INSTITUTE AND FACULTY OF ACTUARIES

February 2017

CA3: Communications

Paper 1

Time allowed: 1 hour 30 minutes + 15 minutes reading time

INSTRUCTIONS TO THE CANDIDATE

1. You have 15 minutes reading time at the start of the examination in which to read the questions. You are strongly encouraged to use this time for reading only, but notes may be made. You then have 1 hour 30 minutes to complete the paper.

2. You must write your submission from the beginning and not use an imported e-template.

Your file names must include your ARN and each file should also contain your ARN as a header or footer.

Please note that the content of this paper is confidential and students are not to discuss or reveal the contents under any circumstances nor are they to be used in a further attempt at the exam.

If you encounter any issues during the examination please contact the Online Education team at online_exams@actuaries.org.uk T. 0044(0) 1865 268 255

You work in the financial reporting team of Bridge Insurance Ltd, a general insurer specialising in household insurance and based in Country S (whose currency is the Shilling). Bridge Insurance Ltd writes business in Country D (whose currency is the Dollar). Alex, the Chief Financial Officer of Bridge Insurance, has sent you the following email:

Dear Brad,

Please see below an email I received from our Chief Executive Officer, Reena, asking for information about the impact of recent currency movements between the Dollar and the Shilling on our business. I suspect it should not have a large effect in the next couple of years, because of the forward contracts we have which lock into Dollar/Shilling exchange rates. However, I suspect that higher business volumes than expected could be an issue, and if the value of the Dollar does not recover we could have a longer term problem.

Could you please draft the paper for the board as described in Reena's email below? I have asked our new actuarial team member, Doug, to provide some information on the business we write in Country D, the recent currency movements, and details of the forward contracts we have in place. You should include the information that Reena asks for in the email. For Reena's third bullet point I'd suggest you cover two actions highlighting potential drawbacks of each action. I would also include a couple of charts as the board generally appreciate being able to visualise the issue. When looking at profitability, you should concentrate on profit margins (i.e. profit / premiums) rather than the absolute amount of profit in Shillings. This is particularly relevant given that business volumes could be fairly uncertain when looking over the next two years. You may want to consider showing profit margins in one of your charts, perhaps compared to the average profit margin that would have been expected without the effect of recent currency movements.

Thanks,

Alex
Chief Financial Officer, Bridge Insurance Ltd

On 28 February 2017, Reena wrote:

Dear Alex

As you are no doubt aware, the value of the Dollar has been volatile relative to other currencies recently. I saw on the news this morning that it has dropped by 30% against the Shilling since the publication of very poor economic forecasts by the government of Country D last month. Given that we write business in Country D, but incur expenses here in Country S, we must be very exposed to these movements.

Could you please prepare a paper for the board setting out the effect the recent drop in value of the Dollar has on our business? The paper should include:

- *A brief summary of recent currency movements (to give the relevant background).*
- *The effect that these currency movements will have on our business in the short term. I believe we have some protection for the next two years, if I understood the recent presentation from our asset managers correctly. Please only confirm the effect of this protection – I am happy to leave the technical details to the asset managers.*
- *The longer term implications, and the actions, if any, that we may need to take.*

Thanks,

Reena
Chief Executive Officer, Bridge Insurance Ltd

Draft a paper to the Board in around 600 words.

Doug has provided the following table which shows the weekly exchange rate between the Dollar and Shilling over the last few months.

Date	*Exchange rate: Dollar / Shilling*
29/11/2016	0.7301
06/12/2016	0.7317
13/12/2016	0.7184
20/12/2016	0.7132
27/12/2016	0.7141
03/01/2017	0.7058
10/01/2017	0.7025
17/01/2017	0.7048
24/01/2017	0.7177
31/01/2017	0.5383
07/02/2017	0.5023
14/02/2017	0.5082
21/02/2017	0.4950
28/02/2017	0.5008

For example on 28 February, one dollar was worth 0.50 Shillings.

Bridge Insurance writes household insurance products in Country D. Premiums and claims are denominated in Dollars, but the business is written out of the head office in Country S, and so expenses are incurred in Shillings. Before the recent currency fluctuations, the finance team made the following projections for the profitability of business written in Country S, expressed in Shillings for each quarter of a year up until the end of 2019.

