

# **EXAMINERS' REPORT**

June 2013 examinations

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

### **INTRODUCTION**

The attached report has been prepared by the subject's Principal 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

### Examiners' comments

For part (i), few candidates appeared to recognise the difficulty of financial compensation or the undermining of investor confidence caused by insider trading, leading to adverse effects for all market participants. Part (ii) was better-answered, with most candidates able to suggest a reasonable range of possible actions.

i.

With insider trading, the key risk is that the damage cannot be undone and it is unlikely that the disadvantaged party could be placed in the same position had the insider trading not occurred, i.e. financial neutrality restored.

However, a few markets internationally recover funds from offenders by way of penalties and reimburse victims. To a degree, the damage can therefore be undone. Victims may of course approach the court and apply for their own private remedies.

Reduced investor confidence would mean that all investors would be affected. Lower demand for equities due to lack of confidence, with possible tighter preventative measures and increased compliance cost, may result in reduced returns.

ii.

Possible actions, in order of importance would typically consist of one or a combination of the following:

- Criminal prosecution with the possibility of imprisonment or a fine.
- Statutory civil action by the affected investors, possibly joined by the regulator.
- Disqualifying persons to be a stockbroker, a dealer or a director.
- Reporting the matter to the offender's professional body (if applicable) for them to take further disciplinary action.
- Administrative penalties.
- The establishment of an industry compensation fund.
- Name and shame.

## QUESTION 2

### Examiners' comments

With the exception of part (iv), this question was well-answered on the whole. Part (iv) required candidates to consider the opportunities and risks presented to the asset manager, and while many of these are related to the opportunities and risks presented to investors, candidates who considered only this perspective failed to score well.

i.

Passive management is justified by the view that markets are (nearly) efficient. The average investor in the market will receive average market returns before fees, therefore active performance must provide outperformance in excess of the fee differential to be justified. Market efficiency and competition rule out opportunities for such sustained outperformance.

ii.

Full replication involves holding every stock in the index in proportion to its index weighting (market capitalisation).

Partial replication involves the identification of a subset of shares which broadly reflect the investment characteristics of the broader index and should therefore move broadly in tandem. Factors to consider include weightings in industry sectors, size profile, and exposure to economic forces.

Full replication offers the advantage of more closely tracking index performance, thus realising lower tracking error, but partial replication offers lower transaction costs. However, research will still be required into the full set of index constituents to ensure that the stratified sample is appropriate. Partial replication comes at the expense of greater tracking error. Full replication involved holding all stocks, many of which may be illiquid, but does not require decisions to be made about portfolio constituents.

iii.

Creation of a synthetic fund: combination of cash and derivatives to broadly replicate index performance.

iv.

Opportunities:

- take advantage of reputation of new portfolio manager
- higher fees available for actively-managed portfolios
- compete for business of funds who choose to manage actively
- ability to grow and diversify book of business
- possible establishment of a core-satellite offering

Risks:

- main concern is relative performance risk
- risk of underperforming competitors, and
- risk of underperforming passive funds
- risk of undermining brand by moving into active management
- outperformance of passive funds by active fund could be damaging, undermining the rationale according to which your clients have thus far invested with you
- short track record of portfolio manager
- key-person risk

v.

Momentum: purchasing stocks which have recently risen in price and selling those which have recently fallen; and

Contrarian: behaving in the opposite fashion to most other investors in the market.

vi.

Anchoring and adjustment refers to the tendency to make estimates by starting from some initial anchor, which may be biased or irrelevant, and then adjusting from this based on data available. The pace of this adjustment is likely to be slower than would be optimal from a rational Bayesian perspective; thus as news relevant to the valuation of a stock comes into the market, investors may be slow to adjust their estimates away from the anchor (perhaps current price) and hence the price will incorporate the news only over some period of time.

vii.

Hindsight bias: the tendency to view events with the benefit of hindsight as having been more predictable than they were ex ante; and

Confirmation bias: the tendency to overweight evidence confirming one's bias/perspective, and underweight or ignore evidence at odds with it.

