

Institute of Actuaries of India

Subject SA5 – Finance

May 2010 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

Solution 1 a)Relative Merits of Raising Finance from Capital Markets

- The company may have reached its limit in terms of borrowing from financial institutions (including banks) and may not be able to access the required extra capital from financial institutions
- The financial institutions may impose restrictions/covenants that are not acceptable to the company.
- The financial institutions may insist on a degree of involvement in the running of the company that is unacceptable to the management. On the other hand, shareholder involvement tends to be less direct.
- Issuing shares may leave the company with scope to borrow further from financial institutions in the future
- The company may wish to issue shares to reduce the level of financial gearing

Demerits of Raising Finance from Capital Markets

- The company already has a borrowing arrangement with one or more financial institutions and may be viewed as a valued client, implying that it can raise finance easily and cheaply.
- The company need not incur the costs or divulge the information associated with a public share issue
- If a loan is required that is beyond the lending capabilities of a single financial institution, it may still be able to obtain the loan through a syndicated loan facility provided by a consortium of financial institutions. Such an approach can be a quick and flexible way to raise finance.
- As compared to equity issues, bank borrowing is tax efficient and term flexible

Solution 1 b)

Features of Mezzanine Finance:

- Mezzanine finance is a form of long term private debt finance that is provided to companies that are not at the start up stage, but are not yet large enough to borrow in the quoted debt and equity markets.
- In terms of security, mezzanine finance is subordinate to senior secured debt, but above equity finance.
- There is often a second charge over the borrower's assets (second to charge that exists for the senior debt)
- The term of the debt is often 8 to 10 years, but investors will be looking for a quicker exit than this – ideally hoping that the company will grow quickly and re-finance itself in the quoted security markets after 3 or so years.
- Mezzanine loans are typically structured to include three components of return:

- Cash coupon (usually floating rate)
 - Repayment premium (or “roll – up”) – effectively an accumulation of deferred interest that is added to the principal to be repaid at maturity.
 - Equity warrants (or “kicker”). These are often referred to as PIK (“payments in kind”) and provide an element of equity exposure to the investor.
- Mezzanine finance is used predominantly in leveraged buyouts. It has the benefit of being a privately held debt instrument with a restricted and stable syndicate and a strong lead investor.

Mezzanine finance may not be an appropriate source of finance for TCP for the following reasons:

- Mezzanine finance is appropriate for companies that are not large enough to borrow in the capital market. TCP does not belong to this category because it is a large listed company
- Mezzanine finance will increase the leverage (like any other form of debt) even though it is subordinate to senior secured debt.
- Mezzanine finance can create a further charge on the existing assets of the company.
- Mezzanine finance tends to be more expensive than quoted debt and can result in dilution of control if it carries equity warrants

Solution 1 c)

- Earnings Per Share:
 - The relative earnings per share of the two companies can be used to determine the exchange ratio. For example, if the EPS of the acquiring firm is Rs. 5.00 and the EPS of the target firm is Rs. 2.00 the exchange ratio based on EPS will be 0.4 ($=2/5$)
 - The advantage of using EPS as a base is that it reflects prima facie the earning power of the two companies
 - However an exchange ratio based solely on the current EPS of the merging companies can be inappropriate because it fails to take into account the following:
 - The difference in the growth rate of the earnings of the two companies
 - The gains in earnings arising out of merger
 - The differential risks associated with the earnings of the two companies
 - There is a measurement problem of defining the normal level of current earnings. The current EPS can be influenced by certain transient factors like: a windfall profit, or an abnormal labour problem or a large tax relief
 - It will be difficult to use EPS as a basis if EPS is negative

- Market Price per Share
 - The relative market prices of the shares of the two companies can be used for setting the exchange ratio. For example if the market price per share of the acquiring company is Rs. 50; and the market price per share of the target company is Rs. 10, the exchange ratio is 0.2 ($=10/5$)
 - If the shares of the acquiring company and the target company are actively traded, using the relative market prices has considerable merit. This is because market prices will reflect current earning power, growth prospects and risk characteristics.
 - However when trading is meagre, market prices may not be very reliable. In the extreme case market prices may not be existent because the shares are not traded.
 - Another problem with market prices is that they may be manipulated by those who have a vested interest
- Book Value Per Share
 - The relative book values per share (BVPS) of the two companies can be used to determine the exchange ratio. For example, if the BVPS of the acquiring company is Rs. 25 and the BVPS of the target company is Rs. 15, the exchange ratio is 0.6($=15/25$).
 - The apparent merit of using the BVPS as the basis is that it provides a very objective basis
 - However the demerits of using BVPS as a base [for setting the exchange ratio] are :
 - BVPS is influenced by accounting policies which reflect subjective judgements
 - BVPS do not reflect changes in the purchasing power of money
 - BVPS are often very different from the true economic values

Assuming that the shares of the two companies-TCP an Hair Line Colours-are actively traded in the secondary market, the recommended base is the relative market prices of the shares of the two companies.

