Institute of Actuaries of India

Subject SA1 – Health and Care Insurance

May 2010 Examination

INDICATIVE SOLUTION

Introduction

The indicative solution has been written by the Examiners with the aim of helping candidates. The solutions given are only indicative. It is realized that there could be other points as valid answers and examiner have given credit for any alternative approach or interpretation which they consider to be reasonable

Solution 1 a)

Burning cost is the estimated cost of <u>all</u> incurred claims in the period of consideration, calculated from previous years' experience adjusted for <u>changes in the numbers insured</u>, <u>the nature of cover</u> and <u>medical inflation</u> and <u>changed provider utilization</u>. The burning cost estimation needs to reflect all incurred claims (e.g. includes incurred but not reported claims <u>(IBNR)</u> and reported but not settled claims (<u>IBNS</u>)).

Solution 1b)

Yearly *burning cost* calculations can be used to compare emerging claim costs over the year against the risk premiums paid. These provide the earliest possible <u>feedback on premium adequacy</u>.

Solution 1c)

In case of products with high excess, the <u>medical inflation</u> is not only impacting the claim size but also <u>frequency of claims</u> (more claims are exceeding the excess due to increased claim size). This needs to be reflected on the burning costs estimation for these products.

[8]

Solution 2a)

The most common reasons for reinsurance are: Limitation of exposure to risk, avoidance of large single losses, smoothing of results, availability of expertise, increasing capacity to accept risk and financial assistance.

Solution 2b)

Start-up companies do have relatively <u>small portfolios.</u> They are usually <u>less diversified</u> portfolios and hence <u>more exposed to random fluctuation of claims, single large losses</u> and <u>catastrophic events</u>. In the case of a start-up it is also expected that there will be no or <u>insufficient credible data</u> and <u>available expertise</u> within the company. Hence, it is likely that Cross Health will opt for a rather <u>high reinsurance protection.</u>

Solution 2c)

As a start-up company, the company's reserves are relatively small and hence, exposed to large single losses or loss events as well as random fluctuation of claims.

Therefore, the level of reinsurance should influence:

a)   the <u>maximum annual limit of a policy/</u> the maximum liability of a single risk.
b)   <u>exclusions of the policy:</u> related loss events which lead to major accumulation risk (like war, radioactive chemical contamination, epidemics, etc.)
c)   <u>triggers for claim event:</u> certain triggers for claims, like accident or specific diseases only are more exposed to accumulation risk than more general claim triggers, like sickness.
d)   <u>cost for reinsurance:</u> protection will need to be reflected in the primary insurance pricing.

[11]

Solution 3 a)

The family floater policy covers medical expenses of the family upto 4 lacs during the policy period. The estimated claims costs of the family will depend on the <u>age</u> of the insureds and eventually on the assumption of a <u>better risk selection</u> – as compared to single polices – since both family members are compulsory to be covered.

The easy way to compare potential differences in risk premium is to compare estimated claims for both: Single Sum Insured plans and floater plan. Since the average claim amount is 30000 and the floater sum insured 4 lacs is more than 13 times higher, we can assume for this purpose that no claim exceeds 4 lacs.

Single Sum Insured
The expected claim amount for the single sum insured product is: <u>2*30000*0.08 = 4800</u>, whereas 30000 reflect the average claim amount and 0.08 reflects the expected frequency, factor 2 stands for two insured's.

Floater Sum Insured
We assume in case two persons incur a claim during the policy period only one claim is covered in full under the 4 lac S. In that case we do an upwards claim estimation for the floater:
<u>2*30000*0.08 – 0.08*0.08*30000 = 4800 – 192 =4608</u>

This is based on the additional assumption that the distribution for claims frequency is <u>independent </u>which shall be reasonable in absence of any data evidence of a dependency.

Therefore, we can conclude that a rough difference of risk premiums between single sum insured plan and a floater plan under the given circumstances is not higher than 1-4608/4800 =<u>4%</u>. Since we can assume that in most of the cases the sum of two claims is still below the 4 lac family floater limit the difference between floater and non-floater plan can be expected to be even <u>lower than 4%</u>.

Solution 3 b)

As compared to an annual guaranteed product you will need to consider in your pricing the following additional aspects:

- The <u>medical inflation</u> for the period in question will need to be estimated with adequate accuracy. This may be difficult since it is not really predictable.

- Trends in <u>changing utilization</u> of provider services will need to be considered in your pricing. New medical equipment, new treatment methodologies and new drugs as well as changing habits of insured are only a few examples for such trends. This cannot be done in a safe way and the assumptions on such trends will remain uncertain.

