



**SECURITIES & INVESTMENT INSTITUTE MASTERS IN  
WEALTH MANAGEMENT  
WINTER 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 apply theoretical material to practical settings.

The current financial environment was brought into the exam for this December paper. Where significant market developments precede an exam and fall within the area of the syllabus it seems an opportune time to examine candidates' appraisal and analytical abilities in a subject area. The origins of recent market stress within the banking sector can in part be traced to weaknesses within the corporate governance process. One weakness is the extent to which some fund managers invested large amounts of client capital in the shares of listed companies in the financial sector with only a partial understanding of their latent risk exposures. A second weakness is the extent to which messages from fund managers who had conveyed concern about risk failed to pass across to the non-executive directors (who represent shareholders' interests) of financial companies, as evidenced by the low level of awareness that many non-executive directors had of shareholder concerns and their banks' risk exposures. This background provided the motivation to test candidates' knowledge and understanding of corporate governance for the first time in the exam. Questions pertinent to this include parts (i) to (k) in Section A, part (c) of question 3 and to some extent question 4. Bringing a significant, contemporary, mainstream financial event into the exam where it coincides with the syllabus can be expected in the future.

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. Marking the script with an asterisk or similar to highlight key points and important outcomes was an effective technique used by some candidates. Essay style answers to each question where not required often indicated weakness in an area. The aim of the exam is to test a balance of numerical and narrative ability and reasoning. Candidates generally performed better on narrative than on numerical questions even though there is greater potential for full marks on numerical questions. The strongest candidates tended to use one half to two thirds of a work book. Overall, candidates tended not to perform well when asked to apply the syllabus to practical situations, for example:

- ◇ recommending how one should allocate assets close to retirement;
- ◇ explaining why standard deviation as a measure of risk might not predict events such as recent falls in world capital markets; and
- ◇ where are the potential principal-agent problems in investment management?

## **Section A**

The aim of Section A was to test knowledge and ability within portfolio construction, portfolio risk, diversification, and corporate governance.

### **Question 1**

There were 11 parts to question 1 as follows:

(a) The explanation of the chart illustrating the relationship between portfolio risk and diversification was well performed by virtually all candidates. Many candidates scored well, with the modal mark 2.5 out of a possible 3 marks. Strong answers were set out along the following lines:

- ◇ The relationship between the number of portfolio constituents (lines of held stock) and portfolio risk is typically non-linear, being more than linear initially but less than linear as more securities are added to a portfolio. There comes a point where holding more securities brings about only marginal reductions in risk. This point comes fairly soon, often between 20 and 25 securities.
- ◇ An investor can, by diversifying globally, remove the basic risks associated with individual markets, countries and industries and achieve a much lower level of risk per unit of return than if investing in a single market. A globally invested portfolio is exposed only to the worldwide level of systematic risk, e.g. energy and climate, that influence the world in general and that cannot be further diversified away. Systematic risk is itself relative, with the level of systematic risk for a country higher than that of the world. Diversification allows the portfolio not to be tied to the economic performance of any one country.
- ◇ Diversification can reduce or eliminate unsystematic risk, however there remains a floor to the level of risk - systematic risk.

A common mistake was for candidates to state that securities need to be negatively correlated. In practice this is very rarely found for liquid instruments.

(b) Candidates showed good understanding of reasons for a positive relationship between portfolio cost and the number of portfolio held securities. Strong answers were set out along the following lines:

