**2013 S2**

**Q1** a) *Calculate the Capital Base of:*

i. Statutory Fund

Capital Base = 120,000 + (-50,000) + 80,000\*20% = 76,000

Under LPS112, **the capital base of a statutory fund is calculated as:**

* **the net assets of the fund; less**
* **all regulatory adjustments to the net assets of the statutory fund; plus**
* **Tier 2 Capital**.

The regulatory adjustments are covered in Attachment B of LPS112 and in this case comprise of the following:

* **Deferred Tax Asset**: The deferred tax asset is an inadmissible for the purposes of calculating the capital base of the statutory fund
* **The difference between the Adjusted Policy Liabilities and the Sum of the Policy Liabilities** which is in effect applying the termination value minimum to the capital base. The adjusted policy liabilities is **defined as the maximum of the Termination Value (which is equal to the IBNR + DLR + UPR given there is no surrender value) and the Risk Free BEL**

The capital base for the statutory fund is calculated as:

* Capital Base = $150m (*Net assets*)

-$5m (*Deferred Tax Asset*)

- [max ($10m + $15m + $50m, $200m) x 50% - $30m)

(*Reinsured Adjusted Policy Liability – Net Policy Liability)*

=$150m - $5m – 70m

= $75m

ii. Shareholders Fund (also known as the General Fund)

Capital Base = -120,000 + 50,000 + 8,000 + (-50,000) + 150,000 +50,000 = 88,000

Under LPS112, the capital base of the shareholders (or general) fund is calculated as:

* the net assets of the fund; less
* all regulatory adjustments to the net assets of the general fund
* *no Tier 2 capital is allowed in Shareholders Fund*

The regulatory adjustments are covered in Attachment B of LPS112 and in this case comprise of the following:

* **Preference Share: the fact that the preference share ranks above policyholders means that it is not eligible as Additional Tier 1 capital under LPS112.** In addition, LPS112 also does not allow the preference share to be redeemable at the option of the holder.

The capital base for the shareholders fund is calculated as:

* Capital Base = $88m (Net assets)

 - $50m (Preference Share Capital)

 = $38.0m

iii. Company as a whole

Capital Base = 238,000 – 80,000\*80% = 174,000

The capital base of the company as a whole is the sum of the capital base of its constituent parts. Hence the capital base is calculated as:

Capital Base = Capital Base of Statutory Fund + Capital Base of Shareholders Fund

 = $75m + $38m = $113m

1b) *How to determine the risk margins to be used for the calculation of the insurance risk charge:*

**Random Risk Charge**

* Use a policy by policy projection model (likely grouping model policies into model points given runtime considerations) to run mortality / morbidity / termination decrements stochastically across a large number of simulations to get a probability distribution function. This can then be used to determine the 99.5th percentile outcome and this would form the basis of the random risk charge
* Consider variability of claims from year to year based on experience studies. For example, the A/E percentage for each year may be assessed against the average over a number of years to make a rough assessment of what a 1 in 200 year event may be.
* Consider the impact of the reinsurance arrangements here in terms of the random risk. The reinsurance arrangements have a per life retention of $1m for lump sum business and the methods noted above would need to consider the impact this would have on the random risk charge
* Consideration of market practice. This information may be available through a number of channels:
  + Consultancies
  + Actuaries Institute Committees
  + Reinsurers

**Future Risk Charge**

* Consideration of **trend of actual vs expected** results from year to year
* Consider the **amount of data** that is has been used to determine estimates of basis. Less data will increase the mis-estimation risk in determining best estimate assumptions
* Consider market trends over the past number of years for profitability by line of business.
* Sources of information include:
  + APRA published quarterly statistics (look at trends in experience losses in the industry)
  + Similar companies financial reports
  + Internal Experience studies
  + Reinsurers
  + Consultants
  + Industry papers and reports (e.g. IAA taskforce)
  + Internal capital model parameterization

**Event Risk Charge**

* Review portfolio for **any concentration of risk** (e.g. geographical proximity if information is available)
  + Feedback on pandemic and catastrophe risk from companies who work in this area – e.g. general insurance consultants
  + Sources include external consultancies

1c) see spreadsheet

**Extra assumptions on recovering profitability:**

For future stress, the stressed period is 3 years. This can be argued as a result of “*The rates for the policies are reviewed every 3 years*”, so the company can increase rates to get back to breakeven profitability after 3 years.

1d) Alternative ways Globex may reduce or eliminate the asset concentration risk charge and advantages and disadvantages of each approach:

**Globex can switch to another reinsurer for the new business**

* Asset concentration risk will be mitigated quite a lot under this approach
* It is hard to find another appropriate reinsurer under a short timeframe. Lots of friction costs are expected.
* But once this is achieved, Globex will have more options when choosing reinsurers
* **Advantages**: Reduce exposure to single reinsurer; Greater diversity of support with a different reinsurer
* **Disadvantages**: May not be able to get as good a deal in the market, on the other hand competition may result in improved terms

Lower the reinsured amount / Increasing retentions of the business:

* Easy to implement.
* Not efficient regarding reducing the asset concentration risk
* Advantages: Reduce asset concentration risk charge that would apply
* Disadvantages: May not be within the risk tolerances / strategy of Globex to retain as much business; May not get as good a deal from the reinsurer if less business is ceded.