- <u>Lack of control on costs</u> for service provider do usually cause additional uncertainty on costs to be covered by the insurance policy.

In summary the points shown above demonstrate that longer term guarantee for reimbursement products do look <u>difficult</u> as long as the trends mentioned are <u>not safely predictable</u>. Even for a shorter period of guarantee, like 2 or 3 years, these trends will need to be estimated with <u>adequate safety margin</u>. Due to the uncertainty of these trends in the future, the safety margin may need to be significant. This may wipe out even assumed investment returns in case of

onetime premium payment which should lead generally to risk premiums considerably higher as compared to the annual premium product.

<div align="right">**[12]**</div>

Solution to 4a)

IBNR is the claims reserve for incurred but not reported claims. IBNR reserve is usually calculated by statistical methods like Chain Ladder method.

Solution to 4b)

- Since the portfolio is large, <u>random fluctuation of claims should not be the reason</u> for the observed effect.

- The new TPA could actually <u>control the claims better</u> than the previous one which may lead to reduced average claims and hence, better performance.

- Due to operational changes the turn-around time for claims payment has increased suddenly. In case the Insurer uses the standard Chain Ladder method for IBNR calculation, the <u>slower claim payment could lead to underestimation of the IBNR,</u> therefore wrongly indicating a better loss ratio.

- Due to operational changes the <u>average time between claims incurred and claims reported may have become longer</u> which would again imply an underestimation of IBNR and therefore wrongly indicating a better loss ratio.

Solution to 4c)

The cause for such an improvement might be due to the difficulty policyholders have in submitting claims acting as a barrier to claims being submitted, or it could be due to a favorable selection which is taking place in the policyholders purchasing this product. Cashless policies would be more attractive to those expecting to use their policies.

<div align="right">**[6]**</div>

Solution 5a)

Media and public is usually sensitive to elderly and sick people. The insurer runs the risk of <u>losing both existing client base and potential new business – with all its negative implications on performance –</u>, when the perception of service records are negative. Therefore, health and care insurers often have a <u>moral obligation over and above their contractual policy obligations</u>, sometimes arising quite unexpectedly.

Solution 5b):

In general, <u>non-disclosure of information</u> at the proposal stage – e.g. the decision made by the policyholder at the proposal stage not to share all risk-related information with the insurer – is difficult to police and prove at this stage.

In case the insurer did choose to initially accept all polices on the basis of a health declaration – <u>moratorium approach</u> – the insurer will have greater difficulties in providing knowledge at the time of application. Since the underwriting approach was freely chosen, it often causes reputational problems if claims are refused at a time the insured needs the coverage.

Solution 5 c)

- *Counterparties related to reinsurance agreements:*

   The insurer is relying on the parties involved in the reinsurance agreement to meet its obligations under the agreement. There is a risk that the involved parties will not be able to do this.

- *Counterparties related to distribution:*

o A distributor may be in a position, knowingly or otherwise, to commit the insurer to conditions which were not the original purpose of the contract.

o A distributor, under circumstances where policyholder money transactions are conveyed through the distributor, may not return premiums received at the appropriate time, or may become bankrupt before these are passed over.

o A distributor may, in dealing with clients on behalf of the insurer, bring the insurer into disrepute.

- *Counterparties related to providing medical services (specific to health insurance):*

   The area of healthcare is complex and often third parties are involved to manage aspects of the <u>client relationship and claims settlement</u>. Examples include TPA's that are involved in claims settlement. The extent to which these bodies can commit expenditure on behalf of the insurer is a source of risk.

   For instance, under medical expenses covered, the benefit itself is provided by third parties on an indemnity basis and provider fees are sometimes negotiated by the TPA. The risk of the ultimate claims cost then lies, at least to some extent, in the hands of these third party providers.

- *Regulation and Fiscal Developments (specific to health insurance)*

   Law and <u>supervisory requirements</u> may often transcend the explicit conditions specified in the policy. New legislation and regulation may apply to policies already in force changing the nature of the contract between insurer and policyholder. For example, certain <u>exclusions may be deemed no longer acceptable</u> or defined in a different way (for instance pre-existing conditions) the payout for certain conditions may be increased nationally by court precedent. <u>Taxes may be introduced</u> or changed related to benefits or premiums which may change the profitability or coverage of existing contracts.

   Another example of a legal restriction is the prohibition of certain factors to be taken into account when pricing policies. For example, in some countries, local legislation prohibits the use of race or gender as a factor to be used to determine health insurance premium rates.

