Institute of Actuaries of India

Subject SA5 – Finance

September 2017 Examination

INDICATIVE SOLUTION

INTRODUCTION:

The indicative solutions provided are very detailed in nature for the benefit of students and the examiners are not expecting the students to provide such in-depth details under examination conditions. However the students are expected to cover all the fundamental principles to demonstrate their understanding of the subject.

Solution 1:

i) BFC business model is based on fee income earned by managing equity and debt fund. Current risk profile of the company is exposed to the following :

a. The income is sensitive to market movements on equity fund and interest rate movements on debt fund.
b. BFC is sensitive to fund size that can change from new money addition, redemptions and dividend payout, if any.
c. Liabilities of BFC is perfectly matched to assets held by the company assuming the fund has no guarantee

Post launch of Life insurance Company, the company risk profile changes to reflect the following:

a. Capital -Life Insurance is capital intensive business, capital invested by the group will go up.
b. Term of the liabilities goes up and the company is more exposed to lapses and surrenders. Actual impact may vary depending on the structure of the product (front loaded have minimal impact in comparison to backend loaded)
c. Regulatory risk – Life insurance business is more regulated than Asset management business
d. Type of product –
   i. Unit Linked product will closely mirror fund business but requires more distribution cost in sale. Liability and Asset are closely matched unless there are options and guarantees in the product.
   ii. Non Unit Linked product – Managing these products will require company to have sound asset liability management capability. It will also require company to think more carefully on insurance risk – mortality
e. Nature of liability – In non-unit linked product, liabilities are more likely to be fixed and guaranteed. The risk for lower return is borne by the company against asset management business where entire risk is passed on to consumer

[6]

ii) Some of the consideration that board should consider before evaluating the proposal are :

a. Longer term strategic fit to current business model
b. Payback period
c. Capital required and return on equity
d. Distribution capability and operational readiness
e. Expertise – Primarily product innovation and pricing , distribution method and customer service
f. Synergies with Asset management business
g. Regulation that may impact any cross – synergies like asset management

[5]

iii) Some of the options that the board should consider are :

a. Dividend pay out
b. Acquisition of another asset management company
c. Investing in other companies through launching their own PE fund
d. Launching new fund – e.g. quant fund - targeted at institutional investor
e. Getting into allied areas – stock broking
f. Exploring other alternate options – Bank or payment bank

[4]

iv) **a)** Advantages of entering into life insurance business are as follows :

a. Diversification of risk of the company
b. Synergies from strong brand in asset management
c. Less sensitive to market movement and reliance on single driver of income – fees
d. Potential to leverage existing distribution channel to sell insurance & customer base
e. Longer term business and hence a stronger chance to build AUM faster
f. Leverage existing operational framework
g. Large customer base to be tapped for insurance sales

Disadvantage of entering into life insurance business are as follows:

a. Capital intensive business especially non unit linked products
b. Need expertise on pricing/ managing insurance risk
c. Longer payback period
d. More regulated than asset management business
e. Longer term risk – need discipline on asset management in context to liabilities as it may not be perfectly matched
f. Consumer interest in life insurance is lower than fund management business

[6]

b) Life business is valued on Embedded Value /Appraisal value principles which is goodwill added to present value of all future profits attributable to SH and net worth of the company. Given it is a long term business and profits emerge over time unlike Fund management business where they are a function of AUM. Process followed will be as follows:

a) Existing business: Build a model to project cash flows (post tax) attributable to shareholder. This should mean building cash flow model for each product segment and running it for complete business volume under each segment. The assumption used for running the cash flows should be on best estimate basis. Allowances should be made for cost of the options and guarantees in-built into the products.
b) Adjusted Net worth (ANW): This is defined as the sum of required capital and Free Surplus. Required capital is amount of money that is locked in as capital for running the risk on the policy.
c) New Business : Current year new business cash flows attributable to shareholder are either modeled separately or included in your existing business projection
d) Goodwill : Given Life insurance business is a longer term business and the brand created will allow the investor to write new business for many years . This aspect is called Goodwill and can be assigned a value by capitalizing future profits that may come in future.

If we add a +b+c+d , we get Appraisal value of the company which is a fair estimate of the value of the life insurance business . Actual value assigned by market participants can be either at a discount or premium to Appraisal value.

[4]

v) Advantages for raising debt are as follows :

a. Tax deductible
b. No dilution of ownership
c. Cost of debt is lower than equity
d. It is temporary and can be structured as per the needs of the organization

e. Obligation on debtholder is known in advance

Disadvantage are as follows:

a. Firm Deadlines - Money must be paid back by a fixed date.
b. Cash flow woes: If you rely too much on debt and have cash flow problems, you'll struggle to pay back the loan.
c. Lower investor potential: If you carry too much debt you'll be labelled "high risk" by investors, which could limit your ability to raise future capital by equity financing.
d. Debt financing can leave your business vulnerable when sales take a dip.
e. Debt can make it difficult for a business to grow because of the high cost of repaying the loan.
f. Collateral: Assets of the business can be held as collateral, and the owner of the company is often required to personally guarantee repayment of the loan.

