

EXAMINATION

16 November 2010 (am)

Subject F101 — Health and Care Principles

MARKING SCHEDULE

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Question 1

Students often did not give an adequate spread of comments for each section of the question. Each section was awarded a maximum of 3 marks with the last section being awarded a maximum of 2 marks. In each case the first point was given a full mark.

Many students missed the first point that the primary aim of the solvency margin is to provide an overall cushion for the technical reserves.

MSM proportional to technical reserves:

- The solvency margin aims to provide a cushion against fluctuations in the value of assets or liabilities (technical reserves)
- So it makes sense for the margin to be proportional to technical reserves.
- But company may use weak basis for technical reserves
- And does not make adequate provision for fast growing company
- Simple to calculate

MSM proportional to square root of premium income:

- Consistent with statistical theory in terms of total claim amount, allowing for variation in number of claims, increases in line with square root of premium income
- Particularly suitable for new and growing companies
- But not for a company reducing volumes
- Need to allow for adequacy of premium income
- Premium income should take into account cost of risk and a margin for profit. It thus is conservative

Many students made comments that this would prevent unethical valuations. This point is if a company chooses to be deliberately under reserve it can be done on any basis. It is disappointing to see many students viewing actuaries as choosing to deliberately under-reserve and that a statutory basis will prevent this. In addition some students mentioned that this provides confidence to the industry. No credit was given for this point as having actuaries providing valuations should provide confidence to the industry.

Statutory basis for calculating technical reserves:

- Provides consistency between companies
- Can be strong basis to provide margin
- But hard to ensure appropriate for companies with different risk characteristics
- Actuaries can't apply judgement in determining reserve requirements

This section was generally well answered.

Technical reserves + MSM in government securities

- Ensures security of reserves (no capital loss and close to risk free rate of return)
- Ensures funding for government
- But investment return constrained
- May not be appropriate to nature and term of liabilities
- May have shortage of supply
- May limit benefits offered as matching assets for liabilities do not exist

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State owned reinsurance

- Protection for the insurer (policyholders)
- With little credit risk
- And lower margins for pooled risk
- But may be more efficient to promote a competitive reinsurance market
- Prevents unscrupulous deals
- Reduces product innovation as may have less access to expertise
- Removes regulatory arbitrage
- Provides credible local data

Tax on technical reserves

- Distribution of profit will be based on company reserves
- Statutory basis usually stronger than basis for company reserves
- So slower realisation of profits for taxation
- Tax deferred – liquidity issue
- Allows a new business to grow

(b)

This question was poorly answered. Many students have a fundamental misunderstanding of free assets being held in the company as reserves. The free assets may not have the same investment restrictions as statutory reserves.

- Company may have performed own calculation
 - Which can be more technically accurate
 - And take account of all the risk factors
 - Can test different levels of security (probability of ruin)
 - Shareholders or Trustees need to be satisfied that entity is financially sound
 - Also can market greater security
 - Greater certainty – less risk of regulator involvement – if more solvent
 - Benefit from tax treatment
-
- more free assets mean that can take unmatched position
 - unmatched with respect to term, nature and currency of liabilities
 - In order to earn a higher investment return
 - And charge lower premiums – more competitive
 - May invest more in equities, property where returns less volatile
 - And less in cash and fixed interest investments

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Question 2

It was disappointing to see many students using a shot gun approach to answering this question. In each case no mark was awarded if the explanation or reasoning of the key words used exhibited a lack of understanding or was weak.

Mo mark was awarded for a mismatching reserve as underlying investments are expected to be small as this is an annually renewable product.

Types of reserves

- Reserve for incurred but not reported claims
- Reserve for claims in the deferred period (probability of remaining sick)
- Reserve for claims in payment (until death, recovery, age 55)
- May need additional risk reserve if underpriced
- Unearned premium reserve (Students had to make the point that an annual premium is received in advance and the valuation period is differed from the policy period)
- Unexpired risk reserve
- Statutory reserves
- No mark was awarded for aggregation of risk reserves as this is an individual income protection product

Many students confuse data with assumptions. Commission is known beforehand it is not an assumption whereas inflation is unknown and is therefore an assumption.

Assumptions

- Reporting delays
- Prob remaining sick in deferred period
- By age, gender, other risk factors
- Prob becoming sick from well
- Per homogenous group
- Prob recovery
- Prob death
- From sick
- Probably ignore death from well
- Likely to use multistate model – transition probabilities
- May include renewal rates if age cross subsidy of rates
- Expenses and expense inflation
- Investment return for discounting reserves
- Salary inflation
- Future outlook of economy

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Question 3

You are developing a personal accident plan for a mining company. The company would like to offer the policy on a voluntary basis to employees to provide cover in the event of accidents outside of the work environment.

- (a)
- Sum assured linked to salary (multiple)
 - Need clear definition of an accident
 - Percentage of sum assured for different injuries
 - Eg loss of limb, sight etc
 - Full payment for total disability
 - May include full payment for death
 - May include cover for medical expenses (if allowed)
 - May include cover for spouse and other dependants
- (b)
- Need to source data for accidents outside of work
 - Employer may not have this data
 - Could approach health insurer
 - Or use industry sources or similar product
 - Identify risk factors
 - Age, gender, job title
 - Calculate expected claims
 - May be rate of salary
 - Also need assumptions for mortality before retirement
 - And withdrawals
 - Add provision for expenses, margin and profit
 - Ensure smooth progression by age for age at entry rates
 - Need a simple premium structure
 - May use age bands or no differentiation
- (c)
- Voluntary cover so risk of anti-selection
 - Accident cover so reduced risk of anti-selection
 - Detailed underwriting will be expensive
 - Medical questionnaire / declaration of health
 - May provide opportunity for employees to enter with no underwriting when first employed
 - Could apply loadings (more likely per employment category)
- (d)
- employees more exposed to accident risk will find cover more attractive
 - unlikely to have sufficient data for North American Method so use conventional method
 - use ultimate (or loaded) experience to price cover
 - assume all take up on resignation at standard rate
 - but with higher experience
 - difference is option cost
 - can manage risk by requiring notice period eg 3 months
 - may waive for retrenchments
 - may limit to minimum service requirement to qualify

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This question tested the application of bookwork to a particular example. Many candidates neglected to provide sufficient core information to answer each part of the question and therefore achieved low marks. Candidates also confused benefit design, pricing, underwriting and feasibility, writing on each aspect in each part of the question.

