$$

$$XD1 = 20$$

$$TRI(2) = TRI(1) * I(2) / [I(1, \text{cum}) - XD1]$$

$$TRI(2) = 183.75, \text{ as expected}$$

## QUESTION 3

### Examiner's comments

*Most candidates dealt reasonably well with this question. A minority of candidates failed to focus their answers to part (i) on the arguments in favour of passive management.*

## **Solution**

- i. The key elements will be that:
  - a. Very few active managers are able to beat their benchmarks over the long run, **after** taking into account fees. For those that do so in the short- or medium-term, it is as likely to be the result of luck as of skill, **or** taking on greater systematic risk **and** for the typical investor, it is impossible to select in advance the small minority that will outperform on a risk-adjusted basis over the long run.
  - b. This is not unexpected if markets are broadly efficient (semi-strong EMH), **which** would imply that it would be impossible for active investors to outperform the market on a risk-adjusted basis over the long run.
  - c. Passive management is therefore a viable alternative for most investors, **given** that it offers exposure to the chosen market(s) at a much lower management fee. It also removes the risk of underperforming a strategic benchmark.
  - d. It protects investors from risks such as exposure to the idiosyncrasies of the investment decisions of a single manager, represented by a small handful of individuals (specific asset manager risk), or from investing in more than one manager with contrasting styles which cancel out, leaving one with effectively a market portfolio at high cost. It also protects against style drift.
  - e. Tracking a broad market index ensures a well-diversified portfolio, likely better-diversified than an active portfolio.
  - f. Research suggests that asset allocation decisions have far greater weight in determining long-run performance than stock selection decisions.
- ii. One may take a partial replication approach, **using** a stratified sample of stocks on the index one is attempting to replicate, **where** the aim is to ensure that the sample reflects the overwhelming majority of the variation on the index. The stratification process will need to ensure that there is correspondence between the sample and the full set **with** regard to criteria such as economic sector, market capitalisations, and exposure to external influences such as commodity prices, offshore earnings and global economic conditions. A well-specified multifactor model, where the factors are carefully chosen to reflect the priced sources of risk in the market, **can** assist in identifying portfolios which move closely with the overall index universe. Alternatively, or in addition, if suitable derivatives are available on the index or subsets of it, **it** may be possible to construct a synthetic fund **of** cash and these derivatives which will broadly replicate the movements of the index.

## **QUESTION 4**

### **Examiner's comments**

- i. *Bookwork. Answered well by most candidates. Note that the question requires a definition of "statutory regulation", therefore neither the words statutory nor regulation must appear in the solution, as that is what must be defined!*

ii. *Most candidates made a reasonable attempt at this part of the question.*

iii. *Poorly attempted by most candidates. It was clear from the answers given that most candidates did not know what a listings authority is and how it functions, even though this is covered in the syllabus. Many candidates focused on the company specific requirements of a listing, rather than attempting the question from the perspective of the listings authority.*

## **Solution**

i. Statutory regulation

- In statutory regulation the government sets out the rules ...
- ... and polices them.

Key advantages

- It should be less open to abuse than the alternatives;
- It may command a higher degree of public confidence;
- Economies of scale can be achieved.

ii. Types of penalties

- A reprimand;
- a fine ...
- ... not exceeding a maximum amount;
- disqualification, in the case of a natural person, from holding the office of director or officer of a listed company ...
- ... for any period of time;
- suspension or termination of listing; or
- any other penalty that is appropriate in the circumstances.

iii.

- the manner in which securities may be listed or removed from the list or in which the trading in listed securities may be suspended;
- the requirements with which issuers of listed securities and of securities which are intended to be listed, as well as such issuers' agents, must comply;
- the standards of conduct that issuers of listed securities and their directors, officers and agents must meet; the standards of disclosure and corporate governance that issuers of listed securities must meet;
- such details relating to the listed securities as may be necessary;

- the steps that must be taken by the exchange, or a person to whom the exchange has delegated its disciplinary functions, for the investigation and discipline of an issuer, or director, officer or employee of an issuer, that contravenes or fails to comply with the listing requirements;
- the prescribed minimum information that must be made available to the public and any potential investor;
- the process for amending any of its listing requirements;
- the role of the supervisory authority in regulating the listing requirements (e.g. amendment, approval etc.)

