



## **SECURITIES & INVESTMENT INSTITUTE MASTERS IN WEALTH MANAGEMENT**

**SUMMER 2008**

### **CHIEF EXAMINERS' REPORT - PORTFOLIO CONSTRUCTION THEORY**

#### **Introduction**

Sections A, B and C of the exam were set to assess candidates' ability to appraise and analyse portfolio construction theory within a wealth management setting. Candidates obtaining high marks demonstrated very good knowledge of the material, critical ability, an ability to rigorously analyse problems and to correctly structure answers. Candidates obtaining a credit mark demonstrated good working knowledge of the material and a good level of competence in its critical assessment. Candidates obtaining a pass mark demonstrated adequate working knowledge of the material and evidence of some analysis. Candidates obtained low marks for a range of reasons including; limited knowledge of the core material, omitted questions, and an inability to manipulate numerical data and correctly structure answers.

Performance in the exam was in line with expectations and generally good. There were many good scripts, and some excellent ones. Scripts were generally well presented. Better presented scripts were double-spaced, structured using bullets or numbers, with sensible use of paragraphs and occasional highlighting. The best scripts were precise, succinct and efficient in their word use. Essay style answers to each question where not required often indicated weakness in an area. Candidates generally performed well on questions requiring them to define, describe, or list, but less well on numerical questions. The strongest candidates tended to use one half to two thirds of a work book. The aim of the exam is to test a balance of numerical and narrative ability and reasoning. This would seem appropriate in the context of a masters programme in wealth management and it can be expected that exams for the foreseeable future will follow suit.

The mean exam grade for Sections A, B and C taken together was 40.5 out of 70 with a standard deviation of 9.4. Section A comprised 10 questions and was worth 40 marks. The mean mark for Section A was 23.6 out of 40 and a standard deviation of 5.9. Candidates generally performed badly on the numerical questions, with a very large majority of students unable to perform the relatively basic portfolio mathematics of annualising a 36 month return and annualising the monthly standard deviation of returns.

Section B comprised a single question and was worth 20 marks. The mean mark for Section B was 10.2 out of 20 and a standard deviation of 3.6. A significant minority of candidates were unable to apply their knowledge of alternative asset

classes in the context of a portfolio manager needing to appraise the suitability of alternative asset classes.

Section C comprised three questions of 5 marks each. Candidates could choose any two for a total of 10 marks. The mean mark for Section C was 6.7 out of 10 and a standard deviation of 1.9. In Section C Q3 (investment planning process) was popular, with 82% of candidates selecting it. Q4 (CAPM) was also popular, with 89% of candidates attempting it. Q5 (fixed income) was least popular, with only 29% of candidates attempting it. Questions 4 and 5 were the best answered in Section C.

### Section A

The aim of Section A was to test knowledge and ability within portfolio construction, portfolio management and portfolio measurement.

### Question 1

There were 10 parts to question 1. The parts were generally either answered very well or very poorly. The maximum mark awarded was 33 out of 40, the minimum mark awarded was 9.5, and the mean and median 23.5 and 23.0 respectively. The 10 parts to question 1 are as follows:

(a) The calculation of the 36 month portfolio return was well performed by virtually all candidates, and the vast majority scored full marks for answer a. Correct answers were set out along the following lines:

| Weight | Return | Product of weight x return |
|--------|--------|----------------------------|
| 0.7    | 15.30% | 10.71%                     |
| 0.2    | 21.20% | 4.24%                      |
| 0.1    | 11.10% | 1.11%                      |
|        |        | =16.06%                    |

(b) Candidates showed very weak understanding of the calculation required to compute an annualised standard deviation. 27 out of 28 students obtained 0 marks on this question. The question was in fact very straightforward. The monthly standard deviation of returns was provided in the question. Candidates were simply asked to calculate the annualised figure from the monthly figure given. The most straightforward way to compute an annualised standard deviation is to multiply by the square root of the return periodicity e.g. weekly, monthly, quarterly. In this instance the return observations were monthly, requiring students to multiply by the square root of 12, or 3.46. Correct answers were set out along the following lines:

|                   | Monthly standard deviation of returns | Multiplied by square root (12) |
|-------------------|---------------------------------------|--------------------------------|
| active portfolio  | 3.90%                                 | 13.51%                         |
| passive portfolio | 3.65%                                 | 12.64%                         |
| benchmark         | 3.60%                                 | 12.47%                         |

An alternative derivation is to square the standard deviation to obtain the variance, multiply the variance by the number of observations in an annual period - in this case

12 – and then square root the annualised variance to obtain the annualised standard deviation.

