EXAMINATION

September 2006

Subject CA1 — Core Applications Concepts

Paper 2
(Liabilities and Asset Liability Management)

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.

M A Stocker
Chairman of the Board of Examiners

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Comments

Individual comments are shown after each question and within each question where relevant.

General comments

As the title of the course suggests, this subject examines applications of the core techniques and considers broad actuarial concepts in practical situations. To perform well in this subject requires good general business awareness and the ability to use common sense in the situations posed, as much as learning the content of the core reading.

The notes that follow are not to be interpreted as model solutions. Although they contain the majority of the points that the examiners were looking for, they also contain more than even the best prepared candidate could be expected to write in the time allowed in the examination room.

1 Require disclosure of large purchases.

Require disclosure of a purchase that takes a holding over a threshold.

Require a pause in further purchases when a bidder's holding reaches a threshold, and then require the bidder to make an offer for all remaining shares.

Restrict a bidder from retracting an offer.

Set a limited period for a full bid to be completed, and prevent further bids within a prescribed period.

Control any bids where the bidder/target would together have market domination.

Comments on question 1: *This question was generally well answered.*

2 *Marks were given for relevant points, even if made in the wrong part of the candidate's answer*

(i) Proper records/data have been maintained for the valuation.

Statement of the funding level (assets/liabilities).

Opinion on whether there is proper provision for the liabilities.

Statement that assets/liabilities have been valued in accordance with the legislation.

Statement that liabilities and assets have been valued consistently.

Statement that contributions are sufficient to enable the scheme to meet the pensions promised.

An assessment of the future contribution rate on the statutory basis.

(ii) Be aware of the sponsor's potential conflicts - possible responsibilities to the scheme, the members, and to the shareholders of the employer.

Be aware of his own conflicts of interest if he advises scheme trustees or sponsors for other purposes.

Ensure that advice is clear and appropriate to the client's understanding.

Be aware of the specific scope of the role.

Take account of any relevant professional guidance.

Consider the suitability of and any gaps in the prescribed assumptions.

(iii) Explanation of the statutory basis.

Comparison of the statutory basis with any previous funding approach.

The data sources and any caveats regarding the data.

Analysis of changes in the data since the previous valuation

Analysis of changes in scheme surplus since the previous valuation.

Set out the benefits valued

Alternative contribution strategies (if permitted by regulations), and the implications of each for cashflow/security

Alternative uses of surplus.

Interaction between investment strategy and the statutory valuation

Comments on question 2: *Part (i) was bookwork. The purpose and how the basis was to be chosen were set out in the question. A lot of candidates missed this and discussed the sort of valuation and how different bases could apply, for example for accounting purposes or a range with margins for prudence.*

Part (ii) was less well done. Many candidates talked in bland generalities about taking account of all stakeholders or taking account of the readers of the report. There wasn't much of an attempt to tailor the standard wording in the course to the particular circumstance.

Most candidates covered the broad issues in part (iii) but didn't really describe the issues in the context of the question. Surplus and how/why it has changed was usually covered but most missed the issue of a change in basis.

3 (i) If the employee leaves within 3 years, they get nothing. Even leavers with three years service get a fixed deferred pension that will not be worth much at retirement and has no value on death in deferment.

The absence of revaluation skews the value of the deferred benefit to older recruits.

Potential recruits don't know if they will stay long at the company - this is not necessarily in an employee's control.

Once significant service has been built up, the difference in value between the accrued pension on remaining in service and the accrued deferred pension will be large. This loss of pension will magnify the cost of potential redundancy. This redundancy risk may be one that prospective employees are not prepared to take. =

(ii) *Marks were given for any two suggestions. Four possibilities are given here but credit was given for any other sensible suggestion. Suggestions had to be a change to the structure stated in the question, so no marks were given for commenting on portability, etc.*

<u>Remove/reduce the 3-year nil benefit period.</u>

Fairly small cost (if no revaluation) even if a high proportion leave within 3 years, but may have a high perceived value for new employees.

<u>Introduce some form of revaluation to deferred benefits.</u>

Likely to be significant cost, so will need to adjust other aspects (e.g. accrual rate or employee contribution rate) to re-balance.

<u>Higher death benefits in deferment.</u>

Meets employee's immediate concerns, so high perceived value, at relatively small cost.

<u>Offer some form of defined contribution benefits.</u>

Benefit value can be independent of age, and may be more obvious to younger employees. Need to consider the impact of possible significant changes in structure on administration costs.

(iii) Cutting the nil benefit period is likely to be of such low cost that the employer would accept the increased contributions (if any). This will only affect existing employees with less than three years' service, and the new benefit would probably be extended to them.

