INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

September 2014 examinations

Subject CA1 – Actuarial Risk Management

Paper One

Introduction

The Examiners' Report is written by the Principal Examiner with the aim of helping candidates, both those who are sitting the examination for the first time and using past papers as a revision aid and also those who have previously failed the subject.

The Examiners are charged by Council with examining the published syllabus. The Examiners have access to the Core Reading, which is designed to interpret the syllabus, and will generally base questions around it but are not required to examine the content of Core Reading specifically or exclusively.

For numerical questions the Examiners' preferred approach to the solution is reproduced in this report; other valid approaches are given appropriate credit. For essay-style questions, particularly the open-ended questions in the later subjects, the report may contain more points than the Examiners will expect from a solution that scores full marks.

The report is written based on the legislative and regulatory context at the date the examination was set. Candidates should take into account the possibility that circumstances may have changed if using these reports for revision.

F Layton
Chairman of the Board of Examiners

December 2014

General comments on Subject CA1

This subject examines applications in practical situations of the core actuarial techniques and concepts. 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 candidates who perform best learn, understand and apply the principles rather than memorising the core reading.

The examiners set questions that look for candidates to apply the principles specific to the situation set out in the questions, having read the question carefully. Many candidates gain few marks by writing around the subject matter of the question in a more general fashion. Detailed specialist knowledge is not required and nor is very detailed development of particular points.

Good candidates demonstrate that they have used the planning time well to understand the breadth of the question and to structure their answer – this is a big advantage in making points clearly and without repetition. This also enables candidates to use the later parts of questions to generate ideas for answers to the earlier parts.

Time management is important so that candidates give answers to all questions that are roughly proportionate to the number of marks available.

Comments on the September 2014 paper

The general performance was slightly higher than in April. Questions 1 and 7 on paper 1 and question 7 on paper 2 were on average less well answered.

The comments that follow the questions concentrate on areas where candidates could have improved their performance. Candidates approaching the subject for the first time are advised to use these points to aid their revision.

1 Expense risk can be managed by:

- regularly monitoring actual expenses against the budgeted expenses and checking to see whether they are higher than expected
- regularly monitoring new business; e.g. cost of sales versus volume of new business/expense allowances for new business
- regularly monitoring withdrawal rates; for example checking that overheads remain proportional to the volume of in-force business
- implementing cost control measures in the event of expenses exceeding budget. For example in a declining operation sub-letting unused office space
- increasing operational efficiencies, for example increasing automation to reduce the cost of more expensive manual tasks
- having a robust business planning process for future periods, for example ensuring in future periods expense levels are proportional to the projected volume of in-force business and new business
- contracting out administration to a third party who assumes the expense risk
- implementing robust operational procedures with monitoring of effectiveness e.g. to reduce the risk of additional costs being incurred rectifying errors

For a long term contract, some of the charges in the contract may be reviewable and hence if expenses are different these might be able to come through in the charges.

[6]

Generally disappointing answers. Many candidates spent too much time describing how to analyse expenses rather than giving examples of how to actually manage the risk.

2 The major risks involved include:

Exchange rate risk – The company will be more exposed to currency risk for the cost of product imported into Europe. The company could hedge currency risk to reduce the price volatility of the product imported. Alternatively the contract can be based on the European currency passing the currency risk to the manufacturing base

Expertise risk – The overseas company may not have expertise in manufacturing the goods; the company may not have expertise in managing a manufacturing facility from a distance. The risk could be managed by transferring managers to overseas country to oversee the manufacturing facility.

Reputational risk – There could be increased reputation risk, particularly if the manufacturing is contracted out to third companies reducing control over the manufacturing facility. For example: use of child labour and poor work safety conditions. The risk can be reduced by including rights in the contract to inspect the facility, review accident reporting, prohibit use of child labour etc.

Brand risk – If the company sells itself as a domestic manufacturer, transferring the manufacturing facility could cause damage to the brand affecting sales and profitability. The risk can be managed be repositioning the brand image before making the change, for example if the product design is planned to be maintained in the home country, this can be emphasised and the "made in country" de-emphasised.

Language/Communication – This is the risk arising from language differences resulting in mis-communication. This risk can be reduce by employing managers with experience in dealing with both countries and fluent in the languages.

Quality control – The company will need to ensure that the quality of the product is maintained. This risk can be managed through a combination of quality control procedure at the manufacturing plant, together with quality control sampling of imported goods. This can be combined with post sales monitoring of warranty claims. Penalties may be included in the contract to incentivise quality control.