Other methods available are as follows:

a. Private placement
b. Preference shares
c. Eurobonds
d. Syndicate Bank loan
e. Hybrid Bonds
f. Strategic partnership through sale of shares
g. Commercial paper
h. Initial Public offering

[6]

vi) Communication to bondholders should be made covering following aspects :

a. Group continues to do well and is making healthy margins on their asset management business
b. Y-o-Y sales have come down due to increased focus on quality of sales. The loss for this year has been significantly lower than last year
c. There has been regulatory changes that has impacted the sales of the existing products
d. Nature of the business is longer term and it is important that we build our business properly by focusing on customer needs.
e. Company has enough assets and the bonds are adequately secured
f. Company has enough liquidity to service the loan

[4]

vii) **a)** Merton Model maybe used to arrive at default probability of bind using equity prices. The model considers

- Equity holders are residual owners of a company
- The value of the company assets over and above the debt D will be paid to them
- So equity holders can be assumed to hold a call option on company assets with strike D
- If the value of assets V is greater than D then equity holders get V-D
- If the value of assets V is less than D then they have the option to default and sell the assets to the debt holders i.e. they get zero
- So, their pay off is MAX(V-D,0)

- This pay-off is similar to that of a call option with strike D with underlying value of V

The equation is

$$E_t = V_t \Phi(d_1) - De^{-r(T-t)}\Phi(d_2)$$

Where

Vt = market value of assets at time t

Et = value of equity at time t

D = face value of debt maturing at time T

σ = annualised asset volatility

$$d_1 = \frac{\ln\left(\frac{V_t}{D}\right) + (r + \frac{\sigma^2}{2})(T-t)}{\sigma\sqrt{(T-t}}$$

$$d_2 = d_1 - \sigma\sqrt{T-t}$$

The two unknowns in the above equation are

- V_t = market value of assets
- σ = annualised asset volatility

The following assumptions are used

- Default can occur only at maturity
- No bankruptcy costs
- No taxes
- Risk free rate remains constant through the period
- Level and form of debt is constant
- Volatility remains constant

In order to arrive at a workable model we need one more equation that connects the 2 unknowns.

V_t & E_t follows a GBM

$$dV_t = \mu V_t dt + \sigma V_t dW_t$$

Where μ is the drift rate

$$E_t \sigma_E = \Phi(d1)\sigma V_t$$

Estimating V_t and σ

Since equity prices are observable and readily available using these 2 equations in 2 unknowns which can be solved numerically to arrive at desired results. This can be achieved by using an initial assumption for V_t and σ and simultaneously minimizing the deviation between calculate and observed equity value and calculated and observed standard deviation of equity.

The objective function can be

$$\left(\frac{Model\ E_t}{Observed\ E_t} - 1\right)^2 + \left(\frac{Model\ \sigma_E}{Observed\ \sigma_E} - 1\right)^2$$

The initial guess can be assuming book value of debt is equal to market value of debt i.e $V_t = E_t + D$ & $\phi(d_1) = 1$ after using which the objective function can be minimized using a commercially available software.

[10]

b) Arriving at probability of default

The value of asset at time T can be expressed in terms of value of assets at time t, V_t, as follows:

$$ln(V_T) = ln(V_t) + \left(\mu - \frac{\sigma^2}{2}\right)(T-t) + \sigma\sqrt{T-t}\varepsilon$$

Where ε is the random component of the asset return

Default occurs at time T when value of assets at time T is less than the value of debt D

The probability PD of this event happening is

$$PD = \Pr(\ln D > \ln(V_T))$$

Which is given by

$$\Phi\left(-\frac{\ln\left(\frac{V_t}{D}\right) + \left(\mu - \frac{\sigma^2}{2}\right)(T-t)}{\sigma\sqrt{T-t}}\right)$$

[5]

viii) De –risking means employing one or more of the following strategies :

a. Reduce exposure to equities to bonds
b. Reduce exposure to corporate bonds and move into higher rated government bonds
c. Diversify the portfolio by investing in only liquid /large cap equity stocks
d. Hedge the portfolio by buying derivatives to minimize the impact on asset values by market movements
e. Reduce exposure on derivative trading , if any
f. Reduce exposure on CDO, MBO and other similar assets
g. Reduce the sale of products that offer longer term guarantees
h. Reduce the sale of products that has longer payback period
i. Increase the amount of money invested in liquid assets
j. Reduce exposure to overseas assets
k. Introduce sub-limits on different asset exposure and monitor market movements more frequently

[10]

[60 Marks]

Solution 2:

i) Horizontal merger

Merger of two companies in similar activities. Utilize benefits of economies of scale

Vertical merger

Merger of two companies in different stages of production process. Benefits from improved coordination and administration

Conglomerate merger

merger of firms in unrelated lines

- lower tax bill
- utilization of surplus
- higher eps
- protection from threat of takeover
- diversification
- cheaper finance

