INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

September 2010 examinations

Subject SA6 — Investment Specialist Applications

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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General comments

Pleasingly, this diet continued a trend and was a better answered paper than previous diets resulting in a much higher pass rate even with a slightly higher pass mark. Despite this trend, the pass mark still remains lower than the examiners feel ought to achievable by candidates, who are likely to be working as advisers or asset managers in this most practical of fields. Candidates typically answered Question 3 better than the others (albeit foregoing a lot of marks) despite the unusual scenario, with Question 2 attracting the worst response even though this was a more conventional area of work. Question 1 required the consideration of structured solutions and although many candidates scored well, others were struggling to get into the detail of different fund/product types.

That said, the increased pass rate reflects that most candidates seemed to identify and understand the key issues being examined and so appreciated the general content of solutions that the examiners were looking for – however those that were unsuccessful will find their solutions lacked sufficient (and often the most basic) detail or application of knowledge and scored lower accordingly. Many candidates still deviate from the topic and include irrelevant material or over emphasise minor points – although candidates will not be explicitly penalised for this, it gives an impression of a lack of understanding and, more importantly, wastes limited time. Time and priority management are key skills actuaries need to have. Where candidates made relevant points in other parts of their solutions, the examiners have used their discretion as to whether to recognise these answers or not. Likewise the examiners share and agree alternative possible solutions to questions during the marking process.

Candidates are reminded of a 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 recently qualified actuary or senior student in a frequently evolving discipline. Hence simple regurgitation of bookwork will never be sufficient to ensure a Pass grade – and this was evident from the dispersion of candidates' responses in the more differentiating questions.

As noted in previous Examiner's reports, in order to succeed, candidates must ensure they familiarise themselves with the prevailing investment issues and the general market background facing institutional investors in the 12-18 months preceding a diet, more so 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 questions 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. Against a background of the credit crisis, new asset classes and ways of structuring investments will themselves generate new types of risk (such as operations, liquidity, credit and counterparty), so the need for new ways of regulation, monitoring and management. Finally the examiners encourage candidates to recognise there are different types of investor beyond purely pension funds and different taxation, time line and cost considerations will apply. As actuaries move into wider fields, the examiners are likely to focus on the application of core skills in what may appear unfamiliar situations. However, better candidates should be able to identify the key principles and considerations that a solution demands.

1 (i) Define risk free return in relation to domestic government bonds

Asset class returns, or "beta", driven
Over the long term…
…by fundamental factors…
…such as GDP growth

Over shorter periods…
…by technical factors…
…such as supply/demand…

…and by sentiment

Returns from manager skill, or "alpha", driven by
A relative competitive advantage expressed by an individual or team…
…typically based on security selection…
…and/or market timing

Additional return associated with holding illiquid investments, or the "illiquidity premium", driven by
Essentially driven by the providers of the capital themselves…
…since projects and investments that demand a lock-in of capital will necessarily demand a higher hurdle rate of return before being approved or accepted

(ii) (a) **An Equity ETF** is an investment that gives exposure to an equity index…
…via a very liquid tradable market…
…and hence is entirely a beta return…
…with no alpha…
…and no liquidity premium

(b) **An Active Long-Only Equity Fund** is an investment that will usually be expected...
…to be in a number of liquid…
…publicly-quoted equities.
The manager of this fund will buy and sell these equities with the intention of outperforming a stated equity market index…
…and the universe from which the manager selects these equities will usually be the constituents of that benchmark index.
Hence will expect to generate the majority of its return from beta…
…and a variable minority of its return from alpha…
…and the expected proportion of return from alpha depends on the extent to which the manager buys equities in different proportions to the index.
No return from liquidity premium

If in addition a candidate discusses small cap investments then *up to two bonus marks* may be given, or if discussed *instead* of the above

then award normal marks (in the same pattern as the above marking plan) for pertinent small cap comments.

(c) **An Equity Market Neutral Hedge Fund** is made up of a series of long and short equity holdings…
…in liquid publicly traded stocks…
…designed to have a zero net holding…
…and so have no net exposure to equity markets.
Bonus marks: In practice there is always some residual exposure…
…and often managers will have the scope to deliberately add some exposure when they have a particular market view up to pre-determined limits.
Hence there is no (or very limited) return from beta…
…virtually all the return is from alpha…
…and there is no liquidity premium.