Time risk – This is the risk arising from the manufacturing facility operating in a different time zone and at a large distance from the European country. Part of the time risk can be managed by employing managers locally in the manufacturing country and robust/sophisticated logistic controls reduce the risk of delays in importing products for sale.

Legal risk – The legal risk in the contracts between company and manufacturing can be managed by using legal firms with specialism of both the home country and the overseas manufacturing base.

Risk of adverse political developments – Political risk is inherent in both the home country and the overseas country. This risk can be managed by detailed research of the country. Using a manufacturing base in a country with an economy geared to manufacturing for export will reduce the risk. The risk can also be reduced by using several manufacturing bases in different countries.

Intellectual property – This is the risk that the company's intellectual property e.g. patents are abused. This risk can be reduced by only using manufacturing bases where the law secures intellectual property.

Supply chain risks – The risk of a breakdown in the manufacturing supply chain; this is greatest if there is a dependency on a sole supplier. Also the infrastructure of the overseas company may not be of the required standard. The risk can be reduced by using several suppliers/manufacturers to remove dependence on a single company.

Project Risk – there could be a risk that the benefits of moving to another country (increased profits due to reduced costs) may not be as fast as anticipated (or at all). This risk can be reduced by good project management and/or research

There is the risk of industrial action due to loss of jobs in the home country by transferring manufacturing abroad. This risk could be reduced if the change is linked to expansion so that in the initial stages the home manufacturing base is unaffected by the change. Further changes are delayed until the alternative manufacturing facilities are operational reducing exposure to industrial action in the home country.

Taxation Rules – e.g. penal duties on distributing outside the proposed country

[10]

This was satisfactorily answered by most, the better candidates commented on risks specific to the circumstances.

3 (i) Market
Credit
Business
Liquidity
Operational
External

[3]

(ii) When designing the new product, the insurance company will need to assess the risks faced.

They will need to start by identification of the risks.

The main risk will be that prices rise above the level of the price cap.
If they do rise, they are likely to affect all policyholders.

This will be affected by (e.g.) the price of wholesale energy, distributions costs and taxes (and/or subsidies from the government). The taxes may include green taxes which may be influenced by political factors.

Other risks may include operational risks; e.g. risk that policies are mis-sold or administrative records for policies are incorrect

The company will need to measure these risks, estimating the probability of each risk occurring and its likely severity. This will give the basis for evaluating and selecting methods of risk control.

The company will then need to consider how the risks could be financed. They will need to determine the likely cost of each risk and ensure that adequate financial resources are available to cover the risk.

Risk control measures will then need to be considered. These will aim to mitigate the risks or the consequences of the risks by:

- Limiting the financial consequences of a risk.
- Limiting the severity of the effects of a risk that does occur, reducing the consequences of a risk that does occur

The company may be limited in what it can do to control any increases in prices; but it can use hedging techniques to minimise the impact.

It can design the policy to reduce the financial consequences. The level of the cap will be very important here, and it may be necessary to consider changing the level of the price cap.

It could also limit the maximum level of protection, for example only guaranteeing the price of £1.05 for price rises up to £1.30 (at which point there is no further protection); or limit the period for which the cap applies; but these may limit the attraction of the policy.

Reinsurance could also be used.

The general insurance company could consider partnering with an energy supplier to share risks and improve marketability for both the supplier and the insurance product.

Can also design the policy to reduce moral hazard risk – e.g. base cover on cheapest supplier to avoid disincentive to shop around

[8]
[Total 11]

Most candidates scored most of the marks for part (i). Part (ii) was generally well answered, though weaker candidates didn't relate their answers to the scenario or digressed away from the product design issues.

4 (i) **State**
Direct provision e.g. a national health service or state funded pension scheme
Financed by the collection of taxes and or levies on companies/employers
Encouraging self provision e.g. a refund of taxes if you opt out and set up your own pension fund (or employer provision)
Education about the importance of insurance products
Regulation of other providers of financial services

Employers
Group benefit schemes, e.g. pension or death in service benefits
Cheaper provision through pooling of expenses and expertise
May be compulsory as part of benefits package
Facilitating employees to make provision e.g. contribution by payroll deduction

Individuals
Direct purchase of required products, e.g. savings products to pay off a mortgage
Taking up optional benefits offered by employer
Taking part in group schemes e.g. unions/clubs
Maybe provision via financial intermediaries e.g. brokers
Provision for dependants/children as required

Provision for themselves, especially if the state benefits are not sufficient to meet the individual's standard of living requirements

[6]

(ii) Death – term assurance, and whole of life
Illness – critical illness
Accident – Income protection
Retirement – Annuity, endowment assurance

[3]

(iii) Group products are schemes that employers or other organisations have in place.

