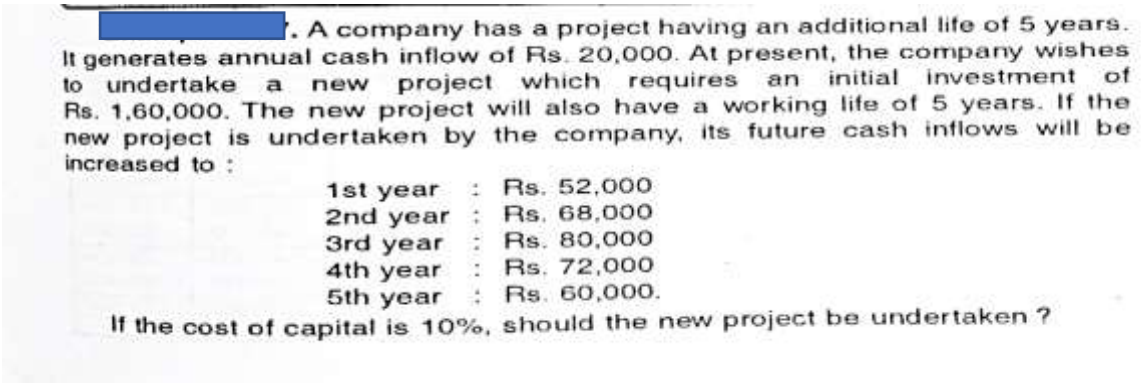
CAPITAL BUDGETING –(CONTINUED FROM AFTER THE LAST CLASS)

1. **SUBJECT- FINANCIAL MANAGEMENT**
2. **SEMESTER- 4**
3. **NAME OF TEACHER- DR. BIDISHA DATTA**
4. **NAME OF TOPIC- CAPITAL BUDGETING**

The material comprises of problems from NPV, IRR , Profitability Index methods, along with some theoretical concepts. This follows from the last problem of NPV method done in the last class

PROBLEM



. A company has a project having an additional life of 5 years. It generates annual cash inflow of Rs. 20,000. At present, the company wishes to undertake a new project which requires an initial investment of Rs. 1,60,000. The new project will also have a working life of 5 years. If the new project is undertaken by the company, its future cash inflows will be increased to :

1st year : Rs. 52,000
2nd year : Rs. 68,000
3rd year : Rs. 80,000
4th year : Rs. 72,000
5th year : Rs. 60,000.

If the cost of capital is 10%, should the new project be undertaken ?

Solution

Statement showing the NPV

YEAR	FUTURE CASH INFLOWS	CASH INFLOWS FROM EXISTING PROJECT	CASH INFLOWS FROM NEW PROJECT	PV OF Re.1 @10%	PRESENT VALUE
1	52000	20000	32000	.909	29088
2	68000	20000	48000	.826	39648
3	80000	20000	60000	.751	45060
4	72000	20000	52000	.683	35516
5	60000	20000	40000	.620	24800
PRESENT VALUE OF THE NEW PROJECT					174112
LESS: INITIAL INVESTMENT					160000
NPV OF THE NEW PROJECT					14112

It is evident from the above statement that the NPV of the new project is positive and hence will be accepted.

CAPITAL BUDGETING –(CONTINUED FROM AFTER THE LAST CLASS)

project is positive. So, the proj...

[redacted] A plant costing Rs. 3,00,000 is required in order to undertake a proposed project. The effective life of the plant is 5 years. The estimated earnings before depreciation and tax of the project are as follows :

Year	Rs.
1	90,000
2	1,05,000
3	1,20,000
4	1,50,000
5	1,65,000

If the tax rate is 50%, cost of capital is 15% and the scrap value of the machine is zero, calculate the net present value and suggest whether the project should be accepted or not.

Given : The present value factors at a discount @ 15% rate are :

Year :	1	2	3	4	5
PV Factors :	0.8696	0.7561	0.6575	0.5718	0.4972

Solution

STATEMENT OF NET CASH INFLOWS

particulars	1st year	2nd year	3rd year	4th year	5th year
PBDT	90000	105000	120000	150000	165000
Less Depreciation	60000	60000	60000	60000	60000
PBT	30000	45000	60000	90000	105000
Less Tax	15000	22500	30000	45000	52500
Add Depreciation	60000	60000	60000	60000	60000
NET CASH INFLOWS	75000	82500	90000	105000	112500

STATEMENT SHOWING NPV

YEAR	NET CASH INFLOWS	PVF OF Re. 1at 15%	Present value
1	75000	.869	65220
2	82500	.756	62378
3	90000	.657	59175
4	105000	.5718	60039
5	112500	.4972	55935
TOTAL PRESENT VALUE			302747
Less INITIAL INVESTMENT			300000
NET PRESENT VALUE			2747

Since the NPV of the given project is positive . so the project should be accepted.