Increasing death benefits say from three to four times salary would also be of low cost, as would paying a benefit such as the current value of the deferred pension entitlement on death in deferment. These costs might also be accepted by the employer, and extended to existing employees.

The employer would see no need to improve the terms for *existing* deferred pensioners, as they have already left employment. Greater increases in death benefits would be more costly.

Adding revaluation to deferred pensions would make the value of accrual more even over an employee's career.

The obvious route to improving benefits without adding to employer costs is to increase the employee contribution rate.

Employment legislation might make this difficult for existing employees, so the changed terms could only apply to new joiners, who pay a higher contribution rate. Recent recruits may be dissatisfied at not being offered the improved benefits.

Offering an option to existing employees might be anti-selective — those expecting to benefit from the option would be prepared to pay the higher contributions.

If neither employee nor employer contributions change then the effect must be to provide more to an employee who leaves and less to an employee who stays until 65, which would mean reducing the retirement benefits in some way.

Any such change would be adverse on existing employees and may not be possible as it would be a worsening in their terms of employment, unless they agreed to it or the reductions only applied to future service.

Comments on question 3:

In part (i) candidates who concentrated on looking at the benefits specified in the question did well. Those who invented other benefit features, or who assumed that benefits not mentioned didn't exist, did less well. Better candidates commented on how the value of the benefit depends on the employee's career progression, which is uncertain. Part (ii) was generally well answered, with most candidates making sensible suggestions for changes.

Part (iii) was not well answered. Many candidates did not look to identify the range of benefits that could be increased at very little cost. Most identified that improving the more expensive benefits would be detrimental to existing members, if total cost was to remain the same, but very few commented on rebalancing benefits from late-career towards early-career.

4 (i) Experience may differ as:

The policies include different insurance coverage — for example inclusion of legal expenses insurance.

The companies may have different NCD or XS structures, which result in different claims patterns, even if the patterns of all claims are similar.

The companies impose differing underwriting procedures/guidelines or acceptance criteria.

There are differences in claim control — in particular the amount at which claims are accepted without investigation.

The companies have a different mix of business which exhibit different claims patterns, perhaps because of different target markets due to different sales channels, reputation, strategy, geographical location, etc., or due to the mix between comprehensive and third party only cover.

The companies may operate in specialist markets — for example concentrating on motor bikes or classic cars.

The companies have different reinsurance programmes, affecting their net results.

The companies have different reserving methods for reported and unreported claims.

(ii) Reinsurance can limit the exposure to risk for the company, and can assist in avoiding large single losses or writing large risks. Reinsurance can provide protection against whole account adverse experience, either claims fluctuations, for example through excess of loss reinsurance, or catastrophes.

This may be vital to a new company to improve the statutory solvency position.

Stability of profits will be an advantage for a new company.

However, in general the reinsurer will load the reinsurance premiums for profit and contingencies, so a disadvantage to the company is that some of the profit will be passed to the reinsurer.

A balance between the risks and the costs of mitigating them must be struck.

The reinsurer can provide expertise on underwriting, product design, system design, and likely future experience, which the new company will initially lack as it has no past experience.

The reinsurer may also provide administration, actuarial services and other insurance advice, which may be at a competitive price for a new insurer. This generally means a reinsurance contract must be purchased, which may effectively tie the company to a single reinsurer from which it cannot readily escape if reinsurance terms deteriorate.

Reinsurance can also allow risks to be spread and a larger portfolio of risks to be written, for example through quota share reinsurance, which may be advantageous to the new company as a means of diversifying its portfolio.

Quota share will cede the same proportion of each risk, irrespective of size or variance, and a new company would ideally wish to cede only the larger, higher variance risks.

Reinsurance can also reduce the capital strain involved in writing new business, as the reinsurer will take on part of the new business financing requirements, which may be beneficial to the new company as it grows.

Comments on question 4: *Part (i) was generally well answered, with the better candidates adapting the general issues to the particular situation fairly well. In part (ii), few candidates answered at sufficient length for the marks available. For all its benefits, reinsurance does mean paying away part of the expected profit on the business reinsured. Very few candidates examined reinsurance from an explicit cost/benefit perspective, which route would have helped gain marks.*

5 The **general principles** of investment are that:

A provider should select investments that are appropriate to the nature, term and currency of the liabilities and the provider's appetite for risk.

Subject to the above, the investments should also be selected so as to maximise the overall return on the assets, where overall return includes both income and capital.

To the extent that the company does not follow these principles it opens itself to risk.