## QUESTION 5

### Examiner's comments

*Overall this question could have been done much better given its simplicity.*

*Part (i) was bookwork, done well by many students.*

*Part (ii) was done incorrectly by many students. The most common mistake was to ignore the purchase of shares as part of the strategy, despite this being very clear from the question.*

*Part (iii) was therefore not done well.*

### Solution

(i)

Global Funds:

These concentrate on economic change around the world and sometimes make extensive use of leverage and derivatives. These funds will take a combination of long and short positions that reflect the fund manager's views on how macroeconomic factors such as the levels of international asset markets, interest rates and currencies will move. These views will depend on economic trends globally and major international events.

Event-driven funds:

These trade securities of companies in reorganisation and/or bankruptcy ("distressed" securities) or companies involved in a merger or acquisition ("risk arbitrage").

These funds invest to try and profit from price movements caused by anticipated corporate events. Securities, eg shares or loan capital, in "distressed" companies are often available at a price well below the par value. A hedge fund may feel able to make profits from buying these securities as:

- many traditional institutional investors will be unable or unwilling to buy these stocks so there will be less demand putting pressure on prices

- there are likely to be price anomalies which a hedge fund can exploit through research and expertise.

Either an active or a passive approach to investing in distressed securities is possible.

A risk arbitrage fund may simultaneously take long and short positions in both companies involved in a merger or acquisition. This typically is a low-risk, as opposed to a risk-free, strategy. The risk is that the merger or acquisition does not go ahead. This “event” risk is generally uncorrelated to overall market movements.

Market neutral funds:

This is the largest group. They simultaneously enter into long as well as short positions.

These funds aim to exploit inefficiencies in the markets by making stock selection profits, eg to take a long position in (buy) securities that the manager considers to be underpriced, and so expects to appreciate in value, and take a short position in (sell) securities that the manager considers to be overpriced and so expects to depreciate.

The extent of market neutrality varies between funds. Funds may be beta-neutral and/or currency-neutral. They may also be neutral in some more stringent ways – eg by equity sector or by size of company.

(ii)

Profit for shares purchased:

$$Y = 1m * (X - 50) \text{ for all } X \geq 0$$

Profit for call options written:

$$Y = 1m * R5 \text{ for } 0 \leq X \leq R50$$

$$Y = 1m * R5 \text{ for } R50 < X \leq R60$$

$$Y = 1m * R(65 - X) \text{ for } X > R60$$

Profit for put options purchased:

$$Y = 1m * R(45 - X) \text{ for } 0 \leq X \leq R50$$

$$Y = 1m * -R5 \text{ for } R50 < X \leq R60$$

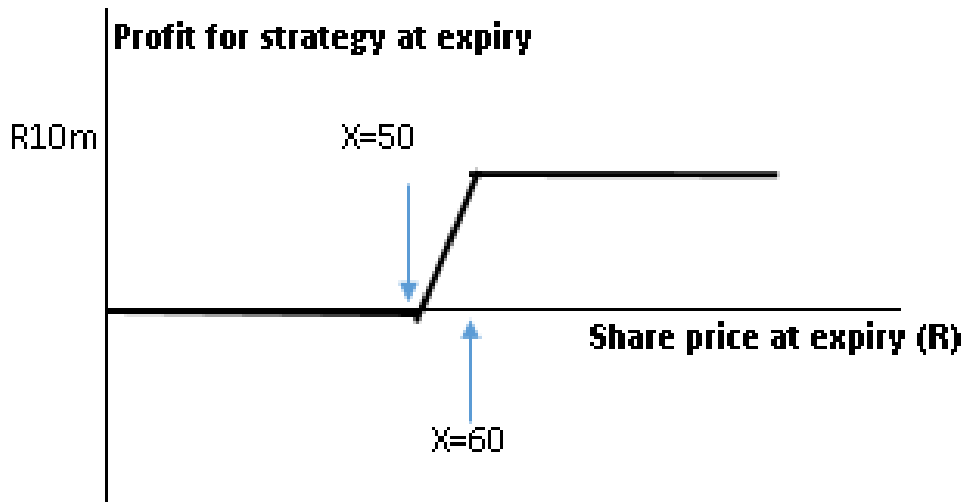
$$Y = 1m * -R5 \text{ for } X > R60$$

Profit for strategy:

$$Y = 0 \text{ for } 0 \leq X \leq R50$$

$$Y = 1m * R(X - 50) \text{ for } R50 < X \leq R60$$

$$Y = 1m * R10 \text{ for } X > R60$$



(iii)

The manager may be concerned with downside risk, and hence purchases put options to protect against losses. The manager offsets the cost of downside protection by writing higher strike call options possibly because he believes there is limited upside potential for the share price. This structure is known as a zero-cost collar, and can be used to protect existing long positions against downside risk for no net cash outflow (but at the cost of limited upside potential should the manager be wrong and the share price appreciates beyond the call option strike).