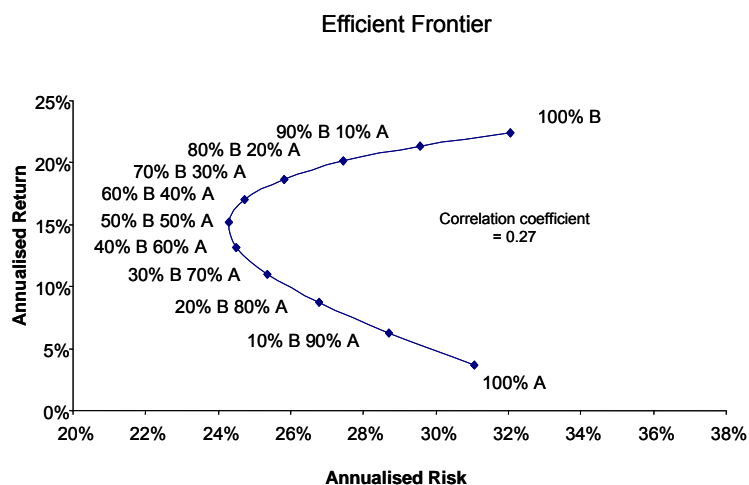
- ◇ Greater information acquisition costs as a portfolio extends to smaller capitalisation securities, overseas, and to different themes and sectors.
- ◇ An element of fixed costs in trading commissions.
- ◇ More trade processing, corporate actions, and cash management in the back office.
- ◇ Greater custody costs associated with some overseas jurisdictions.

A common mistake was for candidates to include per cent based costs such as stamp duty.

(c) This question asked which of four portfolio risk formulas was correct and why. The correlation between the two securities given was 0.27. In this instance where there is imperfect positive correlation between the two securities the portfolio risk formula requires the weighted covariance between the two assets. A large majority of candidates selected the correct answer, i, and gave the correct explanation.

A common mistake was for candidates to select ii, which omitted the weights from the covariance part of the formula.

(d) The annotation and drawing of the locus of points of the chart illustrating the efficient frontier between securities A and B tended to well performed by most candidates. The mean, median and modal mark was 3.0 out of a possible 4 marks. Each candidate's chart should have looked similar to the one below



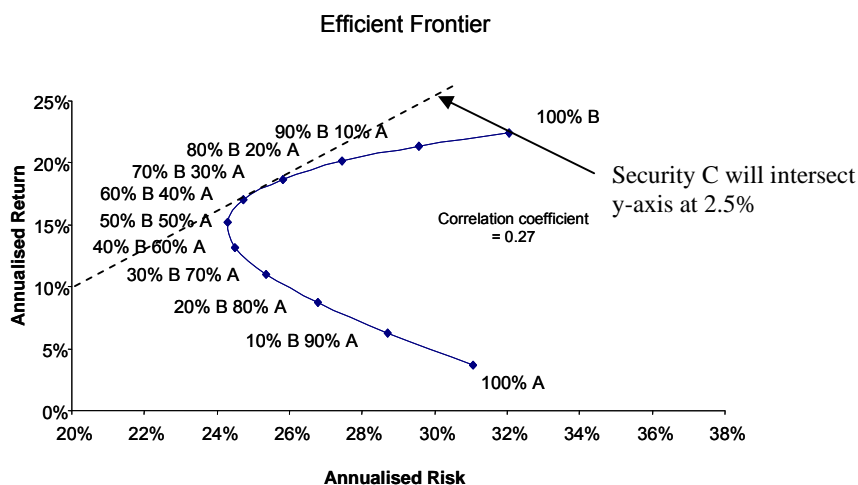
Good answers that justified this shape were set out along the following lines:

- ◇ The correlation is relatively low, 0.27, so significant diversification gains are expected. The frontier will not be a straight line between points A and B but bow toward the Y-axis.
- ◇ Diversification gains are limited however because the direction of the correlation is positive rather than negative. The frontier will therefore not intersect the Y-axis.

- ◇ As the frontier moves closer to 100% A or 100% B, risk dramatically increases per unit of return as diversification stops having an effect. This has the effect of making the 90/10 and 80/20 combinations more spread out.
- ◇ The returns on the portfolio is simply a linear combination of securities A and B.

Common mistakes included drawing a straight line between points A and B, a curve that bowed out from the Y axis rather than toward it, and a frontier that was higher and to the left of points A and B.

(e) The question was an extension of D above.



