**2010 S2**

**Q1** a) *the detailed information that you require in order to construct the business plan:*

* Previous year company balance sheet and income statement
* Previous year plans and budgets
* Financial Condition Report including Capital position
* Dividend policy from the CFO or Board
* In force Projection model (from the valuation area)
* Details of IBNR/RBNA calculations and past claim development data.
* New Business projection model
* Key statistics like number of policies, sum insured, inforce annual premium by major product groups
* Expected new business volumes from the marketing (or other) department
* Any large known wins or losses in respect of group business.
* Product notes for major lines (setting out premium rates and commission terms)
* Projected detailed expenses for next 3 years
* Projected investment income by asset classes with assumptions
* Business plans: intended new/discontinued products, business ventures/partnerships, restructuring, re-pricing, new distribution channels, changes to commission structures, special offers / incentive plans etc
* Input from the Appointed Actuary as to any adjustments to the impact of the above that they feel are necessary and why.

1b) *Main components of projected profit for business plan:*

1)Interest on Surplus, IBNR

Interest 5%, Surplus and IBNR 1090, profit 54.5 = 5%\*1190.

2) Release of Profit Margin on Inforce Block Profit Margin

PV Profit Margin 360, PV Claims 3000, Profit Margin = 12%

Expected Claims 300, Total Release from Inforce 36.0 =12%\*3003) Profit on New Business

Profit Margin 12%, Expected Claims 50, NB sold half way through the year 0.5,Total Release from New Business 3.0 =12%\*50\*0.5

4)Total Profit = 93.5 = 59.5+36.0+3.0

5) Tax 30%

6) Total Profit net of tax = 65.5 =93.5\*0.7

1c) *Why the IFRS profit is only projected to increase marginally, despite a significant increase in new business volumes:*

* The bulk of the projected profit on the IFRS basis is from interest earnings on surplus and undiscounted reserves such as IBNR. (Gross profit of $54.5m)
* If the inforce book is sizable as in this case, then most of the remaining profit would come from the inforce (Gross Profit of $36m)
* Profit from new business under IFRS can only be released gradually. It is held back by setting up profit margin. In this case, only $3.0 for 6 month or $6.0m for 12 month. Thus a 50% increase in sales would only increase the profit of the order of around $3m p.a. This is small in comparison to a total gross profit of around $100m.
* Because claims is the carrier, the expected claims are very low in the first year due to action of the selection period.

1d)

* Purpose: Appraisal Value estimates the true worth of the company which is probably a better guide to decision making than IFRS. Appraisal Value Earning reflects immediately the impact of decision.
* Purpose: IFRS aim is to have smoother reporting earnings and is required for external reporting. It may be slow in showing the impact of good and poor decisions.
* New Business Profitability (AV): Changes in new business volume and price will have a major impact on appraisal value earnings as it capitalises all future year profit in year 1. It will also have a multiplier effect as the appraisal value uses multiple tranches of new business value. Hence this provides management with clearer signals in term of sales.
* New Business Profitability (IFRS): Changes in new business volume and price will only have a minor impact on IFRS profit (unless the company is writing loss making business) and the majority of the profit comes from the in force block. It may be slow in showing the impact of good and poor decisions.
* Change in assumptions (AV): A change in assumptions will be fully capitalised. This leads to volatility in AV earnings. Again this provides more insight for management, however good analysis and commentaries are especially vital in communication.
* Change in assumptions (IFRS): Change in assumptions have no immediate impact on profit. The change in BEL is offset by a corresponding change in the profit margin; provided the Related Product Group is not in loss recognition.
* Expense assumptions (AV): best estimate assumptions but expense savings over the long term can be incorporated in the expense assumptions.
* Expense assumptions (IFRS): expenses need to reflect the budget over the next year following the valuation date. Longer term expense saving cannot be allowed for until the year that they occur.
* Cost of Capital (AV): Appraisal Value also measures the cost of capital which makes it a more comprehensive measure than IFRS. For the companies which sell term products with an upfront commission, cost of capital is important.
* Cost of Capital (IFRS): Does not reflect the cost of capital and doesn’t take into account shareholder risks. This is a shortcoming of IFRS in term of business planning.
* Discount rate (AV): Use bond rate + Beta \* Equity risk premium (about 5% in Aust) to discount the cost of capital and value of inforce.
* Discount rate (IFRS): Use risk free rate as defined in LPS 1.04.
* Premium rate changes: (AV) Can include future premium rate changes if these have been approved by the board.
* Premium rate changes: (IFRS) Will only reflect new premium rates when they are reflected in the administration data.

