

Institute of Actuaries of India

Subject SA6 – Investment

October/November 2007 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.

Q. 1

i) It's a Defined Benefit Obligation. Describe why it is a DB scheme

Liability = to meet the objectives of the Trust

= to meet the return guaranteed by the EPFO

= to meet the expected target pension on retirement – although no legal commitment

Investment strategy: to meet liability, minimize risk of Asset Liability Mismatch, which asset classes, their proportion, what are the investment guidelines, credit rating of assets, trading strategy, permissible assets, investment expertise of trustees, liability driven investments

The process may involve:

- constructing an asset-liability model (ALM) of the scheme;
- using this model to derive an allocation to each asset class considered;
- setting a benchmark for each asset class;
- hiring managers to invest with respect to the chosen benchmarks; and
- minimize tracking error

The principal aim is to meet its liabilities as they fall due.

The investment strategy should:

minimise actuarial risk

consider the liabilities i.e. Nature (fixed, real or varying)

Currency

Term

Level of uncertainty both in amount and timing

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 (e.g. leavers, deaths in service) means that marketable assets must be held.

The pension fund will also need a strategy that will satisfy the requirements of the trust deed and rules as well as Government Guidelines.

Subject to these points, the pension fund will seek to maximize 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 minimization 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.

Pension funds are exempt from most taxes tax and returns the strategy should make allowance for this. The trustees need to consider the sponsors position - the value in the

company s accounts may be tied to corporate bond or gilt yield discount rates.

Other points that may be made are:

funding level may influence risk appetite

diversification needed to control risk

self investment risks

fund size can influence options

SIP

Investment Options: Money Market, Gilt, Corporate Bonds, Equity, Commodities, Art, Derivatives, Property

[5 = description of 5 asset classes with comments on their suitability]

- ii)** It's a Defined Contribution Obligation. Describe the features of a DC scheme
 Liability = fund value
 = to meet the expected target pension on retirement – although no legal commitment
 Investment strategy: to maximize the fund value on retirement, manage risk of the portfolio, life styling strategy (initially equity then gradually shifting to money market when close to retirement), which asset classes, their proportion, what are the investment guidelines, credit rating of assets, trading strategy, permissible assets, investment expertise of trustees
 Investment in Art : Artworks do not generate any income, except to the extent that income can be obtained from lending them to galleries, and they incur negative income in the form of storage and associated costs. Whilst some artworks may appreciate in value over time, is it possible to make a case for artworks overall earning a positive net rate of return in real terms over the long run? Art market is illiquid, opaque and unregulated. Transaction costs are too high, sometimes up to 25% and may in fact wipe out the profits. Further, the value of artworks depends on erratic public taste and short-lived trends.
 Comments on : Diversification, enhanced return, risky, do regulations allow, link with liability and member's expectations, other pension funds, past returns.
- iii)** It's a Defined Benefit Obligation. Describe why it is a DB scheme
 Liability = to meet the pension as guaranteed by final salary formula
 Investment strategy: to meet the desired pension on retirement, consider death, early retirement, minimize risk of Asset Liability Mismatch, which asset classes, their proportion, what are the investment guidelines, credit rating of assets, trading strategy, permissible assets, investment expertise of trustees, liability driven investments
 Investment in Property: Diversification, liquidity, enhanced return, risky, do regulations allow, link with liability and member's expectations, other pension funds, past returns.
- iv)** Privately Managed PF
 Follow the pattern of investments in govt fund, need to follow government guidelines, low / nil equity component. Medium term focus due to withdrawals, transfers
 Defined Contribution DC plan
 Liberal investment pattern, can explore risky assets subject to regulatory limits

Final Salary Pension Scheme

Asset liability modeling important, need to consider fund projection and annuity rates as well, long term focus, strategy review required frequently.

A variety of investment strategies are possible and candidates should express this view. Comments on risk / return, dealing cost, suitability for the liability, reference to the regulations are welcome.

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Q. 2

- i) They are alternative conditions. This means that it is not necessary to decide whether a particular transaction is consistent with one of these terms rather than the other. Provided that a transaction is for the purposes either of reduction of investment risks or efficient portfolio management, the relevant requirement is satisfied.

Reduction of Investment Risk

Reduction of investment risks is to be interpreted broadly. To qualify, a transaction must achieve the following:

- a. In any case where a group of assets is “earmarked” to match specific policyholder benefits where the policyholder bears an investment risk (notably in the case of linked liabilities), there must either be:
 - A reduction in the risks to the company of mismatching of those assets and liabilities, while having a neutral or beneficial effect on the investment risks of the policyholder; or
 - A reduction in the investment risks of the policyholder, while having a neutral or beneficial effect on the risks to the company of mismatching
- b. In any case where there is no such earmarking of assets, it must reduce the risks to the company of mismatching between its assets and liabilities at large.

In either case, exactly what constitutes a reduction in risks is not very straightforward. Most derivative contracts will leave the insurer worse off than if the contract had not been transacted under some foreseeable circumstances. Even the professional guidance notes does not insist that a contract aimed at “reduction of risks” can never leave the company or policyholder worse off, since practically nothing would qualify.