Solution 1 d)

- As the chances of failure in an acquisition can be high, it should be planned carefully. It therefore pays to develop appropriate acquisition strategy. This strategy consists of the following steps:
 - Managing the pre acquisition phase
 - Screening Candidates
 - Evaluating Shortlisted Candidates
 - Instituting a Valuation Process
 - Determining the Mode of Acquisition
 - Negotiating the Deal
 - Managing Post Acquisition Issues

- **Managing the Pre Acquisition Phase**
 - At this stage, the acquiring company needs to understand well its strengths and weaknesses and deepen its insights into the structure of the industry
 - This knowledge will enable the management of the acquiring firm to identify worthwhile acquisition ideas. Such ideas will include opportunities that strengthen or leverage the core business, or provide functional economies of scale or result in a transfer of skill/technology
 - The entire exercise of identifying acquisition targets must be kept very confidential

- **Screening the Candidates**
 - Screening criteria that make sense from the acquiring company's perspective need to be used
 - For example an acquirer may eliminate potential targets that are
 - Too large (e.g.: market capitalization in excess of Rs. 1000 crores)
 - Too small (e.g.: revenues less than Rs.100 crores)
 - Engaged in a totally unrelated activity
 - Not export oriented
 - Culturally very alien

- **Evaluating the Remaining (Shortlisted) Candidates:**
 - The screening criteria applied in a previous step will narrow down the list of candidates to a fairly small number. Each of these candidates must be examined thoroughly.
 - A comprehensive evaluation must cover in detail the following aspects:
 - Operations
 - Plant facilities
 - Distribution Network
 - Finances (including hidden and contingent liabilities)
 - Quality of Management

- **Setting up a Valuation Process :**
 - Each shortlisted candidate must be valued as realistically as possible.
 - Valuation must not be exaggerated by considerations of “synergistic benefits” which may be elusive rather than real
 - Acquisitions are unique investment decisions involving significant upfront payments and exit costs after integration are prohibitively high. Acquisition premiums typically range between 20% to 60% of the pre acquisition market value. It is therefore important to develop a robust valuation framework which factors in all costs and benefits and uses appropriate profitability criteria to judge the financial viability of the acquisition.

- **Determine the Mode of Acquisition**
 - The three major modes of acquisition are merger, purchase of assets, and takeover.
 - The choice of the mode of acquisition is guided by the regulations governing them, the time frame the acquirer has in mind, the resources the acquirer wishes to deploy, the degree of control the acquirer wants to exercise, and the extent to which the acquirer is willing to assume contingent and hidden liabilities
- **Negotiate and Consummate the Deal**
 - For successful negotiation, the acquiring firm should know how valuable the acquisition candidate is to the firm (acquirer), to the present owner, and to other potential acquirers.
 - This implies that the acquiring firm should identify not only the synergies that it would derive but also what other acquirers may obtain.
 - Further, the acquiring firm should assess the financial condition of the existing owner and other potential acquirers
- **Manage the Post acquisition Integration**
 - Generally, after the acquisition, the new controlling group tends to be much more ambitious and is inclined to assume a higher degree of risk. It seeks to (i) quicken the pace of action in an otherwise staid organisation (ii) encourage a proactive, rather than a reactive, stance towards external developments, and (iii) emphasise achievement over adherence to organisational procedures.
 - The changes sought to be introduced by the new controlling group are likely to challenge deep seated values, beliefs, styles, traditions, and practices.
 - However to make a merger work, these changes must be worked out co-operatively.