Question 4

(a)

- Can use PMI data if exposure adequate
- May use reinsurer's data
- Use population/industry data
- Especially cancer registry (need staging data)
- Especially medical research data for prevalence
- Need Alzheimers incidence by age
- May be national statistics for transplants

Many students failed to apply their answer to the specifics of the question i.e. Cancer and Alzheimers.

(b)

- Costing is perceived added value- policyholders have limited capacity to evaluate small probabilities
- For cancer may only cover only specific types (e.g. not skin) that are deemed more serious
- Need clear definition for Alzheimers which may include ADL assessment
- May require independent assessment
- Definition of child dependants required (own or adopted children)
- And max age of cover
- Initial underwriting for pre-existing conditions
- Can have reduced percentage of sum assured for lower severity
- Reference to industry protocols for appropriateness of transplant
- Use of survival period

Again students needed to consider the specifics of the question rather than a general discussion on critical illness cover.

(c)

- Quota share is proportional
- So reinsurer will follow fortunes of insurer
- Appropriate in start up situation (limited data)
- Can reduce share reinsured over time
- Excess of loss is non proportional
- So takes a larger share of higher sum assured policies
- And more serious conditions
- Experience of reinsurer can differ from insurer
- Can increase attachment point over time
- reinsurer can provide access to data
- add pricing/underwriting expertise
- also reduces capital requirements
- and can be used to fund initial expenses (return commission)

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This question was reasonably well answered although some students did not generate enough points.

(d)

- SMS means limited information can be included
- Need to refer to a call centre or advisor
- Important that policyholder understands what is covered
- Reaching only existing clients
- Encourages conversion of existing policies
- And take-up by policyholders with other types of policy
- Need to also target new clients as well

This question was reasonably well answered although the point of only reaching existing clients was missed by most.

Question 5

(a)

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Renewals Invited	1658	1783	1824	1432	1921	1648	1683	1706	1692
Lapses	332	357	347	243	327	478	475	368	240
Factor	100%	100%	100%	100%	100%	100%	94%	72%	43%
Complete	332	357	347	243	327	478	505	511	558
Lapse Rate	20%	20%	19%	17%	17%	29%	30%	30%	33%

(b)

	Feb	Mar	Apr	May	
Difference in factor	6%	22%	29%	43%	
Processed in May	29	111	148	240	528.00

(c)

- There may have been a change in the way that lapses are processed
- Which will invalidate the estimation basis?
- Or between Jan and Feb the competitiveness of the premium rates deteriorated
- May have been a premium increase in February
- Or a reduction in competitors rates
- Or introduction of a product with additional benefits
- Or lower underwriting standards by competitors

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(d)

- Need to consider purpose of calculation to determine how realistic/prudent needs to be
- Increase in lapse rate may necessitate change in basis
- If it is expected to continue
- If lapses are selective will need to consider changing claims experience (worsening)
- If due to once-off factor may not need to change
- Investigate claims experience of lapses vs. renewals
- May even do exit interviews to investigate reason for lapse
- Investigate other products in the market
- Look at rates terms and benefits

This question required the candidate to perform a calculation and interpret the results. Candidates either did well or poorly on this question. Those that did poorly tended to over-complicate calculation and therefore generated incorrect results, while others did not attempt the calculation. Those that scored high marks for this question were able to perform the calculation correctly and provide meaningful analysis of the results obtained.

Question 6

(a)

Many candidates were not able to make the calculation of the incurred claims (considering the change in reserves) and this affected their qualitative responses.

(i)

Claims incurred = $146\,543 - 14\,867 + 20\,367 = 152\,043$

Divide by 167 038 = 91%

Only 9% for expenses, margin and profit

Likely to need increase in rates

(ii)

OCR at 31 Dec 2009 was conservative as it covered claim pain in 2010 iro prior periods

If volume of business similar may be conservative

Consider change in volume of business (eg ratio to earned premiums)

And any changes in processing

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(a)

For-profit environment	Not-for-profit environment
Brokerage 10% contributions	No brokerage
Solvency 30% contributions	Solvency 20% contributions
Shareholders	No shareholders
Costs of administration similar	Costs of administration
Can risk-rate	Community-rating
Can decide who to admit	Open enrolment

- Assume same population covered.
- Assume same hospital benefits covered.
- Assume same incidence of disease in both environments
- Assume same member behaviour in both environments
- Assume same provider behaviour in both environments
- On basis of costs alone, under the assumptions above, the for-profit environment **MUST** be more expensive.
- Only way for-profit can be cheaper is if different degree of ill-health present in the covered population
- Achieved by underwriting so as to exclude or load lives that are less healthy
- May be charging by age – attracts younger, healthier lives.
- Marketing techniques – e.g. incentives to brokers
- Attractive product features e.g. gym membership or frequent user reward programmes
- May be selling at a loss – tied to other more lucrative investment products

Those who attempted the question generally produced good responses but many were incomplete.