

Institute of Actuaries of India

Subject SA6 – Investment

March 2018 Examination

INDICATIVE SOLUTION

Solution 1:

- i) Bank recapitalisation, as the name suggests, means recapitalising banks with new capital to improve their balance sheet.

The government, using different instruments, infuses capital into banks undergoing credit crunch.

Capital is the money invested by shareholders in the business. Since the government is the biggest shareholder in public sector banks, the responsibility of infusing capital majorly lies with the government. This injection of capital is also known as the recapitalisation of banks.

[3]

- ii) There are three modes of fund mobilisation

a) Budgetary Allocations - The government can recapitalise the banks through budgetary allocations. This means that the government takes out money from state coffers and give it to banks

b) Market Borrowings – PSU banks can raise money from the market through borrowings

c) Recapitalisation bonds – Government issues bank recapitalisation bonds which will be used to buy more share in the PSB's

However the main issue with Budgetary allocation is that- Government has set its focus on maintaining its fiscal deficit. By increasing budgetary allocation it won't be able to meets its fiscal deficit target. This leads to cascading effect where Higher government expenditure will push up demand and generate more money in the economy. This may lead to higher inflation.

High fiscal deficit means government is not able to earn as much as it is spending. So often it raises taxes in some form or the other. The government, in order to repay its debt, is likely to levy more taxes in the future. It could be either higher inflation or higher taxes. Or, worse, it could be both

In an emerging economy like India, a higher fiscal deficit leaves little room for interest rate cuts. A higher interest rate may affect private investments from taking off in a growing economy like India. Banks have already witnessed a slowdown in credit takeoff.

The challenge with Market borrowings is willingness of the market to invest in already stressed banks.

[4]

- iii) A government bond is an instrument to raise money from the market with a promise to pay to repay the face value of the maturity date and a periodic interest. A bond issued for the purpose of recapitalisation is called recapitalisation bonds.

The recapitalisation plan comes into action when banks get caught in a situation where their liabilities are comparatively higher than their assets. The liquidity with banks is a liability as it is the money deposited by customers, which needs to be paid sooner or later. Due to this their balance-sheet weakens and banks find it difficult to raise capital from the open market. The government, which is also the biggest shareholder, can infuse capital in banks by either buying new shares or by issuing bonds. **The government will issue recapitalisation bonds, which banks will subscribe and enter it as an investment in their books. The banks will lend money to the government for subscribing the bonds. This money raised by the government through these bonds will go back to banks as capital. This will immediately strengthen the balance-sheet of the banks and show capital-adequacy.** Since the government is always solvent, the money lent to the government for subscribing recap bonds is free from becoming a bad loan.

[4]

iv)

Fiscal Deficit

The funds mobilized from the sale of the bonds will not come as part of the fiscal deficit but the government would be liable to pay the interest and face value of the bonds. Since it is a long-term debt, it provides time to banks to improve their balance-sheets by increasing their credit and private investment. This interest payments expense will be covered from the profits of capital receiving Public sector banks.

Also the government in future can retire the debt from the proceeds by selling the bank equities purchased earlier, once banks' situation gets better.

The larger question is whether this recapitalisation would be sufficient. If Government has to additionally fund other part through budgetary allocation then it would impact the fiscal deficit. The extra borrowing required will probably increase the yield payable on government bonds. The extra borrowing, and higher yields, may "crowd out" private consumption, and private investment.

Exchange rate

Exchanges rates are largely determined by a combination of the interest rate differentials between two economies and by sentiment about the likely prospects for economic growth. Country like India with relatively high interest rates or growth prospects should see positive flows from exchange rate markets.

However the counter would be with relatively high government borrowing requirements are likely to see lower demand for their currencies

The effect that the government's proposal will have on the country's exchange rate will depend on the perspective taken by the market. If the market views it as a positive

development, the increased sentiment about the economic prospects in the country may result in a greater inward investment demand, and consequently a stronger exchange rate.