**Q2** a) *Why an analysis of profit is performed:*

Understand the business. It is important to ensure the operation of the existing business is profitable. Find the place where the company could improve.

Review assumptions: to see whether is necessary to adjust the best estimate assumptions based on the experience.

* To provide some comfort over the valuation results. In particular, the auditors are very interested in the AOP as this gives them comfort that the policy liabilities are correct.
* To identify errors in the valuation which may be modelling or accounting errors.
* To provide management and the business with some information around the areas of profit and loss, and thus help guide the direction of the business. For example, poor lapse experience may lead to additional work on initiatives to help retain business.
* To provide information around experience to help determine which best estimate assumptions may need to be reviewed.
* To provide information around experience that would suggest changes to premium rates or policy conditions.
* An analysis of profit at year-end is required in the notes to the financial statements (AASB 1038).
* An analysis of profit is required for APRA Form LRF 430.

2b) To Head of Life Risk:

The actual profit generated on the DII business in 2010 is $18.6m. This is made up of Planned Profits of $20.5m offset by experience losses of ($1.9m). This experience profit includes $1.4m Claims experience loss and $0.8m Lapse experience profit as well as a Maintenance expense loss of 0.4m, Premiums being less than expected by 0.5m, Interest exactly in line with expected and a total loss from other sources of 0.4m.

The Claims experience loss and the Lapse experience profit are expanded on below.

**Claims Experience**

For DII business, when there is a new claim, we are required to set up a reserve for the expected future claim payments until the insured recovers. When a claim terminates due to death or recovery, we release this reserve. For continuing claims with longer benefit periods this reserve will increase over time due to the fact that assumptions are set to reflect that the longer a claim has been in force, the longer it is likely to last. We also need to hold a reserve for “IBNR” claims or claims that have been incurred but have not yet reported to the company. This includes claims that have been notified but for which adequate information has not yet been received (no claim form etc).

The analysis of profit we have undertaken indicates that the expected gross reserve on new claims in course of payment is $1.2m but the actual gross reserve created on new claims is $1.6m, therefore impact of new claims is higher than expected. Our analysis suggests that we have closed more claims than expected. However actual claims paid during the year were $0.5m higher than expected. As a result, the overall impact is a ($1.4m) claims experience loss.

**Lapse Experience**

Losses occur on lapses due to the high upfront expenses and commissions paid on selling new business which take time to recover from future premiums. We set up a negative reserve (an asset) to offset these large upfront expenses which is written off over time. When a policy lapses in early durations before we have written off the reserve set up to cover the initial expenses, we lose this asset. Losses are higher on lower duration policies.

We expect lapses at a certain level each year. In 2010, we expected to incur a loss of $7.8m due to policy liabilities being released because of lapses. The actual policy liabilities released due to lapses was $7.0m. This means that we have experienced lower lapse rates than assumed leading to a $0.8m lapse experience profit.

Please let me know if you have any questions on this.

Kind regards, An Actuary

2c) *Possible reasons for premiums difference include:*

* Grace period – policies normally allow a period of time where the premium has not been paid but the policy has not yet lapsed. The expected premiums may not take this into account. This will impact policies that go on to lapse and also policies that do not if this occurred near the end of the year.
* CPI rate - The rate of CPI increases to the monthly benefit (and therefore premium) could differ than that assumed in the valuation basis.
* CPI take-up rate – the rate of take-up of CPI increases to the monthly benefit (and therefore premium) could differ from that assumed in the valuation basis.
* Loyalty/Multiple Policy Discounts – there may be a discount available on existing business if a person takes out an additional policy. A certain rate of this happening may be assumed in the valuation basis but the actual experience may differ from that assumption.
* **Sum Insured decreases** – there may be reductions to the sum insured on some policies thus reducing the premium. The valuation basis may have an assumption around this or may totally ignore this. Experience may differ from that assumed.
* Higher than expected claims experience would cause less people to be paying premiums hence this could explain why premiums are lower. This is on the assumption that this impact is not included in the morbidity experience item.
* Claims under the premium waiver for involuntary unemployment may not be showing up as claims but just as unpaid premiums
* There could be delays in some of the accounting / credit card runs resulting in some amounts not showing up or an incorrect accrual could have been made.
* It could be noted that the deficiency in premiums is all the more surprising given that lapses were lower than expected.