(c) A large majority of candidates showed that they did not understand how to calculate an annualised return from a 36 month compound return. Once again, the question was very straightforward. The 36 month return performance was provided in the question. Candidates were required to calculate the annualised return from the 36 monthly figure given. Many students obtained 0 marks and 2 students had the formula right but the answer wrong and received a mark. 9 out of 28 students who answered correctly obtained full marks. The question requires that the 36 month return be decomposed. The standard formula for an annualised holding period return is

$$(1 + \text{holding period return})^{(1/N)} - 1$$

where N = number of years.

In this question N = 3. Correct answers were set out along the following lines:

|                   | 36 month return<br>performance | $(1 + \text{return})^{(1/3)} - 1$ |
|-------------------|--------------------------------|-----------------------------------|
| active portfolio  | 16.06%                         | 5.09%                             |
| passive portfolio | 17.10%                         | 5.40%                             |
| benchmark         | 17.40%                         | 5.49%                             |

(d) The question was very well answered by all candidates, with a mean mark of 3.5 out of 4. Candidates obtaining good marks described growth investing, why and when it is used, and measures employed to identify growth stocks. Good answers noted that growth investing and thematic investing often coincide. Thematic investing can be likened to a derivative of growth investing in that it often involves companies poised to benefit and grow from changes in a set of underlying conditions, be they economic, regulatory, legal and/or business.

(e) The question was also answered very well, with a mean mark of 3.2 out of 4. For the first part of the question good answers described value investing, why and when it is used, and measures employed to identify value stocks. For the second part of the question good answers emphasised that value investing based on informational inefficiency at root involves some kind of informational advantage. In order that an individual investor can know more than the market (absent inside information) this normally requires the market to be informationally inefficient. Value investing based on economic inefficiency is a different prospect altogether for it is entirely consistent with an informationally efficient market. This strategy involves buying shares in firms that are operationally inefficient, whose prices may very well be efficient, and engaging to remove these inefficiencies by bringing about changes in corporate governance, policy and strategy that improve fundamental economic performance and reduce agency problems.

(f) Answers were of a very variable standard. Candidates scoring full marks mentioned a good number of the following points:

- ◇ An unconstrained optimisation will usually take no account of transaction costs, liquidity, investability, availability of financial instruments, tax, government restrictions, market value and currency risk.
- ◇ An unconstrained optimisation may calculate using past performance data whereas the portfolio allocation may be based on expected performance data.
- ◇ The portfolio will usually take account of client mandate restrictions such as security and market limits, lower expected macroeconomic risk of developed markets, lower currency risk and a peer group home bias that may be difficult to ignore.

(g) A large majority of candidates showed that they did not understand how to calculate the proportion of an active portfolio's company specific risk. Candidates needed to first of all figure out that the question concerns a diversified investment setting. This is readily discernible from the question which concerns an EAFE benchmark. In a diversified setting the benchmark has a beta of 1, i.e. all risk is market risk. Second, candidates needed to figure out how to use a correlation coefficient. The question provided the correlation coefficient for the monthly returns the active portfolio and the monthly returns for the benchmark. The correlation of the active portfolio to the benchmark is 0.82, so that 82% of the return on the active portfolio can be explained by market movement i.e. it is not stock specific. The stock specific part is the residual movement not explained by the portfolio's similarity to the benchmark and computed by  $1 - 0.82 = 0.18$ . The correct answer is 0.18.

