

EXAMINERS' REPORT

June 2012 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

Examiners' comments:

Part (i) was a straightforward bookwork question in which most candidates performed well. Some candidates wasted time by adding information on uses of bond indices, which was too specific for this question where students should have focussed on the most important uses of indices in general, as listed in the core reading. In part (ii) most candidates became confused between what the question asked and index-tracking, which is more specific than what the question asked. Hence, many candidates lost marks in this part. As a consequence, part (iii) was poorly answered with most candidates struggling to achieve any marks. It must be noted that the question specifically asked about limitations and ways in which to overcome these. Hence, both aspects of the answer should have been linked to obtain credit. Just randomly regurgitating the broader ways in which the limitations can be overcome showed little understanding and hence, no marks were scored in such instances.

Solution:

i.

The uses to which indices can be put include:

- a measure of short-term market movements
- providing a history of market movements and levels
- as a tool for estimating future movements in the market, based on past trends
- as a benchmark against which to assess the investment performance of portfolios
- valuing a notional portfolio
- analysing sub-sectors of the market
- as a basis for index funds which track the particular market
- to provide the basis for the creation of derivative instruments relating to the market or a sub-section of the market.

ii.

Methods:

The portfolio return could be calculated as e.g. either a time-weighted, money-weighted or internal linked rate of return, or any other suitable measure of return. Risk-adjusted performance measures, such as e.g. Sharpe or Treynor, could be applied to adjust for the risk profile of the portfolio.

The return is calculated by comparing the actual value of the portfolio at the end of the defined period with the value that would have been achieved had the initial value of the portfolio and subsequent net new money been invested in the same way as the index.

Relative merits:

Advantages:

- Relatively easy to do.
- Data is readily available.

Disadvantages:

- Published index may not be appropriate.
- No single index which is appropriate may be available.

iii.

Possible limitations and ways in which to overcome these:

Dominated by a few large caps, small cap stocks are largely neglected resulting in potentially insufficient diversification; may give a misleading indication regarding market direction.

Alternative weights that could be used include capped market capitalisation, or equally-weighted (or unweighted) indices.

Another disadvantage is that not all of the market capitalisation may be available for investment if some shares are tightly held such as in strategic holdings, which could make it difficult for asset managers to track index performance.

Alternative is to reduce market weights to what is available for trading (free float).

Another possible disadvantage is that in a market capitalisation weighted index, there is a tendency to overweight expensive stocks and underweight cheap stocks.

Alternative weights could be based on financial statement metrics instead, such as earnings, sales, cash-flow, book value, dividends etc.

QUESTION 2

Examiners' comments:

Parts (i) and (ii) were straightforward bookwork questions and those candidates who knew their bookwork did well in these parts. Few candidates were able to identify that in part (iii) three responses were required. Most candidates only focused on one or two of the aspects examined and lost out on valuable marks. Very few candidates were able to produce sensible explanations for the high P/E ratio.

Specimen Solution:

i.

Consumer goods companies:

- manufacture consumer durables and non-durables;
- generally the impact of an economic cycle is less severe on non-durable consumer goods companies than on general manufacturers;
- increasingly capital-intensive;
- importance of brand names;
- increasingly international;
- moderate to high gearing;
- low profit margins.

ii.

A fall in interest rates should be beneficial to consumer sector. There will be a reduction in debt repayments linked to the interest rates that the public has to make (e.g. mortgages) and therefore they should have bigger disposable income. Consumer goods companies with high gearing should also benefit from reduced interest charges.

Purchases of consumer durables, usually bought on credit, become more affordable whereas the non-durable consumer sector spending will probably remain constant. Hence, on balance the consumer goods sector should experience a positive outlook.

iii.

General:

P/E ratio can be used to distinguish between growth and value stocks and enable a growth or a value style manager to identify and select stocks to include in his portfolio.

“Cyclical companies” ratios move in sympathy to the economic cycle, defensive companies are relatively immune to the cycle, therefore P/E ratios can therefore help identify cyclical and defensive companies and assist the manager in determining how the portfolio will react with changes in the economy.

