

EXAMINATION

September 2007

Subject SA6 — Investment Specialist Applications

EXAMINERS' REPORT

Introduction

The attached subject report has been written by the Principal Examiner with the aim of helping candidates. The questions and comments are based around Core Reading as the interpretation of the syllabus to which the examiners are working. They have however given credit for any alternative approach or interpretation which they consider to be reasonable.

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Chairman of the Board of Examiners

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Comments

In this diet, there was a less obvious trend for candidates to score better on one question than the other with a broad range of scores achieved on both. By contrast very few candidates scored well on both.

In every diet there will be candidates who are very close to the pass mark and yet receive an FA – indeed I suspect candidates would be very surprised to see just how tightly distributed the marks are; deciding where the pass mark falls will have a material impact on the numbers of candidates who are successful and the examiners take great care to ensure a consistency of standard across candidates, subjects and diets.

That said, it was fairly clear where the hurdle should have been set; as a result, the pass rate for this diet was slightly higher than last time, although the pass mark was lower - indeed the examiners would have preferred to set a higher hurdle. Indeed it is disappointing that candidates, who are likely to be working in this most practical of fields given that they have sat a specialist paper, achieve such low scores. As before, most candidates were able to reproduce the required bookwork for one or other question, hence the low pass mark reflects a widespread inability to apply the bookwork knowledge appropriately and demonstrate practical application and original thinking.

Candidates should note the bias in the paper towards recognising higher level skills and practical application – this is intentional and will continue. Likewise the examination system does properly allow for prior subject knowledge to be assumed. Investment is a necessarily practical subject and at this level, the examiners expect candidates to demonstrate a breadth and depth of competency as would be expected from a practising actuary in what is a frequently evolving discipline. Hence simple regurgitation of bookwork will not be sufficient to ensure a Pass grade.

In order to succeed, candidates should ensure they familiarise themselves with the current investment issues and the general market background facing institutional investors in the 18 months preceding a diet and the solutions (and sources of) being debated by the various stakeholders. A recurring theme in recent years has been a move towards capital market rather than purely insurance and asset management solutions – hence a question regarding banking and derivative approaches to asset and liability risk management or modern financial theory and commercial applications should be considered likely scope for examination.

All extenuating and mitigating circumstances were considered in awarding grades.

- 1** (i) A non-exhaustive report should cover/comment on the following. Bonus marks should be awarded for relevant additional commentary.

Given recent experience, pension scheme trustees and sponsors are faced with having to make choices between:

- paying more contributions
- reducing benefits/closing schemes
- increasing retirement age

Alternatively there is a belief that many of the risks inherent in pension scheme investment such as rate duration are “unrewarded” and so could be better managed.

Fundamental, divisible (and “non-core” for corporate) liability related risks:

- long term interest rates
- future inflation
- future longevity

Longevity risk can only be eliminated/transferred through annuity purchase although longevity bond structures are being developed by banks to mitigate risk (albeit an imperfect hedge due to basis risk).

New accounting disclosures are making deficits (surplus) and liabilities part of the capital structure:

- focus moving from Balance Sheet to Earnings management
- insurance and pensions regulation are merging
- rating agencies penalising companies for poor capital management

Pension Schemes should be treated as a division of the sponsor and financed and managed as such.

Many “old industry” companies have pension obligations significantly larger than market capitalisation and so volatility in deficit may have material impact on earnings.

Rates/inflation volatile hence impact of liability changes more apparent in countries with frequent reporting.

Risks can and, for most companies, should therefore be “outsourced” or hedged.

This situation has arisen for a number of reasons as market and regulatory/accounting frameworks have changed. As this has impacted on corporate activity then corporate treasury functions have become more involved in the risk management of the pension fund to be more consistent with other corporate operations.

Some of the drivers for change would be:

- equity volatility
- lower long term yield
- lack of long dated government debt compatible with liability flows
- lack of insurance capital
- inflation expectations
- population longevity
- poor fund management
- globalisation/pooling

This is not just a domestic market issue although the extent of the problem is driven by history — UK/US pension funds have traditionally had much higher weightings to equities and overseas investment compared with European funds who have adopted more insurance like approaches.

Pensions is a global concern

- the essence of the problem is the same
- but regulation, accounting, inflation, longevity and peer group pressures may differ

We have different cultures

- Japan slow to adopt?
- US — ERISA regulation may restrict effectiveness/implementation of investment manager products
 - Although Pension Protection Act, Department of Labor opinions and new worldwide accounting standards indicate/influence change

There is a lot of external pressure to change from sources such as:

- International and domestic Accounting disclosure
- Regulators, European Directives, Pension Acts
- UK PPF/ US PBGC (and similar) risk rating and levies
- Credit Rating Agencies/Market analysts

From the sponsor perspective, there is a greater impetus to make changes now because of impact of any deficit on:

- capital raising and use
- rating considerations
- cash flow
- earnings volatility
- business growth
- quality of covenant
- Employee Relations
- M&A constraints

Pension funding deficits still exist, even after another strong year of equity performance and rising yields.