### **QUESTION 3**

#### **Examiners' comments**

This question was poorly answered. What was surprising was how the bookwork-related parts (i) and (ii) were badly answered, with a number of candidates not even attempting the straightforward part (ii), while the application part (iii) was better (but still not well) answered.

For part (i), the most common mistake was not answering the question asked, and those who did were not able to make more than two or three valid points. A number of candidates provided a general description of the uses of futures (e.g. for speculation, arbitrage, hedging,

etc.), or types of futures, while others listed the considerations prior to investing in futures (e.g. whether futures are an admissible asset class), none of which was asked for.

Part (ii) was well answered by only some candidates. Few candidates could define the “convenience yield”. A number of candidates did not provide the correct formula for the futures price, adding convenience yield to the spot price instead of subtracting it.

For part (iii) most candidates got a few valid points, however only a few candidates provided a good range of points to score well.

i.

Expected real returns over the long term should provide a good match for real liabilities:

- Continued growth in demand for commodities has led to a squeeze on limited supply in many raw materials, which has led to substantial rises in base metals, energy and certain other commodities.
- As the supply of commodities is progressively exhausted, supply will decrease and hence it may be expected that prices will increase.

However historical evidence for real returns from commodities in general has not been strong, e.g. technological improvements have led to more efficient ways to extract and utilise resources.

Commodities provide diversification benefits from real assets of equities and property:

- commodity futures are significantly influenced by short-term economic factors, rather than longer term expectations.
- In those environments that have produced the worst results from financial assets – rising inflation, excessive global demand, supply disruptions – commodities have produced higher returns than any other asset class used by institutional investors.
- The returns are based on real underlying economics, suggesting that a similar pattern of returns is likely to recur in the future.
- Unlike other asset classes, commodities are concerned with short-term supply and demand and short-term risk.
- Past returns have shown low correlation with other assets used by institutional investors.

However the markets are volatile, being driven by a number of factors unrelated to the underlying economic factors that affect fund liabilities.

ii.

**“contango”:**

In the valuation of commodity futures a distinction has to be drawn between commodities which are commonly held as investment assets and those which are held for commercial purposes.

For commodities, such as precious metals, which are held as investments, no-arbitrage arguments can be used to show that the value of a future must be given by a formula very similar to the one used for gilt and equity index futures:

Future price = spot price of underlying + cost of carry.

Here the cost of carry is the financing cost of holding the underlying, plus storage costs. Because the cost of carry is positive, the futures price is normally above the spot price. This is known as a contango market.

**“convenience yield”:**

In the case where the underlying commodity is not widely held as an investment there is no such simple mathematical relationship between the futures price and the spot price.

The usual situation is that there is a positive value to ownership of the physical commodity (e.g. as a protection against future shortages or in order to be able to take advantage of them by selling at a high price).

This value is described as the convenience yield of the commodity and the formula becomes:  
Future price = spot price + cost of carry – convenience yield.

**“backwardation”:**

When the convenience yield is higher than the cost of carry the futures price will be below the spot price, a situation known as backwardation.

iii.

Suitability of the index: comments on the Weights

- Weight based on \$ value of production seems sensible in the sense that this is a proxy for ‘economic exposure/importance’ of the commodity.
- Production figures for some commodities may be less reliable than other or the effective dates to which they relate may be out of line
- However annual production is likely to be very volatile e.g. impact of environmental influences such as floods and droughts on agricultural commodities.
- A balance between the above considerations can be achieved by use of an averaging period longer than 1 year e.g. use average annual production over the last 5 years.
- High supply of a commodity is likely to yield lower price, given stable demand; it is possible that returns on the index will be downward-weighted as a result (although mitigated by weights based on \$ value of production)

Suitability of the index: comments on the Constituents

- The index is a reasonably well diversified basket of commodities ; and large enough to be relevant - it’s likely that price inflation for fund members is to some extent influenced by prices of most constituents in the basket (i.e. a smaller basket might have been less relevant).
- As for the weights, annual consumption (which is to some extent based on production) is also likely to be volatile, so an average over a period longer than 1 year may be necessary.
- A desirable feature of an index is that it should be ‘investable’ i.e. investors can replicate the performance – it’s difficult for institutional investor to invest in physical assets. If available, the constituents should be easily tradeable assets e.g. futures contracts on the commodities.