Individual products are those that an individual purchases

Group products, whether life or pensions, may be compulsory i.e. a person automatically becomes a member of the insurance when they join a company

Therefore there is less anti selection with group products, but there is a risk of concentration with group products – location and occupation e.g. an accident in a certain factory or a health hazard with a particular job.

[2]

(iv) Legislation and regulation differences

- The compulsory insurances are different
- Certain insurance products may be prohibited in one country

Taxation differences

- The tax status of different insurance products will change the volume

State benefits and services it provides

- Insurance is required to provide for benefits, if the state provides a particular benefit then insurance will not be required.
- State Benefits may be means tested so only those over a certain income level in one country may require insurance

Social differences

- For example home ownership levels may be higher in one country so home ownership related products will be larger
- There may be differences in the cultural attitudes towards families

Demographic differences

- Differences in the age profile will change the demand for difference insurance products
- Differences in the countries' awareness of financial products
- Differences in the spread of wealth of the individuals in the countries

While economic wealth may be similar the actual economic conditions in the 2 countries may be different

There may a general lack of confidence in the financial system (maybe due to a failure of a particular provider)

[5]
[Total 16]

Generally well answered, although in part (iii) many candidates didn't suggest the key differences. In part (iv) many candidates commented on possible legislative/regulatory differences, but not on wider aspects.

5 (i) Income protection
Public liability

[1]

(ii) Identification of the objectives of the project: has market research identified that self-employed individuals are under-insured with regard to accidents, and are they prepared to pay premiums at a high enough level for the product to be profitable?

Will the launch of this product achieve this, if marketed correctly.

Statements on how these objectives will be met: possible quantitative targets to be achieved e.g. a certain number of acceptances for quotes given.

Quality standards: the number of enquires, quality of application forms and the company's reputation in various industry surveys.

Project sponsors role: ultimately this will be the shareholders as they have provided the finance – it is likely that they just want an acceptable return on their investment; the board will have commissioned the project – they will want involvement to ensure that the product is successful.

Third parties: this is a niche market and a new area for the company – they may need to work with consultants or reinsurers; they may also need to work with self-employed people to understand their needs and what equipment they use and what potential accidents could occur.

Communication and IT policy: communications between reinsurers and internal departments is crucial to successful product development; IT will be needed to model potential scenarios in pricing the product.

Financial and economic objectives: ultimately the financial objective is to maximise the return to shareholders. The company want to make profits.

Risk management: all risks and mitigation strategies need documenting in a risk matrix

Legal issues: cause and responsibility for accidents will need defining as clearly as possible – there are likely to be many grey areas so where possible policy is needed; other issues such as client confidentiality and non-disclosure need clarification

Admin Systems: this must be established at the start of the project and is usually immovable.

Financing Policy: the company is well capitalised and therefore unlikely to need additional funds for the new product

Key milestones: timescales, completion of steps e.g. Scenario testing, new business volumes.

Structured breakdown: need to complete this including key phases such as market research and pricing

[10]

(iii) In case Susan's actions/instructions were to cause injury to one of the sports participants, E.g. over stretching on warm up

In case a member of the public gets injured e.g. netball thrown too far

[2]

(iv) When does she start work? (Date on risk)

Any previous claims (including under the group policy when the individual was employed)

Type of sports

Maximum number of participants in a coaching session

Range of the expected age of participants

Ability – are they new to sports or improving what they can do

Target market (e.g. Special needs participants)

Do they fill in a health questionnaire?

Normal location e.g. open park or enclosed building

Number of hours worked; times of training/ matches e.g. day or evening

What sports equipment is involved

Is it new or old and damaged?

Any special information e.g. cover when at a competition venue

Professional qualifications that Susan holds

How experienced is Susan?

This question was generally well answered, although in part (ii) many candidates listed aspects rather than discussing. In part (iv) candidates did not need to give reasons for the information that the insurance company would require.

[4]
[Total 17]

6 (i) Correct perceived market inefficiencies and promote efficient and orderly markets

Protect consumers of financial products

Maintain confidence in the financial system

Reduce financial crime

[2]

(ii) The Reference Interest Rate has a material impact on the finances of consumers. These consumers require protection as one of the aims of financial regulation. This is particularly important for individual financial products as consumers may lack the knowledge to understand financial products

Regulating the Reference Interest Rate may help to maintain confidence in the financial system

Regulation may help readdress any information asymmetry between consumers and banks.