Main options to repair the deficit and/or manage future risk:

- Increase contributions over an acceptable time frame
 - Beneficial (trustees, tax, levy etc) but potential issues of further deficits or indeed “trapped capital”
 - Sponsor may not have further capacity to pay or could better use capital within own business
- Maintain current equity biased asset allocation (at least in UK/US) and repair the deficit organically through increased asset values over time
 - Risk of increasing the deficit position even further
- Maintain the current asset allocation but hedge against further downside
 - Upside potential limited and therefore will take longer to repair the deficit
 - Put protection more expensive than call exposure
- Re-engineer the scheme
 - Requires fundamental shift in mentality and the establishment of a Risk Budget
 - This is more than simply improving the portfolio characteristics of any existing Bond Allocation
 - Equity VaR is a major component risk for most schemes — in allocation and implementation

Issues for sponsor/fiduciaries (and so areas for banks and asset managers to deliver products)

1. Capital management

- Financing
 - Cash, bond raising or asset transfer

2. Pension management

- Liability cash flow management
 - Compensation for inadequacies of bond markets
 - Separation of longevity risk from rates and inflation
- Deficit reduction
 - Regulatory, financial and peer group pressures - worldwide
 - “Finite” repair term imposed by many regulators – scope for absolute return structures
- Surplus control
 - Short term “fix” may prove over cautious
 - Surplus difficult and tax inefficient to recover
 - Hence sponsor disincentive to overfund
 - Use captive or derivative structures to mitigate

LDI — a process more than a product

- Tailored to individual scheme/sponsor requirements.
- Blend of hedging cashflows or curve to remove unrewarded risk through better match of duration by tenor.
- Plus deficit repair structure — mix of contributions, asset management, structured products.

Works for funds in deficit

- Variety of bank derived option strategies available, including zero-cost.
- Can be transacted directly or through third party pricing agent/asset manager.
- Can be implemented in stages to take account of changes in market pricing and capacity — but will affect degree of immunisation and VaR reduction.
- Could be used to reduce total VaR without reducing return (could actually increase allocation to return enhancing products and keep VaR constant).

Why not?

- Universe of physical bonds, size of derivative nominal and liquidity.
- Scheme is too big (or think they are too small).
- Misunderstanding of investment regulations?
- Lack of consultant advice (or no specific authority to advise).
- Misunderstanding of pricing and the law of unintended consequences.
- Not enough fiduciary or corporate understanding/education.
- Lack of communication between company and fiduciaries.
- Irrational fear of derivatives.

To the extent that these issues are overcome then the appropriateness of the products will come down to issues of acceptable risk, effectiveness in managing risk, funding objectives/targets, cost and sensitivity to costs, gearing ratio of scheme to sponsor, balance of power between stakeholders, liquidity and pricing of structure, ability to monitor positions going forward, governance structure and sophistication of sponsor/trustees/investment committee.

- (ii) Options are a form of derivative that permits the holder of the option to sell (put) or buy (call) an equity (or an equity index) at a future date from the writer of the option, in return for paying a premium.

After paying the option premium, the payoff to a holder of a put is equal to the strike price less the price of the underlying equity at expiry, subject to a minimum payoff at expiry of nil.

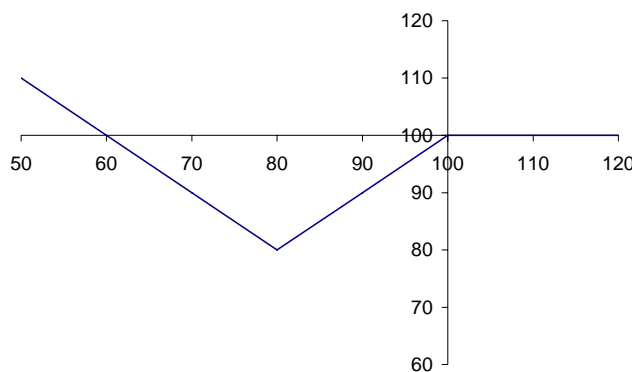
The reverse applies to the writer of the put.

By combining options with the underlying reference equities, the shape of the equity return distribution can be changed to a different shape.