Matching

The liabilities are of known amounts at known times (provided mortality fluctuations can be ignored). Hence the natural matching assets are fixed interest guaranteed bonds.

The company will need to earn a rate of return in excess of 0.75% over the returns available on government bonds in order for the annuities to be profitable.

It may achieve this by investing in assets other than government bonds, but the company could face the risk of insolvency if it adopted an investment policy similar to that described in the question.

How far to mismatch

Some risks may be unavoidable — for example matching assets by term may not be available, hence reinvestment risk — and the investment policy should be to minimise the risk, for example by immunisation.

The extent to which the company is able to take risks by departing from the above principle in order to maximise returns will depend upon the level of the company's free assets. If there are large free assets, then the company can take a long-term view of the returns it might earn on ordinary shares and use the free assets to protect it from short-term fluctuations in value.

Equities

Equity values are volatile, so a large equity content is likely to lead to greater capital requirements. Over the long term, the shares might be expected to produce the required extra return above government bonds. However, there is no guarantee that this return can be earned over the duration of any particular block of business.

Using ordinary shares means that the liability outgo of the annuity portfolio cannot be matched.

Corporates

Bonds issued by supra-nationals, for example the European Investment Bank and the World Bank, are guaranteed by a group of governments. There is negligible risk of default but they offer a higher yield than government bonds because of poorer marketability.

Corporate bonds will typically offer an even higher return to reflect both the poorer marketability and the risk of default. The default risk may be more acceptable than the risks of equity investment to gain the additional return required. Poorer marketability may not be an issue if it is possible to match the liability outgo of the portfolio since it is assumed that the assets will be held to maturity.

Alternatives

It could invest in a portfolio of government bonds and attempt to increase returns through switching activity. It is unlikely that switching activity would generate an adequate additional return.

Overseas assets might give higher yields, but the currency risk needs to be taken into account.

A derivative/swaps/options strategy might increase returns, but costs may be prohibitive.

Expenses

Future expenses are likely to increase in real terms, and a matching asset with similar characteristics is appropriate. Equities or index-linked bonds may be a good match.

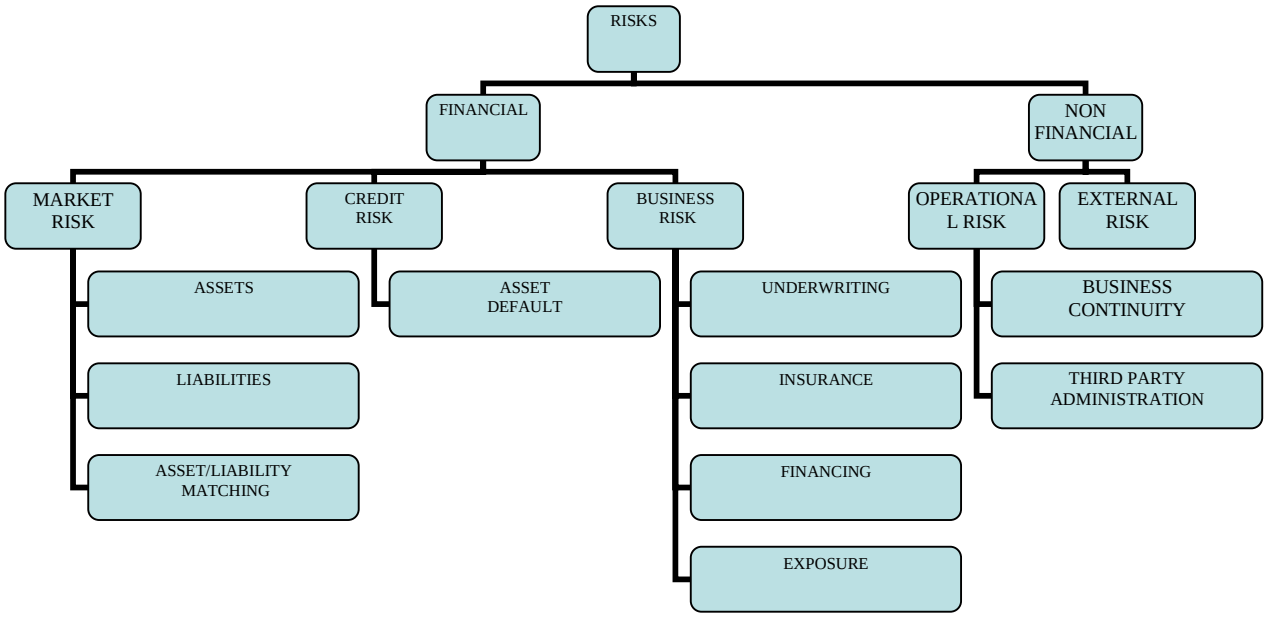
Comments on question 5:

A surprisingly high number of candidates did not start this question by stating the general principles of investment. This is an important starting point for any practical problem around an appropriate investment strategy. Many candidates missed obvious marks by not describing the nature of the liabilities, and hanging their solution on that.