If there are a number of other retail banks (outside the four largest) regulation of these rates may also provide protection to them. As their finances will also be directly impacted by the Reference Interest Rate

By not regulating the Reference Interest Rate there may be cost savings to the regulator. Which may save money for the banks / consumers, or the government / tax payers

This may also avoid undermining the professional responsibility of the banks

Both loans and savings products are linked to the same rate; there may be less need for regulation. As while profits may be increased / decreased on one product there may be an offsetting impact on the other, reducing the direct effect on the profits of the banks, and hence any incentive to falsify the Reference Interest Rate

Business loans will impact on the ability of businesses to grow so the government may wish to regulate. As this will have further implications for future tax receipts as well as overall economic prospects

[5]

(iii) The banks contributing data to the calculation: which banks are allowed to contribute (including how many)

Whether all banks are treated equally or if, for example, the largest bank has a greater weight

If a bank can lose, or gain, its contributing status

What data is used: whether from completed transactions or other market pricing material; how recent the data must be, i.e. over what period is the data valid

If there is any specific pricing applicable, for example bid / offer prices

The calculation method, for example averaging method used, or method by which it is expressed, e.g. interest rate / discount rate or whether compounded monthly or annually

Disclosure required: what underlying data must be made available; how soon the index must be published

What mechanisms are in place if an error is observed, e.g. is any correction to historic rates permitted

[4]

(iv) Abolition of the Reference Interest Rate may be a complex exercise

For example, if contracts explicitly reference the rate this may create problems if the rate simply ceased to exist, or may lead to complex / expensive legal advice being required to confirm treatment based on the actual wording in each policy.

There may be a desire for the rate to continue to exist so that consumers can understand the difference between the Reference Interest Rate and any new rate

Setting up a new rate will require consideration of all the aspects underlying the current rate, including:

- Data sources and type
- Calculation method

- Disclosure requirements

Setting interest rates annually may also cause difficulties

The underlying rate may change materially over a full year and the banks would be forced to set business based on the new rate, which may make cause material advantages to either the banks or consumers

It may also create arbitrage opportunities on short term contracts

A consequence may be that banks add significant margins (offer worse terms) to protect themselves from market changes, which may decrease confidence in the financial system

Only updating the rate on an annual basis may mean that costs are lower, as few calculations would be undertaken, and this would decrease the variation in rates on a short term basis, providing greater certainty for consumers

Although there may be larger jumps in rates on an annual basis as the rate is corrected to a market consistent level

Using an independent government department to set the rate may improve consumer confidence, if the government is seen as more "stable" or trustworthy than the banks

There would be costs from setting up a new department or adding this as a responsibility of an existing department

Depending on reporting line there could be a concern of political risk, as the department may be incentivised to match rates to other goals / ambitions which may alter depending on the political climate, if there is any discretion or interpretation involved in the way the rate is set

[7]
[Total 18]

Part (i) was well answered. Part (ii) was generally well answered although many candidates concentrated on generic pros/cons of regulation without considering specific issues such as the position of other banks. Part (iii) was difficult but better candidates scored well by structuring their answer on the general process: data, method, disclosure, etc. Few candidates scored well on part (iv); most commented on the pros/cons of annual/weekly but few commented on transitional problems.

7 (i) Statutory solvency valuation will likely be on prudent assumptions set at a level to reduce the likelihood of an insolvency event. This will place a value on liabilities which is higher than a best estimate valuation

In addition the statutory solvency basis may be on a basis prescribed by legislation which may determine the assumptions used, or add explicit solvency capital margins to the liabilities

Management may require valuations for a number of different purposes: for internal reporting purposes management may prefer a best estimate valuation to show the expected financial position of the product

This may be for a realistic assessment of the commitment required to the product, for example, to compare to other uses of capital

It is unlikely that an internal management valuation will include an explicit solvency margin, although different allowances for expenses may apply, for example contributions to overheads

As a result the internal management valuation assumptions are likely to be less prudent than the statutory solvency valuation assumptions; although the actual difference between valuations may depend on the purpose of the internal management valuation, and on any other financial costs included or excluded from either valuation

The internal management assumptions may allow for the benefit of diversification amongst its business, and/or for the possible concentration risks within its business

Either valuation may require a deterministic or stochastic approach, which may then result in alternative sensitivities, confidence intervals or likelihoods of particular outcomes being used

[4]