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Solution 2 a)

- Corporate Governance refers to the managerial decisions made in the company in relation to its stakeholders. Stakeholders are any group that has a relationship with the company and is affected by its actions.
- Key stakeholders are the shareholders, employees (and pensioners), customers, suppliers and the state
- In order to demonstrate good corporate governance, the company's directors must make decisions (and be seen to make decisions) in the interests of the stakeholders rather than management
- A company can demonstrate good corporate governance through
 - Management remuneration packages being structured so as to reward when management act in the interests of stakeholders (e.g.: bonuses linked to share price)
 - Management having the required training and expertise
 - Management meeting all its legal obligations (for example timely and fair accounts are produced)
 - Management ensuring transparency in its actions (example: in relation to share issues or takeovers)

- Meeting regulatory requirements in relation to competition and fair trading controls and regulation of monopolies
- Meeting any ethical, social or environmental responsibilities
- The role of non executive directors to :
 - Represent share holder interest and provide an unbiased view
 - Be responsible for setting executive director pay awards
 - Audit the company's activities

Solution 2 b)

The answer to this question needs to cover the following themes:

- Role of the Board
- Sub committees of the Board regarding ALM, Risk, Investment etc
- Valuation Methodology and Statutory Reserve Bases
- Assets Under Management
- NBAP Margins
- Strength of the distribution and the policy holder base
- Persistency Levels
- Current and Projected Solvency Position
- Projected Capital Requirements
- Investment Strategies
- Regulatory Violations/Reprimands, if any

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Solution 3 a)

To meet the guarantee we need to ensure that NAV at maturity is the highest. This can be achieved by investing in money market or in government/corporate securities; however that would not meet the investor's expectations.

Let's look at the following strategies:

Strategy 1:

- 1) Step1 - Compute $\text{Margin}(t) = \text{Current NAV}(t) - \text{current present value of the highest NAV observed over the past (from 0 to } t \text{) and assumed to be paid out at maturity.}$
- 2) Step2 – Invest m times the $\text{Margin}(t)$ in the Equity market. Invest the remaining between bonds and money market in a fixed proportion α . The value of m should not be zero and should be higher than 1 to meet the investor's expectations. The higher the value of m , the closer it is to the investor's expectations. However, higher m increases the risk for the fund. The α represents the proportion of the remaining money (after investing in equity) invested in bonds. Closer it is to zero, lower would be the return for the policy holder and lower the risk for the fund.

- 3) Step3 – The investment in the bond market can be either in the corporate bonds or in the government securities. The term may be the maturity of the fund for exact matching or may be higher for duration matched strategy.

Strategy 2:

- 1) Step1 Invest the appropriate amount in the bond market so that at maturity one can meet the time 0 NAV which means the principal amount can be met at the maturity.
- 2) Step2 Buy an OTC at the money lookback put option for term of 7 or 10 years on any stock index like Nifty or Sensex with the remaining amount. This may be expensive since there is no liquid market in these options. After the expiry of the options the payoff may be invested in short term bonds for the remaining period.

Even though the investments under both the strategies are specified in terms of asset classes there are various choices available within those asset classes. The fund manager need to optimize the expected return to the policy holder keeping the risk to the fund at a certain agreed level. For example, under both the strategies, the fund manager would need to ensure that the bond market investment generates the minimum return assumed under PV computation.

Solution 3 b)

Principal Investment risks associated with both the above options are

- 1) Credit risk on investment in the corporate debt. The credit risk may relate to the outright default or may relate to the credit migration. The second one is more relevant if the duration based immunization strategy is followed for maximization of the yield to the investors. One way to minimize would be to diversify among multiple corporate and to invest only in high quality debt like AAA or AA+. Alternatively, credit derivatives may be used to transfer the risk to other market participants.
- 2) Sovereign risk and exchange rate risk may arise if investment is done in debt or equities of another country. If investment is done in another country then hedging for the exchange rate risk may require the fund to enter into a forward contract or futures contract. This may lead to additional credit risk and/or basis risk. To minimize this risk, one should enter into a forward contract for an amount equivalent to maturity proceeds. It should be invested in safer countries to reduce the sovereign risk.
- 3) The contribution made throughout the three year period would be guaranteed for maximum of the first seven years including the past. This may mean that the future contribution received would already be guaranteed more than the principal at the time of contribution. If the maximum is more than the present value at the then prevailing risk free rate then the fund may run into a huge investment risk with no limits on contribution amount. The only way to reduce this risk would be to set another goal for the NAV to NOT cross a specified amount within the first 3 years. The specified amount would be the maturity value that would result at the end of 7 years if invested at end of 3 years at the then prevailing interest rate. Just like a gap margin which is computed, there should be an inverse margin that needs to be computed to see how much more the NAV may be allowed to increase and depending on that margin the amount invested in money market need to increase.
- 4) Future interest rates and credit spreads are not known which would be used to invest the future contribution and probably the coupon payments. The uncertainty regarding the future interest

rates would have an impact on the PV computation and this should be allowed during the computation of margin. One way to hedge this risk would be to enter into forward rate agreements which may be synthesized by using two swap agreements.

