

EXAMINERS' REPORT

November 2019 examinations

Subject F105 — *Finance and Investment* Fellowship Principles

INTRODUCTION

The attached report has been prepared by the subject's Principle Examiner. 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

i. Financial risks:

- Market risk
- Credit risk
- Operational risk
- Liquidity risk.

Asset-liability mismatching risk is acceptable if the student specifies that this applies if the institution is investing to meet liabilities; Relative performance risk is acceptable if the student specifies that this depends on the nature of the institution.

ii. Suitability of bonds:

- Investing in government bonds can be considered to be a risk-free investment because:
 - credit risk is removed if the government is able to print more money to pay its debts.
- An investment in government bonds might not be free from financial risks because:
 - credit risk exposure would remain if the ability of the government to print money is not a route available to them if they use a shared currency, or wish to tie their exchange rate closely to something else (which a developing country might want to do).
- As the date of the liability is not known, this creates timing mismatch risk:
 - If the bond term is too short, there is considerable reinvestment risk;
 - If the bond term is too long, there could be market risk in selling the bond prior to maturity;
 - If the bond term is too long, there could be liquidity risk in that it may be difficult to sell the bond, or it may have to be sold at a discount.
- Even if the term was known, or almost known, there may not exist sufficient bonds of suitable term;
 - However it might then be possible to use an immunization strategy.
- Reinvestment risk for coupons contributes to risk and uncertainty.
- Fixed interest bonds match nature and currency of the liability.
- The market in government bonds is liquid and deep in terms of available terms.

iii. Reasons:

- The yield on developed country bonds may be higher than in the home country (allowing for likely exchange rate depreciation).
- The bonds in the developed country may be mispriced according to the investor.
- The investor may believe the developing country currency may be undervalued.
- The investor may be looking to diversify his portfolio.
- The developing country bond may be part of a world-bond index, and therefore part of the fund's benchmark.
- The investor may have liabilities in the developing country that need to be matched.
- Take advantage of differences in tax regimes.

Examiner Comments

Part (i) was a straightforward bookwork question and most students scored full marks.

For part (ii) a number of students suggested investments in corporate bonds and even in equity in order to give an enhanced yield. These suggestions did not score marks since the question specifically refers to government bonds.

Part (iii) was well answered with many students scoring full marks.

Overall, the question was well answered.

QUESTION 2

- i. Reasons to limit exposure to hedge funds:
 - To ensure diversification by asset class.
 - Due to liability matching considerations, the need to protect solvency and low risk budget.
 - To reduce risks associated with hedge funds arising from:
 - High gearing, the ability to short-sell and the extensive use of derivatives;
 - High risk complex strategies and past performance figures not well understood;
 - Lack of transparency.
 - Due to high fees charged by hedge funds.
 - Infrequent valuations might be problematic for the trustees e.g. determining exit benefits for members leaving the fund.
 - Poor liquidity e.g. due to lock-up periods.
 - Complex nature makes it difficult to model e.g. for ALM purposes – limit the proportion held to limit uncertainty.
 - To meet regulatory requirements or fund rules.
 - Hedge funds are not well regulated.

- ii. Market-neutral strategy:
 - The investor must identify market inefficiencies in prices of CDS:
 - on bonds that are very similar iro credit risk (to ensure market-neutrality) e.g. similar industry and;
 - on bonds of same term (to prevent a term mismatch).
 - The investor will then purchase CDS priced cheaply, and issue CDS priced more expensively:
 - CDS trigger conditions need to be identical such that either none or both CDS are triggered.
 - If there are credit defaults, the investor can offset his losses on the CDS issued with the gains made on the CDS purchased.
 - The net gain is independent of market conditions and whether there are defaults or not – the gain is solely due to mispricing of CDS on similar bonds.

Alternatively:

- The investor uses CDS on bonds instead of equity to execute long-short or event-driven strategies:
 - The investor sells CDS on bonds of companies expected to perform better than the market (in terms of probability of default), or alternatively buys the market index, and;
 - Buys CDS on bonds of companies expected to perform worse than the market (in terms of probability of default).
- If the investor is correct, the price of the CDS sold falls by more (or increases less) relative to the price of the CDS purchased; profit is realised by purchasing back the CDS sold and selling the CDS purchased.
- The strategy is market-neutral as the performance of the strategy is dependent on the performance of the CDS's relative to each other.