*Possible reasons for the unexplained item include:*

* **Errors** in the policy liability calculations.
* Errors in the expected items in the AOP (modelling errors)
* Errors in the accounting records.
* Additional sources of profit/missing items in the AOP
* Mis-calculated items in the AOP

*Investigations on the unexplained item that could be performed include:*

* Cross check the Actual items in the **company’s Profit and Loss statement** to the Actual items in the AOP to make sure they are all included and have the correct value.
* Similarly, add together all the expected items in the AOP and compare this with the expected change in the best estimate liability.
* Compare with other sources – e.g. compare lapse profit with management reporting of exits, compare mortality profit with experience investigations work.
* Compare the actual and expected items to previous years’ numbers for reasonableness, allowing for changes in the business and assumptions over the period.

2d)

* AOP lapses will be based on release of policy liability on lapse since this represents the loss on lapse. Exits information will probably be based on policy count or annualised premiums. There may be a large number of low duration lapses which have a proportionately larger impact on a policy liability basis than a count or premiums basis.
* Definition of a lapse may differ between AOP lapses and exits information. For example, the treatment of reinstatements or policies that lapse and become new business (replacement business), perhaps due to new premiums rates introduced for new business only. Another example might be cancellations from outset.
* Timing of lapses may differ, for example where the policy has stopped paying premium but is in the grace period. The AOP will probably not call this a lapse whereas management exits info may do so.
* There may be errors in either the AOP or management lapse information. This would require further investigation.

2e) *Reasons for a morbidity loss yet drop in claims in course of payment include:*

* Though the number of claims in payment has dropped, there may have been increases in claims cost due to:
* increase in average claim amount
* increase in benefit periods claiming (e.g. more to age 65 claims)
* more claims have increasing claims benefit o more smokers
* more females / older claimants
* longer durations on claim
* A large number of short term claims that commenced during the year that have since terminated hence not included in the end of year claims in payment number
* Errors in the AOP (the morbidity profit has been calculated incorrectly) / errors in the actual profit (due to policy liability calculation errors or accounting errors) / errors in the number of claims in payment number.
* A change in the definition of a claim (e.g. include reported but not admitted claims at the start of the year, but exclude these at the end of the year).
* The increase in the IBNR reserve has contributed to the morbidity loss yet will not be included in the end of year claim numbers.
* There may be reserves for claims that are not in the list of current open claims (for example claims that have been declined but now gone to litigation).

**Q3** a) **Areas to be familiar with:**

* Local or regional taxation legislation/ regulations
* Local or regional insurance, financial services legislation /regulations
* Professional standards and operations in the region
* Financial services/life insurance industry including other companies in the industry – Industry operations: commission structures and distribution methods,
* Other companies’ products: pricing bases, features, trends

**Consult with:**

* Other actuaries in company and where possible outside the company (potentially via
* the local professional body), being aware of confidentiality and competition requirements
* Sales operations and teams
* Marketing team
* Senior management group
* Risk team
* Actuarial valuation
* Finance team (including tax)
* Product development team, IT department
* Distributors. Direct Marketers / Banks / Sales people etc. Who is selling what and how and what are the needs?
* Investment team/Fund managers
* Reinsurers