Overall Impact

How effective the proposal will also largely depend on its ability to restore bank liquidity, and enable banks to fund the creation of new lending in the economy

The government's recapitalisation plan can give a big push to the anaemic credit growth in the system, as banks will have enough money to take care of their stressed loans as well as to support green shoots of recovery in certain pockets in the industrial sector.

It will enable the Government to tackle a major drag on the economy that and help to revitalise the growth momentum at a time when the global economy is recovering

To revive private investment this recapitalization of state-owned banks would be crucial, as they provide much of the credit in the economy. Currently they are saddled with a mountain of bad debt that has crimped their ability to extend new credit.

Also several SME's were badly hit by the government's demonetisation move last year. This mover will hep the state-run banks to vigorously step up their lending to small and medium-sized enterprises.

[12]

- v) The impact of the recapitalization will depend on the extent to which the banks start reinvesting in the market. How far the investment cycle is given a push by this recapitalization will be the crucial impact. This ties up with the confidence the market has on the banks & how they resolve their NPA's.

[2]

[25 Marks]

Solution 2:

- i) The investment strategy should consider the liabilities:

Nature

Currency

Term

Investment strategy should recognize that there is level of uncertainty both in amount and timing of the liabilities.

Accounting constraints

Contribution and expense flows

Tax considerations

The investment strategy chosen will aim to most closely match their liabilities by nature, currency and term. Even if such a strategy cannot be adopted, alternate strategies should be evaluated against this benchmark position.

Uncertain liabilities means that marketable assets must be held.

Subject to these points, the pension fund will seek to maximise the investment return.

Under trust law the trustees have a duty to seek the best possible return in relation to (acceptable) risk.

The attempt to maximise return may involve departing from the benchmark position and hence conflict with the minimisation of risk. The value of the assets relative to the liabilities will determine the risk involved.

Risk tolerance will depend largely on the attitudes of the sponsoring employer and of the trustees.

Similar considerations apply to assessing the true solvency position with an ostensibly gilts based target.

Pension funds are exempt from most taxes and returns the strategy should make allowance for this.

The trustees need to consider the sponsors position the value in the company's accounts is tied to corporate bond yield discount rates.

funding level may influence risk appetite

diversification needed to control risk

self investment risks

fund size can influence options

[5]

ii) Some of the reasons are :

Attractive risk-adjusted returns

Hedge funds target absolute returns under a variety of conditions, including those in which traditional investments – equities and bonds – are depressed.

Hedge fund managers claim that this is possible because of the flexibility they enjoy in balancing long and short holdings and freedom to use a range of instruments.

For pension fund trustees, an even more important consideration is arguably that many hedge fund strategies have historically provided such returns at lower volatility levels than the stock market.

In general, hedge funds tend to measure and manage risk over much shorter time horizons and are less tolerant of losses than in traditional asset classes. Most hedge funds are conservatively run and place great emphasis on disciplined risk management procedures.

Furthermore, it is common for hedge fund managers to invest a portion of their own capital in their portfolio, which is a strong indication that they do not want to take on any untoward risk.

Diversification benefits

Hedge funds offer investors the potential to build more return drivers into their portfolio.

With a number of managers pursuing different strategies, it is likely that hedge fund investments will exhibit a low correlation to other traditional investments in the portfolio.

This low correlation has the potential to reduce the overall risk in the portfolio.

Accessing manager skill

Hedge funds claim to have attracted some of the world's best investment professionals.

They are motivated not only by the potential financial rewards, but they also enjoy working in a more entrepreneurial environment, with greater autonomy on investment decisions and the freedom to use a range of investment tools to implement their ideas.

[5]

iii)

Risk must be borne in order for there to be the potential for profit. As with any investment, it is imperative that trustees consider all associated risks, including:

- *Infrastructure*: most funds are run as small boutiques and rely on external service providers for many operational areas such as administration. Investors are not compensated for taking on operational risk, so it is essential that they perform thorough due diligence in order to minimise this before investing.

- *Personnel*: because hedge funds are generally managed by individuals or relatively small teams, changes in key personnel, sickness or personal problems may severely affect performance.
- *Investment and risk management processes*: efficient and effective processes are critical to successful hedge fund performance, and the consequences of a breakdown or a change in approach can be severe. Trustees may choose to use skilled investment professionals to conduct the monitoring.