(d) **A Hedge Fund investing in "distressed opportunities"** will typically be seeking to invest in a variety of assets…
…each of which are available for purchase at an abnormally low price…
….due to either distress in a market…
…or distress in the current owner…
…and which the manager believes will revert to their more normally-observed market value…
…over a period of time, usually a number of years.
Because of this time period, these hedge funds normally have a "lock-in" period during which investors may not withdraw their investment.
Thus we see that will be some return from beta as the market returns to normal valuations…
…and some return from alpha as the manager selects those investments with the deepest discount to and best chance of returning to normal valuations…
…and some return from the liquidity premium as the manager needs to wait for these revaluations to occur without any need to sell the investments.

(iii) (a) **CDSs**

A CDS involves payment of a fee by the party that is looking to hedge their credit risk to the party that is selling the protection. In exchange for this fee, the seller of the protection will make a credit default protection payment if a credit default event on the reference asset occurs within the term of the contract. This hedges the default risk but does not explicitly hedge the price risk. The amount of the credit default protection payment is the difference between the original price of the reference asset and the recovery price of the reference asset (or in some cases the CDS may be settled physically, i.e. the seller pays the full notional amount and receives in return the defaulted security). If the credit event does not occur within the term of the contract, the

buyer receives no monetary payment but has benefited from the protection during the tenure of the contract.

CDSs are regularly traded and are mainly used for hedging, portfolio management and speculation, and/or a combination of these.

CDSs are traded over the counter (OTC), involve intricate knowledge of the market and the underlying assets and are valued using complex computer pricing algorithms and models, so they are better suited for institutional rather than retail investors, accepting the latter may use models too. Dealing costs are likely to deter retail investors too, given likely volumes.

The market for CDSs is OTC and unregulated, and the contracts often get traded so much that it is hard to know who stands at each end of a transaction. There is the possibility that the risk buyer may not have the financial strength to abide by the contract's provisions, making it difficult to value the contracts. The leverage involved in many CDS transactions, and the possibility that a widespread downturn in the market could cause massive defaults and challenge the ability of risk buyers to pay their obligations, adds to the uncertainty.

(marks to be available for further information given)

(b) **TRSs**

Total Return Swaps (or Total Rate of Return Swaps) are less common types of Credit Derivative, but are important off-balance sheet tools for hedge funds and for banks seeking additional fee income. They are often considered another form of financing.

A TRS allows an investor (the receiver in the TRS) to enjoy all the benefits of the cash flow benefits of a security without actually owning the security. The investor receives the total rate of return. At the end of the defined swap term, or at pre-arranged interim periods, the receiver in the TRS also receives the difference between the price of the security and the original price if the price of the security has appreciated, or has to pay any decline in the price of the security to the payer in the TRS.

To enjoy these benefits, the receiver makes on-going payments to the payer of the TRS. These payment are referred to as floating rate payment, the financing cost, or the funding cost to the receiver (aka the investor). The floating rate payment is often a spread to LIBOR. The reference assets can be indices, bonds, loans, equities, property receivables, lease receivables, or commodities.

TRSs are off-balance sheet transactions.

High cost borrowers who seek financing and leverage, such as hedge funds, are natural receivers in TRSs. Lower cost borrowers, with large balance sheets are natural payers.

The payer is the legal owner of the reference asset, and generally holds it on its balance sheet.

The payer in the TRS has created a short position in the market risk for the reference asset and the credit risk for the reference asset. And vice versa for the receiver.

Procedures for when any default on the reference asset occurs are included in the agreement, including whether or not the overall agreement terminates in this circumstance.

Uses of TRSs

1) The primary use of a TRS is financing/leverage
2) Balance sheet management
3) Portfolio Management
4) Hedge Fund Leverage
5) Asset Swap Maturity Manipulation

An organisation who cannot short a security may be able to hedge a long position by paying in a TRS. Deferring losses on an asset without risking further losses may also motivate a payer in a TRS.

With TRSs

Receivers can create new assets with specific maturity dates not currently available in the market.

Receivers can gain access to syndicated loans or high yield bonds which they would otherwise not have access.

Receivers can possibly gain a higher return on capital.