## QUESTION 6

### Examiner's comments

*A surprising number of candidates were unable to correctly calculate portfolio standard deviation in part (i) from the information provided. Few candidates were able to come up with an expression to calculate tracking error in part (ii), and many interpreted relative return as the excess over the risk-free rate rather than the benchmark.*

### Solution

i. The Sharpe ratio is defined as follows:

$$S = \frac{R_p - r}{\sigma_p}$$

where  $R_p$  is the portfolio return,  $r$  is the risk-free rate (4%) and  $\sigma_p$  is the standard deviation of portfolio returns. For the strategic allocation:

$$R_p = 0.6(0.12) + 0.4(0.07) = 10\%$$

$$\sigma_p = \sqrt{(0.6^2(0.2)^2 + 0.4^2(0.12)^2 + 2 \times 0.5 \times 0.2 \times 0.12 \times 0.6 \times 0.4)} = 0.14988$$

$$S = 0.40032$$

For the tactical asset allocation:

$$R_p = 0.8(0.12) + 0.2(0.07) = 11\%$$

$$\sigma_p = \sqrt{(0.8^2(0.2)^2 + 0.2^2(0.12)^2 + 2 \times 0.5 \times 0.2 \times 0.12 \times 0.8 \times 0.2)} = 0.17325$$

$$S = 0.40404$$

ii. Tracking error is the standard deviation of the difference between the portfolio returns and benchmark returns.

The difference between portfolio and benchmark returns =  $0.2 (R_E - R_B)$ .

$$TE = \sqrt{[0.2^2(0.2^2 + 0.12^2 - 2 \times 0.5 \times 0.2 \times 0.12)]} = 0.03487$$

Alternatively, with  $R_p$  denoting the tactical portfolio return and  $R_b$  the strategic portfolio return, one could evaluate tracking error as the square root of:

$$Var(R_p - R_b) = Var(R_p) + Var(R_b) - 2 Cov(R_p, R_b)$$

iii. There is a marginal improvement in Sharpe ratio, so on that basis it is perhaps viable. The use of the Sharpe ratio is appropriate since this portfolio represents the trust's entire assets, although the limitations of standard deviation as a measure of risk should be acknowledged, but additional measures of risk and risk-adjusted return would be useful in addition, e.g. Value at Risk or the information ratio. The central question is whether the additional expected return of 1% p.a. justifies the tracking error, given the trustees' risk tolerance. This ought to be established in discussion with the trustees. Consideration ought to be given to the trust's liabilities (in particular their term and any liquidity needs), as well as the level of free assets available to support a freer allocation strategy. It would be useful to highlight the potential risks to the trustees through asset-liability modelling: stochastically, or deterministically using scenario analyses.

It will also be necessary to ensure that the proposed allocation is compliant with any legislated or regulatory guidelines and with any self-imposed limits. The costs of the transition should also be considered.

## QUESTION 7

### Examiner's comments

*Overall this question was not done well.*

*Part (i) was done reasonably well.*



Part (ii) was very disappointing. Most students treated this as a straightforward bookwork question, and thus did not answer the question asked, answering in general terms and ignoring the details specified in the question.

Part (iii) was done correctly by a small number of students only.

## Solution

(i)

The risk of default on the bonds may have increased as a result of any of the following factors that rating agencies focus on:

- Fundamental risks of the industry have deteriorated
- The company's competitive position relative to peers may have deteriorated.
- As a result, the outlook for the company's profits may have deteriorated.
- Cash-flow generation may have deteriorated regardless of profits, e.g. if customers are no longer paying on time.
- A change of management strategy that will increase risks, or a change of risk appetite by the company.
- Reduced financial flexibility e.g. reduced ability to raise new debt to finance maturing debt.
- A deterioration in company financial strength (in terms of operating leverage, financial leverage, asset leverage or liquidity position).
- A deterioration in company operating performance (in terms of sources and trends in profitability and revenue composition).
- A deterioration in company market profile (in terms of spread of risk across different markets and event risk).