Only one strategy, properly explained, is necessary for full credit.

Examiner Comments

Part (i) was generally answered well. Students had to apply their bookwork knowledge of hedge funds to the typical needs of pension funds. Candidates that were well prepared managed to score well.

Part (ii) was not that well answered. The majority of candidates started out defining a market-neutral strategy and credit-default swaps. Many candidates then ignored the instruction that investments are in CDS's exclusively and would propose an arbitrage buying a credit bond and credit protection via the CDS and selling a risk-free bond, or vice-versa. Candidates were required to change the equity-based bookwork into a credit-based version using CDS's. It then follows that buying and selling protection on different bonds would be an appropriate strategy. Not many candidates managed to suggest this. As with equity-based market-neutral funds, if longs and shorts cancel out in terms of value, then the fund would hold an amount in cash.

QUESTION 3

- i. Insurance linked security (ILS):
 - This is a security whose return depends on the occurrence of a specific insurance event.
 - The event can be either related to non-life (e.g. catastrophe) or life risks.
 - ILS offers an insurer the ability to transfer risk from its balance sheet to investors in return for payment of a risk premium – alternatives to transfer risk include retention or reinsurance.
- ii. Biases:
 - Anchoring – this is the term used to refer to the fact that people base their views of the likelihood of an event on recent experience:
 - ABC management's decisions to reduce reinsurance over time due to an absence of catastrophic events, and their decision to increase cover after the recent event, could be due to the anchoring effect.
 - Dislike of negative events – the degree to which an outcome is considered negative or positive has a significant influence on an estimate of its likelihood:

- In general, people are optimists and overestimate the likelihood of positive events (e.g. the likelihood of a catastrophe not occurring and thus justifying a reduction of cover by ABC).
- Representative heuristics – people find more probable that which they find easier to imagine:
 - The recent catastrophe will make it easier to imagine this occurring again and thus justifying ABC increasing cover now.
- Availability – people are influenced by the ease with which something can be brought to mind. This can lead to biased judgements when examples of one event are inherently more difficult to imagine than examples of another:
 - The recent catastrophe is easily brought to mind and more easily imagined than this type of event not happening again, justifying ABC increasing cover now.
- Regret aversion – people want to minimise the possibility of regret (the pain associated with feeling responsible for a loss)
 - Management want to minimize the feeling of regret they will have if another catastrophe strikes and they did not take out reinsurance.
- Ambiguity aversion – people are prepared to pay a premium for reducing uncertainty
 - Taking out reinsurance cost money, but their net claim experience will be more stable
- Hindsight bias – events that happen will be thought of as having been predictable prior to the event; events that do not happen will be thought of as having been unlikely prior to the event.
 - When the catastrophe occurred, it might have then seemed predictable that it would happen at some point, so taking out reinsurance seems like a more obvious action.

iii. The role of the SPV:

- As the SPV is likely to be a separate legal entity, it provides protection to ABC from investors in the event of SPV assets being used to pay for future catastrophe losses and not being sufficient to meet investor payments. It also protects the investors from ABC's creditors, should ABC go bankrupt/default.

iv. The process for creating the catastrophe bond:

- The SPV establishes a reinsurance agreement with ABC.
- The SPV issues a note to investors; this note has default provisions that mirror the terms of the reinsurance agreement.
- The proceeds from the note sale are invested by the SPV in money market instruments and government bonds within a segregated collateral account.
- Reinsurance premiums are paid by ABC to the SPV and passed to investors as interest.
- If no trigger events occur during the risk period, the SPV returns the principal to investors with the final coupon payment. If trigger events occur, the assets of the SPV are first used to meet ABC's losses, before any return of principal (if any).

v. Factors to consider:

- Size of the issue, term and liquidity:
 - A large issue size should help improve liquidity;
 - Liquidity will be especially important for a long-term bond.
- Yield (after costs and taxes) offered on listing:
 - The yield should be consistent with other similar catastrophe bonds;