Large changes in P/E ratios can also assist the manager in identifying possible anomalies or errors in data.

Asset managers may use prospective P/E ratios to determine relative attractiveness between shares, especially within the same sector.

P/E ratio of 35.8:

Price is a forward looking measure as opposed to earnings which is historical.

It could be that the company Trading with low earnings as a start-up but expectations of high future growth.

Possibly a poor year last year for particular reasons and the market is looking through last year's poor earnings to future earnings.

The commodity that it sells may have greatly increased in value with consequent higher earnings potential

Growth investor:

Generally speaking, growth stocks are stocks that are expected to experience rapid growth of earnings, dividends and hence price. Therefore, a growth stock will typically have a high P/E ratio.

This is because investors will be willing to pay a high multiple of current earnings to buy into an earnings stream that they expect to grow rapidly in the future.

Therefore a growth investor would invest in this share, assuming that there are grounds to believe that earnings will grow rapidly, provided that it is allowed in terms of the investment mandate and that it is not an anomalous instance.

QUESTION 3

Examiners' comments:

This was reasonably answered by students.

Part (i): Most students scored some marks by identifying a correct strategy, but many missed out on marks through careless omissions. For example, many did not make the point about expiry date being the same for the put and call options, and most did not consider that it could take some time for the news to reflect in the share price after the conference, so a 2 week strategy might not be long enough. Most did not mention that the strike price should be set around the current share price (many students drawing a payoff and assigning various symbols to the strike price, but hardly ever relating this to the current share price).

Part (ii): Generally well answered although some students outlined a few risks despite the question asking for the key risk. Many mentioned credit risk without specifying that this is mostly only relevant in over-the-counter instruments. A number of students mentioned cross-hedging risk, even though in part (i) they specified that the options need to be on KTC shares.

Solution:

i.

Straddle:

Simultaneously buy call and put options on KTC, with same exercise price (around the current price), and same expiry date.

(Some time after the press conference which will allow time for the market to reflect the price impact of the announcement).

(Recognise other valid, properly-described strategies with similar outcomes, e.g. strangle, strip, strap.)

ii.

The key risk is that the price doesn't move significantly in either direction.

Perhaps because the announcement is not as major as expected, or its effects are indeterminate and buyers cancel out sellers, or the option expires before the market has managed to work the effects of the announcement into the price).

However, the relative loss is limited to the cost of the options.

QUESTION 4

Examiners' comments:

Overall this question was done very badly.

Part (i): Most students were able to calculate the forward price set at inception of the contract.

Part(ii): Most students were not able to do this part correctly. The most common approach was to use the no-arbitrage argument to derive the forward price at inception of a contract, not the value of the contract after inception as required by the question. Presumably most students took this approach because it is bookwork and were therefore able to attempt it, however many students could not even reproduce the bookwork correctly and many gave up after spending some time on this. Clearly students did not take the time to understand the no-arbitrage concept and therefore were not able to apply it as required in this question.

Part(iii): Most students correctly calculated the forward price of the new contract, but most stumbled in calculating the value of the contract already incepted. A few students got the latter calculation correct by realising that the value of the original contract was a discounted value of the difference between the two forward prices.

Part (iv): This part only required a very basic understanding of the assumptions underlying the formula that most students were able to recall in part (i), however this understanding seemed to be missing. A surprisingly low number of students realised that a published dividend yield figure is historic, while the assumption required for pricing a forward contract requires a prospective dividend yield assumption.

Solution:

i.

The forward price is F, which is given by:

$$F = Se^{(r-q)(T-t)}$$

where $r = 5\%$ is the risk-free rate, $q = 2.5\%$ is the dividend yield

$(T-t) = 1$ is the time to maturity of the forward contract in years

$S = 650$ the index level

$$F = 650e^{(0.05-0.025) \times 1}$$

$$F = 666.45$$

ii.

$$f_t = S_t e^{-q(T-t)} - K e^{-r(T-t)}$$

where:

S_t = price of the underlying asset at time t

K = delivery price on the forward contract

q, r = income yield on the underlying asset and risk free interest rate (both compounded continuously)