Advantages and disadvantages of NPV Method

■ **Advantages :** The advantages of NPV method are —

Firstly, the time value of money is considered in this method. So it is possible to evaluate a proposed project correctly by using this method.

Secondly, this method is consistent with the financial objective of maximisation of wealth of the shareholders.

Thirdly, all the probable inflows of cash of the entire economic life of a project are considered in this method in evaluating the project. So, each project is evaluated on the basis of its entire returns.

Fourthly, a project should be evaluated under this method when it is expected that different amounts of returns will be obtained in different years. Because, the incomes stream of different years are converted into money value of a particular point of time.

■ **Disadvantages :** The disadvantages of the NPV method are —

Firstly, this method is very complex. To determine the present value of future inflows and outflows of cash is a very complex and laborious job.

Secondly, in this case, the present value of inflows of cash is determined by discounting the future cash flows with the rate of cost of capital. But determination of cost of capital is very difficult and there are differences of opinion regarding the process of determining such cost. So, if it is not possible to determine the correct cost of capital, then it will not be possible to evaluate a project properly.

Thirdly, it is not right to say that if a project has comparatively high NPV than others, the project will be a good one, because the initial investment of this project may be larger than the others.

Fourthly, if the life span of different projects are different, then their comparative evaluation may not be possible with the help of this method. As for instance, if the life span of a project with highest NPV is more, then capital remains blocked in it for a long period. So, the project may not be desirable.

2.2b. Internal Rate of Return or IRR Method

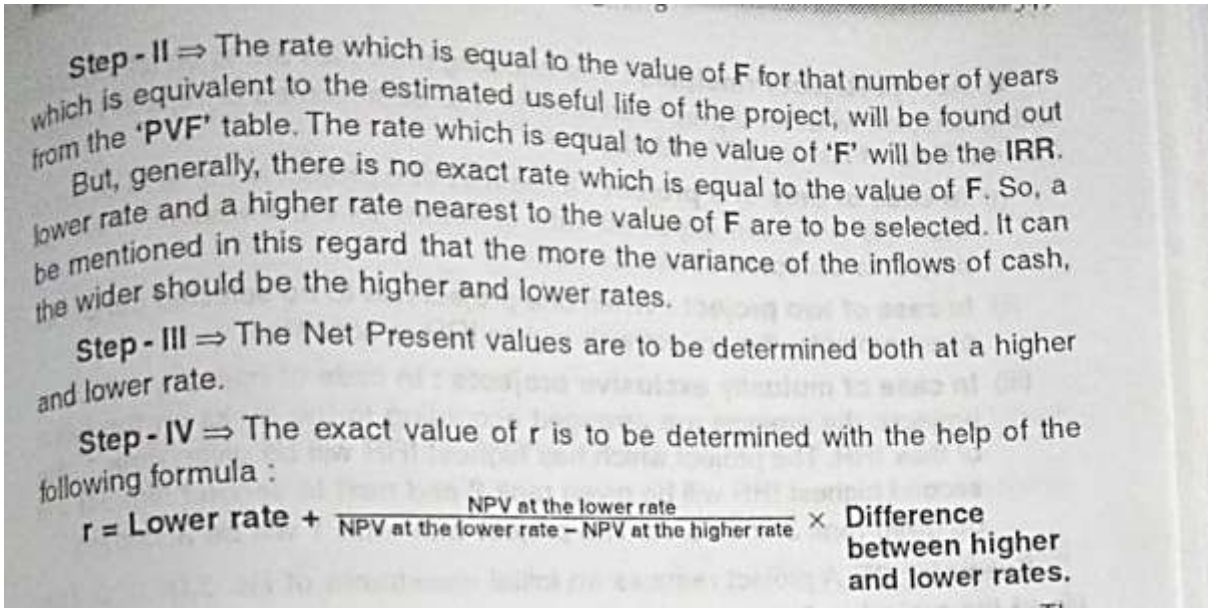
The discount rate which equates the aggregate present value of the cash inflows with the aggregate present value of cash outflows of a project, is called **Internal Rate of Return (IRR)**. Thus the value of the 'r' for which—

$$C = \frac{R_1}{(1+r)^1} + \frac{R_2}{(1+r)^2} + \frac{R_3}{(1+r)^3} + \ldots + \frac{R_n}{(1+r)^n}$$ is called Internal Rate of Return, where, —

C = Initial Investment ;

$R_1, R_2, R_3, \ldots R_n$ are the inflows of cash for the 1st, 2nd, 3rd .....nth year respectively ;

r = Internal rate of return.



Step - II ⇒ The rate which is equal to the value of **F** for that number of years which is equivalent to the estimated useful life of the project, will be found out from the **'PVF'** table. The rate which is equal to the value of **'F'** will be the **IRR**.