- The yield should be consistent with corporate bonds yields and risk-free bonds;
 - The margin above risk-free needs to be high enough to compensate the investor for the risk of a catastrophe.
- Catastrophe trigger event likelihood:
 - Long term trends should be used to assess this risk (expert views will be needed);
 - Level of losses to be incurred before trigger event (and extent of reinsurance prior to the trigger event).
- ABC risk management processes:
 - Spread of risks by geography and type of cover may help lower the impact and likelihood of a trigger event;
 - Need to assess steps taken to avoiding exposure to higher risk areas e.g. near flood plains, low-lying coastal areas.
- ABC credit rating considerations (as ABC is responsible for coupons in excess of risk-free returns):
 - ABC's capital position after the recent catastrophe;
 - ABC's strategy and forward-looking prospects;
 - Quality and sustainability of profitability and cashflow generating ability.
- Developing country political stability / market maturity:
 - Risk of unexpected controls/limits on repatriation;
 - Risk of unexpected taxes/expenses;
 - Risk of loss through fraud;
 - Developing country currency is likely to be particularly volatile.
- Credit risks (of SPV / bank issuing the bond):
 - If not credit rated, own assessment will be required.
- Bond investor's own objectives/restrictions:
 - The investor's benchmark may not include catastrophe bonds, this increases risk of underperformance;
 - Limitations/restrictions by geography, type of bond;
 - There may be liability matching considerations;
 - Investors risk appetite and time-horizon.
- Bond investors current portfolio:
 - Current spread by geography and types of bond – may already have high exposure in the region.

Examiner Comments

Part (i) was well answered.

In part (ii) candidates managed to find ways to present any of the bookwork behavioural biases as guiding management's thinking. None of the explanations given by students for over-confidence bias, myopic loss aversion, confirmation bias, mental accounting, framing or prospect theory seemed plausible.

Part (iii) was generally answered well, although many candidates did not recognise the nuance of role vs process (part iv). The marking took this into account by giving credit for part (iii) points made under part (iv) and vice versa.

Part (iv) was bookwork and well answered by many candidates. Unfortunately many candidates gave the right steps but left out important detail and lost marks.

Part (v) seemed to sift the candidates well: the question required candidates to cast a wide net, covering many angles, but also to delve a bit into each point. Some candidates managed to think widely, only to provide a list of things to consider, and not show further insight into modalities of each point. Others lost marks by fixating on a small number of points and then going quite deep.

QUESTION 4

i. Main reasons to regulate digital currencies:

- To protect consumers against loss of digital currency funds:
 - Information asymmetry is likely to exist because the migrants using the currency might not be that knowledgeable about the complex workings of digital currencies.
 - The individual using the currency are likely to be of a lower socio economic class, and a loss of funds would be a huge blow to them.
- To promote efficient and orderly digital currency markets – transfers should occur as expected.
- To maintain confidence in the financial system:
 - Many of those unbanked are presumably already skeptical of the financial system and great damage could be done if the system collapsed or money was lost or stolen.
- To prevent fraudulent activities from occurring via digital currency platforms.

ii. Possible rules under a statutory regulatory regime:

- Require approval to operate, and only approve a firm if:
 - Key individuals are fit and proper (e.g. no criminal record, suitably qualifications);
 - Initial independent audit to confirm credibility of processes.
- Require regular independent audits of processes, transactions and financials and submitted to the regulator.
- Require firms to submit transaction details (or summaries) to the regulator (e.g. for tax purposes, or for investigating fraudulent transactions).
- Require firms to contribute to a central fund to be used for compensating victims of digital currency fraud.
- Require firms to verify the identity of account owners.
- Require firms to immediately report unusually large or suspicious transactions,
 - And/or require approvals for number and/or size of transactions exceeding specified limits.
- Require firms to permit trading only in reputable digital currencies.
- Place restrictions on the types and levels of transaction fees chargeable.

iii. Direct and indirect costs:

- There are direct cost incurred by the regulator in developing and administrating the regulations:
 - These might be high given that the unfamiliarity of the issue and volumes of transaction data to be transferred and analysed;

- These costs are likely to be passed on to account holders thus penalizing the unbanked and lower socio economic classes, as well as the families receiving the remittances;
- Direct costs not borne by users or digital companies will be borne by taxpayers.
- There are direct costs incurred by the digital currency companies in complying with the regulations:
 - These costs too are likely to be passed on to account holders.
- There is an indirect cost in that the socio-economic benefit from using digital currency as a cost-effective remittance mechanism might be reduced.
- Indirect costs can arise from a change in the behaviour of consumers of digital currencies and regulated firms providing access to digital currencies, including:
 - Unbanked individuals may be discouraged from using digital currencies and resort to keeping cash which is more easily lost / stolen;
 - ...or resort to unregulated providers of remittance services;
 - Stringent regulations might act as barriers to entry for service providers, thereby reducing levels of competition in the market and accessibility to the unbanked;
 - A rules-based regime is likely to lead to a reduction in consumer protection mechanisms developed by the market itself;
 - Individuals might take less care in selecting their preferred service provider due to a false sense of security arising from the knowledge that the market is regulated.

