

MGT411 – Money & Banking Solution Assignment No 1

Question no 1: (Marks: 08)

Mr Ahmad, the director of Supreme Textile Mill (Ltd), is deciding to install a new plant for fiber spinning. Mr Ahmad has a choice to install a plant that will transform the raw cotton into yarn, project costs Rs 2,000,000/- and will generate revenue of Rs 550,000 for the next five years. Assume the company's discount rate/cost of borrowing is 9%.

Calculate IRR for above project by using trial and error method.

Solution:

Spinning Project:

| Time | 0 | 1 | 2 | 3 | 4 | 5 |
|------------|---------------|------------|------------|------------|-----------|------------|
| Cash flows | Rs -2,000,000 | Rs 550,000 | Rs 550,000 | Rs 550,000 | Rs550,000 | Rs 550,000 |

By using 11% as internal rate

$$NPV = 0 = -\text{Initial outflow} + CF1/(1+irr) + CF2/(1+irr)^2 + CF3/(1+irr)^3 + CF4/(1+irr)^4 + CF5/(1+irr)^5$$

$$NPV = 0 = -2,000,000 + 550,000/(1.11) + 550,000/(1.11)^2 + 550,000/(1.11)^3 + 550,000/(1.11)^4 + 550,000/(1.11)^5$$

$$NPV = 0 = -2,000,000 + 495,495.49 + 446,392.34 + 402,155.26 + 362,302.04 + 326,398.23$$

$$NPV = 0 = -2,000,000 + 2,032,743.36$$

$$NPV = 32,743.36$$

By using 12% as internal rate

$$NPV = 0 = -\text{Initial outflow} + CF1/(1+irr) + CF2/(1+irr)^2 + CF3/(1+irr)^3 + CF4/(1+irr)^4 + CF5/(1+irr)^5$$

$$NPV = 0 = -2,000,000 + 550,000/(1.12) + 550,000/(1.12)^2 + 550,000/(1.12)^3 + 550,000/(1.12)^4 + 550,000/(1.12)^5$$

$$NPV = 0 = -2,000,000 + 491,071.43 + 438,456.63 + 391,479.14 + 349,534.94 + 312,084.77$$

$$NPV = -2,000,000 + 1,982,626.91$$

$$NPV = -17,373.09$$

Now we have one positive NPV and one negative NPV, we use following formula for calculation of IRR

IRR = Lower discount rate + Difference between the two discount rates * (NPV at lower discount rate/difference between the NPV of the two discount rate)

$$\text{IRR} = 11 + (12-11) * (32,743.36/32,743.36 - (-17,373.09))$$

$$\text{IRR} = 11 + (12-11) * (32,743.36/50,116.45)$$

$$\text{IRR} = 11 + (1 * 0.65)$$

$$\text{IRR} = 11 + 0.65$$

IRR=11.65 Approx

Now applying 11.65, we have NPV near to zero

$$\text{NPV} = 0 = -\text{Initial outflow} + \text{CF}_1/(1+\text{irr}) + \text{CF}_2/(1+\text{irr})^2 + \text{CF}_3/(1+\text{irr})^3 + \text{CF}_4/(1+\text{irr})^4 + \text{CF}_5/(1+\text{irr})^5$$

$$\text{NPV} = 0 = -2,000,000 + 550,000/(1.1165) + 550,000/(1.1165)^2 + 550,000/(1.1165)^3 + 550,000/(1.1165)^4 + 550,000/(1.1165)^5$$

$$\text{NPV} = 0 = -2,000,000 + 492,610.84 + 441,209.89 + 395,172.31 + 353,938.48 + 317,007.15$$

$$\text{NPV} = 0 = -2,000,000 + 1,999,938.66$$

$$\text{NPV} = 0 = \text{Rs } -61.34 = \text{near to zero}$$

So IRR of this project is 11.65%

Question no 2: (Marks: 08)

Find the present value of a coupon bond, having face value Rs 1000/-, coupon rate of 12.5% per annum with 7 years maturity. During current economic conditions investor's required rate of return is 5%.

Requirement: Calculate Present value of Coupon Bond.

Solution:

Face Value = Rs 1000

Coupon rate = 12.5%

Required rate = 5%

Years = 7

$$PV = C1/(1+i) + C2/(1+i)^2 + C3/(1+i)^3 + C4/(1+i)^4 + C5/(1+i)^5 + C6/(1+i)^6 + C7/(1+i)^7 + \text{Face Value} / (1+i)^7$$

$$PV = 125/1.05 + 125/(1.05)^2 + 125/(1.05)^3 + 125/(1.05)^4 + 125/(1.05)^5 + 125/(1.05)^6 + 125/(1.05)^7 + 1000 / (1+1.05)^7$$

$$PV = 119.04 + 113.3787 + 107.9797 + 102.8378 + 97.9407 + 93.2769 + 88.83517 + 710.68$$

$$PV = \text{Rs. } 1433.97$$

Alternative method

$$PV = C \times [\{ 1 - 1 / (1 + r)^t \} / r] + [\text{Face value} / (1 + r)^t]$$

$$PV = 125 \times [\{ 1 - 1 / (1 + 0.05)^7 \} / 0.05] + [1000 / (1 + 0.05)^7]$$

$$PV = 125 \times [\{ 1 - 1 / 1.4071 \} / 0.05] + [1000 / 1.4071]$$

$$PV = 125 \times [\{ 1 - 0.7107 \} / 0.05] + [1000 / 1.4071]$$

$$PV = 125 \times [0.2893 / 0.05] + 710.68$$

$$PV = 125 \times [5.786] + 710.68$$

$$PV = 723.25 + 710.68$$

$$PV = \text{Rs. } 1433.93$$

Question no 3 (Marks: 04)

Prevailing interest rate in the country is 14%, if expected inflation rate is 11% calculate the real interest rate by using fisher equation.

Solution

Real interest rate = Nominal interest rate - expected inflation rate

$$r = i - \pi_e$$

$$r = 14 - 11$$

$$r = 3\%$$