Capacity constraints

Most hedge fund managers do not want to compromise performance through market impact and liquidity concerns. In order to maximise potential returns, many stop accepting new capital once they reach a certain level of assets, preferring to have a limited amount of assets to manage.

Liquidity

Hedge funds must have sufficient flexibility to capture investment opportunities that arise at the most advantageous time, and therefore some funds impose lock-up periods. Trustees must recognise the longer time horizon of hedge fund investing.

Transparency

Some hedge fund strategies are extremely complex and managers can be reluctant to reveal details of their investment process and portfolio positions as it might limit their competitive edge. Again, this will depend on the strategy of the hedge fund.

Fees

In addition to normal management fees, hedge fund managers are normally rewarded by performance fees. Typical management fees are 1-2% of invested assets, and performance fees are typically about 20% of realised returns.

[5]

iv)

Trustees need to take into account these hedge-fund specific factors, in addition to taking the usual steps to select a manager for a conventional asset class:

- *Establish objectives*: Before beginning the search for a fund manager, trustees need to establish their objectives – returns, risk, correlation – in incorporating hedge fund investments into their portfolio, and to set a target for expected performance improvement, or risk reduction.
- *Identify the best managers*: The next crucial step is to identify the best managers within the target strategies, paying particular attention to the managers' investment and risk management

processes. The confidence hedge fund managers place in their own methodology can often be measured by the proportion of their own capital invested. The quality and reputation of the organization, the extent of resources and the experience and skill of key personnel are all important issues which trustees need to address..

- *Study the manager's track record:* A proven track record is important, but with hedge funds this is not always available in "audited" form. Investors should look for evidence that the manager has previous expertise in a particular strategy.

- *Monitor the manager:* Hedge fund investment requires close and ongoing monitoring to ensure that the managers are adhering to their articulated processes, and that the investor understands these processes and is aware of any personnel changes. The objective is to identify early any factors which could either cause future underperformance or lead to an increase in unacceptable risk.

[5]

v)

Assets have to be held as per the liabilities of the fund. There are many factors that affect quantum of liabilities. Pension liabilities are influenced by interest rates, longevity and inflation.

Duration is the main problem if one has to match the liabilities of the fund. Assets are not available for as long a duration as the liabilities.

Hence a liability cash flow matching should be build or one should build a longer duration portfolio using suitable bonds.

However, the bond market does not offer sufficient maturities to be able to match a pension fund's liability profile. This results in a very discontinuous portfolio. There is also considerable reinvestment risk.

Pension funds can benefit from future market growth from their "risky" investments, whilst removing or reducing other risks e.g.higher inflation.

It is generally accepted now that getting the best risk/return balance involves spreading your investments among a wide range of different asset classes, rather than attempting to pick individual investments with the most attractive individual return potential. Pension schemes can use derivatives to access a wider variety of markets or economic factors in order to complement their existing investments.

Barriers to direct investment in an asset class, such as physical availability, taxes, lack of liquidity, regulation, make access difficult or simply unaffordable.

Pension funds are looking to remove duration and inflation risks from their pension obligations – and many are now using derivatives to do just this.

If pension funds can construct a portfolio of swaps, the mismatch risk can be reduced to a large extent. This also holds if interest rates change.

In this way, the fund could meet its future pension obligations with a high degree of certainty.

How this helps in reducing deficit, is by enabling a structured approach or active asset management, due to which deficit can be quantified and stabilized.

Swaps may be good also due to following factor:

(a) Swap market might offer better value than physical due to demand/price anomaly.

(b) Overlay strategy to temporarily alter the asset allocation of the portfolio.

Using hedging in this way “fixes” the size of the deficit. In order to resolve the deficit then a structured solution involving guaranteed returns from equity, credit, commodities, currency, real estate or other markets than government bonds with or without principal protection could be used to generate the required solution.