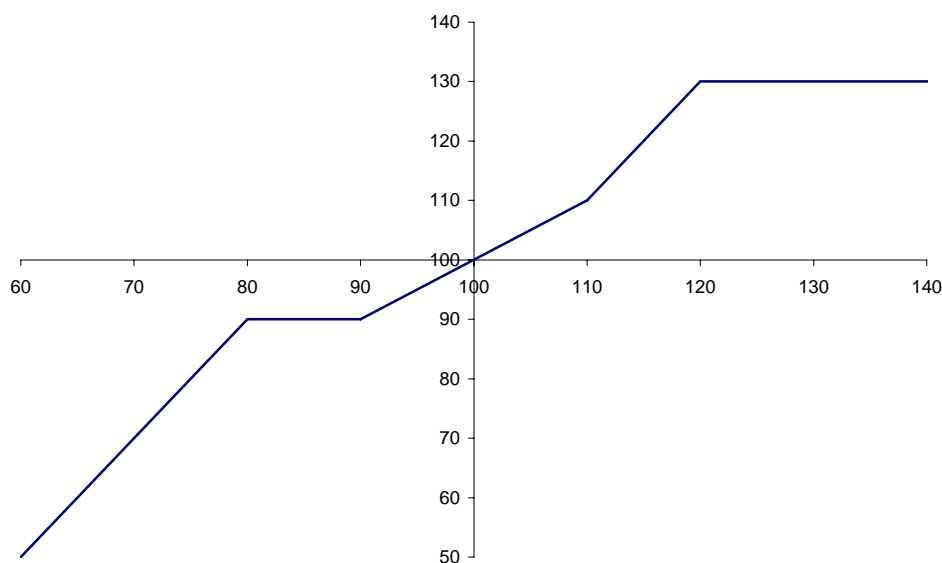
For example, return outcomes above or below a certain point can be bought or sold.

This can be done at multiple strike prices, leading to piecewise segments of the equity return distribution being combined to potentially give very different return distributions to the equity return distribution, (subject to liquidity constraints within the equity option markets).

(iii) (a)



(b)



(iv) The investor may want to mitigate the potential loss if equity values fall over the next year, but may feel there is little likelihood of a significant price fall. Similarly the investor may feel there is a moderate likelihood of strong returns over the next year, but be unconcerned about the potential loss of upside if market conditions are extremely favourable.

In practice it is likely that the pricing of the options will have influenced the choice of strategy, since this will affect the strike prices and whether the strategy is self-financing or has a cost.

- (v) (a) Due to demand from equity investors with guaranteed liabilities (e.g. insurance companies), there is significant demand for out of the money puts. Many of these investors have dynamic hedging programmes to provide downside protection, since long-term equity options are expensive and illiquid. This results in a continuing high level of demand for out of the money puts.

In contrast, there is less structural demand for out of the money calls since there are no natural buyers ie any buyers are likely to be speculative and have an expectation of generating a profit over time from this activity.

- (b) This feature of equity options results in the implied volatility being higher for out of the money puts than calls, and is known as volatility skew.

As the strike prices move closer to at-the-money the skew reduces.

- (vi) Only have assets because of liabilities
Liabilities influenced by rates, inflation and longevity
Regulatory, accounting and risk based levies are encouraging “derisking”

One way to address risk is to build a liability cash flow matching or longer duration portfolio using suitable bonds.

However, the bond market does not offer sufficient maturities to be able to match a pension fund's annual liability profile.

The result is a very staggered profile, leading to considerable reinvestment risk.

Constructing a portfolio of swaps greatly diminishes the mismatch risk regardless of what happens to rates.

In this way, the fund could meet its future pension obligations with a high degree of certainty.

More importantly, the size of any deficit is quantified and stabilised so creating the scope for using a structured approach or active asset management approaches to repair the deficit within a finite term whilst eliminating uncertainty in corporate reported earnings.

The Trustees may be interested in taking out an interest rate swap also:

- (a) Swap market might offer better value than physical due to demand/price anomaly.
- (b) Overlay strategy to temporarily alter the asset allocation of the portfolio.

Using hedging in this way “fixes” the size of the deficit. In order to resolve the deficit then a structured solution involving guaranteed returns from equity, credit, commodities, currency, real estate or other markets than government bonds with or without principal protection could be used to generate the required solution.

2 (i) (a) What are the details of the foundation?

- Size of fund
- Funding position
- Future financial commitments and income
- Appetite for risk
- Regulatory Permitted assets
- Socially responsible, sustainable or ethical investment policies
- Existing asset management arrangements
- Governance and administration structure
- Justification for existing investment policy

How would the exposure to commodities be achieved? [reference to real estate exposure may give clues to size/management approach]

Would holdings be restricted to long only? Or should short positions be considered?

Which commodities? Energy/precious metals/base metals/agricultural/meat and livestock

- (b) Matching of liabilities — **nature**: real / fixed - commodities can be argued to perform well in inflationary environments hence provide some inflation matching although they are neither fixed or real in nature.