### Suitability of futures

- The suitability will depend on the liquidity of the futures market.
- Also if it is OTC, it introduces credit risk which might not be wanted by the fund.
- Expenses of dealing in this futures contract might be too high (esp if OTC)
- Should consider other alternatives e.g. ETF and other instruments
- If the index is used for benchmarking an actively-managed commodities portfolio, the use of the weighted arithmetic average method is more suitable than other alternatives, e.g. unweighted geometric average.

## QUESTION 4

### **Examiners' comments**

This question was well answered. Credit was given for “Reputation” and “Business” risks if well explained and not similar to other types of risks listed by the student. Minor errors comprised listing “interest rate” and “exchange rate” risks in addition to “market risk” (when they are both specific examples of market risk). “Longevity risk” and “asset-liability mismatch” risks are specific examples of a broader category of “actuarial risk”.

i.

- market risk: volatility in value of portfolio due to changes in the market value of the assets.
- credit risk: risk of counterparty failing to fulfil its obligations.
- operational risk: risk of loss due to fraud or mismanagement in the financial institution.
- liquidity risk: risk of having insufficient cash to meet cashflow needs at all times.
- relative performance risk: risk of underperforming comparable institutional investors.
- actuarial (asset/liability) risk: risk of assets being insufficient to meet liabilities.
- regulatory or political risk: risk of unexpected changes to regulations affecting life companies

ii.

Marks were awarded for suitable examples and suitable mitigation strategies.

## QUESTION 5

### Examiners' comments:

The first two parts of the question were pure bookwork and candidates fared reasonably well. The third part was a reasonably straightforward application of performance attribution theory. The vast majority of candidates, however, struggled to achieve any marks. This is concerning as performance attribution is one of the more practical calculation sections in subject F105.

Notwithstanding the problems encountered with part (iii), most candidates were able to generate reasonable points for part (iv). For part (v), the vast majority of candidates did not recognise that free assets are actually a reasonable proxy for a life assurer's total net wealth, thus suggesting that the Sharpe measure is the more appropriate measure

i.

Strategic asset allocation describes the long-term benchmark allocation of assets between classes, usually driven by the liabilities.

Tactical asset allocation refers to short-term deviations from the strategic allocations, in the pursuit of higher returns.

ii.

Growth stocks are those which are expected to experience rapid growth of earnings and dividends.

Value stocks are those which appear cheap on some relative price metric or accounting ratio (e.g. PE ratio or book-to-market ratio).

Growth stocks are likely to have high recent earnings growth and high forecast earnings growth. They may also have seen upward revisions of forecast earnings.

Value stocks tend to have high earnings yields, or equivalently low PE ratios.

iii.

Notional Fund

	2012/06/30 b/f c/f's
Core	$105.00 * 50\% = 52.50$
Value	$105.00 * 25\% = 26.25$
Growth	$105.00 * 25\% = 26.25$
Total	$100.00 * (105/100) = 105.00$

	2012/06/30 after c/f's
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Core	$52.50 \times 80\% = 42.00$
Value	$26.25 \times 80\% = 21.00$
Growth	$26.25 \times 80\% = 21.00$
Total	$105.00 \times 80\% = 84.00$

	2012/12/31
Core	$88 \times 50\% = 44$
Value	$88 \times 25\% = 22$
Growth	$88 \times 25\% = 22$
Total	$84 \times (110/105) = 88$

#### Actual Style, Notional Stocks

	2012/06/30 b/f c/f's
Core	$105.00 \times 45\% = 47.25$
Value	$105.00 \times 40\% = 42.00$
Growth	$105.00 \times 15\% = 15.75$
Total	$100.00 \times (105/100) = 105.00$

	2012/06/30 after c/f's
Core	$47.25 \times 80\% = 37.80$
Value	$42.00 \times 80\% = 33.60$
Growth	$15.75 \times 80\% = 12.60$
Total	$105.00 \times 80\% = 84.00$