Receivers can fill in "credit gaps" in their portfolios.

Receivers can reduce administrative costs of buying loans.

Receivers can access entire asset classes.

For creditworthy receivers and creditworthy banks no unfront collateral is usually required.

Marks can also be awarded for:

Comment on Counterparty risk.

Comment on Relative liquidity of a TRS.

Comment on Dealing costs.

2 (i) The theory of Liability Driven Investment can be summarised as:

- Buy a "risk reducing" portfolio of bonds whose payments hedge cash flows or characteristics (duration, nature, term, sensitivity to changes in interest rates/inflation) of Liabilities.

- Invest in "return seeking" Assets (equities, credit, real estate) to finance any deficit and/or uninvestable risks (e.g. longevity).

The risk reducing strategy can be implemented on a segregated or pooled basis using external asset managers. However in considering the most appropriate structure and timing, there are other decisions to be made:

- What market level should you hedge at?

- What liabilities/actuarial valuation basis should be hedged?

In practice, the Liability cash flows cannot be forecast accurately and will change, so the Trustees need a dynamic approach where the risk reducing portfolio is rebalanced periodically.

The other fundamental issue is that the "matching" bonds don't exist (or are not for sale).

Consequently the Plan will need to invest in derivatives to achieve the appropriate duration and other characteristics, such as capped inflation increases..

This means the Plan will engage with a bank(s) either directly or through an asset manager to swap agreed "fixed" long-dated future liability cash flows for payment of a "floating" short-term rate.

Although this will bring the Liabilities closer in line with the Assets, removing unrewarded risks and reducing adverse funding level volatility, it does mean new counterparty and operational risks are introduced

as well as the challenge in generating short-term rate based (e.g. LIBOR) cash flows consistently

and the need to hold and manage acceptable collateral.

The main reason for deferring the investment in swaps and longer dated bonds would be a belief that longer dated bond and swap yields will increase and so it will be possible to hedge more liabilities at a lower cost.

The key reasons for an increase in yield expectations would be:

- A return to a more normal pricing of swaps to returns above the implied Government bond yield curve to reflect the higher credit risk of bank counterparties relative to government.

- An increase in supply of longer dated Government bonds to finance the public sector borrowing requirement.

- A reversal of a Quantitative Easing programme.

- Possible credit downgrade of the Government.

- Market uncertainty over the possibility and consequences of a "hung parliament".

Since these factors are a consequence of policy and sentiment, it is not possible to be precise about the timing or market level when it will become more appropriate to instigate the full risk reducing portfolio.

(ii) Although over the longer term equities have historically outperformed bonds, bond investment is still suitable for pension funds for a number of reasons:

- More opportunities for generating return (country/currency/ market/sector/company/security/rating/duration/income).
- Return of capital if the issuer does not default.
- Return of some capital (c.40%) if it does.
- Income certainty.
- Tax advantages.
- Match asset for certain liabilities, at least under accounting standards.

There will also be periods where bonds are expected to outperform equity and other return seeking assets

Likewise there are periods when it would appear that developed equity markets are "range bound", demonstrating considerable volatility without making significant gains.

(iii) Bonds markets, unlike stock markets, often do not have a centralised exchange or trading system. Instead they trade in decentralised, dealer-based "over-the-counter" markets.

When a pension fund buys or sells a bond (through an asset manager), the counterparty to the trade is almost always a bank or securities firm acting as a dealer.

However bond market liquidity has been very poor in the last 18 months as most banks' bond repurchase ("repo") trading desks have been closed.

The liquidity problem has been compounded by an overhang of structured products awaiting realisation – packages of bonds that investors are looking to sell as soon as conditions permit.

Bonds are subject to *interest rate risk* – market prices will decrease in value when prevailing interest rates rise, reflecting new investors' ability to get a higher interest rate on their money elsewhere. This does not affect the interest payments to the current bondholder, so pension funds wanting a specific amount at a maturity date to meet a liability payment need not worry about price swings in their bonds, and so would not consider interest rate risk were it not for accounting disclosures.

In addition, corporate bond yields include a "spread" above the yield of a comparable Government bond to compensate the investor for the additional default risk. Spreads increase with increasing risk and can vary significantly over time. If spreads and so yields increase, this means the market price of the bond falls. Typically pension funds limited themselves to "investment grade" bonds although rating downgrades in illiquid issues mean that pension funds have become unintentional holders of "sub-investment grade" stock.

