

Engineering Economics Fall 1398
Second Assignment – Rate of Return

As a loan applicant, obtain relevant information and conditions for getting a loan with the amount of at least 50 Million Toman from a Bank, Financial Institution, or a Leasing Company. The type of loan may be for doing a business, buying a house, buying an automobile or special equipment. In some cases, before getting a loan, it may require to deposit some amount of money with the bank. If this is the case, please consider it as well. Assume that to repay the loan, it needs n instalments/payments. Do the following tasks.

1. Determine the cash flow of the loan. Calculate NPV of this loan using an arbitrary interest rate. Then calculate rate of return (ROR) of the loan using Goal Seek in Excel following menus of Data > What-If Analysis > Goal Seek.
As a guidance, there is a snapshot of Excel at the end of this assignment.
2. Calculate annual interest rate paid to the bank using at least one of functions of IRR, XIRR, and Rate in Excel.
3. Calculate the amount of each instalment/payment for this loan using PMT function and the calculated rate in the previous item.
4. Calculate the amount of principles for all instalments using PPMT function in Excel.
5. Calculate the cumulative principles using CUMPRINC function in Excel. Show that this function calculates the cumulative amounts of numbers calculated in the previous item.
6. Calculate the amount of interest for all instalments using IPMT function in Excel.
7. Calculate the cumulative interests using CUMIMPT function in Excel. Show that this function calculates the cumulative amounts of numbers calculated in the previous item.
8. Show that summation of numbers in the 5th and 7th items should be the same as summation of all instalments.
9. Assume that half of instalments have been paid to the bank.
 - a. How much money the applicant should pay to the bank if he/she wants to settle the load. Calculate this amount based on the above calculated cumulative principles.

- b. Ask the bank that how much money the applicant should pay for the loan settlement. Compare the amount of this item and the previous one.

10. In the loan cash flow, please add an amount of 2A with positive sign to cash flows in time periods of $n/4$, $n/2$, and $3n/4$. Please round these time periods if they are not integer. A is the amount of each instalment. Now the loan cash flow has more than one sign change. Assume that external investment rate (i_i) is the rate for the bank short-term saving account and is external borrowing rate (i_b) is ($i_i + 5\%$). Calculate External Rate of Return (EROR) using the following two approach:

- a. Modified Rate of Return (MIRR)
- b. Return on Invested Capital (ROIC)

Please use Microsoft Excel for doing this assignment, and everybody must submit **his/her own solution** as a single Excel file with multiple worksheets **no later than Azar 23, 1398 only through LMS.**

Sending the assignment to my email is not acceptable.

Good luck!

Esfahanipour

Azar 11, 1398