Examiner Comments

Part (i) was well answered.

Part (ii) was less well answered with candidate struggling to generate a sufficient number of points. Reference to solvency and liquidity considerations, or deposits, is not appropriate because these companies are not banks. Some candidate described the three different types of regulation (i.e. prescriptive, freedom of choice and outcome-based). This was not considered to be a valid solution to the question.

Part (iii) was better answered. Candidates are reminded to tailor their solutions to the scenarios presented and not to simply regurgitate bookwork.

QUESTION 5

- i. Differences between anomaly and policy switch:
 - An anomaly switch involves switching between stocks with similar volatility, thereby taking advantage of temporary anomalies in price.
 - A policy switch involves taking a view on future changes in the shape or level of the yield curve and moving into bonds with different terms to maturity and/or coupons.
 - Anomaly switching is therefore a lower risk strategy than policy switching as the structure of the portfolio is not changed.

- Widespread use of computer-based analysis now limits opportunities for significant anomalies between similar bonds (i.e. anomaly switching opportunities) in most markets, while policy switching has not been limited in the same way.

ii.

$$\text{One – year forward exchange rate} = 15 \times \left(\frac{1.07}{1.03} \right) = 15.5825$$

$$\text{Two – year forward exchange rate} = 15 \times \left(\frac{1.07 \times 1.06}{1.03 \times 1.035} \right) = 15.9589$$

Value of one- and two-year forward rate contracts to the investor,

$$(0.12 \times 15 - 0.075 \times 15.5825)(1.07)^{-1} = R0.5900m$$

$$(1.12 \times 15 - 1.075 \times 15.9589)(1.07 \times 1.06)^{-1} = -R0.3137m$$

$$R0.5900m - R0.3137m = R0.2763 \text{ million}$$

Alternative method

$$\text{USD discounted cash – flow} = 1 \times \left(\frac{1 + \frac{0.075}{1.035} + 0.075}{1.03} \right) = 1.08121 \dots \dots \dots (A)$$

$$\text{ZAR discounted cash – flow} = 15 \times \left(\frac{1 + \frac{0.12}{1.06} + 0.12}{1.07} \right) = 16.49445 \dots \dots \dots (B)$$

$$\text{Value} = B - 15 * A = 0.2763$$

iii. Trigger events can include:

- A ratings downgrade.
- Missing a coupon payment or maturity proceeds (or part thereof).
- Cross-default: a credit event on another security issued by (or guaranteed) the SA government.
- Repudiation: a future government may dispute the validity of the bond terms and may decide not to honour its obligations.
- Moratorium: the current or future government may place a temporary suspension on its obligations due to short-term financial hardship.
- Debt restructuring: this includes a change in the terms of the debt causing the debt to be less favourable to debt holders.

Note: “Bankruptcy” is not a sensible event in the context of a government

Examiner Comments

This question was relatively well answered, with a few candidates even scoring full marks. In part (ii) some candidates treated the forward rates as spot rates. Candidates are encouraged to read the questions carefully. In part (iii), some candidates referred to the issuer as if it were a company, while the question makes it clear that it is the government.

QUESTION 6

i. Primary uses of options:

- Hedging
- Income enhancement
- Trading or speculation
- Arbitrage
- Portfolio transition management

ii.