T = full term of the forward contract from inception to maturity

No arbitrage argument:

An investor shorts a current (new) forward with delivery price of $F_t = S_t e^{(r-q)(T-t)}$, while at the same time borrows an amount (V) to enable him to purchase the long position on the original forward with delivery price of K . Under no-arbitrage the following relationship applies at delivery:

$$\text{Receipts} - \text{Outgo} = 0 \text{ ie } F_t \text{ \{or } S_t e^{(r-q)(T-t)} \} - K - V e^{r(T-t)} = 0 \text{ (i.e. no profit).}$$

$$\text{i.e. } V = S_t e^{-q(T-t)} - K e^{-r(T-t)}$$

iii.

Forward price with 8 months to maturity is:

$$F = 780 e^{(0.045 - 0.021) \times 8/12}$$

$$F = 792.58$$

Value of the original forward position, f , is given by

$$f = S e^{-q(T-t)} - K e^{-r(T-t)}$$

where $K = 666.45$ the delivery price

$$f = 780 e^{-0.021 \times 8/12} - 666.45 e^{-0.045 \times 8/12}$$

$$f = 769.16 - 646.75$$

$$f = 122.40$$

$$\text{Alternatively: } f = (792.58 - 666.45) e^{-0.045 \times 8/12} = 122.40$$

iv.

The published yield is an historic yield and so may not be applicable to the period for which the forward is held. An estimate of the dividends to be paid in the period of the forward contract would be required.

Also dividends are not paid continuously as assumed. Actual dividend payments are spread unevenly throughout the year.

Tax implied in the published DY might not be the same as an investor's tax rate, requiring an adjustment to be made in pricing the forward for such investors.

QUESTION 5

Examiners' comments:

Overall this question was done reasonably well.

Part (i) and (ii): Most students did these parts well, however a large proportion of students thought that top-down is only used in conjunction with a strategic asset allocation position linked to liabilities. While top-down helps to manage and control the risk in this case, this investment approach can be used for any fund, including unconstrained funds that don't have liabilities to match.

Part (iii): A common error was to ignore the instruction words "explain" and "discuss" giving too little detail for many points made. Some students clearly did not know what quantitative analysis entails, and made points about "growth" and "values" styles and "technical analysis" methods used by the company needing to be reviewed. Some thought the CIO did not know the benchmarks for his own funds, which seems very unlikely. A large number of students thought that the CIO should consider starting to use fundamental and technical analysis – however the company is most likely using these techniques already, as quantitative analysis is "an important step" and not the only step in the asset management process.

Solution:

i.

- A top-down approach involves a structured decision making process which starts by considering the asset allocation at the highest level, i.e. between asset classes.
- Within each asset class further analysis is made to determine how to distribute funds by sector, and finally stock selection decisions are made.
- In contrast, a bottom-up approach seeks to identify the best value individual investments, irrespective of their geographic or sectoral spread.

ii.

Key advantages of top-down:

- The top-down approach lends itself better to controlling the risk (including compliance with any regulatory limits on asset classes and sectors) of a portfolio by virtue of the fact that a balanced, diversified portfolio is held.
- It is also argued that the biggest difference in portfolio performance comes from differences in asset allocation rather than from individual stock selection.

iii.

Factors that could have led to underperformance:

- Inadequate pricing models might be to blame – perhaps not sophisticated enough to allow for all important economic and financial variables required in a valuation of a stock or asset class;
- Model errors – some parts of the model, e.g. interaction between specific variables have been incorrectly programmed;
- Inadequate assumptions – the models have been incorrectly or inadequately parameterised (e.g. assumptions not updated frequently enough);
- Staff expertise: - the staff might not be sufficiently qualified to understand the principles on which the model has been built;
- Inadequate documentation – this has led to current staff to not fully understand the working of the model, its weaknesses and possibly led to derived assumptions inconsistent with model;
- Poor supervision of the process – a suitably experienced and qualified quantitative manager should be in a position to pick up any weaknesses or errors in the process;
- Market efficiency – with efficient markets it would not have been possible to significantly outperform the market consistently.