	2012/12/31
Core	$88.00 \times 45\% = 39.60$
Value	$88.00 \times 40\% = 35.20$
Growth	$88.00 \times 15\% = 13.20$
Total	$84.00 \times (110/105) = 88.00$

	Stock Selection
Core	$39.6236 - 39.60 = 0.0236$
Value	$35.7754 - 35.20 = 0.5754$
Growth	$12.6371 - 13.20 = -0.5629$
Total	0.0361

	Style Selection
Core	$39.60 - 44 = -4.4$
Value	$35.20 - 22 = 13.2$
Growth	$13.20 - 22 = -8.8$
Total	0.0

	Overall Relative Performance
Core	$0.0236 - 4.4 = -4.3764$
Value	$0.5754 + 13.20 = 13.7754$
Growth	$-0.5629 - 8.80 = -9.3629$
Total	0.0361

iv.

The free assets' portfolio is 0.0361% larger than if the assets had been invested notionally. The primary driver of this is the outperformance of the stock selection of the value manager relative to its benchmark- the free assets portfolio was 0.5754% larger as a result. This is, however, offset by the poor performance of the stock selection of the growth manager relative to its benchmark- the free assets portfolio was 0.5629% smaller as a result.

The performance attribution does not provide relevant information to analyse the tactical asset allocation ability of the multi-asset manager. This is because the style benchmarks are all the domestic all share index. Therefore the performance attribution will show a net zero for style selection.

From the gross figures, however, one can see that the multi-asset manager has allocated more to the outperforming stock-picker (Value). The multi-asset manager has also allocated the least to the worst performing stock-picker (Growth).

In order to do a proper performance attribution on the style selection, more appropriate benchmarks need to be chosen for the style portfolios. Domestic style-based indices would be more appropriate. This may, however, conflict with the mandates given to the specialist managers.

It is difficult to comment on the 0.0361% in isolation. Comparisons against other funds with similar mandates need to be done. Also, the performance attribution should be adjusted to allow for the additional active risk taken on. The excess TWRR of 0.0451% over the benchmark does appear to be low, however.

The performance attribution should also be done over a longer period, e.g. 3 years. This does, however, depend upon the purpose of the performance attribution.

The Core performance matches the benchmark exactly. This suggests that the Core portfolio is managed on a passive basis.

v.

	Free Assets' Portfolio	Average Equity Portfolio
Excess return	$10.0451\% - 7\% = 3.0451\%$	$9\% - 7\% = 2\%$
Treynor measure	$3.0451\% / 0.8 = 0.0381$	$2\% / 0.9 = 0.0222$
Sharpe measure	$3.0451\% / 7\% = 0.4350$	$2\% / 6\% = 0.3333$

Free Assets = Assets – Liabilities – Capital Requirements

The free assets are a reasonable proxy for the whole of the life insurer's net wealth. Therefore the appropriate measure of risk would be the standard deviation. This is because using standard deviation to adjust the return allows measurement of both:

- a. Diversification ; and
- b. Excess return relative to betas.

Therefore the Sharpe measure is the appropriate risk-adjusted performance measure.

43.50% of each risk unit is converted into excess return over the risk-free rate. It is difficult to judge whether this is reasonable in isolation. When compared against the average equity portfolio, this is, however, 1.3 times better. This may suggest that the free assets' managers in combination are performing better than the average equity portfolio manager on a risk-adjusted basis.

Additional investigations that are needed:

- a. Comparison against the domestic all share index ;
- b. Calculations over longer observation periods, i.e. a minimum of 3 years ;
- c. Comparison between the average equity mandate and the free assets' mandate ;
- d. Information ratio may be more meaningful.

## QUESTION 6

### Examiners' comments:

Part (i) was answered well by those candidates who made the effort to study this part of the syllabus, resulting in most of the marks being awarded. Most of the points were picked up on except the one relating to risk tolerance and/or risks taken within the portfolio. Some candidates misunderstood the question and provided answers relating to the admissibility of assets, rather than focusing on what is required by the core reading, which takes precedence in any question which examines bookwork.