Good answers presented a diagram similar to the chart above. The capital market line will intersect the Y-axis at 2.5% and also be tangential to the efficient frontier. Risk averse investors will locate closer to the Y-axis. More risk tolerant investors will locate close to where the capital market line meets the efficient frontier. Risk loving investors will locate to the right of this area. We would not expect investors, in theory at least, to locate inside and to the right of the capital market line, such as points A and B.

Common mistakes included drawing the capital market line from the Y-axis through point B, not making the capital market line tangential to the efficient frontier at any point, and confusing the line with undervalued and over valued securities.

(f) Answers were of a very variable standard. The mean mark was 1.3 out of a possible 3 marks. Candidates scoring full marks performed the following calculation:

$$COV_{ab} = \sigma_a \sigma_b \rho_{ab} = 0.31 \times 0.32 \times 0.27 = 0.026784$$

(g) Answers for question (g) were of a very variable standard. Almost all candidates demonstrated a basic understanding of the concept of the efficient frontier

and could give one reason why an investor might select a portfolio that does not reside on the efficient frontier. Only very few candidates were able to demonstrate knowledge and understanding of a number of reasons. Good answers were set out along the following lines:

- ◇ Overweight domestic securities due to investment home bias.
- ◇ It may feel safer to construct a portfolio based on a peer group benchmark that limits exposures in order to be in line with what like investors are doing and also general market practice and advice.
- ◇ Securities regulation and prudent person laws may limit exposures to overseas assets, foreign currency exposures and derivatives.
- ◇ According to portfolio theory it is diversification of the total portfolio that individuals should look to. Within a total portfolio approach, holdings of financial assets are but one input. An efficient total portfolio is formed by an individual or household combining all financial, physical and human capital assets, and giving consideration to expected future income and liabilities over the particular planning horizon. Since physical and human capital assets are not as divisible as financial assets it is the financial assets that can be expected to be allocated in such a way that total portfolio risk is minimised for a set of expected liabilities. This may require a compensating skew or tilt to the holdings of financial assets so that at the level of the individual investor a financial portfolio is not of itself fully diversified.
- ◇ Too expensive for a small investor.
- ◇ An investor may prefer a particular portfolio tilt that does not reside on the frontier e.g. desire for income rather than growth, or may have faith-based or ethical-based investment requirements.
- ◇ Investor ignorance.

(h) A large majority of candidates understood this regulation. It is a statutory requirement but also a disclosure legislation only. The disclosure legislation does not remove the requirement that trustees make decisions that are in members' best financial interests. The regulation cannot be construed as a requirement on trustees to invest in a socially responsible way. The disclosure takes place within the Statement of Investment Principles. More detailed instructions are most often reflected in individual investment manager contracts. Peter needs to consider what is in members' best interests. One part of this is considering the scheme's position on responsible investment and disclosing the investment stance that is being taken. Many candidates went further, and described some methods of undertaking socially responsible investment, but the question did not ask or require this.

(i) The question was generally not well answered by candidates. The corporate governance arrangements of institutional shareholders in portfolio firms involves a patchwork of industry based regulation, and mix of political encouragement, threat and pressure, all of which are voluntary.

The role of institutional shareholders in the corporate governance process is largely concerned with the degree of influence which should be exerted over companies in order to advance their clients' financial interests, normally through engagement and the exercising of voting rights. In order to encourage this, the ISC principles request that fund managers:

- ◇ have a policy on monitoring and intervention,
- ◇ monitor performance and establish regular dialogue with portfolio firms,
- ◇ intervene where necessary,
- ◇ evaluate the impact of engagement; and
- ◇ report to clients.

Common mistakes included stating that the Section E of the Combined Code represented legislation and confusing corporate governance of companies with the corporate governance role of institutional investors.