Possible actions to take:

- Check that your investigation is sufficiently robust before taking any actions e.g. was the period of investigation long enough;
- More detailed investigations might be needed to understand the source of the problem e.g. a specific model/s, or specific staff;
- Consider performance of quantitatively run funds of competitors to check how their quant teams have been performing;
- If it is found that a specific model/s is faulty, then obtain expertise to fix this e.g. specialist consultant;
- If staff are at fault, consider re-training or replacing staff;
- Ensure there is supervision and overall accountability of the quants team;
- Consider changing your investment process to put less weight on quants team, perhaps they could still be used for asset allocation and sector decisions; and only provide data analysis to portfolio managers for stock selection rather than making recommendations;
- If you conclude market is mostly efficient, consider introducing index-tracker funds.

QUESTION 6

Examiners' comments:

This question was reasonably well-answered by most students, though poorly-answered by a significant minority. Part (i) was well-handled, although few students considered the operational risk. Part (ii) was less well-handled, with some unnecessarily convoluted swap structures offered. Most problematically, a number of candidates failed to consider the fact that this is a strategic switch, and as such the trades in the underlying equities still need to be carried out over the period.

Solution:

i.

As a large fund, there is a significant risk of moving market prices through an immediate bulk transaction, in both markets.

It may not be possible to ensure that the timing of the trades is advantageous; current market conditions might not be optimal, and it will take some time to physically make all of the trades. This also exposes the fund to the risk of adverse currency movements.

Operational risk: significant trading volumes put pressure on the back office, and increase the likelihood of errors and mistrades.

The switch will involve significant transaction costs, e.g. commission, bid-offer spread, purchase taxes.

Capital gains are likely to be crystallised leading to a tax liability.

ii.

Enter into a 6-month equity swap, where you long a suitable market index in the target economy, and short a suitable market index in the transferring economy. Both indices should be representative of the stocks you hold/plan to purchase (for the transferring leg, it may be possible to arrange a total return swap on the actual basket of equities held). The nominal value of the swap should be equal to 5% of the total portfolio.

The investment decision can be executed immediately to catch all the anticipated movements in both markets, ensuring immediate exposure to the desired markets.

The physical purchase and sale of assets can then happen over the six-month period.

The physical trades will therefore not threaten to move the market, nor place undue pressure on the back office. The trades will however still incur transaction costs, although the staged implementation may reduce these, and will crystallise capital gains (although these may perhaps be spread over two reporting periods). The swap also introduces a counterparty credit risk.

As physical trades occur, it will be necessary to unwind the swap position. This will need to be done in tranches over the swap duration. Each tranche can be unwound by agreement with the bank for a cash settlement, or by entering in partially offsetting swaps. This may be complex and costly.

iii.

Crossing: ask investment bank to source willing buyers of source stock and sellers of target stock among its clients.

Use new cash flows to assist the strategy: invest inflows in target equity and disinvest outflows from the source portfolio.

Share exchange: seek out other managers looking to conduct the reverse trade (less likely).

QUESTION 7

Examiners' comments:

This question was surprisingly poorly-answered, although some candidates handled it well. Parts (i) and (ii) were straightforward bookwork, while parts (iii) and (iv) required more insight and understanding. Sufficient information about quantitative easing was however given in the question for any well-prepared candidate to be able to handle part (iii) with confidence.

Solution:

i.

Monetary policy is the process by which central banks aim to control the money supply (or availability/cost of money, i.e. interest rates).

The ultimate goal of monetary policy is the growth and stability of the economy, with price stability as the major objective; some monetary authorities target inflation exclusively, while others have economic growth or employment as an equal or secondary objective.

ii.

Central banks may execute monetary policy through:

- setting the rate at which the central bank will extend credit to the banking sector, which is typically the key short-term interest rate in the economy;
- open market operations: buying and selling bonds and bills in the open market;
- direct control measures: setting minimum liquid reserve ratios, setting interest rate ceilings for bank deposits or issuing directives regarding the types of lending to be undertaken.

iii.

