Quadrant II - Notes

Programme : **Bachelor of Commerce (First Year)**

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Paper Title : **Managerial Economics**

Unit : **Unit III A – Capital Budgeting**

Module Name : **Internal Rate of Return (IRR)**

Module No : **25**

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INTERNAL RATE OF RETURN (IRR)

Internal rate of return (IRR) is the discount rate that makes the net present value of all cash flows (both positive and negative) equal to zero for a specific project or investment.

The internal rate of return is used to evaluate projects or investments. The IRR estimates a project's breakeven discount rate (or rate of return) which indicates the project's potential for profitability.

It's impossible to understand the concept of IRR without understanding net present value (NPV), so let's begin with NPV. The cash that we have today is more valuable than the cash that we will receive after five years due to inflation. Hence, when you decide to invest money each year, you need to first check how much that money is worth today. This is called net present value of money.

SYMBOLICALLY:

$$C_0 = \sum_{t=1}^{n} \frac{R_t}{(1+i)^t}$$

Where:

- C_0 = Initial Investment or Cash Outflow.
- t= time period (from O to n years)
- R_t= Cash inflow in period t
- r= Discount rate (cost of capital)
- n= Last period of the project.

Accept the project: if the IRR is greater than the opportunity rate of interest.

Reject the project: if the IRR is less than the opportunity cost of investing the available funds elsewhere.

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IRR EXAMPLE

Year	Cash flow (Rs.)	At 20%	At 25%	At 23%	At 23.2%
Initial	-40000	-40000	-40000	-40000	-40000
1	25760	21458.08	20608.00	20942.88	20909.08
2	17760	12325.44	11366.40	11739.96	11700.96
3	13760	7967.04	7045.12	7389.12	7358.44
		1750.06	-980.48	71.96	-31.52

First, we try with 20% discount rate and find that the Net Present Value is quite high, i.e; Rs. 1750.56. We than try with 25% rate of discount and get a negative Net Present Value. This gives an indication that we must search for an internal rate of return between 20 and 25%. Next, we try with 23% and get NPV equal to 71.36 which is still positive, so we try with discount rate 23.2% to get NPV equal to minus 31.52. So, we are in fact closing in on a right rate of discount which gives us NPV+0. If we do further interactions between 23% and 23.2%, we find that at discount rate of 23.1416% NPV becomes positively equal to zero. Thus 23.1416% is the Internal Rate of Return.

LIMITATIONS OF THE IRR

1. **IRR is generally most ideal for use in analyzing capital budgeting projects:** It can be misconstrued or misinterpreted if used outside of appropriate scenarios. In the case of positive cash flows followed by negative ones and then by positive ones, the IRR may have multiple values. Moreover, if all cash flows have the same sign (i.e., the project never turns a profit), then no discount rate will produce a zero NPV.
2. **Within its realm of uses, IRR is a very popular metric for estimating a project's annual return:** However, it is not necessarily intended to be used alone. IRR is typically a relatively high value, which allows it to arrive at an NPV of zero. The IRR itself is only a single estimated figure that provides an annual return value based on estimates. Since estimates in IRR and NPV can differ drastically from actual results, most analysts will choose to combine IRR analysis with scenario analysis. Scenarios can show different possible NPVs based on varying assumptions.
3. **In some cases, issues can also arise when using IRR to compare projects of different lengths:** For example, a project of short duration may have a high IRR, making it appear to be an excellent investment. Conversely, a longer project may have a low IRR, earning returns slowly and steadily. The ROI metric can provide some more clarity in these cases, although some managers may not want to wait out the longer time frame.

IRR is usually used to calculate the profitability of investments made in a financial product or projects. Higher the IRR, the more profitable it is to invest in a financial scheme or project. Assume all financial products require the same amount of up-front investment, the product with the highest IRR would be considered the best. Of course, one also needs to understand the risk factors before investing.