In terms of alternative strategies, many candidates proposed a different mix of bonds and equities, but very few considered other asset classes or alternative investment strategies. A number of candidates suggested redesigning the contract or increasing the premium, or just

said the strategy was hopeless. The examiners were looking for a balanced argument where there is no perfect solution, as often happens in real life.

6 (i) A possible risk analysis structure is given in the following diagram:



One could add counterparty risk in the credit risk area

It was not necessary to reproduce this diagram to gain the marks. Any other form of diagram, or a description in words was accepted.

(ii) **Data recording**

Holding good quality data on all insured risks can assist in ensuring adequate provisions are established for those risks, and reduce the operational risks from having poor data.

Accounting and auditing

Good accounting and audit procedures enable proper provisions to be established, regular premiums to be collected and claims paid, and the providers of finance to the company to be reassured as to its financial position.

Good data recording and accounting and auditing procedures cannot change the company's exposure to the business risks underwritten, but they can protect against fraud.

Regular monitoring using the control cycle (including investment performance).

Monitoring of liabilities taken on

This can protect against aggregation of risks of a specific type to an unacceptable level. It can also quantify the amount of new business to ensure that it is within the provider's resources.

In addition, since premium rating may involve cross subsidies from one type or class of business to another, then this can monitor the business mix achieved in practice against that assumed in the premium rates.

Monitoring options and guarantees

Monitoring the state of options and guarantees offered in contracts can highlight where other risk management techniques may be useful in protecting the company.

(iii) **Mortality risks**

On a without profits basis, the death claim value is guaranteed.

Underwriting will be a significant means of limiting exposure to mortality risk. It will help in ensuring that actual mortality experience does not depart too much from that assumed in the pricing of the contracts being sold.

Reinsurance can be used to pass all, or a portion of, the risk to the reinsurer, although reinsurance also passes on profit making ability.

Diversification will assist in minimising the mortality risks — for example, diversification of lines of business and geographical areas of business.

Investment risks

Diversification of investments will assist in minimising the investment risks, as will matching those assets which back the guaranteed liabilities as closely as possible. In practice matching can be difficult because of the long term of the liabilities.

Alternative risk transfer methods — such as swaps/derivatives — may be useful in this situation.

Issues specific to without/with profits

For a without profits contract the full risk is borne by the company, the whole of the liabilities are guaranteed, and are theoretically able to be matched. For with profits policies, the policy value can reflect actual experience and so pass some of the risk to the policyholder. However, as payouts are generally smoothed, the company will pick up some risk in periods of volatile investment returns.

On a with profits basis, the final payment to maturing policyholders can be determined by consideration of the actual mortality experience of a group of policyholders. This is particularly the case if there is a significant final bonus that is not guaranteed until the date of payment. However, there may be practical constraints, for example due to guarantees or policyholder expectations.

Comments on question 6:

Candidates who understood what part of the core reading the question was referring to managed to score well in parts (i) and (ii), which were essentially bookwork with some straightforward applications. Other candidates struggled to score many marks at all. Structured risk analysis is becoming an increasingly important part of the management of any business. Part (ii) was looking for high level management control systems, not individual techniques for risk reduction and mitigation such as reinsurance and underwriting.

In part (iii) the without profit sections were answered well, but most candidates did not explore the operation of with-profits in enough detail. They therefore missed some of the key points around managing a with-profits portfolio, such as delaying the granting of bonuses and that mortality experience will also be reflected in the bonuses declared. The weaker candidates filled up the space with digressions that did not answer the question asked.

7 (i) Company A is no longer core business for Company B.

Profits may be declining or losses may be appearing.

Falling volumes of new business will increase unit costs (per policy). There will be compliance and management overheads that cannot be reduced in proportion to business volumes.

In force policy volumes will also be falling. Expenses will be increasing in excess of inflation.

Because a prudent provision for future expenses will be made in the valuation basis, this will increase the capital tied up in provisions.

Some overheads, such as office accommodation may be able to be absorbed by Company B.

Specialist skill sets may be in decline.

This will be exacerbated by the retirement of the CEO.

The flat monetary capital requirement for Company A may exceed the risk-based calculation. This would tie up Company B's capital, which it needs to support or develop its own business.