(ii) The first step in distributing any surplus will be to identify the maximum surplus available for distribution

For the product the minimum / guaranteed return is 3% each year; so if investment return in a given year is higher than 3%, and there is no shortfall to correct, there will be a surplus, and a choice of whether to distribute this surplus can be made

If the company is a mutual all surplus will be allocated to policy holders

For other companies there will be shareholders and a decision will be needed as to what proportion of surplus will go to shareholders or policy holders. That is shareholders will want to make a return on investment

It will also be appropriate to consider what capital should be retained, rather than distributed

This could be a contingency against future poor performance, or a regulatory requirement to hold capital

Deferring the distribution of capital may allow further risks to be taken which may increase the long term potential of the product

If the level of return on corporate bonds is expected to fall below 3% a year the insurer may wish to reduce the surplus distributed to members

Where surplus is distributed to policyholders this could be done via reversionary (annual) bonuses, or terminal bonuses

The level of any reversionary (compared to terminal) distributions may depend on:

- Policyholder expectations, for example from stated policies or documentation
- Acceptable levels of cross subsidies between policyholders
- The risk appetite of the insurer, as holding capital for a more significant terminal bonus will reduce risk
- The possible impact that any approach may have on withdrawal rates
- The business objectives of the insurer, as capital may be required (for example) to fund new business

[7]

(iii) If returns are less than 3% a year then the guarantee will bite

Recent domestic corporate bond returns have been materially above this level meaning the guarantee was unlikely to bite

The recent concerns mean that returns may be less than this level in the medium term which will increase the value of the guarantee

Need to consider how long medium term is, if medium term is less than ten years then there may be limited impact, as excess returns in other years may mean overall return will continue to be in excess of the guarantee

The impact would vary for business already written, for example with only two years left till maturity – the downturn may not impact on these policies

But the impact may be more significant for business currently being written

This could lead to a number of actions:

- A change in the current split between reversionary and terminal bonuses may be required

- The level of the bonuses (both reversionary and terminal) may need to be reduced to compensate for the medium term

Also need to consider if the index referred to in the product documentation will reflect this change in expectation

As the product is backed by other assets (including overseas) it may be that this change in expectation will have a limited impact on the actual return on assets, which may limit the impact on the value of the guarantee unless the downturn is also likely to impact on returns in emerging markets

If the bonus distribution policy is unchanged then the downturn may make the product more attractive to investors, and so there may be more business written

This may lead to changes in the business model as economies of scale or other underlying factors may change

[5]

(iv) Would need to consider if these changes are possible: for example, would they be out of line with policyholder expectations, or even in breach of any rules set out in the product documentation?

In considering any changes it will be important to consider the overall impact on policy marketability, and how the product will compare to any direct competitors

If the market is competitive it may not be possible to introduce changes without altering the potential business volume

An alternative to changing the product would be closing to new business and setting up a new product (or bonus series) with the desired risk profile

Bonus pattern

Reducing the amount of surplus distributed by annual bonuses is effectively deferring profit distribution

By deferring distribution this would introduce more flexibility

And if changes to conditions make it less likely that a high level of bonuses are possible, reducing the distribution from annual bonuses would help build a contingency against weakening conditions

May wish to consider current level of cross subsidy between products

Implementing a change unilaterally with immediate effect could over-compensate those maturing in the next couple of years – they would have received high annual bonuses and potentially a more significant terminal bonus

Therefore some transitional arrangement would be needed in order to move to a new distribution without changing the level of subsidy

Withdrawal penalty

Introducing withdrawal penalties would make the product less attractive

This may reduce the volume of sales which could impact on the expenses / profit model being used

There could also be a behavioural impact, with investors less likely to withdraw leading to more policies reaching maturity, and a greater exposure to the guarantee which would not be applicable to those withdrawing

The extent of any effect would depend on the nature of the penalties

By introducing the withdrawal penalty might mitigate any losses in the early years where initial expenses have not been covered

A move away from annual bonuses would serve as a withdrawal penalty, there may be no need to introduce a separate penalty; this is due to the greater value of terminal bonus which would not be available on withdrawal

[6]
[Total 22]

This question was generally not well answered. On part (i) many covered the basics but didn't develop their answers sufficiently. For part (ii), better candidates discussed how to decide how much surplus to retain. Part (iii) was generally not well answered, with few candidates commenting on how returns might be insufficient to meet the guarantee. There was a wide range of scores on part (iv), better candidates commented on the challenges of treating new customers equitably versus existing customers.

END OF EXAMINERS' REPORT