Institute of Actuaries of India

Subject CA3 – Communications

November 2008 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.

Indicative Solution & Marking Guide: Question 1

Indicative solution

Memorandum

To: [Client Name]
From: [Actuary]
Date: 1 November 2008

Subject: Aspects of risk management

Introduction
This memorandum covers certain aspects of risk management as requested by you. It discusses the following elements:

- Value at risk as a risk measure and its drawbacks;
- Need for qualitative assessments in risk management;
- Risk management of new products; and,
- Impact of fair value accounting on risk management

Value at risk (VAR)
VAR is a quantitative risk measure commonly used in the banking industry and its use is expanding in other industries such as insurance. It reflects the amount of value that might be lost by an institution with a given level of confidence. For example, a 99% VAR of Rs10million over 1 year indicates that the institution might lose Rs10million over the next year in 99 out of 100 scenarios.

The calculation of VAR is based on several assumptions that reflect the uncertainty of the outcomes. Since these assumptions are based on short-term historical data the estimate of VAR reflects this data. Thus when the past data indicates benign conditions it lowers the VAR estimate and conversely when conditions are turbulent it raises the VAR estimate. Using VAR as a risk management tool may thus lead to surprises when conditions change quickly.

The other drawback of VAR is that it does not give any information on the amount at risk in the extreme scenarios. It is therefore not useful for capturing extreme risk such as those arising out of catastrophe.

Qualitative assessments
As discussed in the section above there are limitations and drawbacks with the use of quantitative risk measures such as VAR. Any risk management program thus needs to incorporate qualitative assessments such as building adverse scenarios that a business might be exposed to. The results of such an exercise may be captured in qualitative terms for example with the use of traffic lights.

New Products
Financial services firms regularly launch new products. Such products pose two essential problems for risk management. The first one relates to the lack of past data to be fed into the calculation of risk measures such as VAR.

New products may not be set up on the IT systems and therefore not captured in the standard risk management reporting framework. Innovative products may also change the nature of risk for example converting market risk into credit risk. Although the individual risk from these products may be estimated using other tools the interaction effect with existing business is not adequately reflected. Thus new products need to be closely monitored and set up on the system before their volumes grow too large.

Fair value accounting
Fair value accounting refers to marking of traded assets to their market or fair value. Assets that are frequently traded do not present a problem in ascertaining their market values as these can be readily observed from the market. Other assets, which are infrequently traded, require alternate ways to arrive at their fair value. The methods include using similar assets whose prices are available as proxies or models to determine their market value. Both of these elements introduce judgment or even bias in the valuation process. Fair value accounting may also lead to a vicious circle of selling assets when their value is depressed leading to a realization of losses.

Summary
Risk management is complex and requires a holistic approach encompassing both quantitative and qualitative assessments. Challenges highlighted by the recent crises include shortcomings with risk measures; the difficulties of aggregating individual risks; dealing with new and innovative products and fair value accounting.

Marks are split as follows –

Meeting objectives
Presentation
Contents

Meeting objectives

Has the script met the overall objective of:

- Explaining value at risk and its drawbacks?
- Explaining the need for qualitative assessments in risk management?
- Explaining the risk management issues with new products?
- Explaining the problems in fair value accounting and its implications

Will the reader:
- Understand the explanations?
- Be satisfied with the answer?

Presentation

- Clear statement of purpose
- Logical structure
- Appropriate language used
- Suitable sentence length
- Ideas grouped appropriately in paragraphs
- Suitable ending
- Correct grammar
- Correct spelling and punctuation

Contents

- Defining VAR, including an example
- Listing the drawbacks of VAR
- Need for including qualitative assessment in risk management
- Presenting qualitative assessment
- Risks with new products
- Lack of data and IT systems issues with new products
- Defining fair value accounting briefly

- Problems with fair value accounting
- Fair value accounting and its link with risk management

Penalties

Cut marks for
- Very poor grammar, spelling or punctuation
- Requests for more information
- Speculative statements
- Excessive waffle

(Total 60 Marks)

Indicative Solution & Marking Guide: Question 2

Indicative solution

Dear Ram,

Embedded values

I explain below the concept of embedded values and various approaches to calculating them.

What is an embedded value?

An embedded value measures the value of a life insurance company to shareholders but does not place any value on business that is to be written in the future. Therefore it is only concerned with valuing the policies that are on the books of the insurer.

What are the components of an embedded value ?

An embedded value has two components namely (1) the adjusted net worth and (2) the value of in-force business.

The adjusted net worth is taken from the net assets appearing on the balance sheet and assets are adjusted to reflect their market value. This is necessary as often assets are shown on a different basis on the balance sheet. For example, in certain countries the asset is shown at the original cost at which it was bought.

The value of in-force business represents the present value of future profits to shareholders expected to emerge from the in-force policies. In order to arrive at the value we need to make certain best estimate assumptions regarding various factors including investment return, expenses, rates of surrender and mortality rates. We then on the basis of these assumptions derive the cash flows to the shareholder. These are then discounted using a risk discount rate to arrive at a value in today's money called the present value.

The higher the discount rate the lower the resulting value so the risk discount rate needs to be chosen appropriately having regard to the riskiness of the stream of profits. The riskier we feel the profits are the higher the risk discount rate is giving a lower embedded value.

What have been the key criticisms levelled against the above approach to embedded values?

The key criticism has been that the method of calculating embedded values described above is not consistent with the way the market values assets and liabilities.

In particular, investing in riskier assets under the above approach to embedded values increases the embedded value as we can take credit for the higher expected investment return in our best estimate assumption but there is no adjustment to the discount rate to reflect the additional risk from investing in riskier assets. The higher expected investment return for a riskier asset simply compensates for the greater risk involved – it does not indicate that the riskier assets are worth more and therefore the embedded value would generally be unaffected in a market framework by the insurer's choice of investments.

Furthermore, the approach does not value guarantees provided to policyholders properly. As long as under the best estimate assumptions the guarantee does not bite then no value is placed on the guarantee. There is no recognition of the volatility of future returns which is a key parameter in the way the market values financial instruments having guarantees.

I trust the above satisfactorily explains the concepts behind embedded values as used by life insurance companies.

Regards/Madhu

Marking guide

Marks are split as follows –

Meeting objectives
Presentation
Contents

Meeting objectives

Has the script met the overall objective of:

- Explaining the concept of embedded values?
- Explaining the components of embedded value?

- Explaining the criticisms of embedded value?

Will the reader:
- Understand the explanations?
- Be satisfied with the answer?

Presentation

- Clear statement of purpose
- Logical structure
- Appropriate language used
- Suitable sentence length
- Ideas grouped appropriately in paragraphs
- Suitable ending
- Correct grammar
- Correct spelling and punctuation

Contents

- Embedded value not concerned with future business
- Adjusted net worth taken from balance sheet net assets
- Value of in-force equals present value of future shareholder cash flows
- Best estimate assumptions
- Risk discount rate
- Inconsistent with market
- Riskier assets giving higher value
- Guarantees and options improperly valued

Penalties

Cut marks for
- Very poor grammar, spelling or punctuation
- Requests for more information
- Speculative statements
- Excessive waffle

(Total 40 Marks)
[Total 100 Marks]

**********END********