[8]

[28 Marks]

Solution 3:

i) Securitization /Asset Backed Securities:

Securitisations involves the creation of an asset backed security, typically a bond, the repayments upon which are linked to the revenue generated by an underlying asset or pool of assets held by the borrower.

Examples of the assets whose proceeds have been securitized include pools of mortgages, bonds or loans, or indeed royalty payments.

The underlying assets are typically not very marketable in their existing state.

Securitisations enables their owner to create a single more easily marketable and divisible asset, which can then be sold to generate funds immediately, whilst transferring the income risk to the purchaser.

Asset backed securities enable investors to gain indirect exposure to a particular type of asset, without direct involvement in the management and administration of the underlying pool of assets.

[2]

ii) Key Risks

Default risk – the revenue generated by the underlying assets may vary for a number of reasons, or even cease entirely.

Prepayment risk – the amounts outstanding may be repaid earlier than expected. This means that the reinvestment risk may increase, since the uncertain reinvestment terms may apply to substantially larger amounts of debt.

Capital value risk (or inflation risk) – the present value of the future payments will fall if interest rates rise (due to rising inflation expectations).

This risk exists with all fixed income bonds.

Marketability risk – if circumstances change, for example a recession leads to an increase in mortgage defaults, then the marketability of the asset backed security may reduce, making it very difficult to realise the value of the investment.

[3]

iii) Structuring of Securitization:

The underlying assets are generally below investment grade, and the associated loans are typically over-collateralised, both in respect of initial assets and cash flow margins.

Securitisation has become particularly common when a pool of assets has been assembled (often with considerable effort) but now offers the prospect of a secure income stream with minimal additional management required.

However, one problem for the provider of finance is pre-payment risk – the risk that the loan may be repaid earlier than originally anticipated because the underlying assets have been redeemed.

The framework of securitisation is that the original owner of the assets sells those assets to a corporate entity specifically established for the purpose, called a Special Purpose Vehicle (SPV).

The SPV will be structured to be “bankruptcy remote” in the event of the failure of the borrower.

The SPV then raises the funds to purchase the assets by issuing debt securities, such as bonds, to investors.

The receivables transferred into the SPV meet the principal and interest liabilities on the debt. In addition, the SPV may grant security over the receivables to secure its obligation to repay principal and interest.

The borrowings are normally made in a multi-tranche format, with credit ratings or credit default protection obtained for (at least) the major tranches.

The tranches will be repaid in order of rating, with the actual timing of amortisation / repayment dependent on the underlying assets, early repayments on them and any default losses and recoveries.

Excess remaining collateralisation may be returned to the original asset owner or kept by the bond holder.

[5]

iv) CDO structuring

A collateralised debt obligation (CDO) involves combining the credit risks of different instruments into a portfolio which is then divided and repackaged as several new securities.

The new securities are backed by the portfolio of bonds, and the cash-flows from the portfolio are divided up into tranches and assigned to the different new securities created.

The new securities are designed to have different credit risk features, by construction.

Thus the cash flows from the underlying portfolio might be used to create:

- A bond with fixed coupon rate. This is the most senior security and its coupons are paid first.

It is termed *senior debt* and might carry a AAA rating.

- A bond whose coupons are paid as long as there is enough left after the payments to the senior debt is made.

This bond might carry a BB rating, and is often known as the *mezzanine* piece or tranche.

- A claim on the residual cash flows from the original portfolio after the two senior classes are paid. This third tranche might be a high-yield speculative bond, or it might be considered as an equity claim.

[5]

[15 Marks]

Solution 4:**i) Current Scenario:-**

The important points from an industry perspective to consider in the 2 proposal are:

- Currently there is a requirement to invest minimum of 50% in G-Sec. The maximum exposure to equities is only 15%. Even though the products are long term in nature this restriction comes in the way of generating superior returns. This creates the problem when compared to the returns generated by equity backed funds. Hence by allowing for the mandatory G-Sec to be lowered it provides an opportunity for companies with appropriate portfolios to have the flexibility.
- The purpose of using the derivatives should be limited to hedging the future cash flows from contracted policies and / or for hedging the market risks in existing assets held by the insurers. For example, options (eg. Put option) on bonds can offer downside protection without loss of potential upside in case interest rate falls. Equity derivatives can be used to manufacture and efficiently manage Unit Linked funds with guarantees. This proposal hence will help companies hedge their portfolios accordingly.