3b) *MoS:*

* Objectives of the MoS approach to reporting profits are to recognise profits as they are earned with a degree of smoothing over periods.
* Valuation method changes the **timing** of the release of profits **not the quantum**. The quantum of profit depends upon the income, expenses and claims over the life of the policies not what is assumed in the valuation basis.
* Profit margin will be expressed in terms of a profit carrier.
* If a product group becomes loss making then the future losses are capitalized at once.
* Changes in assumptions are not (other than market related changes in economic assumptions or for a product group in loss recognition) capitalized but are spread over the future by adjusting the profit margin (so that the policy liability remains unchanged).
* Smoothing of MoS profits may mean that substantial changes in the business may not be immediately apparent such as an increase in sales levels may have an immaterial impact on the MoS profits recorded. This could delay management taking timely actions to arrest a change in the profit position in the longer term especially with a new line of business.
* The profit determined may not necessarily be identical to that available to be distributed (as the local regulations may specify a different approach to be used)
* Profit carrier: annual bonus distribution. This is an appropriate carrier because it is smooth over time and broadly represents the service provided to the policy owners.

3c*) Assumptions：*

* That the local legislative/reporting requirements allow market value to be used.
* That the method for valuing the liabilities being used will be consistent with a market value approach to asset valuation (e.g. MoS principles)
* That the asset mix and terms will be adjusted if necessary to ensure that they are broadly matched to the liabilities otherwise there may be significant mis-matching profits or losses.
* That market values are available for all the asset classes.

*Reservations:*

* Reliable market values may be difficult to establish for certain assets.
* Profit volatility may be significantly increased if valuation methods are not in sympathy with market value, or the assets and liabilities mis-matched. Even if the valuation method is in sympathy with market values, certain possible future products could be a problem e.g. term insurance where the liability may be negative and market related asset movement will cause profit volatility.

*Regarding particular asset classes:*

* Reasonable to assume that regional shares, international shares and regionalgovernment bonds have listed prices so could use Market Value.
* Consider that regional corporate bonds may not be a completely liquid market so market values may not always be available. Consider the credit ratings and whether the intention is to hold the assets to maturity.
* For property assets consult with property experts – may use either appraisal value or discounted cash flow methodology
* Cash & deposits: MV of holdings could be used

3d) i. *Principles for the establishment of a bonus policy:*

* **Equitable** distribution between generations of policy owners.
* Sustainability/financial responsibility to maintain solvency of the entity.
* Consistent with reasonable policyholder expectations.
* Ease of understanding by distributors and customers.
* **Meets any regulatory requirements**, including in relation to capital adequacy.
* Whether the approach is consistent with the approach used by other players in this market.

ii. *Maintain constant bonus levels for the first 5 years:*

**Pros:**

* Marketing advantage in entering a new market
* Will be easier to explain to distributors
* Simple to establish product design

**Cons:**

* Depending upon the size of the bonus the capital adequacy requirements will most likely be high
* [Anti-selection] No immediate link between investment performance and distribution to clients which could impact persistency – if bonuses are above the competition due to poor returns, persistency will be good, while if bonuses are below the competition due to good returns, persistency could be bad
* Providing guaranteed performance to clients during the first 5-years - resultant cost compared with allowance in pricing of business
* Difficulty in establishing equity between different generations of clients.
* Difficulty in establishing reasonable policyholder expectations
* Legality in terms of regional regulations, including description of the line of business as ‘with-profits’

**Further consequences:**

* Marketing material will need to be very clear
* Investment policy may need to be adjusted
* Practicality of altering the rates at the end of the 5-year period
* Depending upon the investment market conditions there could be large (unrealised) investment profits or losses in the early years
* Surrender experience during at and the end of the 5-year period will be highly dependent upon underlying investment performance
* Difficulty in establishing and demonstrating a fair surrender value during the early years.
* Consider the capital implications of a constant bonus level
* [Anti-selection] Distribution remuneration and approach should be reviewed to remove the incentive to churn in 5 years’ time.
* The solution can be easily copied if successful so there needs to be further refinements down the track if the competitive edge is to be maintained.

