Subject SA6 — Investment Specialist Applications

EXAMINERS' REPORT

April 2009

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.

R D Muckart
Chairman of the Board of Examiners

July 2009

Comments

Disappointingly, this was a generally worse answered paper than the previous diet, reversing what had been an encouraging trend, resulting in a lower pass rate despite a slightly lower pass mark.

There was no question answered better than the others, but the range of responses for each question was wider than before, particularly Question 3. Given the global topicality of the subject, although the marking schedule reflects the most likely solution reflecting recent experience, full credit was given for well thought through alternative solutions to an issue which is affecting everyone personally, publically and professionally.

Behavioural finance has been a feature of many recent papers and, again, very topical as markets have behaved increasingly "irrationally", hence I would have expected Question 2 to be answered better than it was. Candidates were either confused between the different behavioural biases or were unable to identify which were the most likely to be relevant.

This was the third diet to feature a third question, yet still some candidates seem to have left insufficient time to complete their last question, even if they understood the key issues. Given the diversity of issues affecting institutional investors and the direction of the paper to address practical solutions, then it is quite likely that future papers will also feature three questions. Time and priority management are also key skills actuaries need to have.

Many candidates seemed to 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 and scored lower accordingly. Worse, some candidates deviated from the topic and included irrelevant material – although candidates will not be explicitly penalised for this, it gives an impression of a lack of understanding and, more importantly, wastes limited time. 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.

As in previous diets, there were many candidates close to the pass mark whom were awarded an FA – most 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. 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, particularly given the improving trend in ST5. Although no candidate was awarded an FD in this diet (which is a further positive improvement in the overall standard), the examiners remain concerned by candidates achieving only an FC grade since this would imply little knowledge and understanding.

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 practising actuary or senior student in a frequently evolving discipline. Hence simple regurgitation of bookwork will never be sufficient to ensure a Pass grade.

As noted before, 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 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. New asset classes and ways of structuring investment will themselves generate new types of risk (such as operations, liquidity, credit and counterparty), so the need for new ways of monitoring and management. Similarly we will be looking for candidates to be able to apply theory appropriately for non-pension fund situations.

All extenuating and mitigating circumstances were considered in awarding grades and, where there was a genuine cause, credit given.

1 (i) The actual scope to take investment risk will be a complex decision, and there will be a range of reasonable answers that can be justified.

Relevant factors will include:

University constraints

- University's level of dependence on the endowment (% of funding from this source)
  The higher this is, the less scope there is to take investment risk in the endowment

- University's ability to secure other sources of funding in the event of the endowment spending less (e.g. tuition fees, gifts, government funding, sponsorships)
  The higher this is, the more scope there is to increase investment risk in the endowment

- University's ability to reduce expenditure (short-term and long-term scope may differ)
  The more scope there is to reduce expenditure, the more scope there is to increase investment risk within the endowment

- University's other assets
  Potentially these might permit more investment risk to be taken within the endowment.

Endowment constraints

- The higher the level of annual spending, as a proportion of assets, the less scope there is to take investment risk

- Future commitments (e.g. undrawn commitments to private equity programs) may mean part of the endowment needs to be held in liquid, realisable assets

- Some existing assets will be illiquid, so changes in asset allocation will need to be deferred until exit opportunities from existing investments arise.

Governance/other constraints

- There may be restrictions on particular asset classes due to social or other factors, e.g. within the constitution of the University

- The University may request the endowment not to make investments where there is a risk of reputational damage (e.g. arms manufacturers)

(ii) **Quantitative analysis:**

Year ended	*Assets y/e*	*Annual change in endowment spending*	*Assets / spending by endowment*	*University income*	*Annual change*
	(a)	(b)	(c)	(d)	(e)
31/12/2008	2500	9.1%	10.4	632	3.3%
31/12/2007	3090	29.4%	14.0	611	4.2%
31/12/2006	2935	6.3%	17.3	586	13.6%
31/12/2005	2715	6.7%	17.0	516	3.2%
31/12/2004	2600		17.3	500	
31/12/2003	2480				

Formulae:

(a) Start of year assets = End of year assets + Spending – Gifts – Investment Return

(b) Annual change

(c) Ratio of endowment assets to endowment spending in current year

(d) University income = Endowment spending / % of total University income

(e) Annual change

Commentary

The University is highly dependent on the endowment at the present time as shown by the increasing proportion of total income provided by the endowment.