For the specific company, we note that it is a mid-size company which is only 10 years old and has limited free assets. Also currently their book is predominantly Par followed by Non Par.

To consider the impact of the two proposals we need to consider the following factors

- a. Risk appetite: Risk appetite is one of the most important drivers of an investment decision.
- b. Nature of liabilities – There may be differences between portfolios that Match without profit policies and those that match with profit policies due to the Perceived difference in risk appetite of the policyholders
- c. Level of Surplus: -All else being equal, a larger surplus will provide more scope for risk taking. Although sometimes a small deficit may also lead to the adoption of a risk appetite in order to grow out of the deficit. Here we see that level of surplus is low
- d. Size of the institution
If an institution operates a very large portfolio, the level of diversification can be significant, and can reduce the overall risk to the sponsors, policyholders, Shareholders and other stakeholders. Here the size is also a mid-sized.
- e. Term of the liabilities: Here the business being underwritten is all long term business
- f. Extent to which liabilities are discretionary: The extent to which liabilities are discretionary or within the control of the institution will be taken into account in determining risk appetite. Greater discretion or control over the liabilities will generally enable more risk to be taken.

With profit policy liabilities are to some extent determined by the size of declared bonuses, which can be determined by the institution itself. As is the terminal bonus, which is not guaranteed and is “declared” and guaranteed only at the maturity of the policy.

- g. Competitors: It would be important to understand from the market the reaction of competitors. Are the competitors increasing the exposure to equities and thereby illustrating higher returns? Are the derivatives being used more actively to manage and hedge the portfolio's?
- h. PRE: Given that the Par book is 65% any action should be taken with the PRE's in mind

[10]

ii)

It might be possible to hedge this liability by investing in a suitable combination of: a portfolio of equities that tracks the performance of the index (or a suitable forward contract)

an OTC put option based on the index value and with a five-year term.

An alternative approach might involve:

a five-year zero-coupon bond to guarantee the capital value (times 0.95)

an OTC call option based on the index and with a five-year term.

[2]

[12 Marks]

Solution 5:

i)

	Growth	Income Funds	Money Markey
Objective	To provide capital appreciation over the medium to long term	To provide regular and steady income to investors	Provide easy liquidity, preservation of capital and moderate income
Investment Pattern	Mainly equities. Such schemes invest a majority of their corpus in equities and small amounts in money market to be able to	Fixed income securities such as Bond, Corporate Debentures and Government Securities.	Safer Short-Term Instruments such as Treasury Bills, Certificates of Deposit, Commercial Paper and Inter-Bank Call Money.

	meet the liquidity		
Suitability for him	<ul style="list-style-type: none"> • Being an artist it is expected that his income would be sporadic and coming in chunks rather than regular • It is mentioned that he is young. • It is assumed that he will be regularly selling some of his work • It is also mentioned that he has no other liabilities 		
	<p>Since he is young he should invest more in capital appreciation kind of funds. Also as he has no other liabilities he can perhaps invest in more riskier options depending on his risk appetite. This will help him provide capital appreciation for future</p>	<p>He should invest a portion of fund into this to provide him with income. However the portion doesn't need to be large. Maybe 10 – 15%</p>	<p>If he prefers liquidity it would be advisable to keep only a very small portion (perhaps 2 -5%) in this fund</p>