A much less extreme view is taken. A contract which brings benefit (to company or policyholder, as appropriate) under some circumstances while having adverse consequences under other circumstances can be reducing investment risks if:

- any adverse consequences of the contract are unforeseeable; or
- the extent of any adverse consequences is insignificant, in particular:
 - small and
 - reasonable, given the benefits resulting under other circumstances

The obverse also applies. A derivative contract which has significant adverse consequences on investment risks cannot qualify as “reducing investment risks”. It is not a case of balancing the advantages and the disadvantages; rather, there must be no significant disadvantages.

Efficient Portfolio Management

The concept of efficient portfolio management is related to the question of how an insurer manages its assets so as to fulfill its prudent adopted investment strategy.

When assessing whether a transaction caused a reduction of investment risks, the appropriate comparison was with a “do nothing” strategy. But when considering efficient portfolio management, the right comparison is with a non-derivative strategy having broadly the same economic effect.

The fact that a derivative transaction increases asset risk (i.e. the risk that the value of the portfolio will drop) does not necessarily prevent it from being regarded as for the purposes of efficient portfolio management. The same increase in asset risk might well have been achievable by trading in the underlying assets.

However, a derivatives contract which gives rise to a significant adverse consequence which could not result from a direct and prudent strategy of investing in or disinvesting from (as the case may require) the assets underlying the transaction can never be consistent with efficient portfolio management.

It follows that use of derivatives which has the effect of significantly gearing the total investment return on the fund is incompatible with efficient portfolio management.

Subject to the over-riding condition that there must be no reasonably foreseeable significant adverse risk consequences arising from the use of derivatives (as opposed to arising from investing in or disinvesting from the underlying assets), a transaction is consistent with efficient portfolio management if, under normal circumstances, it will assist the company to make progress towards its investment objectives either: more quickly or more easily, more efficiently, more cheaply or more flexibly than can be achieved without the use of a transaction of that nature.

Where there are no material benefits from using derivatives other than saving of tax, the, provided that it is not reasonable to foresee that a tax advantage might be removed (or even reserves) with retrospective effect, it can legitimately be invoked to justify efficient portfolio management.

- ii) • This is a straightforward calculation but needs to show the yield that is required on the underlying portfolio to achieve the dividend.

Balance Sheet		(Rs. Crores)	
Assets		Liabilities	
Equity Investment	240	Shareholders' Funds	210
		Debt	30
Total Assets	240	Total Liabilities	240

(Rs. Cores)

Cost of Dividend = $200 * 0.045 = 9.0$

Management Fees to Income = $210.0 * 0.01 * 0.25 = 0.525$

Interest Cost to Income = $30.0 * 0.075 * 0.25 = 0.563$

Fixed Costs = 0.375

Total Income Required = Sum of above = 10.463

- Using an approximation to current 10-year gilt rates, the premium that needs to be paid on early redemption needs to be determined. The balance sheet and income account then need to be reworked to see what conclusions can be drawn.

The yield that is needed on the equity portfolio to produce the income required is 4.36%

Redemption yield on loan = 4.5 % + 100bps = 5.5%

Value of loan = $30.0 [7.5a_{10}^{(2)} + 100v^{10}]/100 = 30.0 * 115.84 = 34.752$

Ignoring dealing costs, marketability issues, tax implications and other expenses and assuming that early repayment is permitted, the fund will shrink to Rs. 205.248 crore.

Assuming that the portfolio has been prorata reduced i.e. the yield is still the same, the income received will be Rs. 8.949 crore.

This is insufficient to meet the dividend and so a dividend cut is likely to be a consequence of the repayment.

- Each bond needs to be evaluated to show the impact that it would have. The zero might have some attractions given that income could be enhanced but breakeven points will need to be determined. The equity loan stock is interesting and draws out the effect of stock selection and dividend yield on returns.

First the current breakeven position needs to be determined. The capitalized costs are 1.575 crore + 1.688 crore = 3.263 crore or 1.36 % of total assets.

The yield requirement from earlier was 4.36% and so the total return required is 5.72%.

Zero Coupon Bond

The annual return on this is 6.25%

By replacing the debt, total assets become 280.248 crore and net assets are 205.248 crore. The breakeven capital cost becomes 6.227 crore = 2.22 % of gross assets. The income required to meet the other costs and the dividend becomes 9.888 crore = 3.53% of gross assets, giving a total return requirement of 5.75%

The quality of the portfolio is likely to have improved since the equity dividend yield required has fallen from 4.36 % to 3.53% c.f. 3.05% for Mumbai All Share Index.

Equity Index Loan Stock

Assume that we replace the loan with 75 crore of this stock. Therefore the fund size and management cost figures are the same as the zero. However the annual return for this bond is variable as the capital cost is a function of the index return and so therefore will the breakeven.

To cover the management cost charged to capital required $1.539/205.248 * 100 = 0.75\%$

The income costs are 9.0 (dividend), 0.375 (fixed), 0.513 (management) and 2.288 (bond yield) = $12.176 = 4.34\%$

Assuming that it is market movement that covers the cost and not good stock selection – the latter would not result in a capital cost for the debt – the return requires is 5.09%.

A variety of conclusions are possible and so this should show understanding by candidates. Comments on quality of income yield, early repayment risk, stock selection v market return v fixed cost comparisons should be made in coming to a view. There is no single appropriate answer and this should be brought out by candidate.

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