(ii)

- (1) Swap: Under this arrangement the company enters into an agreement in a year's time to pay floating rate in exchange for receiving a fixed rate.
- (2) Forward swap: The company enters into an agreement now to start paying floating rate starting in a year's time in exchange for receiving fixed rate.
- (3) Swaption: The company purchases a 1-year option now on a swap beginning in 1 year under which it will pay floating in exchange for receiving a fixed rate.

The main advantage of (1) and (2) over (3) is that no option premium is payable.

The main disadvantage of (1) is that the floating rate could fall before agreeing to fix the rate. (2) overcomes this disadvantage by agreeing the fixed rate now.

The main advantage of (3) is that if the floating rate rises over the next year, the company can decide not to exercise the option and instead enter into a more favourable swap in a year's time.

(iii)

$V = LA [R_x \Phi(-d_2) - F_0 \Phi(-d_1)]$  i.e. pay floating to receive fixed rate  $R_x$

$L=R10bn$   $m=2$   $n=10$   $T=1$

$A=1/m \sum P(0,t_i) = 1/(1.04)^2 \times a_{\overline{10}|}^{(2)} = 6.28251$  where  $i^{(2)} = 8\%$  p.a.

$F_0 =$  forward swap rate (Time 1 to 11 years)  $= i^{(2)} = 8\%$  p.a.

$$R_x = 7\% \quad T=1 \quad \sigma=0.2$$

$$d_1 = [\ln(8\%/7\%) + \frac{1}{2}\sigma^2] / 0.21 = 0.767657$$

$$d_2 = d_1 - 0.21 = 0.567657$$

$$\Phi(-d_1) = 0.221346$$

$$\Phi(-d_2) = 0.285134$$

$$V = R10bn \times 6.28251 \times [0.07 \Phi(-d_2) - 0.08 \Phi(-d_1)] = R141.4656m$$

## QUESTION 8

### Examiner's comments

i. *This part of the question was the most challenging and most candidates did not manage to score half the marks available.*

ii. *Bookwork. Generally well answered, although many candidates failed to explain how  $\beta$  can be utilized to manage the risk.*

iii. *Bookwork. Answered well by most candidates.*

iv. *Bookwork. Generally poorly attempted by most candidates, and even though the question specified "other than the issue of risk ...", many candidates mentioned risk! The question demanded a "discussion" and many candidates were able to correctly identify the issues, but failing to discuss these resulted in at least half the marks available being forfeited. Failure to properly read a question will result in losing out on easy marks, especially in a straight-forward bookwork question like this one.*

### Solution

- i. The limitations of using a "median of manager universe" benchmark:
  - Difficulty in identifying a universe of managers appropriate for the investment style of the fund manager
  - Selection of the manager universe will introduce subjectivity
  - Comparison with a manager universe does not take into account the risk taken in the portfolio
  - The median of a manager universe may not represent an "investible" portfolio
  - The benchmark may be ambiguous – the names and weights of the securities making up the benchmark are not clearly delineated, resulting in unavoidable structural risk
  - The benchmark is not specified in advance
  - The benchmark may exhibit some survivorship bias – managers that have gone out of business are excluded from the universe resulting in a measure that may overstate the performance of the managers included.
- ii. Systematic risk means the risk of an individual share relative to the overall market which cannot be eliminated by diversification.  
Systematic risk is measured by the beta factor:
  - A share with a beta greater than 1 is said to be aggressive, *ie* the price of the share is expected to do better than the market when prices rise.

- Conversely, a share with a beta less than 1 is a defensive stock, *ie* its price will be expected to fall by less than the market when prices fall.

iii. Treynor-measure:

$$T = (R_p - R_f) / \beta_p$$

Where:  $R_p$  = actual return on portfolio  
 $R_f$  = risk-free rate of return  
 $\beta_p$  = portfolio beta

*Credit was also given for the Jensen risk-adjusted performance measure.*

iv. Limitations and disadvantages associated with portfolio performance management

*Projection of past results:* the fact that a particular result was attained in the past does not mean that it will occur in the future. There is a random element in investment returns and it may be difficult to determine how much a fund manager's results are due to method and how much to luck. Furthermore a technique that proved successful in a particular set of circumstances may not work so well in changed circumstances in the future.

