

# **Actuarial Society of India**

## **EXAMINATIONS**

*June 2005*

*CA3 - Communications*

**Indicative Solution**

## **Indicative Solution: Question 1**

Dear Mike,

### **Guaranteed return product**

Thanks for the queries on the captioned matter.

First of all I would like to reassure you that the figures provided by Ram are indeed correct. I will first explain why the guaranteed return product offers a higher rate of return than our existing product under the 6% scenario but a lower return under the 10% scenario. I will then go on to give the rate at which both products offer the same return and why the guaranteed return product has a higher annual charge than the existing product.

#### **Comparison of returns**

Under the 6% scenario our existing product gives a return of 4.25% (6% less the 1.75% charge). Under the guaranteed return product the return on the fund is 2.5% (6% less the 3.5% charge) but the minimum guaranteed return is 5%. Therefore, in this instance the guarantee bites and the policyholder would receive a return of 5% under the guaranteed return product. Therefore, under the 6% scenario the guaranteed product gives a higher rate of return than our existing product.

Under the 10% scenario using similar reasoning the existing product gives a return of 8.25%. For the guaranteed return product the return on the fund is 6.5%. This is above the guaranteed return of 5% so the policyholder receives 6.5% under the guaranteed return product. Hence our existing product gives a higher return in this case.

#### **Equal returns**

As you have correctly stated there is a cross-over rate of return at which both the products give the same return. Below this rate the guaranteed product gives a higher return and above this rate our existing product gives better returns.

The cross-over rate of return is 6.75% where both products give a return of 5%.

#### **Annual management charges**

Under our existing product no guarantee is provided and so the policyholder receives just the value of the fund. There is therefore no requirement for the company to top up the fund value.

Under the guaranteed product under low return scenarios the value of the fund can as we have seen under the 6% scenario be lower than the minimum guaranteed amount. When this occurs, the company has to top up the fund value from its own resources. To ensure the profitability of the product we need to charge for the cost of this guarantee and hence the annual management charge is higher for the guaranteed return product than for our existing product which offers no guarantees.

In summary, the guaranteed product fares better under lower return scenarios, provides the same return as the existing products if returns are 6.75%pa, and it has a higher management charge due to the cost of providing the guarantee

I trust this satisfactorily answers your queries.

Yours sincerely,

John

## **Indicative Solution: Question 2**

Dear Ram

It was very good to hear from you after a long time.

I will first quickly explain to you the nature of the fixed interest security you are proposing to buy. I will then explain the various approaches taken to computing the yield by Tom, Bill and John and which approach is the correct one.

The fixed interest security will pay you interest of 11.50 (this equals 11.50% interest applied to the “par” value of the security which is 100) at the end of every year for the next five years. At the end of the fifth year you will also receive an additional 100 as the maturity value.

### **Tom’s approach**

Tom’s approach has been to compute what is known as the “running yield.” This is calculated by dividing the 11.50 interest you will receive every year by the 115.00 you have paid for the security giving you a yield of 10%. The problem with this approach is that while you pay 115 you only get 100 back and so there is a capital loss to you. So your return will be lower than 10%. For the return to be 10% you would need to get back your original 115 which you do not in this case.

### **Bill’s approach**

Bill has simply taken the interest rate (“coupon”) stated on the security as the return. The issues here are twofold. First, the 11.5% coupon is paid on 100 to give you interest of 11.50. However, you have paid 115 and not 100 so 11.5% is too high as a return.

Secondly, the approach does not take into account how much you have paid for the security and so therefore is not a reasonable way to calculate the return to you. Clearly, the more you pay for the asset the lower the return to you.

### **John’s approach**

John has computed a yield of 7.77% known as the “yield to maturity”. Under this approach we take the 115 paid by you and compare it against the amounts you will receive, that is 11.5 for each of the next 5 years and the additional 100 at the end of the fifth year. We then calculate the rate of interest you would need to earn throughout the next 5 years on the 115 purchase price to be able to make the promised payments.

Put another way if you put 115 in the bank and the bank gave you interest at 7.77% throughout the next 5 years you would be just able to pay yourself 11.5 for each of the next five years and the additional 100 at the end of the fifth year. You would then be

neither better nor worse off as compared to having bought the security and so the return to you on buying the security is 7.77%.

In summary therefore Tom's and Bill's approaches overstate the return to you while John's figure of 7.77% is the correct one.

I hope I have answered your queries satisfactorily.

Regards

Mark