In a climate of falling gifts and rapidly growing expenditure it is likely that short-term dependence on the endowment will increase further (unless capital expenditure has been a key factor in recent spending).

Recent spending by the endowment has not been matched by increases in gifts and investment returns, unlike the position up to 2006 when assets and spending were increasing by similar amounts each year.

The University should be concerned that the ratio of endowment assets to endowment spending has fallen so far in the past two years, to a level that is no longer sustainable.

The endowment was meeting the all of the three financial objectives (asset growth, sustainable spending, stable spending) between 2004 and 2006.

Since 2007 both of the first two financial objectives have been breached, although this may reflect temporary circumstances (e.g. an expansion of the

university) and short-term financial difficulties (weak level of giving, and poor investment returns).

A further source of concern is that only 10% of assets are in liquid asset classes (bonds and cash) at a time of low donations, which could lead to forced asset sales at a time of low asset valuations.

(iii) **Analysis**

Arguably the endowment's spending is becoming increasingly guaranteed in nature, particularly in the short to medium term. This is because as the proportion of University income derived from the endowment increases, it becomes more difficult to replace this source of income. In the longer term it may be possible for the University to access other sources of funding or reduce expenditure to reduce dependence on the endowment.

For a guaranteed liability, the perfect matching asset in x years time is a zero coupon risk-free bond with term x.

This would suggest an increased weighting to short to medium duration bonds to match future planned spending.

However the endowment does not have sufficient assets to meet the current nominal level of spending in perpetuity, before allowing for expected future increases (which would require a still larger asset base).

The endowment also has the objective of growing its asset base in real terms over time.

Without an increase in gifts or a reduction in the level of spending, it will not be possible to simultaneously maintain the real value of the endowment over time and distribute the desired amounts with a high degree of certainty over an extended period. Increasing investment risk (in the aim of achieving higher expected returns) will increase the long-term expected growth rate, but will also increase the probability of the endowment needing to reduce its spending in the event of poor investment returns.

ALM analysis can help find an appropriate balance between these objectives.

With a larger asset base, it would be possible to reconcile these objectives by investing in a mix of growth-oriented assets (as currently) and liquid assets to cover short-term spending.

Recommendation

On strategic grounds, it would be desirable to increase the allocation to bond assets to perhaps 30–50% of assets (to cover 3–5 years spending) as the University will not be able to obtain additional funding from elsewhere over this period. From a tactical perspective it will be difficult to achieve this without selling assets at low valuations. This is a particular issue for the assets

held in illiquid assets, although it should be possible to realise a high proportion of assets held in skill-based strategies (e.g. equity market neutral, TAA or active currency) without being unduly concerned about this issue. Therefore a medium-term target of 30-50% coupled with a short-term target of 20% bonds may be more realistic, investing new funds or returns of capital from existing strategies into bonds. If investment returns and/or gifts are healthy over the next few years this may enable the medium term target to be lowered to 20–30% bonds whilst still covering 3–5 years spending.

(iv) This type of structure is typically invested in a zero coupon bond plus an equity call option to provide the equity upside. For example at an interest rate of 6% pa over 5 years, around 75% ($=1.06^{-5}$) of the initial investment needs to be invested in the bond, leaving 25% (including expenses) to finance the purchase of a 5 year FTSE100 at-the-money call.

(v) If the issuing bank becomes insolvent, then the entire payment due at maturity will become an unsecured liability of the bank.

It will rank equally with other unsecured creditors such as deposit-holders and potentially some of the bond-holders, and rank behind creditors with security.

Most bond-holders and all equity shareholders will rank below the purchaser of a note.