[5]

ii) Factors to consider while selecting a mutual fund

- a. **Past Performance:** The Net Asset Value is the yardstick for evaluating a Mutual Fund. An increase in NAV means a capital appreciation of the investor. While evaluating the performance of the fund, the dividends distributed is to be considered as the same signifies income to the investor. Dividends distributed during a period go on to reduce the Net Asset Value of the fund to the extent of such distribution.
- b. **Size of Fund:** Managing a small sized fund and managing a large sized fund is not the same as it is not dependent on the product of numbers. Purchase through large sized fund may by itself push prices up while sale may push prices down. Medium sized funds are generally preferred.
- c. **Age of Fund:** Longevity of the fund in business needs to be determined and its performance in rising, falling and steady markets have to be checked for consistency.
- d. **Largest Holding:** It is important to note where the largest holdings in mutual fund have been invested in order to identify diversion of funds to Group Concerns.
- e. **Fund Manager:** One should have an idea of the person handling the fund management. A person of repute gives confidence to the investors. His performance across varying market scenarios should also be evaluated.
- f. **Expense Ratio:** SEBI has laid down the upper ceiling for Expense Ratio. A lower Expense Ratio will give a higher return which is better for an investor.

- g. PE Ratio: The ratio indicates the weighted average PE Ratio of the stocks that constitute the fund portfolio with weights being given to the market value of holdings. It helps to identify the risk levels in which the mutual fund operates.
- h. Portfolio Turnover: The fund manager decides as to when he should enter or quit the market. A very low portfolio turnover indicates that he is neither entering nor quitting the market very frequently. A high ratio, on the other hand, may suggest that too frequent moves have lead the fund manager to miss out on the next big wave of investments. A simple average of the portfolio turnover ratio of a peer group updated by mutual fund tracking agencies may serve as a benchmark. The ratio is annual purchase plus annual sale to average value of the portfolio
- i. Timing: The timing when the mutual fund is raising money from the market is vital. In a bullish market, investment in mutual fund falls significantly in value whereas in a bearish market, it is the other way round where it registers growth.

[5]

iii)

S.No.	Description	Fund X	Fund Y	Remarks
I	Alpha	12% (20%-8%)	6% (14%-8%)	<ul style="list-style-type: none"> Fund return – market return Fund X outperforms
II	Beta	1.67 (0.8*25/12)	0.67 (0.4*20/12)	Corr * Fund Stdev/Market Stdev
III	Treynor Ratio	9% [(20% - 5%)/1.67]	13.5% [(14% - 5%)/0.67]	(return on fund – risk free return) /Beta
IV	Sharpe Ratio	60% [(20% - 5%)/25]	45% [(14% - 5%)/20]	(return on fund – risk free return) / Fund stdev
V	Information Ratio	2 [(20% - 8%)/6%]	3 [(14% - 8%)/2%]	return on fund – index return)/Tracking error
VI	E(r) – CAPM	10% [5% + 1.67 * (8% - 5%)]	7% [5% + 0.67 * (8% - 5%)]	Risk free + (market return – risk free)*beta
VII	Jenson	10% (20% - 10%)	7% (14% - 7%)	Fund return – VI
VIII	E(r) – Pre-specified s.d.	11.25% [5% + 0.25 / 0.12 * (8% - 5%)]	10% [5% + 0.2 / 0.12 * (8% - 5%)]	risk free return + [(fund stdev/market std dev) * (market return – risk free return)]

IX	Outperformance Pre-specified s.d.	using	8.75% (20% – 11.25%)	4% (14% - 10%)	Fund return – VIII

[5]

iv) Comments

Fund X outperformed the Index by 12% and Fund Y outperformed by 6%.

The Treynor and Jensen measures are more suitable risk measures for parts of a portfolio, rather than a whole portfolio, in which case the Sharpe and Pre-specified standard deviation measures are the most suitable.

Fund X seems to outperform on a standalone overall basis except for the Information Ratio where Fund Y clearly outperforms Fund X.

When considered part of a portfolio, both Funds are equally preferable (Fund X outperforms Fund Y using Jensen measure but using Treynor Ratio it is vice versa).

Fund Y seems to be more consistent than Fund X basis Information ratio.

Limitations

The results are based on past performance. Past performance is not necessarily a guide to the future.

The frequency of the performance assessment is important – it needs to be short enough to spot a problem and long enough so as not to be spurious.

The two Funds might have different objectives – so a direct comparison may not be appropriate.

The costs and benefits of performance measurement must be weighed in a similar manner so that the cost does not exceed the benefit.

[5]

[20 Marks]