*Timescale:* determining the frequency of performance measurement calculations requires a delicate balance between assessing performance frequently enough so that problems can be spotted and corrected and avoiding spurious conclusions based on too short a measurement period.

*Differing fund objectives:* different funds may have different objectives and constraints. Comparisons between such funds may not be valid.

*Impact on fund manager behaviour:* knowledge of how, and how often he will be assessed is likely to influence the investment strategy of a manager. This may not be in the fund's best interests. For example, frequent monitoring can encourage a short term approach to investment. This has behavioural finance implications as a result of myopic loss aversion.

*Cost:* users of performance measurement services must balance the value of the service against the cost. Also, for a number of assets (e.g. property), valuation is difficult, time-consuming and very subjective. Detailed, frequent calculations based on subjective valuations are inappropriate.

## QUESTION 9

### Examiner's comments

*Overall, this question was reasonably well answered by candidates, but with a wide spread of marks achieved.*

*Part i was well answered, due to the wide range of reasonable points.*

*Part ii was pure bookwork.*

*For part iii, the majority of candidates struggled to differentiate between the specific risk asked in this sub-part and the broader concerns asked in part v. The majority of candidates therefore were unable to clearly identify and argue the specific risk. In contrast, candidates who recognised that the government is facing undiversifiable risk and argued this point comprehensively were awarded the majority of marks.*

*Part iv differentiated between candidates who were able to construct a logical argument using business and economic reasoning and those who were not. The former group scored well.*

*For part v, the confusion regarding part iii resulted in a large group of candidates being unable to generate and argue sensible additional points. For candidates who read part iii correctly, most marks were obtainable.*

## **Solution**

- i. Policy regarding taxation will affect demand for goods and services, including labour, because of its impact on prices.

Government can utilise taxation policy to provide incentives to targeted industries. This would be aligned with their macro-economic policy to stimulate growth.

Any other reasonable examples will be given credit.

- ii. Reducing the taxation on company profits.  
Reducing the taxation on dividends paid out of post-tax profits.
- iii. The companies within the industry are more correlated than with companies in other industries. Thus a large amount of specific risk associated with the tax incentive remains. This specific risk is further accentuated if brand name power has created dominant companies within the industry.

Durable consumer goods include cars, furniture, televisions and “white goods”, e.g. washing machines. Non-durable consumer goods include food and drink and tobacco.

This industry covers a large and varied range of products that accommodates a reasonable range of corporate structures. As such, the specific risk associated with this tax incentive should, however, be mitigated through reasonable diversification across companies.

Targeted tax incentives would result in cheaper after tax funding relative to other industries. This should result in a flow of investment funding from other industries into the consumer goods industry. This would result in further concentration of resources and investments, exasperating the specific risk.

- iv. Generally the impact of an economic cycle is less severe on non-durable goods companies than on general manufacturers. This is especially true for companies producing basic necessities. For these companies the effect of the tax incentive should not be distorted by the stages of the economic cycle.

This industry is likely to be primarily labour intensive, particularly in a developing country. Although the industry is becoming increasingly capital intensive, this should have less impact on a medium-term objective. Thus, in isolation, it should contribute to reduce unemployment.

There is moderate to high financial gearing for most non-durable consumer goods companies. Lower taxation means fewer assets need to be disinvested to pay tax which means a better asset cover which allows for greater financial gearing. These funds can then be utilised to produce more products and employ more people.

There are low profit margins. The impact of the tax incentive could therefore be significant. For example, the tax incentive could make marginal product lines more profitable and more attractive. Again, more people would need to be employed to produce the goods.

- v. The industry is becoming more capital intensive. The tax incentive may instead fuel greater investment in capital production instead of labour. This risk is greater if labour productivity is poor, which may be an issue in a developing country trying to combat unemployment.

The industry is becoming increasingly international. If other countries have a competitive advantage in producing consumer goods, the tax incentive may be used to cut prices to compete rather than investing in production. Whilst a more competitive industry should ultimately grow, this may be beyond the medium-term horizon.

Even if the domestic industry is competitive, a strong international brand may make it very difficult to take market share, e.g. Coca Cola.

Durable goods manufacturers are more affected by the economic cycle. The problem with this is that the absolute effect of a tax incentive is likely to be greatest around the peak of an economic cycle when employment is already around peak. And the reverse is true at the trough.