Although this may seem unduly risky, it is not unreasonable given that many such funds invest in smaller/poorly rated companies through their equity exposure being in passive funds.

(iv) The right time to hedge will rely on a number of factors:

- An increase in the level of long dated Government bond yields commensurate with an increase in the Plan's funding level.
- A pricing of the swap curve above the returns available on Government bonds to reflect the greater relative credit risk of bank counterparties.
- The availability of a suitable investment vehicle through which to manage a portfolio of bonds and swaps to hedge liability risks.
- Improvement in operational considerations for hedging portfolios such as charges for credit and the acceptability of different asset classes as collateral.
- Appropriately low initial investment and ongoing charges for managing the hedge portfolio.

Of these, the first will have the greatest impact on the value placed on the liabilities although the affordability of hedging depends on both the assets and liabilities – hence the monitoring tool we propose will help us to identify and analyse both the funding level of the Plan and the trend (and contributing factors) and so the reasonable likelihood (or not) of further improvement.

Market based triggers can be used to capture market gains and therefore lock into higher market levels as and when they arise. The investment manager that

is mandated to carry out this process for you would monitor the triggers. When a trigger is hit, the investment manager would take the necessary steps to switch into the hedge portfolio. The investment manager should be mandated to minimise the costs of switching into the hedging portfolio.

Triggers would be based on various market levels. These will be scheme-specific, but the key factors are likely to be:

- Equity market levels
  - switches out of the return-seeking strategy, into the hedge portfolio, if equity markets have outperformed by more than the "expected" or "required" amount to achieve the funding target
- interest rate/inflation levels
  - switches into interest rate or inflation hedging assets (either bonds or swaps) at pre-determined yields
- funding level triggers
  - if the funding level (which can be estimated regularly using a proxy index) has improved by more than the "expected" or "required" amount, then the probability of meeting the target funding is likely to increase

[Additional marks for suitable illustrations]

(v) (a) Longer term we would expect corporate bonds to outperform Government debt and long dated issues to generate higher returns than short-dated ones.

(b) The analyst is basing their analysis on the spread (yield difference) between corporate bonds and gilts. These are generally considered to arise from two main sources: illiquidity premia and credit risk premia.

The illiquidity premium reflects the lower marketability and higher buying and selling costs of corporate bonds relative to gilts.

The credit risk premium reflects the expected loss from defaults and also a premium to reward investors to compensate investors for the risk of these losses being higher than originally expected. Whilst downgrade risk doesn't necessarily create a default, it will create a loss as the bond will trade at a discount, so this is also reflected in the premium.

For a buy-and-hold investor that is expecting to hold corporate bonds to maturity and expects actual defaults to remain within a particular level, they would expect to "lock-in" the spread differential over the term of the bonds, and this is the "profit" the analyst is referring to.

(vi) In practice, this is not a valid statement for the following reasons:

- If corporate bonds are not held to maturity there is market risk, the risk that the credit spreads widen (and prices fall) because of changes in credit rating of the corporate bonds held or general widening in credit spreads, for example due to a weakening economic environment.

- Even for a buy-and-hold investor, there is a risk of lower returns if defaults are higher in future than that indicated from historical default data.

- If gilts increase in value during the lifetime of the short position, then additional collateral may need to be sourced. Typically gilts are sold through a "repo" programme with terms of 3/6/9/12 months, and if the income received for selling gilts changes then this will alter the financing cost of holding the corporate bonds.

(vii) The analyst is assuming the following:

- Gilt yields do not fall further – if they do then additional collateral will be required as a loss will have arisen on the short gilt position. This is exacerbated for long-dated gilts which have higher price volatility than short-dated gilts (although yield volatility may be less).

- The gilt repo market (and other means of short selling gilts) remains liquid and transaction costs remain at current levels – if this fails to remain the case then this will result in a potentially uncovered long position and capital squeeze (which may mean the corporate bonds need to be sold to finance a loss on the gilt short, in a worst case scenario).