[4]

ii) Following could be the reasons

- Faster to buy versus build capacity. Time to market lower
- Consolidation leading to more market share and more pricing power with customers/suppliers
- Benefits of economies of scale (elaborate on economies of scale)
- DEF is manufacturing product segments where Tim-Tim doesn't have a presence and take over gives that opportunity to expand product portfolio
- Which leads to benefits of diversification
- Economies of scope (elaborate)
- Tim-Tim has more markets accessible due to larger global footprint. DEF capacity utilization could be enhanced by Tim-Tim
- DEF available at valuations which Tim-Tim deems attractive
- Tax advantages if DEF has accumulated losses
- If company has surplus funds then acquisition could be a way to boost ROE
- Ability to improve DEF's productivity and ROCE through best practices available to Tim-Tim

[5]

iii) DEF promoters may look for an exit due to following reasons

- Promoter wants to monetize his assets and diversify as a substantial part of his net worth is in the company
- Promoter wants to retire and handing the company to another player in the industry is a way out
- Competitive markets – DEF being a small player may not be able to compete effectively in future
- Getting a good price

- If structured as a merger promoter will continue to hold stake in the industry – though it will be a smaller stake in a larger entity
- Low capacity utilization and inability to find new markets
- Inability to meet debt obligations – lenders forcing the promoter to sell the company
- Not having sufficient capital to expand the business – promoter foresees gradual loss of market share

[5]

iv) Five ways include

a. Internal cash accruals
   - Whether the company has enough cash/liquid investments available

b. Using debt financing to raise cash to pay the promoter
   - Cost of debt
   - Impact on credit rating
   - Profitability and interest/debt service coverage ratios of the combined entity

c. Raise funds through rights issue
   - Past track record of company will decide whether shareholders are willing to put more money into the company
   - Since it is shareholder's funds risk of default doesn't arise
   - But cost of equity is higher than cost of debt and ability to service equity and generating acceptable ROE is critical. Whether acceptable ROE is generated on expanded capital.
   - Current stock price and whether dilution at current levels makes sense. Rights usually are priced at a discount and what level of discount is needed to be offered
   - Being largely owned by US parent company whether the parent company is willing to put money into the company decides the success of the rights issue

d. Raising funds through preferential allotment to investors
   - Extent of dilution in ownership of current shareholders and whether it is acceptable to current shareholders
   - At what price the dilution is happening and whether it makes sense at this price

e. Share swap
   - Valuation of the company and the target entity
   - Recent price performance of the shares
   - Acquired companies usually demand a premium to quoted stock price – control premium. Level of control premium
   - Dilution to existing shareholders and is it acceptable to them?
   - No need to furnish debt obligations
   - But pressure to generate acceptable ROE on a higher equity base
   - Acquired company promoter may end up as a sizeable shareholder and may even demand a board seat – is it acceptable to parent company?

[10]

v) As per SEBI takeover code

- If the acquisition results into entitlement of 25% or more voting rights in the target company, the acquirer is required to make an open offer to acquire at least 26% shares from the existing public shareholders of the target company in terms of the Takeover Code

- If maximum permissible non-public shareholding exceeds, say 75%, pursuant to open offer – the acquirer is required to bring down his or her shareholding to 75% within the time specified as per SEBI regulations
- The open offer price should be the highest of the negotiated price or market price whichever is higher. There are specific ways in which market price is determined – like 2 week VWAP, 60 days VWAP and so on and the highest is taken

An important role of SEBI is to protect minority shareholders and they should be provided an exit route in the event of a change in management. This is because the takeover is not something the minority shareholders would have factored in at the time of making the investment. An open offer to minority shareholders would ensure that they get at least a partial exit at the same price as that received by promoter. To an extent this addresses the information asymmetry issue.

[8]

vi) The following could be the reasons for opting for share swap

- DEF promoter continues to want an exposure to the bearings industry albeit as a minority shareholder and share swap is the easier way to achieve it
- A cash buy out may lead to taxation issues for promoter and share swap may help them to defer it
- Tim-Tim is a large multinational company and the shareholders of DEF may in general have expressed an opinion to be part owners of the merged entity
- A share swap would mean that there is no need for leveraging the balance sheet which is probably an approach Tim-Tim would have preferred
- MCAP of Tim-Tim is 3876 Cr and MCAP to Sales is 3.6X and P/E is 40X. Tim-Tim board may have deemed the valuation pricey and felt that using stock as a currency makes more sense
- DEF has significant debt in its balance sheet indicated by positive EBITDA but not much flowing to PAT indicating interest payout. DEF MCAP is 208 Cr with little profits. Swap ratio at current market price values DEF at 246 Cr plus debt in DEF books – a premium t current valuation. A lot of this valuation hinges on Tim-Tim's ability to turnaround DEF operations. DEF has a EBITDA margin of under 10% while Tim-Tim has a margin in mid-teens. Time taken to turnaround the operation may be long and using equity is safer than debt as equity is more of risk capital

[8]

[40 Marks]

****