(h) The question was generally very well answered by candidates, with the mean, median and modal mark of 5.4, 6.0 and 7.0 respectively. The question required candidates to describe three indexation techniques. A number of indexation techniques could be drawn on to answer this question, including; full replication (duplication), stratified sampling, factor matching, co-mingling and a cash portfolio that is 'equitised' using derivatives. Candidates did draw on these, and needed only to provide an adequate description of each for full marks.

(i) Answers for question (i) were of a very variable standard. Almost all candidates demonstrated a basic understanding of the concept of tracking error. Only very few candidates were able to demonstrate the critical reasoning needed to propose why a large pension scheme might become concerned as tracking error on a passive index fund moves away from zero. Good answers brought in topics relevant to pension schemes. One answer is that the pension scheme, if a defined benefit type, may have set the investment benchmarks so as to meet expected liabilities and pension payments as they come due. A non-zero tracking error suggests underperformance relative to the benchmark and introduces shortfall and payment risk. A second answer is that many pension schemes employ a core-satellite approach. Passive portfolio management is often employed as a 'core', with the aim of doing no more than delivering the market beta, with active portfolio management employed as a 'satellite' to deliver alpha. A non-zero tracking error may imply that the passive portfolio is not efficiently delivering the market beta, and by definition delivering some other type of risk, and therefore not doing its job. This may not fit well with

portfolios run by other managers hired by the pension scheme and introduce unanticipated and costly scheme wide risks.

(j) The question was generally well answered, but a number of candidates chose to omit the question. Tracking error has a number of explanations. Good answers noted that the benchmark has no costs and (if total return) assumes immediate and full reinvestment of income. Good answers also listed a number of reasons for tracking error, including some of the following:

- ◇ local market prices, currency conversions and rates not being the same for the portfolio and benchmark
- ◇ dividends paid net of tax for the portfolio and gross of tax for the index
- ◇ reinvestment of dividends is on pay date for portfolio but on ex-dividend date for index
- ◇ cash flows may be too small to invest
- ◇ some cash always held by portfolio but index always has zero cash
- ◇ lot sizes
- ◇ index rebalancing, constituent changes and index calculation rules
- ◇ survivorship bias of index
- ◇ transaction costs, including stamp duty, bid-offer spread, broker commission, trade clearing, settlement and custody costs, fund accounting, depositary
- ◇ type of index replication strategy of the portfolio

## **Section B**

The aim of Section B was to test understanding of the possible impacts of adding alternative asset classes to a conventional portfolio of fixed income and equity.

### **Question 2**

This question was generally not well answered, with a maximum mark of 19 out of 20, a minimum of 2 and a mean and median mark of 10. One key reason for a low mark was a poorly structured answer. Most candidates were aware of the various alternative asset classes, but, on the whole, could provide little beyond a long general description of each asset class, when what was required was a demonstration that candidates could appraise the investment effect of including alternative asset classes within a conventionally invested portfolio. A number of candidates incorrectly equated risk with diversification. Good answers were set out along the following lines:

(a) Expected return: alternative asset classes are expected to be more risky than conventional asset classes due to a mix of underlying characteristics, fewer pricing points, lower liquidity, uncertain distributions and indivisibility. Given a trade-off between risk and required return alternative asset classes should have a higher expected return. There are exceptions, for instance yields on infrastructure funds may be more certain than a near all-equity fund, but in the overall sense the premise of adding alternative asset classes is greater expected return, as argued in the 2001 Myners Review on Institutional investment.

(b) Diversification: whilst individually risky, when judged in the context of a portfolio alternative asset classes may not be risky, and this can contribute greater return per unit of risk i.e. alpha yielding at the portfolio level. Diversification is so

powerful that an unconstrained portfolio optimisation will often allocate much greater weight to alternative asset classes than fund managers would consider practicable. Diversification will vary by type of asset. Private equity may offer far less diversification since unlisted firms are often exposed to the economic cycle in the same way as listed firms are. Commodities are variously linked to the economic cycle, and therefore their diversification potential. For hedge funds, potential diversification can be traced to the particular strategy. Infrastructure funds, depending on the underlying project, are often characterised by permanent and relatively stable income and thus provide significant diversification.