Solution 5 d)

   Medical progress due to medical science is a very **specific risk arising in health insurance.**

-       cost of treatment for particular illnesses might rise because of new and more expensive treatments and equipment.

-       Health Insurance products which are triggered by diagnosis are facing another risk: risk of earlier screening or diagnosis. If medical technology advances in the diagnostic area, insurers may find that they are facing claims significantly earlier than was expected on the basis of the data on which premiums were calculated. The earlier diagnosis may prompt

some claims which would not otherwise have been payable (because the policyholder might have died prior to diagnosis, or lapsed, or a term policy might have expired).

- The encouragement by medical professionals to get screened or the launch of national screening campaigns for particular illnesses, such as breast cancer, will accelerate this issue which may lead to a risk of increased number of claims due to higher prevalence of screening programs.

[14]

Solution 6.A

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1 point for a sensible description/example of each item

Up to 5 points for demonstration of thoroughly understanding the subtlety of the impact on claims and how they have different impacts on different products. Also give credit for acknowledgment of how product features can change the impact.   It should be clear that the impact can go up or down.

	CI	FB MS	Indemnity
Freq	Better diagnostic methods can bring forward diagnosis time and detect some conditions that would not have been diagnosed previously. Alternatively, advances e.g. screening, might stop a condition ever occurring to start with.	Some of the impacts from indemnity but may have reduced impact e.g. New procedures might not be covered.	Changing treatment protocols (e.g. greater use of exploratory laparoscopy). New procedures may lead to increased number of procedures.
Size	No change	Depends on if there is a varying SI by procedure. May be no change. If there are categories of payout then a change can make claim size go in either direction.	– Fluctuation; can go up or down. – Improvements can lead to decreased LOS. (e.g. laparoscopy, although the surgeons costs might increase). – A new procedure might be a high cost procedure.
Escalation	Can increase it by giving unintentionally wide coverage.	Similar to indemnity but dampened depending on the SI structure.	Depends on: – product design (e.g. impact of limits, exclusions) – might be a "once off" jump or a long term trend

Solution 6.B

Part (i):
- Written premium vs. earned premium
- IBNR - especially because duration so low
- Waiting periods
- Other as reasonable

Part (ii):   will dangerously increase:

Part (iii):   lack of underwriting, selection likely by this and other features of product design such as reduced PEX waiting period, etc.

Solution 6.C

SA1-23 Wider UK Health & care provision. Page 11 & solution to Q&A 5.3

- Help allocate resources in an cost effective manner
- Help decide on the best treatment option

ii)   If QALY's had been calculated for appropriate medical services/treatments in rural or slum areas it would help in the design of a more socially beneficial micro or state scheme e.g. for USD$500.

They could be used to help decide the most appropriate treatment protocols to cover (e.g. is it better to provide a ceramic or titanium hip for a 90 year old (assuming of course that hips were covered).

iii)   practical difficulties:
- India would need its own QALY's; and the same set of QALY's wouldn't work for all segments.
- They could be very controversial with public/politicians (e.g. it raises the question is a 90 year old less valuable than a 30 year old?) and that some lives might be too expensive to save.
- There may not be agreement amongst providers about the values and again could be controversial.
- QALY's are hard to develop and calculate fairly, meaningfully and accurately.
- Also they still only describe part of the decision making process (e.g. if there are no facilities then a procedure can't be offered regardless of its QALY).
- For use in product design they might be too hard to understand and they might not be trusted (wrongly or rightly).

There are many difficulties - full marks should only be given where it is obvious that they **understand** the difficulties that they mention.   As some of the practical difficulties are a bit hard to solve, points should be given for an attempt that shows understanding of the problem even if iota wouldn't totally solve the problem.

Solution 6.D

- *The actions are listed in the reading material "Solution 14.10"*
- Sell off the group Mediclaim portfolio - reduce premiums and losses thereby improving solvency ratio. Advantage - it has a double impact on improving solvency. Disadvantage - it might be hard to find a buyer.
- Sell off other parts of the business - reduces premium and thereby solvency margin.
- Increase premium rates – Advantage - Should improve solvency ratio in the longer term although may worsen in the shorter term. Disadvantage - may lose good business and keep poor business
- Borrow
- Issue equity
- Increase RI
- Merge with another insurer with better solvency

1 point for each sensible major item listed, a good example (don't give where there is not a clear indication the student understands the impact on solvency margin), a good disadvantage. Some flexibility for where student understands several drivers of solvency and with a good health specific example.

[49]
[Total Marks 100]

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