- The borrower purchases put options on short-term interest rate futures to protect against interest rate increases:
 - Short-term interest rate futures are based on short-dated money-market instruments e.g. money market bills;
 - A put option on a short-term interest rate futures contract provides the right to sell the future so that if money market bill prices falls (i.e. short term interest rates rise) below the strike, the put option provides a positive payoff to compensates for the higher cost of borrowing.
- Alternatively the borrower could purchase call options on futures based on the level of interest rates (rather than the price of money market bills).
- This way a cap can be put on the interest rate to be paid for future borrowing, while still benefiting from a fall in rates.
- A borrower may be willing (or may need to) to give up the benefit of falling interest rates to help fund the cost of the put options by selling a call option on the same futures:
 - If money market bill prices rise (interest rates fall) above the strike the call option will be exercised leading to a loss on the option which cancels the benefit of lower interest rates on the loan;
 - By setting option strike process at different levels, a maximum and minimum borrowing interest rate can be set (a 'collar');
 - The calls and puts can be structured so that the overall price of the collar is nil ('zero-cost' collar).

iii.

Exercise Price	Call option expiry dates			Put option expiry dates		
	May	August	November	May	August	November
100	6	6	6	0	0	0
110	0	0	0	4	4	4
120	0	0	0	14	14	14

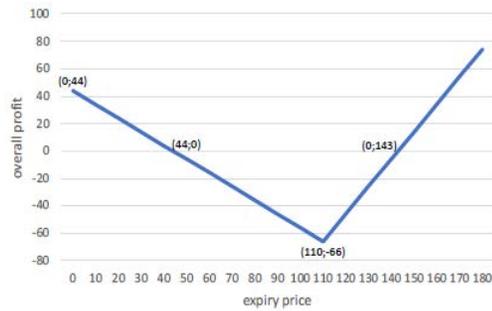
Alternatively:

Exercise Price	Call option	Put option
100	6	0
110	0	4
120	0	14

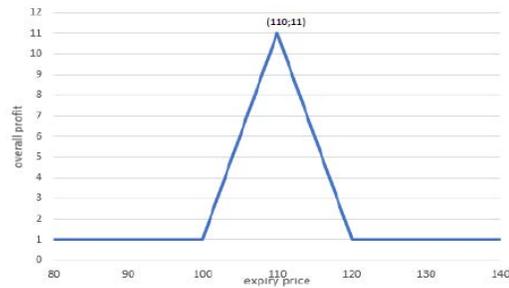
Award $\frac{1}{2}$ mark per option (by type and exercise price) i.e. $\frac{1}{2}$ mark per row of 3 correct entries (first table) or $\frac{1}{2}$ mark per correct entry (second table)

iv.

(a)



(b)



Max 4 marks per graph $\times 2 = 8$ Marks

v. For strategy (a):

- If the investor is expecting the share price to either rise or fall significantly a profit can be made from the payoffs:
 - perhaps as a result of general market price changes;
 - or as a result of an announcement expected which could impact the share price.
- The maximum loss is the cost of the premiums paid if the investor's expectations do not materialize.

For strategy (b):

- If the investor is expecting the share price to remain relatively flat over the period, then the investor can make profit from the net premiums of the transactions.
- The downside loss is limited given the buying and selling of the calls:
 - In this case there is always a positive profit presenting a risk-free arbitrage opportunity (in a liquid market this is likely to disappear quickly).

Examiner Comments

Part (i) Candidates all knew the bookwork for this part and almost all scored full points.

Part (ii) Candidates did not score well here. Many did not read the question, and described other derivative based solutions rather than the options on futures. Of those that did stick to the question, only some were able to explain how this would work and very few developed their discussion further to explain the zero cost collar

Part (iii) straightforward calculation question with the usual mixed bag of results.

Part (iv) Many candidates got the shapes of the graphs right, but lost valuable marks by not labelling the axes and intercept points.

QUESTION 7

i.

- Liability hedging is where the assets are chosen in such a way as to perform exactly in the same way as the liabilities in all states and in respect of all factors that influence liability values.
- Synthetic portfolio management can be achieved by hedging the pensioner liability cash flows using swaps, rather than directly investing in bonds.

ii.

- Deterministic modelling is a non-dynamic approach based on a single set of assumptions (a scenario) about future experience.
- The modeller decides the nature and extent of the scenarios to be tested, depending on the purpose.
- In contrast, a stochastic model treats the key parameters as random variables with a given mean and a defined probability distribution.
- A stochastic model will generate many possible future scenarios.

iii. The report is likely to include sections that correspond to the various stages of the ALM process:

- Key objectives
- Assumptions
- Data
- Description of the modelling methodology
- Nature of liabilities
- Progress of scheme in the future under different investment strategies
- Analysis of different asset mixes
- Summary of results
- Recommendations

iv.