- Corporate bond spreads over gilts remain at similar levels in the future – if spreads reduce then a profit will arise but there will be a refinancing risk as the yield available on corporate bonds will fall. This may mean the position needs to be liquidated when the corporate bonds mature, reducing the potential profits (and potentially creating a loss due to prematurely closing the short gilts position).

3 (i) Investigations need to cover:

The generic market opportunity

- Why invest in renewable energy? – provides stable (quantifiable) and sustainable returns for investors with a medium-term view, investment in physical assets through a transparent structure, socially responsible investment (SRI) and here to stay.

- Why CEE and SE? Certain EU markets are saturated (e.g. Spain, Germany) and the incentives are being reduced every year (providing lower yield for new projects), CEE and some SE countries provide still

better incentives for investments, most similar funds lack the required expertise, thus it is still a relatively less populated market, optimal combination of meteorological conditions and proximity to users.

- Why now? The number of physical locations that are optimal for a certain type of generation in any given jurisdiction is finite and given away on a first come, first served basis (i.e. later investments will have a lower efficiency), incentives still high in some countries, but will be decreasing every year, arbitraging recently collapsed technology prices with current schemes based on higher technology prices of the not too distant past, current availability of projects from forced sellers and ready-to-go projects lacking equity.

The specific market opportunity – deal flow, access, pricing, persistence, change, comparators, independent validation.

The management team – relevant experience, skill, qualifications (languages), previous experience of working together, current employment (will they move), expected remuneration, lock in, competitors.

The fund structure – legal entity, domicile, regulation, scope of investment, scope of coverage (geography, type of renewable), directors/management, total size and capital structure, other investors, familiarity, closed/open, target horizon.

The investment – size, concentration, commitment, pricing, control, time commitment, alternatives and existing exposure, IRR, exit strategy.

(ii) SWOT needs to cover both the renewable energy market and the management proposal.

Strengths

- Strong appetite for renewable energy generation is forecast to grow rapidly as non-hydro sources are still very small in terms of overall investment and installed generation capacity.

- Political support and incentive mechanisms provide guaranteed long-term contracted off-take agreements at prices prescribed by law, i.e. price risk is very low.

- Entire production value chain of each renewables technology is focused towards cost reduction and improvement of efficiency in power generation.

- Decreasing risk in owning the development risk.
  - Low construction risk for solar and wind projects
  - Simple installation process backed by contractor
- Strong pipeline and access to viable projects.
  - Pipeline well in excess of the target size for funding.
  - Management Team's network and relationships on the ground.
  - Management Team's detailed knowledge of the industry, local industry and the target geographical areas.
  - Management Team has access to key decision makers in their respective regions.
- Strict investment criteria allowing for swift vetting of projects and investment decision.

Weaknesses

- Renewables generation is dependent on political support and incentive mechanisms.
  - However, there is a strong resolution of politics both globally and in the EU, which is likely to get even stronger and is backed by public opinion increasingly in favour of low-carbon power generation.
  - Ongoing projects with long-term contracts in place do not require ongoing political support only at the time of going online.
- No track record.
- Management Team has no "classic" private equity specific investment experience but may have experience in analysing renewables investments and in capital structure analysis or working with SMEs including evaluation of business plans and subsequent decisions to invest in equity tranches and mezzanine – the exact experience required for the contemplated investments.

Opportunities

- Growth play with most countries needing to catch up with aggressive emissions targets.
- Some owners (funds and one-off investors) needing to sell.
- Fragmented market with inefficient pricing mechanism.

- Economics of stand-alone projects are attractive and locked-in at the outset.
- EU directives setting ambitious targets for CO2 reductions and subsidising low-carbon power generation.
- Regions targeted are expected to experience exponential growth over the next few years.
- Assets and entire portfolios available from forced sellers.
- Management Team's unique access to some of these assets.
- Few serious players occupying this space.
- Potential to co-invest.

Threats

- Low barrier to entry has led to many small project developers and operators.
  - Selection of appropriate local partners as such is key to success.
- Decreasing costs and technology risk.
  - Mitigated by the long-term guaranteed supply contracts that are in place from the onset of the individual projects.
- Potentially low number of commercially viable and thus suitable projects available (as opposed to projects pushed by special interest groups).
- Competition from other similar funds bidding for the same projects.

END OF EXAMINERS' REPORT