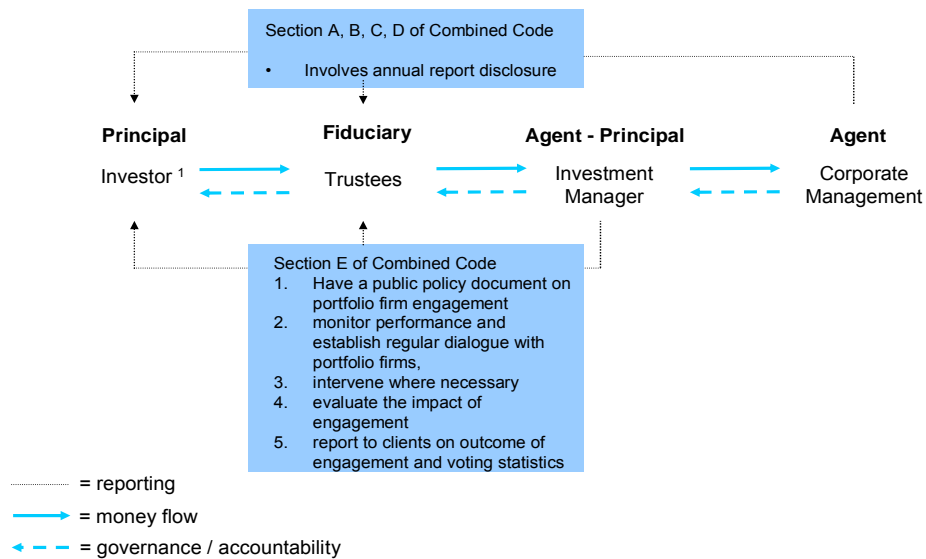
(j) The question tended to not be well answered. Very few candidates had any grasp of meaning of ownership rights. The voting recommendation is voluntary. There are very few barriers to voting shares held in UK domiciled listed companies. Shares held in overseas domiciled listed companies do sometimes have a number of impediments. Ideal answers would list a number of reasons for stock not being practicable to vote, including:

- ◇ The time and costs involved in the voting of some overseas shares and potential problems due to registration difficulties, differential voting rights, rights of minority shareholders, share blocking and verification of the delivery of the votes.
- ◇ Voting information may be received by the fund manager too late to make an informed voting decision prior to the AGM.
- ◇ Stock is on loan.
- ◇ Where client consent is needed and the client is out of reach.
- ◇ Where a holding is too small to be worth researching how to vote.

(k) The question tended to not be well answered. A number of candidates chose to omit the question. Few candidates had any grasp of the theoretical underpinning to corporate governance in general and of the role of institutional shareholders in the corporate governance process in particular.

The prototypical intermediated investment setting involves shareowner principals delegating the investment management of their financial savings to institutional fund manager agents who then act as temporary principals to corporate manager agents of portfolio firms. The chart below shows this for trust-based pension schemes in particular.

## Institutional Pension scheme Investment As a Three Tier Principal Agent Relationship



<sup>1</sup> Collective investment scheme unit holder/shareholder, life insurance policyholder, pension scheme member, charity, church, foundation

According to agency theory imperfect monitoring, imperfect contracts, and different objective functions from those of principals will lead fund managers agents, if left alone, to act in their own rather than the clients' best interest. Compliance departments, investment management mandates, short-term contracts, alignment of fees, and regular client reporting are all mechanisms used to reduce the agency problem. In addition, the Combined Code and the ISC principles attempt to reduce potential fund manager myopia by ensuring that institutional shareholders act as owners on behalf of final investors in their interactions with corporate manager agents.

### Section B

The aim of Section B was to test understanding of the efficient market hypothesis and the impact that evidence on the hypothesis has for different types of investment management style.

### Question 2

This question was generally well answered. One key reason for a low mark was a poorly structured answer. Most candidates were aware of the three classic forms of the efficient market hypothesis. Almost all candidates correctly attributed all forms of fundamental active management with weak form market efficiency.

A significant proportion of candidates incorrectly believed that an actively managed portfolio of large capitalisation securities is best suited within semi-strong or strong form efficient markets. Few candidates explained that large cap stocks are more closely followed by market participants and that as a result there are fewer pricing anomalies for active management to exploit. Since it is more difficult to outperform

on large cap indices one would expect to observe significant passive management of large cap portfolios (which we do).