- A likely result is that an optimised strategy will now show a reduced exposure to equities:
 - and a higher exposure to other investments that are not taxed,
 - e.g. bonds and property; or
 - a higher allocation to high dividend yield shares (if dividends are untaxed) and
 - a lower allocation to growth shares (if this is modelled).
 - Higher allocation to unlisted equities because they are not subject to CGT, and
 - Greater use of derivatives.
- Alternatively the ALM may still show the same allocation to be optimal, however with lower net returns.

- The exact effect will depend on the nature of the liabilities of the fund,
 - And also on whether the tax will be applied to retrospective gains or only future accrued gains.
- Overall the ALM is likely to show an increased cost of funding and/or lower projected benefits.

Examiner Comments

For part (i) many students ignored the fact that the question related to a pension fund, and gave a generic answer, which scored low marks. It is important to read the question carefully and take the scenario into account in the answer.

Part (ii) was generally well answered.

For part (iii) most students realised that the topics would correspond to the various stage of an ALM exercise and scored well.

For part (iv) some students stated that the new tax would not affect the results of the ALM since the tax is only payable when the shares are sold. However, this tax reduces the expected net yield and thus listed equities will be shown by the ALM to be less attractive than before.

Overall, the question was answered reasonably well.

QUESTION 8

- i. Financial industry characteristics:
 - Includes banks, general insurers, life insurers, investment companies, and real estate companies.
 - They tend to be capital intensive.
 - Banks are highly-g geared and have volatile profits:
 - Provision for bad debts usually increase when interest rates rise and during a recession;
 - The ‘endowment’ effect can help to offset bad debts when interest rates rise by increasing the returns banks earn on lending while their cost of funding on some of their borrowings does not.
 - General insurers have volatile profits (due to volatile claims) and usually no borrowings.
 - Life insurers have stable profits (realized over policy lifetime) and low gearing.
 - Labour costs are important for many companies in this group.
 - The domestic market is traditionally most important but there is increasing internationalization:
 - Reinsurance companies often have a high proportion of overseas contracts.
 - Highly regulated due to the importance of companies as custodians of savings, long-term promises made and systemic risks posed, and due to the nature and complexity of the industry.

ii. Manager’s suggestion:

- There are normally several reasons for using industry grouping for classification:

- Companies within an industry grouping tend to be very similar and exposed to similar factors:
 - Inputs/raw materials, labour, regulations, financial structure, markets.
- The asset management industry will be structured to analyse companies by industry:
 - Investment analysts tend to specialise by industry;
 - Statistics are usually available by industry grouping;
 - Financial statements are prepared in a similar way for companies within an industry group.
- After overall market movement industry grouping is usually the next most important factor in explaining a company's price change.
- The manager's suggestion may be valid if for companies in the local market there is:
 - Large variation between companies in the proportion of their foreign revenues, and
 - The local currency is highly volatile (which may be likely given that this is a developing country);

... Then the change in local currency value may explain a greater proportion of share price changes than industry.
- Even within industry groupings, if there is wide variation of foreign revenues earned, then industry classification may be a poor method for creating homogeneous groups of companies and proportion foreign revenue may be more effective.
- However if only using source of income to classify companies this will also lead to heterogenous groups of companies; industry classification is likely to remain a significant explainer of price changes after source of revenues;
 - An ideal solution might incorporate both proportion of foreign revenue and industry grouping;
 - However in a developing market there is unlikely to be a large enough listed share market to enable subdivision by too many factors.
- A more robust alternative should consider other ways that local companies are affected by exchange rates e.g. input costs for importers.
- The merit and justification for changing the method of classification and calculating indices will depend on how widely the new method will be accepted by the asset management industry and investors;
 - The proposed method may assist investors seeking to match liabilities by currency;
 - Inconsistency with foreign indices will make comparisons more difficult.
- There may be some merit in using both methods independent of each other i.e. carry on with the current method and introduce a new method of classification to provide additional insights to investors;
 - It may however be impossible to create historic index performance based on the proposed method.
- Practical issues:
 - Classification will not be straightforward as proportion of foreign revenues can only be ascertained from company financial statements;
 - The requirement to report foreign revenues in a prescribed and consistent way will complicate financial reporting and add to reporting costs;