Term — can be argued that commodities are short term, not appropriate for matching longer dated liabilities.

Currency — commodity prices commonly in US dollars, liability £ — would require currency swap, introducing further element of cost

Certainty — commodity prices can be volatile in both the short and longer term. There is no direct link between their price movement and the valuation of liabilities. This will introduce volatility into the funding position.

Commodity holdings do not produce income and are therefore not suitable for “matching” future cashflow commitments.

It is possible to make significant profits from investing in commodities in short periods, however there is also the opportunity to lose large amounts in equally short periods.

Diversification — commodities offer significant real returns that are produced by doing real economic work within the economy.

The returns accrue to long only investors without the need for *active* management but there will probably remain the need for third party management in terms of selection, market access, trading.

Recommended management approach and costs

Reasoned argument for appropriate size of allocation

- (ii) (a) The principal benefits of alternative investments are:
- Potential for higher returns, possibly from increased beta, market inefficiencies, pricing anomalies or the skill in selection/management of the investor.
 - Diversification due to a lack of correlation with existing assets or by exposure to underlying risks that are uncorrelated so reducing the overall portfolio risk.
- (b) Should an institution wish to gain exposure to commodity price movements it can do so in 3 ways:
- Invest in the underlying commodity (or basket of commodities)
 - Commodity derivatives which are widely traded on major exchanges such as LIFFE and the Chicago Mercantile Exchange on either single commodities or an index.
 - Invest in companies whose share price is influenced by commodity prices such as oil and mining companies.
- (c) Comment on management costs and skills, minimum bargain size, scope for diversification, basis risks with derivatives, volatility, liquidity and physical settlement/storage/shipping/transportation

Holding individual contracts introduces risk of being delivered against

Disadvantages if companies are used as a proxy for commodity investment:

- It is unlikely that there will be exposure to just one commodity.
- The company's management may alter the exposure via acquisitions or disposals or by hedging its position.
- The company's share price may be influenced by other factors.

- The company will incur various operating expenses which will dilute the overall return.
- Use of commodity shares (mining, exploration companies) gives less diversification from equity market than physical would.

(iii)&(iv)

Behavioural finance looks at how a variety of mental biases and decision making errors affect financial decisions.

Anchoring

Investors are often mentally anchored on a past prices, past market situations or past practices. As the present situation is usually different, this leads them to make unsuited decisions.

Usually, anchoring is based on past standards (e.g. a previous stock or index price or price trend), schemas, practices, information or beliefs. Anchors are those reference points that people keep in mind and that influence their decisions.

People adjust insufficiently from anchor values.

Those past standards can come from gradual learning. Sometimes also people create instantly their mental anchor when they get a first perception of a market or prices without waiting for enough information. Their mind gets stuck in their initial understanding whatever new data they get later.

Avoiding the Anchoring Bias

[Award up to 3 marks for any one method of avoiding the bias.]

The first step in protecting oneself against the effects of anchoring is to be aware of any suggested values that seem extremely high or low.

One way of doing this is to generate an alternative anchor value that is equally extreme in the opposite direction.

For example, before estimating the value of a stock that seems grossly over priced, a decision maker might imagine what the value would seem like if the stock price had been extremely low.

Extreme values produce the largest anchoring effects and the effects of anchoring often go unnoticed.

For these reasons, it is important to realize that a discussion of best-case or worst-case scenarios can lead to unintended anchoring effects.

For instance, after considering the profitability of a business venture under ideal conditions, it is difficult to arrive at realistic projections.

Framing & Question Wording

The way people behave depends on the way that their decision problems are framed.

Framing is a cognitive heuristic in which people tend to reach conclusions based on the “framework” within which a situation was presented.

The rational theory of choice assumes description invariance: equivalent formulations of a choice problem should give rise to the same preference order.

Contrary to this assumption, there is much evidence that variations in the framing of options (e.g., in terms of gains or losses) yield systematically different preferences.

Investors realize their gains more readily than their losses. The winning investments, investors chose to sell, continue to outperform the losers they hold on to in subsequent months.

Avoiding the Framing Bias

People tend to look for information that is consistent with a hypothesis rather than information which opposes it.

Ask questions designed to disconfirm what you think is true.

Frame questions to encourage disconfirming answers.

Overconfidence

Overconfidence is the gap between the confidence one attaches to a forecast and the accuracy of the forecast.

Overconfidence is greatest when accuracy is near chance levels.

Avoiding the Overconfidence Bias

Overconfidence is greatest when judgments are difficult or confidence is extreme. In such cases it pays to proceed cautiously.

Stop to consider reasons why your judgement might be wrong. Even though you may not change your mind, your judgements will probably be better calibrated.

END OF EXAMINERS' REPORT