In such an event, it is likely that less than a full return of principal will occur, and potentially there could be a total loss of principal (although historically losses have been well under 50% in most cases).

(vi) The endowment could invest in a FTSE100 index fund or an ETF to obtain the equity exposure without counterparty risk (as funding is not being provided to a bank).

To obtain the desired payoff profile, an equity dividend swap will need to be entered into, which will finance the purchase of an at-the-money put to provide principal protection on the FTSE100 price index.

Provided the put and dividend swap are written under documentation that provides for frequent collateralisation (e.g. daily), there will be no direct counterparty risk.

An alternative approach would be to invest in a secured deposit with one or more banks and buy the equity call under documentation that provides for collateralisation.

Under either of these strategies there will be replacement risk for the derivatives in the event of failure of the bank(s) writing the derivatives, as the derivatives would be closed out at their current value and replacement derivatives would need to be found in the markets for the remaining term (or an unhedged position continued). However the underlying principal would be protected.

(vii) Overcapacity is likely to lead to lower margins on car production, and possibly some restructuring activity (redundancies, plant closures). This will lead to poor profitability within the auto production sector (manufacturers and suppliers) and below-average profitability within the auto finance sector.

Equity holders in these companies will suffer a much greater loss of value than bond holders, although some much of this information may already be priced into asset values.

Whilst debt/equity ratios are relatively low within the auto sector, these businesses often have very large unfunded pension and healthcare liabilities, creating a much higher implied leverage ratio.

Therefore bond holders may be more exposed to downside risks than the leverage ratio suggests, although this information may be captured in credit ratings.

Within the endowment's assets, the following asset classes are most likely to have direct exposure to the auto sector: absolute return equities, market neutral equity hedge funds, credit hedge funds, private equity.

Although the auto industry only makes up some 10% of the global economy, the proportionate exposure may be higher if for example:

- the equity managers are overweight the sector, or are overweight to companies with more underutilised capacity relative to the average

- the equity hedge funds have a net long exposure to auto sector, or a material long exposure to companies with more underutilised capacity relative to the average

- the credit hedge funds have a net long exposure to auto sector, or a material long exposure to companies with more underutilised capacity relative to the average

The commodity funds, skill-based strategies, illiquid assets and the rest of the bond portfolio should have very limited exposure to the issue of overcapacity within the auto sector, unless the reduction of capacity in the auto sector results in a significant reduction in car production which could impact the wider economy through consumer and industrial demand, or monetary or fiscal policy.

2 (i)

- Anchor and adjustment – Has view about stock and continues to hold view even where news outlook is negative.
- Confirmation bias – look for evidence to confirm their views even though the market says something different
- Regret aversion – by retaining the existing arrangement will not suffer from regret if they sell share and the value actually goes up rather than down
- Status Quo bias – people have preference to keep things as they are

(ii)

- Confirmation bias – looks for evidence that confirms their point of view
- Anchor and adjustment – has pre-defined idea of stock, it is favourite company, so doesn't matter what people say they will continue to believe it will do well.

(iii)

- Anchor and adjustment – has view of stock and uses past performance to make judgement. View on growth is anchored on past performance
- Overconfidence – investor overconfident in their ability to predict future cashflows
- Availability – easier to imagine future returns based on past experience

(iv)

- Framing – although the actual expected return of the alternative bond is higher the investor has framed the decision in such a way as to make the alternative bond seem poor value even though it offers the better return.
- Regret aversion – if hold the alternative investment and the return actual is 0% will regret not holding the guarantee return.
- Risk adverse/myopic loss aversion – prefers to hold a guarantee return as places more weight on the downside return of the alternative investment rather than the upside
- Representative Heuristics – by having a guarantee return they place a higher value than an alternative that involves chance. By adding further probabilities into the scenario the return profile becomes more difficult to understand

3 (i) *Effectiveness of the government's proposal*

Confidence

For the government action to make a significant impact, it will need to regenerate confidence in the banking industry. There may be a time lag before this happens also.

