



## 2014 PART III EXAMINATIONS

Subject Title: **C2B Life Insurance**  
(longer answer component)

Date: **Tuesday, 29 April 2014**

Time: **1:00 pm – 1:15 pm** (Reading Time)  
**1:15 pm- 4:15 pm** (Examination)

**Time allowed:** Three (3) hours and fifteen (15) minutes  
including reading time.

**Instructions:** Type your answers to the longer answer component into one Word document and ensure that there is no data linked to spreadsheets.

An Excel workbook must be submitted for each question.

**Number of Questions:** **Two (2)**

Question	Marks
1	30
2	30
Total	60

Candidates are required to answer **ALL** questions.  
This paper has **four** (4) pages (excluding this page).

**Answer 2 questions**
**QUESTION 1**
**(30 Marks)**

You are the Valuation Actuary at Nadal Life. Nadal Life specialises in writing group insurance policies covering Death and Total and Permanent Disability benefits. The company has been writing this business since 2010. In addition to these policies, it has a separate book of legacy participating business.

For the 31 December 2013 valuation, the IBNR for the business has been determined based on an assumed ultimate undiscounted loss ratio of 92%, which is consistent with that used for pricing. The table below shows the earned premiums and claims reported to Nadal Life since the inception of Nadal Life's group business.

Incidence year	Earned premiums (\$000s)	Claims Reported	
		Claims Paid	Claims Pending
2010	110,000	99,004	3,425
2011	110,000	99,458	9,189
2012	110,000	95,297	13,098
2013	200,000	168,499	34,192

A new three year premium guarantee period began in 2013 and this coincided with a 60% increase in sum insured but also a change in TPD definition that was designed to tighten the requirements that need to be met for a TPD claim to be accepted.

- a) Calculate the IBNR for Nadal Life using this approach. Note that Nadal Life's accounting policy assumes that pending claims are shown on the balance sheet at 85% of their reported value to allow for the expected rate of declinature of claims. Comment on the appropriateness of the valuation methodology used and when such an approach may be appropriate (ignore discounting in your calculation).

**(3 Marks)**

- b) You are exploring the option of applying a more sophisticated technique to determine the IBNR. You have been able to obtain and collate historical claims data for all of the Group schemes insured by Nadal Life (including claims data for the period prior to Nadal Life becoming the insurer).

This data provides information on the following for each of the claims:

- Date that the claim was reported to the insurer (in the case of pre-2010 claims, this was the date of reporting to the previous insurers Golden Life and Silver Life);
- Date that the claim was incurred;
- The status of the claim being either:
  - o Paid – i.e. claim was accepted and paid;
  - o Pending – i.e. claim is under assessment with the claim amount being the full claim amount; or
  - o Declined - i.e. declined without payment.

The claims data is in the spreadsheet in the "Claims Data" sheet.

Your analyst has calculated the IBNR based on a chain ladder methodology and using a discount rate of 4%. She has calculated two IBNR estimates, one based on claim amounts and the other on claim numbers (multiplied by an average claim size). Her calculations are contained in the sheet named "IBNR Analysis – Analyst".

As the Actuary for Nadal Life, you are responsible for the final IBNR. Review the data and approach used by the analyst in calculating the IBNR reserve for Nadal Life under both approaches. As a result of this review, prepare a valuation note for the valuation files including:

- (i) List the data checks that you carried out; (2 Marks)
- (ii) Any issues identified in the claims data and related adjustments made; (15 Marks)
- (iii) Any assumptions used in the determination of the IBNR, comments on their suitability and whether any changes are required; (5 Marks)
- (iv) Your estimate of the final IBNR for Nadal Life. (3 Marks)

To assist you in the calculation of the IBNR, the attached spreadsheet includes a sheet named "IBNR Analysis – Actuary" which can be modified. This spreadsheet links to columns N to R in the "Claims Data" sheet, which can also be modified for the purposes of making any adjustments.

(You can assume for the purpose of this question that the discount rate chosen is appropriate). (25 Marks)

- c) Noting the experience of the business and the fact that the current premium guarantee period still has two years to run, your CFO asks if any additional reserves would be required to be held for this business other than those relating to past periods of exposure. He notes that the participating business has significant margins and these could be used to cover any deficiency. Set out the points you would make to the CFO to cover his question. (2 Marks)

**Attachment:** C2B\_LAQ1\_S1\_2014\_Student\_Workbook

**QUESTION 2**
**(30 Marks)**

You are the Actuary at Clooney Life, an Australian life insurance company which is the subsidiary company of a North American insurer. Clooney Life writes both individual policies written through independent financial advisors and group business.