The objective of quantitative easing is to provide liquidity and stimulate the economy, by providing money to the holders of assets purchased by the central bank, by lowering yields on assets to make credit cheaper, and by directly promoting credit extension by providing liquidity enabling the banking system to offer loans.

Traditional expansionary measures include lowering the repo rate and open market operations in the Treasury bill market; however, with very low short-term interest rates, there is insufficient scope to lower the interest rate further to stimulate the economy.

iv.

If banks are overly cautious and fail to create loans from their strengthened balance sheets, the expected economic stimulatory effect will not occur.

There may also be inflationary consequences undermining any real economic gains from the strategy.

QUESTION 8

Examiners, comments:

Parts (i) and (ii) were generally answered well by the majority of the candidates. In part (iii) few candidates were able to provide a sensible explanation. Very few candidates scored even half of the marks available here. Part (iv) was the worst-attempted part of the question with very low marks scored in general. The majority of candidates were not able to present a logical argument, based on supply and demand principles, to explain how the tax environment will influence the investment strategy.

Solution:

i.

Classical split-rate system, since profits are taxed in the hands of the corporate and dividends in the hands of the shareholder, at different tax rates.

ii.

- Total rate of tax on investment
- Tax split between components
- Timing of tax payments
- Tax deducted at source or paid subsequently
- Extent to which losses or gains can be aggregated between different investments, and different time periods.

iii.

- $CGT < \text{tax on income}$ encourages investment in capital-appreciating, long-term real assets which are seen as the engine for future economic growth.
- Long-term $CGT < \text{short-term } CGT$ encourages long-term holdings rather than short-term portfolio turnover which makes firms' fortunes less subject to destabilising speculation.

iv.

- The taxation of other investors will influence their demand for different types of assets, distorting prices and thereby indirectly influencing the foundation's investment strategy, as well as the extent to which any tax deducted at source can be reclaimed.
- In particular, the fact that CGT is significantly lower than income tax will lead to taxed investors preferring assets which produce low levels of taxable income, i.e. equities and low-coupon bonds preferred to high-coupon bonds.
- All else equal, the price impact of these preferences should make high-coupon bonds attractive for tax-exempt investors.

QUESTION 9

Examiners' comments:

This question drew a wide variety of responses. Many students worked out relative performance in percentage return terms, despite the clear instruction in the question.

For part (ii), the return-based approach gives misleading results. Correct application of this method would have required mid-year portfolio values. It appears that over the year, there was an under-allocation to equities relative to benchmark, which apparently contributes positively to sector selection profit. However, by failing to break the year into the two six-month components, this overlooks the fact that there was an over-allocation to equities in the first half when they underperformed severely, and an under-allocation in the second half when they recovered; clearly the allocation decisions contributed to a sector selection loss here. Appropriate partial recognition was given to candidates who followed this approach.

Solution:

i.

Notional fund (benchmark asset allocation and index performance) (F_{NN}):

$$\begin{aligned} &= 1,000 (0.6 (23000/25000) + 0.35 (11400/10000) + 0.05 (1050/1000)) \\ &\quad + 300 (0.6 (23000/25000) + 0.35 (11400/10000) + 0.05 (1050/1000)) \\ &= 1,326.9 \end{aligned}$$

This assumes that there is no rebalancing of the portfolio during the year (credit was given to candidates who assumed the portfolio would be rebalanced at 31 Dec 2011, if the calculations were consistent with this assumption).

Hence, the total underperformance is $F_{AA} - F_{NN} = 1,326.9 - 1,305 = 21.9$.

ii.

Fund with actual sector allocation and index returns (F_{AN}):

$$\begin{aligned} &= 620 (23000/25000) - 80 (23000/21000) + 320 (11400/10000) + 280 (11400/10800) \\ &\quad + 60 (1050/1000) + 100 (1050/1020) \\ &= 1,309.1 \end{aligned}$$

$$\text{Stock selection: } F_{AA} - F_{AN} = 1,305 - 1,309.1 = -4.1$$

$$\text{Sector selection: } F_{AN} - F_{NN} = 1,309.1 - 1,326.9 = +17.8$$

END OF EXAMINERS' REPORT