Exchange rate

Exchanges rates are largely determined by a combination of the interest rate differentials between two economies and by sentiment about the likely prospects for economic growth in the two economies. Countries with relatively higher interest rates should see positive flows from exchange rate markets, and countries with higher growth prospects should also see positive flows from exchange rate markets.

Countries with relatively high government borrowing requirements are likely to see relatively lower demand for their currencies.

The effect that the government's proposal will have on the country's exchange rate will depend on the perspective taken by the market.

If the market views it as a positive development, the better sentiment about the economic prospects in the country may result in a greater inward investment demand, and consequently a stronger exchange rate.

The movement in the exchange rate will also depend on the market's perspective on the outlook for other economies. If the market views that the situation is worse in this country than in others, the exchange rate will fall, and vice versa. Also if the market views the governments move as being a quick and decisive action, and consequently that other countries are slower to act, and so will be slower to reap the rewards, then the country's exchange rate should appreciate.

If there were rumours of the government's action before it was announced, the size and structure of the action compared to what had been rumoured will also impact the exchange rate.

Economic growth

There are likely to be a number of negative effects on economic growth.

The government has stated that their proposal would double the fiscal deficit. Implicitly, they are planning to borrow the monies needed to implement the proposal. The extra borrowing required will probably increase the yield payable on government bonds issued from that country.

The extra borrowing, and higher yields, may "crowd out" private consumption, and private investment.

The borrowing will have to be paid back by future taxation which will dampen economic growth in the future.

There are likely to be a number of positive effects on economic growth also.

Should the actions succeed in freeing up bank's balance sheets and reviving confidence in the banking sector, this is likely to enable banks to lend more freely. The resultant increase in credit growth should enable an increase in investment spending which should increase economic growth.

Effectiveness of the proposal

How effective the proposal will depend on its ability to restore bank liquidity, and enable banks to fund the creation of new lending in the economy.

The proposal involves reducing the banks' assets by purchasing their most illiquid assets. This should indirectly increase the banks' capital ratios, enabling greater future lending.

The increased liquidity that may be created will reduce the illiquidity risk premiums in some parts of the markets improving market efficiency.

Other answers may also be acceptable

(ii) *Recapitalizing the banks' balance sheets*

The collapse of the property boom is likely to have generated significant bad property debts for the banks. The losses resulting from these bad debts will reduce the banks' capital.

With less capital, the banks will have to do a combination of scaling back their assets/lending (because they have less capital to support it) and also reduce future lending/asset growth.

Providing extra funds for banks' capital, through say a rights issue underwritten by the government, or the issuing of new preference shares, would directly enable the banks to fund future lending/asset growth.

(iii) *Implications of the proposal and argument against it*

Typical Mortgage Bank

Pre-crisis

ACB Mortgage Bank

Net annual profit p.a. = (1 % – 0.2% – 0.4%) * (Net mortgage loans)
net revenue funding costs other costs = 0.4% * (Net mortgage loans)

"Embedded value" = the discounted present value of the net annual profit.

Post-crisis

ACB Mortgage Bank

Net annual profit p.a. = (1% – 1.2% – 0.4%) * (Net mortgage loans)
net revenue funding costs other costs = minus 0.6% * (Net mortgage loans)

The above example is simplified and effectively assumes lapse rates are zero.

In the context of the above example, a typical mortgage bank will have seen its "embedded value" on its existing business to have approximately reversed sign following the banking crisis.

Consequently, the proposal is likely to show the typical mortgage bank in the country to be insolvent.

(iv) Reporting that mortgage banks are insolvent is likely to cause runs on these banks. This may be considered against the interest of maintaining confidence in the banking system.

(v) *Possible regulatory changes*

The new regulator may call for the introduction of fixed rate mortgages which are funded by fixed rate borrowings with terms that match the expected mortgage terms.

Alternatively he/she could call for new tracker mortgages to be funded by Floating Rate Note borrowings by banks, with rates a fixed percentage above inter-bank borrowing rates.

These proposals would reduce the mis-match interest rate risk of the banks on new mortgages.

Other reasoned examples should score similarly.

END OF EXAMINERS' REPORT