The individual business covers death and trauma. The group business covers death and TPD.

The group business is comprised of a number of small to medium sized schemes which have a premium guarantee period of 3 years (after which most schemes go to a market tender).

Your parent company reports on a US GAAP basis and hence Clooney Life will have to report on both a MoS basis (for its local accounts) and a US GAAP basis (for its parent office's consolidated accounts).

For Clooney Life, this US GAAP basis requires:

- For active lives, liabilities are to be valued based on the assumptions that were in place at the time each policy was written (including investment assumptions). These assumptions are determined based on each year's experience investigation as best estimate plus a Provision for Adverse Deterioration ("PAD") which is a margin added to the best estimate assumption;
  - The US GAAP reserves for active lives are comprised of a benefit reserve which is calculated on a net premium type of valuation approach and a separately calculated DAC which runs off based on premiums. The DAC is shown as an asset on the balance sheet;
  - For claims reserves (i.e. IBNR and Disabled Lives Reserves), liabilities are valued based on current best estimate assumptions;
  - Loss Recognition testing under US GAAP is undertaken at a global level where the Australian business will be combined with the other business in the Asia Pacific for this purpose (which is quite large and very profitable for the parent company); and
  - Assets are reported on the balance sheet at Book Value.
- a) The CFO of your parent company (the Group CFO) has asked you to provide some detail as to how reporting will differ between the MoS and US GAAP basis for each line of business. In particular, she has asked you to highlight the key differences and similarities in the MoS and US GAAP balance sheets.

Set out the points you would make to the Group CFO covering her questions.

(6 Marks)

- b) The reinsurance arrangements of Clooney Life are currently sitting with a large international reinsurer who has been designated as a "specialist reinsurer" by APRA. The Group CFO is annoyed that Clooney Life is passing off its profits to a third party when such business could be reinsured directly with the parent company.

The Group CFO has asked you to put together a short memo drafting the potential negative implications for Clooney Life for reinsuring within the group. For each of these implications, she would also like you to document some ideas on how these challenges could be overcome. Draft the requested memo to the Group CFO.

(9 Marks)

- c) Being a North American life insurer, the parent company is not particularly familiar with embedded value reporting. The Group CFO has asked you to calculate a traditional embedded value for Clooney Life.

For the purposes of the embedded value calculation, the parent company determines the assumptions to be used for the calculation. You are provided with the following information:

	<b>2014 Expected Claims Ratio</b>	<b>2014 Expected Premium</b>	<b>2014 Expected Expenses*</b>	<b>2014 Expected Commission Rate</b>	<b>Economic Capital as a % premium</b>
<b>Individual</b>	55%	\$200m	\$24m	20%	20%
<b>Group</b>	82%	\$160m	10%	4%	30%

\* Expenses expressed for group as a % of premium

<b>Additional Assumptions</b>	<b>Individual</b>	<b>Group</b>
Expense Indexation (pa)	2%	n/a
Lapse Rates (pa)	12%	n/a
Investment Income (pa)	3.5%	3.5%
Premium Rate Increase (pa)	10%	n/a
2014 Claim Rate (qx)	0.10%	n/a
Annual Claim Rate Increase	10%	0%
Risk Discount Rate	13%	

Use the information above to calculate the Value of Inforce Business (VIF) separately for group, and individual business. The parent company has provided a worksheet with the format of the cashflows that need to be populated for this purpose (the assumptions listed above are also provided on the front sheet).

Clearly identify any additional assumptions that you have made in the calculation of the VIF. (8 Marks)

- d) The Group CFO is very encouraged by the results of your analysis. She is however concerned that if she reports these results to the Board of the parent company they will be expecting this value of business to materialise.

She knows that the value is dependent on a number of actuarial assumptions but is not too sure which assumptions the model is most sensitive to.

She has asked you to prepare another report covering the following:

- Identification of three key assumptions which have a significant influence on the VIF;
- For each of these assumptions, propose a suitable stressed assumption and recalculate the VIF under the stress;
- For each of these assumptions, actions that Clooney Life could reasonably take to manage the risk that actual experience is worse than the assumptions.

Draft the report for the CFO.

(7 Marks)

**Attachment:** C2B\_LAQ2\_S1\_2014\_Student\_Workbook

**END OF PAPER**