- The proportion of foreign revenues are likely to vary significantly over time and for classification purposes would need to be determined from historic revenue, however a company's performance depends on its future proportion of foreign revenues;
- It may be difficult to decide on and obtain agreement on the levels of "high", "medium" and "low" foreign revenues;
 - And whether classification should be further split to reflect exposure to groups of foreign currencies based on correlations e.g. developing vs developed world currencies.

iii. Returns:

- Manager A TWRR = $130/200 \cdot 400/230 - 1 = 13\%$
- Manager B TWRR = $90/100 \cdot 180/140 - 1 = 15.7\%$
- Benchmark total return = $1262 \cdot (1.03)/1150 - 1 = 13\%$
- The trustee's calculation reflects a higher MWRR for Manager A:
 - Manager A MWRR = 40.7% p.a. [from $200(1+i) + 100(1+i)^{1/2} = 400$]
 - Manager B MWRR = 24.3% p.a. [from $100(1+i) + 50(1+i)^{1/2} = 180$]
- MWRR is influenced by the timing of cashflows:
 - Manager A's good performance after receipt of a large cashflow offsets his weaker performance in the first half of the year.
- As MWRR is beyond manager influence this is not a good measure of manager skill.
- TWRR is a better indicator, and on this measure Manager B is better than Manager A.
- However Manager A still managed to match the benchmark return.
- One year is too short to make any meaningful comparison and it would not be wise to make any decisions on this alone.

iv. Calculations:

First calculate Betas:

$$\text{Manager A} = (0.75)(0.15)(0.095)/(0.095)^2 = 1.184211$$

$$\text{Manager B} = (0.45)(0.075)(0.095)/(0.095)^2 = 0.355263$$

Treynor Measure:

$$\text{Manager A} = (0.12 - 0.06)/1.184211 = 0.050667$$

$$\text{Manager B} = (0.105 - 0.06)/0.355263 = 0.126667$$

Sharpe Measure:

$$\text{Manager A} = (0.12 - 0.06)/0.15 = 0.4$$

$$\text{Manager B} = (0.105 - 0.06)/0.075 = 0.6$$

Jensen Measure:

$$\text{Manager A} = 0.12 - [0.06 + 1.184211(0.10 - 0.06)] = 0.012632$$

$$\text{Manager B} = 0.105 - [0.06 + 0.355263(0.10 - 0.06)] = 0.030789$$

Pre-specified SD:

$$\text{Manager A} = 0.12 - [0.06 + (0.10 - 0.06) / 0.095 * 0.15] = -0.00316$$

$$\text{Manager B} = 0.105 - [0.06 + (0.10 - 0.06) / 0.095 * 0.075] = 0.013421$$

Information Ratio:

$$\text{Manager A} = (0.12 - 0.10) / 0.025 = 0.8$$

$$\text{Manager B} = (0.105 - 0.10) / 0.005 = 1$$

v. Comments:

- Both managers beat the benchmark, however Manager B did so with less risk.
- On all measures, Manager B is better - the risk return profile for Manager B appears superior
- Limitations of the results include:
 - The data period is only three years so difficult to be confident about repeatability – ideally want to measure managers over a full cycle;
 - Comparability and consistency of manager returns to the benchmarks should be tested e.g. should be net of all fees and taxes;
 - Investment restrictions and objectives might be different for the two managers;
 - Treynor and Jensen are based on the validity of the Capital Asset Pricing Model.

Examiner Comments

Overall this was done reasonably well, however there was a large variation in marks.

Part (i) was bookwork and generally done well.

Part (ii) marks varied considerably. Weaker students struggled to conceptualise the suggestion, made few points and usually made nonsensical assumptions and comments e.g. “companies with no foreign revenues are being excluded/ignored/biased against”, and these students tended to also be fixated about the weights to be used in a new index.

Parts (iii) and (iv) were simple questions and surprisingly few students got all the calculations correct – careless mistakes were often made in part (iii) and risk-adjusted measures are fundamentally important and easy bookwork, yet most students could not correctly calculate four measures.

Part (v) was another easy question and done well by the few students that produced sensible answers in part (iv).

END OF EXAMINERS' REPORT