The alternative of developing attractive products for the target market may be seen as too risky. Expensive and with unknown probability of success.

(ii) As it has no shareholders, Company C will have to regard the business as an investment for its policyholders fund.

It is an equity-type investment and so is only suitable to back with-profits business.

A standard risk assessment will be required.

Is it the best use of Company C's capital?

Without the sales link through Company B's market contacts will any new business at all be written through the legal profession. Alternatively, will the contacts that come with Company A's business enhance sales of Company C's products — i.e. is there any goodwill.

Company C may have limited access to capital to finance the acquisition externally, as it is a mutual. It needs to determine whether it has enough capital to invest., given that Company C will still need to demonstrate continued solvency on the supervisory basis.

Depending on the market it operates in, Company C may need to be able to demonstrate significant assets in excess of minimum requirements in order to maintain new business.

Can company C avoid putting up the flat monetary amount of capital — can it consider merging Company A's business into Company C rather than maintaining a subsidiary. *(Lots of issues here — outside the scope of the course and the question.)*

Will the business be able to be run on Company C's administration systems, or will two systems have to be maintained for a period — and how long.

Staff issues will need consideration:

- Where are the companies located.
- Will any staff transfer.
- If staff transfer, are there salary and benefit differentials that may cause problems.
- Can any staff who don't transfer be absorbed by Company B.
- What are the redundancy terms for others and who funds them.
- Pension issues for everyone.
- Can additional staff be recruited in company C's location if necessary?

Can all the Company A business be administered from Company C's existing premises, or will additional accommodation be needed. Will there be any savings in unit costs that will result in valuation expense loadings for the acquired business bring reduced.

Are there taxation synergies, or taxation disadvantages.

Does it fit with C's operational culture (customer service, etc)

As Company C is a mutual, there are issues regarding membership for A's policyholders to be addressed, depending on its constitution.

Does it need C's members' approval. Might the regulator/competition authorities intervene?

(iii) Company C will have to use data that is either in the public domain — statutory accounts, regulatory returns (if available), or data that is supplied to all interested parties by Company B.

Company C will have to approximate company A's business by using the models it has developed for its own business. The wide rage of linked business in Company A may give rise to some difficulties.

Company C will have to estimate how the latest published data will move forward to the intended acquisition date. A history of past data my help do this.

Depending on its accounting policy, Company B might have published some sort of value of Company A's future profits in Company B's accounts. Attempts could be made to verify this, which would add validity to any models used. The value of Company A will be the sum of the shareholders' net assets and the discounted value of the future profits expected to emerge from the existing business.

The first item will usually not difficult. Both Company B and Company C should have valued it similarly. Company C will want to assess the present value of future profits both as Company B might view it, with the existing operational position, and as it expects it to be after a sale, taking account of expense and tax synergies.

It will also be necessary to quantify the capital requirements and calculate the expected return on capital.

Company C will use its own business model, modified for the different contract types and other features. Because of the limited data the value after sale will need to include margins for data and model error.

This could be done by increasing the risk discount rate. But this approach reduces the value of the most distant cash flow, while leaving near ones little changed. Data difficulties may affect the near cash flows just as much as the distant ones. Thus it might be better to add margins into the cash flows before discounting.

Company C would need to decide whether to make any allowance for goodwill/brand — the value of future new business for Company A. In these circumstances, probably not.

Company C would hope that the assessment of the value of the business to Company C is greater than the value assessed by Company B. Thus an

indicative price between the two values would appear to give benefit to both vendor and purchaser.

Economies of scale from the acquisition will also affect Company C's business, reducing unit costs. It might be possible to reduce valuation expense loadings, which would release capital.

The costs of the transaction would need to be estimated and included.

Comments on question 7:

Generally part (i) was well answered with most picking up the main issues. Not enough was said in the main on expenses or unit costs (most said low profits but didn't link it to expenses) particularly in the context of falling volumes. The flat monetary capital point was only mentioned by the better candidates. Many got too subjective about why A was doing badly and the consequences of this — hence inventing their own question.

In part (ii), few candidates recognised that as a mutual, Company C would need to purchase Company A as an equity investment in its policyholders fund. Some talked simply of merging the two business without providing recognition of the complexities that merging a with-profits company and a non-profits one would entail.

Often parts (ii) and (iii) were mixed up together and this lead to a lot of repetition. Marks were given wherever valid points were made. Very few candidates dealt with the limited data issue, which was specifically highlighted in the question. This element of the question required little more than some applied common sense but it clearly worried many candidates.

END OF EXAMINERS' REPORT