Almost all candidates correctly attributed passive management to strong-form efficient markets. A significant minority of candidates correctly explained that a value style based on corporate inefficiency was entirely compatible with a strong-form efficient market.

An ideal answer would have given some background to the efficient market hypothesis (EMH) and set out reasons why tests of it are important. This would have emphasised that efficient capital markets are important for welfare economics. Asset prices fluctuate. Is this fluctuation the appropriate response to new information as it becomes available? If the efficient markets view is correct, capital values guide scarce resources toward the right firms. Furthermore, if securities are priced efficiently, their prices reflect forecasts of expected benefits from future cash flows capitalised at appropriate discount rates i.e. all expected rates of return are consistent with their perceived risk.

An ideal answer would have set out some assumptions of the EMH, including one or more of the following:

- ◇ A large number of profit maximising participants who analyse and value securities independently of one another
- ◇ New information regarding securities arrives to the market randomly. New information must, by definition, be unpredictable and random otherwise it would not be new information
- ◇ Profit maximising investors adjust security prices rapidly to reflect the effect of new information
- ◇ Dealing costs are not too high, that the relevant information is available to a sufficient number of investors, and that no individual participants are of sufficient wealth that they can in any sense dominate the market.

The ideal answer would then describe the three classic forms of the EMH, the empirical evidence, and map the different investment styles to the theory and evidence. The ideal answer might conclude that different forms of the EMH may hold at the same time in different markets. Due to this, different investment styles may be used contemporaneously but applied to different security subsets – as evidenced in the core-satellite approach to investment.

### **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**

The question was generally not well answered by candidates, with a mean mark of 0.7 and median and modal mark of 0.0. The question was in fact relatively straightforward.

(a) The Yen will appreciate by 3 percent because the inflation differential favours the Japanese Yen and the real rate is assumed to be constant. In order to maintain the same real exchange rate UK pound sterling will depreciate by the inflation differential.

- (b) The local currency Yen return on the Japanese bond is the 2% interest rate.
- (c) The UK pound sterling return on the Japanese bond is equal to the Yen interest rate plus the currency appreciation. This = 2% Japanese interest rate + 3% Yen appreciation. Hence, the UK pound sterling return is 5 percent.

#### **Question 4**

Answers were generally of an average to good standard. There was not a correct answer as such. Rather the key to a good mark lay in setting out very clearly the motivations for the asset allocation path selected close to retirement.

The usual arrangement is for lifestyling to target a final year allocation of 25% cash and 75% bonds. This is because UK pension legislation requires that an individual uses the value accumulated in a defined contribution pension plan to purchase a life annuity by 75 years of age, with the option to take up to 25% of the value of the fund in cash at retirement. Since the 25% cash lump sum is tax-free it is widely expected that individuals will take it. The remaining 75% of the pension value is then used to purchase an annuity. This legislation explains why most lifestyle funds start to switch from growth assets, such as equities, close to retirement, to a final pre-retirement allocation of 75 percent bonds and 25 percent cash; the cash is to protect the portion of the fund likely to be taken as a lump sum, and the bonds are to hedge the interest rate risk in the annuity price.

An ideal answer would have explained at what date the asset allocation would start to change, how it would change, the motivations and reasons for the change, and the rate of change.

Very few candidates mentioned that bonds hedge the interest rate risk in the annuity price. A minority of candidates had not read the question properly and were overly concerned about income, or yield, when the central concern is protecting the capital value achieved. Candidates that suggested high yield securities seemed to not understand the concept of an annuity.

#### **Question 5**

The question was generally well answered by candidates.

- (a)  $\text{Beta} = \text{covariance} / \text{variance} = 0.25 / (0.3^2) = 2.77$

A common mistake was not to take the square of the standard deviation given in the question.

(b) Systematic and unsystematic risks are combined by adding variances and then taking the square root to obtain the standard deviation.