(c) Risk: different from diversification, alternative asset classes vary in their exposure to inflation risk, leverage, short selling, failure rates, capital distribution, perishability, manager selection risk, adverse selection, moral hazard and agency risk.

(d) Liquidity: alternative asset classes vary as to their liquidity, and are often less liquid than conventional asset classes. A number of students proposed that liquidity was overcome once an alternative asset vehicle was listed on an exchange. This is not entirely correct. Underlying assets may have fewer pricing points and only infrequently mark to market. An investor may then have to trade on stale or incorrectly estimated prices. Volumes can often be small, so the desire to buy and sell may significantly move prices against trading positions. Minimum notice and investing periods hinder exit following upturns and downturns in the market. Even with minimum notice periods, significant demand from investors to sell at the same time can often not be met from liquidity or more readily realisable holdings and may require forced selling of physical underlying assets at distressed prices.

(e) Divisibility: alternative asset classes can be lumpy and indivisible, and therefore lead to large lot sizes. For small and medium size investors this can prevent small exposures to the assets, and make any exposure gained a risk in terms of the overall portfolio allocation to this asset.

(e) Transaction costs: alternative asset classes encompass a number of transaction costs including, but not limited to, high legal costs for private equity transactions, high search costs for Infrastructure funds (there are few of them and those that there are may not be suitable), storage costs for commodities, front and back end fees for hedge funds and within fund costs and charges.

### **Section C**

The aim of Section C was to sample from three areas of the syllabus not tested in Sections A and B.

### **Question 3**

There were no incorrect answers to this question but there was significant variability in the quantity and quality of answer. Overall the question was not especially well answered, with a maximum mark of 3.5 out of 5 and a mean and median of 2.5. Low marks were awarded to candidates who demonstrated only a limited knowledge of the investment planning process. Higher marks corresponded to candidates whose answer reflected a well-defined focus and a good working knowledge of the core material. A very strong answer would have included the following elements:

Establish client circumstances

- Life cycle concerns: young/old

- Married/single/children
- Wealth
- Human capital
- financial commitments / liabilities

Establish client constraints

- Tax position
- Ethical preferences
- Need for liquidity
- Time horizon
- Regulatory / legal

Establish client return objectives:

- Capital preservation
- Capital appreciation
- Income
- Total return

Establish client risk tolerance

- Conventional methods
- Note investors require compensation for risk: Asset pricing theories and the capital market line

From the above

- Create an investment policy statement
- Set the investment strategy
- Form capital market expectations
- Create the strategic asset allocation for the benchmark.

Establish investment management

- Method of investment management
- Investment mandate and constraints

#### Question 4

A majority of the candidates who answered this question demonstrated a good grasp of the Capital Asset Pricing Model. Answers were generally of a very good standard, with a mean mark of 4.0 out of 5 and a median and maximum of 5 out of 5. A small minority of candidates gave an incorrect answer. A further small minority of candidates gave the correct calculation but an incorrect analysis of the answer. This candidate cohort suggested that stock A was undervalued when in fact it was overvalued, and that stock B was overvalued when in fact it was undervalued. Candidates in this group seemed to confuse that the investor estimates a return (i.e. what he or she will receive) (12% and 11% for Stock A and Stock B respectively) and that the CAPM gives the required return that an investor needs to compensate for the systematic risk taken (the CAPM calculated return) (13% and 10% for Stock A and Stock B respectively). Thus the answers are:

The required return for Stock A =  $4\% + 1.5 * (10\% - 4\%) = 13\%$ .

Stock A is overvalued for its estimated return is 12%, i.e. it lies below the Security Market Line

The required return for Stock B =  $4\% + 1.0 * (10\% - 4\%) = 10\%$ .

Stock B is undervalued for its estimated return is 11%, i.e. it lies above the Security Market Line

### **Question 5**

Few candidates answered this question, but those that did tended to do so very well, demonstrating excellent applied critical reasoning. The mean mark was 3.8 out of 5, median 4.0 and mode 5.