- 5) The immunization strategy may not work due to multiple and non-parallel changes in the yield curve. The rebalancing expenses may be high. The portfolio needs to be rebalanced frequently for the immunization strategy to work. The fund may choose to rebalance at a lower frequency however the computation should be done frequently to identify the gap. With a high gap the chance of this strategy failing increases and consequently the cost of the guarantee.
- 6) The size of investments may not be available to the extent required by the fund for proper diversification. In case, proper diversification is not available the fund may choose to invest in a safer strategy like investing in government securities.

Risk for Strategy 1

- 7) The main risk seems to be the jump risk. It is possible that the Equity market jumps by 20% and opens at a lower circuit breaker leaving near zero chance for the fund to re-balance the portfolio. Similar, may be the case with interest rates which defines the margin. There may be a drop in interest rates and that may be again through a jump rather than continuous movement. It is difficult to mitigate the jump risk. The fund may be able to handle the normal day to day jumps by allowing for it in the margin computation. However, extreme scenarios like war or closure of market for few weeks can only be mitigated by inserting conditions on the guarantee to exclude such extreme events.
- 8) The liquidity risk may also have an impact on the strategy. It is assumed that the fund would be able to buy or sell as per the movement in the margin, however that also means that there is ample liquidity for the fund to execute the same. The concept of liquidity and jump risks are quite related. It would be good to restrict investment in highly liquid securities and to switch when the liquidity starts falling before it goes down to zero.

Risk for Strategy 2

- 9) OTC contract would give rise to counterparty credit risk. This risk can be minimized by intermediate settlement mechanisms and also on events like credit migration just like future contracts.
- 10) There is a risk that the time value of the contract goes up significantly leading to a very high NAV though the intrinsic value does not rise leading to the cost of guarantee. The OTC contract may specify that the time value would be as straight line amortisation or some other formula to ensure that such an event is ruled out.
- 11) The future contributions are not yet certain and that amount would be invested later. If we can eliminate that risk by following strategy under point 3 then it would be fine to buy the OTC contract in future when the future contribution is received. However, OTC contract may have some minimum size and its cost at that point may be different. The fund may keep the right to shop with other providers in a bid to reduce the costs.
- 12) The fund would need to set the terms to exit or earlier closure which may happen due to high surrenders. In such a contract, the surrender terms may be severe with high surrender penalty. There is a risk that those who exits would cause the fund to suffer through the surrender penalty. This surrender penalty is distributed over the full portfolio and hence those who exit do not suffer to the full extent. To protect the long term investor, it may be useful to use the surrender value of the contract for published NAV so that distribution of loss is limited. As per

the current legislation this would not be permitted and hence special permission from SEBI would be required to follow the same.

Solution 3 c)

Operational risks associated with this product are the following:

- 1) The major risk is misselling risk. It is possible that the investor has an expectation that they will receive the highest sensex or nifty value rather than highest NAV. It is important to highlight the difference between the same probably by giving an example of 100% investment in cash.
- 2) Risk lies that the investment strategy designed to meet the guarantee is not followed rigorously without any mistakes. It is possible that the rebalancing of the portfolio as envisaged in the investment strategy is not carried out or excessive mismatch risk is taken in the hope of making good a past mistake. This can be mitigated by designing appropriate controls around the investment decisions and execution of these decisions. It is imperative that there is second chain of human resources available to carry out the decision/execution in case the first line fails due to some reasons. There should be regular report on suitable metrics for risks taken in the portfolio and the value of the portfolio and cost of guarantee on various scenarios. The appropriate strategy that would be taken on such a scenario and the impact of each of them. These should be designed so that the top management can understand and appropriately guide the investment team.
- 3) There can be risk with regard to collection of the contribution and payout of the proceeds. It is important that all the processes involved in collection of the contribution and the investor's instructions are efficiency processed so that the investment team is aware of all the movements that would be required on the portfolio within hours of such transactions. This can be mitigated by suitable IT processes and also back-up of the similar processes in the event that they fail by suitable additional communication infrastructure.
- 4) There exists risk in a situation where the fund is sold in large quantities to institutional investors with large block of funds. This would have an impact on the investment strategy since any withdrawal by that institution would have a significant impact on the remaining investors. There are two ways to manage such a risk – launching separate funds for institutional and retail with different investment strategies or tweaking the investment strategy so that there is enough liquidity to meet such a large exit. The losses suffered by existing investors may be partly met by imposition of an exit charge for an early exit. However, this would require an approval of the SEBI.
- 5) Alternatively, the fund may see a large contribution later especially when the condition mentioned in 3 is met. One way to limit such a risk may be to allow only existing investors to contribute later on or to limit the amount of contribution during the subsequent years. Also, for new contribution it may be advisable to redefine the Max NAV such that it is applicable only from the date of contribution (or first contribution) rather than from the date of launch of the fund.
- 6) There exist risk in the way the terms and conditions are defined in the contract and the way the product is defined in the sales brochure. The only way to limit this risk would be to get them peer reviewed by another legal team/person.
- 7) Operational risk exists in computation of NAV – it may be computed higher or lower than what it should be. Specially, under strategy 2 if time value of option is required and/or surrender value is required for the OTC derivative contract.