**Q4** a) i. *The relevant accounting and actuarial standards are:*

* LPS 5.02 Cost of Investment Performance Guarantees. This defines the approach to be taken in calculating the cost of providing the guarantee, which must then be compared to the total liability value, and if representing less than 5% of the total liability then both types of business can be included in the same (unit linked) statutory fund.
* AASB 139 Financial Instruments. This defines the conditions for separation of the embedded derivative from the hybrid contract in respect of the guaranteed option. It also details the considerations for calculating the fair value of the financial liabilities.
* LPS1.04 Valuation of Policy Liabilities. This is the base actuarial standard for setting policy liabilities and refers the reader to the relevant accounting standards for investment contracts. That is, it contains no additional requirements beyond those in the accounting standards.
* AASB 4. This standard includes a definition of an insurance contract and refers the reader to AASB 1038 and AASB 139 for valuation of life insurance contracts and life investment contracts respectively.
* AASB 1038 Life Insurance Contracts. This standard states that investment contracts should be valued at fair value through profit and loss and refers the reader to AASB 139 for the financial instrument component and AASB 118 for the management services element.

ii. The guaranteed option is treated as an investment contract as there is no transfer of insurance risk, as defined by AASB 4, nor is there a discretionary participation feature in the product.

4b) The Policy Liability consists of both a Life Investment Contract Liability (LICL) and a Management Services Element (MSE)

**LICL** = Fair value of underlying assets = Premiums + return – fees

= $1bn \* (1 + 10%/2) \* (1 – 1%/2) = $1.045bn

**MSE** consists only of DAC as there are no up front fees received (i.e. DRL is zero) and is therefore negative.

MSE = -DAC = -2% \* $1bn = -$0.02bn

Need to consider any amortization of the DAC. As there have been no surrenders and the FUM has increased, no amortization has been applied.

The recoverability of the DAC from future fees less expenses must be checked

Therefore, Policy Liability = $1.045bn - $0.02bn = $1.025bn

4c) Steps required would be:

* Determine an acceptable probability of ruin / insolvency (0.5 marks) and associated time horizon for that probability of ruin. E.g. Company may wish to hold an amount of capital so as to be 99.5% sure of losses on the product not exceeding that capital amount over the following year (i.e. 0.5% probability of ruin). (0.5 marks).
* Develop an economic scenario generator for simulating the values of the underlying assets backing the guaranteed liabilities. This economic scenario generator should be calibrated to appropriate expected return and volatility parameters for each underlying asset class. (0.5 marks)
* Determine the number of simulations to be performed. This will likely be a function of both the selected probability of ruin (with lower probabilities of ruin requiring more simulations for sufficient statistical comfort to be gained with the tail simulations) and also the computing power of the company. (0.5 marks)
* For each simulation, determine the value of the assets at regular intervals (probably daily) during the projection period. (0.5 marks)
* Compare the asset values Y1, ..., Yn to the guaranteed minimum value of the liabilities (Z). If Yi < Z then the guarantee will be “in the money” and the company will have to pay Li = (Z – Yi) in the case where policy owners lapse. If Yi > Z then the value of Li = 0. (1 mark)
* In determining which policy owners lapse, we need to consider, amongst other things, the rationality/level of inertia of the policy owners. There may also be tax benefits for not lapsing. (1 mark)
* Discount all values of Li back to time zero using the risk-free rate. The risk free rate should be the simulated risk free rate to time point i in that particular simulation. Call each discounted value DLi (0.5 marks)
* Determine the maximum value of DLi for each simulation and call this value DL.
* List and rank the DL‘s for all simulations. (0.5 marks)
* Set the capital amount to the discounted value of L which corresponds to the tolerance level chosen. For example, if there are 1000 simulations and a 99.5% probability of adequacy is chosen then set the capital equal to the 99.5th best (i.e. 5th highest) value of L. (0.5 marks)

**Q5** a) *Information required and questions to be asked*:

• Latest internal accounts

• Estimated parent company capital position at next financial reporting period and the next few years. (What basis have these projections been prepared?)

• What is the impact on the asset values of the economic crisis?

• What is the impact on the liability valuation of the economic crisis?

• Were there any hedges in place? How effective where the hedges?

• Any issues with hedge counterparties?

• Any capital issues with any other branch or subsidiary?

• Why are Standards and Poor’s considering a possible downgrade?

• What is the level of cash in the Parent Company?

• Why is cash required to be remitted?

• Are there any issues with our retrocessionaires?

• Are there any plans for raising capital?

• What is the likelihood of being able to raise capital given the state of the market?