(a) The principal risks to a holder of gilt edged and corporate bonds were well understood, with a small minority of candidates providing excellent answers. Good answers will have included inflation risk, interest rate risk, reinvestment risk, investment grade risk, default risk and sector spread risk.

(b) The principal risks to a holder of shares and bonds in the same company in which the interest rate risk of the bonds has been fully hedged was also well understood, with once again a small minority of candidates providing excellent answers. Good answers will have noted some similarity of risk exposures, and discussed inflation risk, cash flow risk (dividends are discretionary and capital appreciation is sensitive to cash flow), and default risk (bondholder ranks higher in company payouts).

## **SECTIONS D and E**

### **INTRODUCTION**

I was very pleased with the overall standard of candidates. The examination was entirely based on the workbooks so any diligent student should have passed this paper. The case study represented 20 out of the 30 marks and did not involve complex computations. Top marks could be scored by candidates who were well prepared and willing to discuss each element. The three remaining questions each involved situations that should have been studied in the workbooks so the questions should have been relatively straight forward. Many candidates delivered excellent scripts. A few unprepared candidates struggled, even with the case study.

#### **Question 6:**

The Case Study with 20 marks available evenly split among 5 sections covering a different aspect of the syllabus. The case study was used to illustrate a typical situation that could be faced in practice. If candidates can advise a client well under examination circumstances, then they should be able to do so in real life. Equally, if candidates find it difficult to deal with a case study in an examination, it is usually clear that they are not ready to advise clients even at an overview level. 20% of this year's candidates were unable to answer one element of the case study. 30% of candidates scored a very low mark or zero on one element of the case study.

Approximately, 2/3rds of the candidates scored very highly on this question with scores of 15 or above with more than 14% of candidates scoring the full 20 marks. Part a) required a good explanation of capital gains tax and its share pooling rules; some correct calculations; and a good presentation and layout of the answer to attain the 4 marks available. Generally, this was well answered but a few candidates got completely lost.

Part b) required an understanding of inheritance tax and an application of allowances and exemptions that were available for clients to use to minimize their tax liability. The question was phrased in such a way as to encourage discussion of the options available to a client. It should have been straight forward. Almost all candidates scored well.

Part c) appears to have been too tricky for most candidates, yet it merely required an appreciation of income tax saving options like Enterprise Investment Schemes and income swapping to try to save income tax. Some candidates recognized that the pension might qualify for a lump sum payment and provided some ideas like that to the client. Half the candidates struggled with this answer and generally it was answered poorly with an average mark of just 2.3.

Part d) concerned tax planning for grandchildren and the use of trusts. Although two clear questions were asked within the section, many candidates dropped an easy mark by failing. The few candidates who read the question correctly managed to score top marks.

Part e) involved an international element and capital gains tax. A number of candidates failed to spot the possibility of Spanish tax on the sale of the Spanish cottage and the interaction between double tax relief. Other candidates spotted the double taxation problem but did not understand how the double taxation relief system

operated. Generally though, candidates made a good attempt at answering this question and the majority of candidates achieved the top mark.

**Questions 7, 8 and 9:**

On the whole these questions involved a computation and were based on examples available in the workbook. Few candidates attempted Question 9, even though it was a straight forward example taken from the inheritance tax manual. Generally, candidates scored top marks or made an error. Some candidates failed to impress when it came to lay out and presentation, dropping easy marks. Others made computation errors. These were penalized but only one zero mark and one score of 1 mark were recorded, indicating that candidates were able to do the computations at issue.

Question 7 involved the calculation of a UK person's tax liability with an international element which involved double tax relief. Most candidates spotted the problem and managed to calculate Mr T's tax liability correctly. Those that laid the answer out nicely were rewarded and answers with slight mistakes were only penalize slightly. Question 8 involved the calculation of a gain/loss on the sale of an asset and the use of the inflationary tables to calculate the allowance and taper relief. Overall, candidates did well on this question. Question 9 was a straight forward example of calculating the revised probate value of the shares and the key point to remember was that the commission and dealing costs were not deductible.