Date	*Premiums*[1] **A**	*Claims*[1] **B**	*Expenses* **C**	*Profit* *A-B-C*
Q2 2017	19.5	9.6	3.9	6.0
Q3 2017	20.4	9.9	4.1	6.4
Q4 2017	21.3	10.9	4.2	6.2
Q1 2018	22.2	11.7	4.5	6.0
Q2 2018	23.3	11.4	4.7	7.2
Q3 2018	24.3	11.8	4.8	7.7
Q4 2018	25.5	13.0	5.1	7.4
Q1 2019	26.6	13.8	5.3	7.5
Q2 2019	27.8	13.8	5.6	8.4
Q3 2019	29.0	14.1	5.8	9.1
Q4 2019	30.2	15.3	6.0	8.9

[1]Premiums and Claims have been converted from Dollars to Shillings based on the exchange rate as at 29 November 2016.

The asset management department hold forward currency contracts matching the equivalent net cashflow of premiums minus claims for the next two years (i.e. up to and including Q1 2019). The finance department have therefore stated that the Q2 2017 to Q1 2019 figures above will not be affected by the recent movement in exchange rates. The forward contracts have been written as options and as such the full value of the forward does not have to be realised. Therefore if business volumes are lower than expected the asset managers can exercise the options to exactly match the cashflows coming from Country D. The forward contracts are written at an exchange rate of 0.7301.

However, if business volumes are higher than expected, the asset management department will not have enough forward contracts to cover the arising cashflows. The following table illustrates the impact on the expected cashflows in Q1 2018 of business volumes being 10% higher than expected.

	Expected cashflows	*Actual cashflows before currency effects*	*Actual cashflows after currency effects*
Premiums	22.2	24.4	23.7
Claims	11.7	12.9	12.5
Expenses	4.5	4.9	4.9
Profit	6.0	6.6	6.3
Profit margin	27.0%	27.0%	26.6%

Where the actual premium cashflow after currency effects is calculated as:

$$\text{Expected premium} \times \left(1 + 0.1 \times \frac{\text{Exchange rate @ 28 February 2017}}{\text{Exchange rate @ 29 November 2016}}\right)$$

$$= 22.2 \times \left(1 + 0.1 \times \frac{0.5008}{0.7301}\right)$$

$$= 23.7$$

After the currency protection we currently have in place runs out (i.e. in two years' time) the full premium and claims cashflows will be reduced by the currency movements, rather than just any excess. The following table shows the profits and profit margins with and without currency effects:

Date	*Before currency effect*		*After currency effect*	
	Profit	*Profit margin*	*Profit*	*Profit*
Q2 2017	6.0	30.8%	2.9	21.7%
Q3 2017	6.4	31.4%	3.1	22.2%
Q4 2017	6.2	29.1%	2.9	19.9%
Q1 2018	6.0	27.0%	2.7	17.8%
Q2 2018	7.2	30.9%	3.5	21.9%
Q3 2018	7.7	31.7%	3.8	22.8%
Q4 2018	7.4	29.0%	3.5	20.0%
Q1 2019	7.5	28.2%	3.5	19.2%
Q2 2019	8.4	30.2%	4.0	21.0%
Q3 2019	9.1	31.4%	3.9	19.6%
Q4 2019	8.9	29.5%	4.2	20.3%

The value of a forward contract can be calculated using the following formula:

$$f = (F_0 - K)\, e^{-rT}$$

where:

F_0 is the forward price agreed upon today and is given by $F_0 = S_0 e^{rT}$
f is the current value
K is the delivery price
r is the risk free interest rate (which has remained steady at 5% over the last five years)
T is the time to the delivery date in years
S_0 is the spot price of the underlying asset

In the case of a currency forward, the underlying asset will be an amount of foreign currency, but expressed in the local currency. K will therefore be the value of the foreign currency at the outset of the contract, and S_0 will be the value of the foreign currency at the point the forward contract is valued.

Beyond Q1 2019 the company does not have protection against the recent exchange rate movements. Current expectations are that the exchange rate will stabilise at around the current level over the coming years. Premiums and claims can therefore be expected to be around 30% lower when expressed in Shillings, and therefore future profits are likely to fall by approximately 50%. Crucially, this brings profit margins down from around 30% to around 20%, which will seriously affect the return we make on our capital. Return on capital is one of the key measures that shareholders use.

It is likely that Bridge Insurance will need to increase premium rates in Country D to compensate for the loss in profit margin. However, this could lead to the product becoming uncompetitive, particularly against domestic insurers in Country D who will not have been affected by the change in the exchange rate. In the longer term, Bridge Insurance may need to consider opening a branch in Country D so that it can benefit from the lower cost base, and maintain profit margins and its competitive position. This would however involve a large upfront cost, and will therefore need to be considered carefully by the board.

All of the figures and information provided is correct for the purposes of the question. You can assume that the exchange rate changes have no other effect on Bridge Insurance's business other than those outlined in the question. There is no need to provide further actions that the board may choose to take or to comment on any regulatory or legal considerations.

END OF PAPER