5b) *Factors to consider:*

• Market values of the assets and full details of the assets that would returned on recapture

• Note that the liability position is already known as gross and net numbers presented in accounts

• **Solvency and capital adequacy position** upon recapture and projected positions

• Expected **level of volatility** post recapture of profit and capital positions

• Potential benefits of reduced exposure to the parents’ credit rating problems.

• Level of capital within the subsidiary - known

• Ability to enter into **hedges**

• Technical capability to manage the guaranteed book of business

o Sourcing of economic scenarios

o Management of positions

o Ability to settle positions

• Availability of sufficient management to have separation of duties

• **Investment policy** post recapture

• **Cost** of hedging program compared to cost of retrocession

• Views of the local board especially the independent directors (advice should be given to the board under LPS320)

*Investigations:*

• **Projected** capital positions under economic scenarios

• Projected profit outcomes under economic scenarios

• Projected capital position if there are further downgrades to assets that are returned

on recapture

• Comment on impact if proposed dividend proceeds

5c) Chair of the Board,

I am writing in connection with the proposed payment of a special $50m dividend to our parent company. Advice is required as the retained earnings are currently held in the statutory fund. It would not be required if they were in the shareholders’ fund.

Advice is required as to the consequences of the proposed dividend payment. In particular, no distribution can be made if the statutory fund would then fail to meet the APRA solvency standard. After the distribution, the company must continue to meet the APRA capital adequacy standard. In the case of our statutory fund, the payment of the $50m dividend would mean that the fund would continue to meet the solvency and capital adequacy requirements by $100m and $50m respectively.

In considering this matter, due regard must be paid to the effects of the possible downgrading of our parent company’s credit rating. In accordance with the capital adequacy standard, the value of our retroceded business would need to be written down by $175m in 3-month time (500m \* 35%) and by a total of 325m ($500m \* 65%) in 12-month time. Either additional capital would be required to meet the solvency and capital adequacy standards or we would need to look at recapturing the $500m retrocession to our parent.

Recapturing the $500m retrocession would require separate advice under LPS 320. The effect on our capital position of the details of the recapture would need to be examined before the appropriateness of the dividend could be assessed.

Above the statutory requirements, we need to have regard to our target surplus policy. In determining the desirable level of target surplus, or the excess of assets over the capital adequacy requirements we should have regard to:

* The desired probability of breaching the capital adequacy requirements in adverse circumstances.
* The cost of capital.
* The amount required to secure a given financial strength rating.
* The risk profile of the company, including:
  + Insurance risk and mitigation strategies, reinsurance retention, catastrophe exposure. Insurance risk is the risk of higher than anticipated claim payments.
  + Asset risks. This covers market risk, interest rate risk, credit risk, currency risk and asset-liability mismatch risk
  + Operational risks. The risk of loss from failed internal processes, people or systems; or from external events.
  + Diversification and independence of risks. The assumed independence of risk factors reduces the target surplus.
* Working capital needs. This is the difference between the release of capital from the runoff of in-force business and the capital strain from new business.

My advice is that while retained earnings could be distributed, there is a risk that if the downgrade of the parent company’s credit rating occurs then the company could be in breach of the capital adequacy standards. Additionally, there may be requirements around the possible recapture of the $500m retrocession, and it is desirable to continue to meet the requirements of the target surplus policy. I would, therefore, not recommend the payment of the $50m dividend.

I am happy to discuss this further with you. Kind regards, An Actuary

5d) *Points to be included in the advice to the CEO on the suitability of the purchase of the Polish Funds Management Company:*

* Separate formal advice to the board on potential changes needed to investment policy would be required.
* This would be an illiquid asset
* There would be no readily identifiable market value
* Any Polish restrictions on the payment of dividends
* Taxation issues– possible double tax
* Due diligence requirements
* Related asset – rules
* Asset concentration risk, having $200m invested in one asset.
* Inadmissible Asset – Financial services company limited to $50m but further limited by capital requirements (30m) resulting in a net $20m.
* Excess capital of $100m would be reduced to $50m after the dividend payment. Due to the inadmissible asset issue, above, $180m of the purchase price would be regarded as inadmissible which would result in a breach of the capital adequacy requirements.
* **APRA permission is required** and this would probably be quite unlikely to be received due to the issues above.
* Advice to CEO is that this is not recommended due to the issues above and the impact on the capital position.