	<b>Column A</b>	<b>Column B</b>		
	<b>Systematic Risk</b>	<b>Unsystematic Risk</b>	<b>Columns A+B</b>	<b>Square Root Columns (A+B)</b>
Standard Deviation	0.19	0.06		
Variance	0.0361	0.0036	0.0397	0.1992

Total risk is 0.1992 or 19.92%.

- (c) Standard deviation is a good measure of dispersion, or variability, where data are normally distributed about the mean. The sample return distributions of securities and market indices often exhibit leptokurtosis – there is both a greater concentration of observations around the mean than a normal distribution and a greater concentration of observations in the extremes of the distribution. Put differently, relative to a normal distribution, securities and market indices tend to have a great many ordinary event days. Periodically these are punctuated by a greater number of extreme event days than would be expected. The distribution of security and market index returns tends to also be negatively skewed. Put differently, the extreme event days tend to be negative. The normal distribution underestimates the probability of both of these occurrences and therefore mis-estimates the risk that investors are actually exposed to.

## Section D

Overall the standard of scripts was of high quality.

Question 6a: Many candidates failed to get simple calculations correct and accordingly lost easy marks. Lay-out of answers was often poor thus contributing to the calculation errors (simple addition and subtraction errors for example). A number of candidates worked methodically through the answer but failed to get the final answer correct losing easy marks. In some case the application of double tax relief in the UK was misunderstood. There was also a number of candidates who scribbled their answers on their scripts. The suggestion for those people with extremely poor handwriting is to “skip-a-line”.

Q6b: Candidates were asked to advice Gerry; many failed to address the advice to him. Consequently there were too many short paragraph answers: would a client be happy with one or two lines of advice if he/she asked about self-assessment and payments on account? Few candidates made any link to the case study/Gerry. Equally, many candidates did not appreciate that there were two parts to the question (1) self-assessment and (2) payments on account. Both needed to be explained /discussed.

Q6c: Four things were required – (1) “potentially exempt transfers”; (2) some examples; (3) “exempt lifetime transfers” ; and (4) some examples. Many candidates explained the terms (very) briefly but failed to give examples losing easy marks. Also, the terms should have been explained in the context of the case study to Gerry and the answers should have related to his situation. Examples should have related to your advice to him.

Perhaps, a key point to remember (and which refers to “Case Study” questions generally) is that each part of the question carries equal marks and therefore each part deserves an equal amount of time, consideration and discussion. One line/sentence answers will invariably fail to score top marks.

Q6d: Some candidates forgot to mention/discuss the use of the nil rate band. Most forgot to relate the answer to Gerry’s situation. The question asked – “List the main IHT Exemptions and reliefs”.

One candidate wrote a list and then referred to the same list for Q6e losing valuable marks.

Q6e: This was generally well answered by candidates often quite differently but even so many candidates achieved top marks for their efforts. The better candidates related the advice to Gerry’s situation and the Case Study. Many candidates missed the importance of making a will. The possible use of trusts was also missed by many candidates. Similarly, few spotted the importance of agricultural property relief. Some candidates’ lay-out and presentation skills were extremely poor.

Q7: There was a widespread difference in the answers. Some candidates assumed “new rules” applied. The examination question was similar to an example in the workbook so should have been relatively straightforward for any reasonably prepared candidate. In the end, most candidates got the answer and lay-out correct.

Q8: Again, there were different results on offer but the question was generally well answered. There were a number of simple calculation errors and many candidates wasted valuable time calculating the “tax” when the question merely asked them to calculate the “gain”.

Q9: Probably the easiest question on this examination paper and was generally well answered. Many candidates lost easy marks by failing to state the relevance for UK tax purposes.

Overall, the standard of scripts was high and I was very pleased with the better candidates who managed to (1) lay-out and present their work to a high standard despite operating under examination conditions; (2) get the right answers to simple tax calculations seen in the workbook and representing examples they will meet in practice; and (3) when asked to give advice and discuss tax planning ideas, some was of high quality although brief in nature.