- 8) Risk would also exist for NAV computation when a particular asset is not traded and a consistent market value is substituted. The validity of the consistent market value would be in question – especially when the liquidity is low and holding is large. Alternative way to mitigate the same would be through captive buying/selling through another fund from the same house in case the valuation is a fair value.
- 9) Risk may exist in creation of units and elimination of units. It is imperative that the units created are reflective of the contribution and eliminated units are reflective of the charges or of the benefit payouts. A regular reconciliation in the movement of the fund along with the movement of the units would ensure in detecting any error in this regard.
- 10) Risk exists in proper perception in public about this product. For example, the media may compare return on this product against the return over a pure equity fund or against a pure debt fund. A pure comparison with no regard to the essential features of this product may not be proper and a risk exists on the comparison impacting the future contribution on the fund or impacting the brand name of the fund house. Alternative way to reduce this risk would be to raise awareness about this product by proper advertising.

Solution 3 d)

Dear Sir,

Thanks a lot for evaluating our product Max NAV fund. We are pleased to have an opportunity to answer the queries. Please find below the answers to the queries raised by you in the same order.

Investor's perspective

The product is designed to provide some minimum return to the investor with a potential for higher returns. To begin with the starting NAV is guaranteed which means that the contribution is guaranteed for the investor. Yet, the fund is not invested in debt to meet this guarantee and is still invested heavily into equities providing an upside potential for the investor. This upside potential does not come free since there is nothing free on the Dalal Street. In a scenario where the market dips substantially just after the launch of the fund the investor would suffer a permanent loss and would only be able to recoup the initial investment. However, in case the market does not drop substantially which is an extreme scenario than any upside gains are locked in and guaranteed for the investor. This strategy does have a potential to generate a higher risk adjusted return than a plain vanilla equivalent balanced fund. We have back tested the strategy on the historical data and our finding was that this strategy leads to a better return compared to a static traditional debt/equity mix portfolio. In fact, in terms of risk adjusted return we find that this return is far superior than the return on a static mix of debt/equity portfolios. However, these are historical results and are not guaranteed to repeat in future. As argued earlier, the future outcome may be worse. Still, the worst outcome under this strategy is zero return on the portfolio compared to a possible negative return over pure equity or some balanced portfolios.

Considering that this portfolio provides a set of return over the time horizon which is non-linear combination of the debt and equity portfolios over time means that this can be treated as a new security over this horizon. To reproduce the return generated by this asset, the investor would have to actively follow a strategy which would not be feasible given large transaction and diversification costs compared to small size of his portfolio. The argument is similar to the argument that derivatives complete the market even though derivatives can be replicated

through a dynamic portfolio strategy. Hence, this fund introduces a new class of security from the investor's choice perspective which is likely to impact the efficient frontier of the investor. Such a positive impact on the efficient frontier of the investors would lead to a better investment return and a better utility for the investors.

Considering, all the above aspects we believe that this is fair to the investors and is required from the investor's perspective.

We are happy to provide any further information that you may need on this aspect. We believe that this would be a great addition from investor's perspective and we are sure that you would concur with us on this ground. We hope that you would approve this product.

With regards,

Raj

CEO, Maxima Mutual Fund

[40]

[Total Marks 100]