For part (ii), most candidates could distinguish between specialist and balanced mandates but very few were able to provide the core reading definition of what is understood by "mandate" hence forfeiting easy marks.

Parts (iii) and (iv) were poorly-answered on the whole. Part (iii) required some higher-level thinking than just the obvious. In essence, it is expecting the candidate to list the "high-level" items that are included in an investment mandate. Very few candidates managed to produce more than the obvious points, hence resulting in very few scoring more than half the marks available. For example, whereas "performance measurement" is considered one item of an investment mandate, most candidates would list almost every aspect relating to performance measurement and produce a level of detail which was not required neither awarded any credit. Part (iv) required some higher-level thinking than just the obvious. In essence, it is expecting the candidate to list the "high-level" items that are included in an investment mandate. Very few candidates managed to produce more than the obvious points, hence resulting in very few scoring more than half the marks available. For example, whereas "performance measurement" is considered one item of an investment mandate, most

candidates would list almost every aspect relating to performance measurement and produce a level of detail which was neither required nor awarded any credit.

Part (v) was well-answered. Most candidates scored well in this part of the question but heed must be taken that the core reading would form the basis of the most appropriate answer in this instance, i.e. candidates should produce the four most appropriate permissible uses as dictated by the core reading.

i.

- Minimum or maximum permissible holdings in individual assets or asset classes;
- Limitations on risk tolerance or risks taken within the portfolio;
- Prohibitions on “self-investment” in the sponsor’s own securities; and
- Ethical or social limitations.

ii.

Definition:

- Mandate refers to the authority given to an investment manager by the owner of assets to manage their investments.

Types:

- Specialist mandate – authority to invest in one particular asset class.
- Balanced mandate – authority to invest in a range of asset classes subject to certain restrictions.

iii.

- Domicile
- Structure of the mandate, e.g. segregated, pooled etc.
- Commencement and termination provisions;
- Power and authority of the investment manager;
- Applicable currency;
- Investment objective (e.g. to beat inflation or return on index);
- Risk tolerance (e.g. tracking error or “active risk” that may be taken);
- Permissible investments, including foreign investment and specified maxima / minima;
- General and specific investment constraints, including use of derivatives;
- Performance measurement – benchmark and method of calculation;
- Service level agreements in terms of investing, disinvesting and reporting;
- Fees and how these are determined and when payable;
- Indemnity and Insurance arrangements;
- Dispute and complaint resolution mechanisms;
- Process for amending or renewing the mandate;
- General restrictions relating to SRI and ethical investments;
- Details of dependencies on third parties (e.g. IT platform; administration etc.), where relevant;

- Accounting and record keeping provisions;
- Tax and regulatory disclosures and compliance monitoring;
- Confidentiality.

iv.

Markets in futures and options can be highly volatile and investment in them carries a substantial risk of loss.

The high degree of “gearing” or “leverage” which is often obtainable in trading these contracts stems from the payment of a comparatively modest margin (or deposit) compared to the overall contract value. As a result a relatively small market movement can, in addition to achieving substantial gains where the market moves in your favour, result in substantial losses which may exceed your original investment where there is an equally small movement against you. Pension liabilities may therefore not be met, putting the pension fund at substantial asset-liability mismatch risk and insolvency risk.

v.

OTC markets are much less liquid (i.e. low marketability) and transparent than the markets in exchange-traded derivatives. Therefore, credit risk is a major factor as no clearing house as a guarantor and no margins are deposited.

Credit ratings represent the likelihood of repayment and therefore present a measure of credit risk. Issuers with high credit ratings are more likely to meet their commitments. Prescribing a minimum credit rating ensures that excessive risk is not taken in that exposure to poor credit risk is capped at the prescribed minimum.

vi.

- Varying the asset allocation of the portfolio
- Hedging or “protecting” the portfolio against adverse market movements.
- Managing market risks
- Rebalancing cash-flows in or out of the portfolio
- Arbitrage opportunities that may exist in terms of price anomalies

**END OF EXAMINERS' REPORT**