**Having the reinsurer deposit back some assets with Globex to cover any liabilities (e.g. DLR / IBNR)**

* Advantages: Would reduce the potential for an asset concentration risk to apply
* Disadvantages: Reinsurer may not agree or charge more as their assets are encumbered

**Add a form of acceptable collateral against the counterparty risk as allowable under LPS117**

* Advantages: Would reduce the potential for an asset concentration risk to apply
* Disadvantages: May result in additional costs (e.g. a guarantee) or some assets being encumbered (e.g. trust arrangement)

**Increasing capital holdings to increase the value of assets of the statutory fund**

* Advantages: Assuming the capital is available, then an easy solution which does not rely on third parties
* Disadvantages: Does not effectively improve the asset concentration position as only the Value of Assets of the statutory fund is improved.

*Your preferred approach and why you have made this choice:*

Changing reinsurer, the reasons are:

* If Globex only collaborate with one reinsurer, it may lose the ability to get an attractive term in the long run
* More reinsurers tend to provide wider and different insight on the industry experience.
* The business volume is relatively large compared to the existing business. This can diversify the risks thoroughly than the other approach.

*How your preferred approach would impact target capital:*

* The target capital will be lower as the capital required will reduce as a result of the decrease of asset concentration risk.

**Q2** a) see the spreadsheet

2b) i. see the spreadsheet

ii. *what the analysis means for the business:*

* Sales have been under expectations and this has reduced profits below expected. The implication is that sales volumes need to increase in order for Omega life to cover their fixed costs (particularly the $1m fixed maintenance expense cost).
* Selling larger sized business, but less business may increase the variability of lapse experience as there is less diversification than expected across a number of schemes.
* Claims experience is far poorer than expected. If this is to continue and become part of best estimate assumptions, **DAC may not be recoverable.**
* Investment income experience was better than expected. This may be due to a number of factors. **If it is due to taking on additional risks**, then the investment profit is unlikely to continue. On the other hand, **if the investment market has changed in the year**, the investment income assumption may need to be reviewed.

2c) *i. Increasing business volumes by increasing the level of upfront commission:*

**The expected impact on the profit and loss forecasts;**

* Initial commission will increase and hence the DAC will increase considerably.
* Would need to consider the potential impact on whether the DAC will be recoverable with an increase in upfront commissions. The current profit margin (before the flat $1m expense) is 7% (1 – (75% + 30% / 5 + 12%)). Increasing the upfront commission much more may make the DAC unrecoverable which would result in a significant profit write-down as the business goes into loss recognition.

**The expected impact of the level of risk undertaken by the company;**

* Lapse risk is a main concern as this could have a significant impact on the P&L of the company and eventually the capital position should lapses prove to be worse than expected
* Another risk is that the volumes of new business increase well above plan such that the company does not have sufficient capital to support this risk.

**Whether the company should implement this strategy**

* A reasonable opinion is that the strategy is risky and too great an increase in initial commissions will likely have a negative impact for the reasons noted above.

*ii. Changing the investment mandate to allow the company to invest in corporate bonds with BBB and lower levels of credit rating:*

**The expected impact on the profit and loss forecasts;**

* Likely increase in yields would increase investment income
* However, the investment income would be subject to greater volatility in particular when there are increased spreads on low-rating corporates held or as the result of a default

**The expected impact of the level of risk undertaken by the company;**

* Greater risk if the credit rating of the bonds is overall poorer
* Should be noted that the level of risk is dependent on the scope of bonds that the company would hold (going down to BBB may be okay, but much lower would increase risk further)

**Whether the company should implement this strategy**

* Reasonable opinion should be open to this option, but limiting the exposure to a reasonable level of bond (e.g. BBB) and limiting total exposures across the investment t portfolio.

*iii. Removing the 5 year pre-existing condition exclusion on the policies and instead to fully underwrite all lives that will be given cover:*

**The expected impact on the profit and loss forecasts**

* Likely increase in initial expenses due to the need to underwrite all persons getting cover.
* Experience may be expected to improve above the pre-existing exclusion approach and hence the loss ratio may be lower
* The question of whether the larger upfront commissions is recoverable is also a concern and any significant increase in upfront costs without an appropriate increase in premium and/ or reduction in loss ratio may result in a significant loss as the result of loss recognition

**The expected impact of the level of risk undertaken by the company;**

* The insurance risk may be reduced as the business is underwritten rather than using a pre-existing condition exclusion
* However, there is an expense risk due to **the need to hire / train underwriters** etc which would need to be borne out of future profits (which is dependent on future new business income)

**Whether the company should implement this strategy**

* The approach seems reasonable, but the additional costs of the underwriting approach must be weighed up against what premiums can be charged and the expected loss ratios for this business would be.