But, generally, there is no exact rate which is equal to the value of **F**. So, a lower rate and a higher rate nearest to the value of **F** are to be selected. It can be mentioned in this regard that the more the variance of the inflows of cash, the wider should be the higher and lower rates.

Step - III ⇒ The Net Present values are to be determined both at a higher and lower rate.

Step - IV ⇒ The exact value of r is to be determined with the help of the following formula :

$$r = \text{Lower rate} + \frac{\text{NPV at the lower rate}}{\text{NPV at the lower rate} - \text{NPV at the higher rate}} \times \text{Difference between higher and lower rates.}$$

PROBLEM : a project requires an initial investment of Rs. 12000. The annual cash flow is estimated at Rs. 4000 for 5years. Calculate the internal rate of return.

Solution: Let F be the factor

So, F=12000/4000= 3

We get from the PVF table

PV of annuity of Re.1 at 19% for 5 years = Rs. 3058

PV of annuity of Re.1 at 20% for 5 years=Rs. 2991

Computation of NPV at 20%

PV of cash inflow: (Rs. 4000*2991) =Rs. 11964

Less: Initial investment =Rs. 12000

NPV - 36

Computation of NPV at 19%

PV of cash inflows : (Rs. 4000*3058) = Rs. 12232

Less: Initial investment =Rs. 12000

NPV Rs. 232

Now let IRR =r

So, r= 19 +232/232-(-36) *(20-19)

=19+232/268

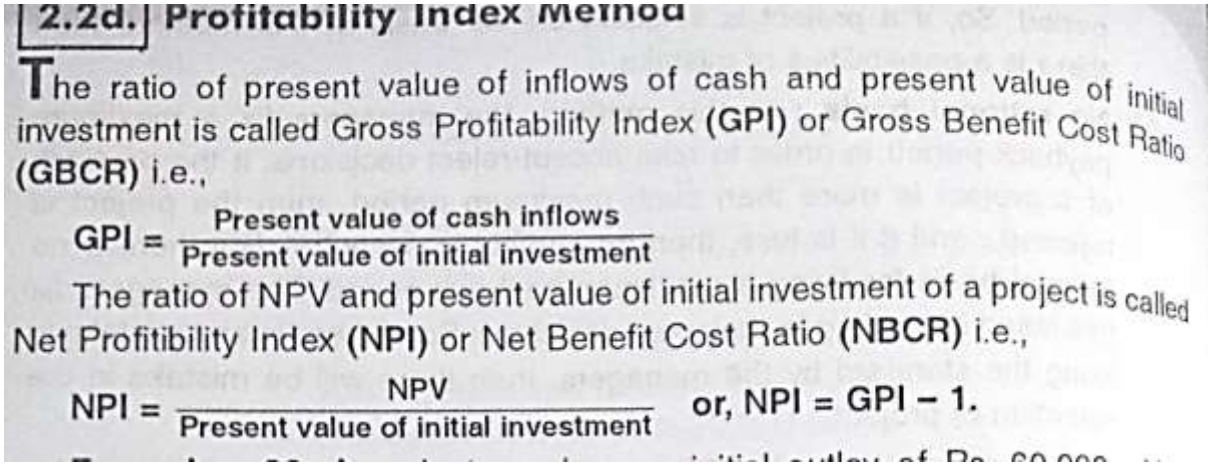
CAPITAL BUDGETING –(CONTINUED FROM AFTER THE LAST CLASS)

=19+ 0.87

=19.87

So, required IRR is 19.87

PROFITABILITY INDEX METHOD



2.2d. Profitability Index Method

The ratio of present value of inflows of cash and present value of initial investment is called Gross Profitability Index **(GPI)** or Gross Benefit Cost Ratio **(GBCR)** i.e.,

$$GPI = \frac{\text{Present value of cash inflows}}{\text{Present value of initial investment}}$$

The ratio of NPV and present value of initial investment of a project is called Net Profitibility Index **(NPI)** or Net Benefit Cost Ratio **(NBCR)** i.e.,

$$NPI = \frac{NPV}{\text{Present value of initial investment}} \quad \text{or, } NPI = GPI - 1.$$

PROBLEM

A project requires an initial outlay of Rs. 60000 with a working life of 4years. The annual cash inflows that will be occurred from the project during the first year through four years are expected to be Rs. 15000, Rs. 24000, and Rs. 30000 respectively. If the rate of discount is 12% , calculate the Profitability Index of the project.

STATEMENT SHOWING PRESENT VALUE OF CASH INFLOWS

YEAR	CASH INFLOWS	PV OF Re. 1at a discount of 12%	PV
1	15000	0.893	13395
2	24000	.797	19128
3	24000	.712	17088
4	30000	.636	19080
Total present value of cash In flows			68691
Lesss:initial investmneg			60000
NPV			8691

GROSS PROFITABILITY INDEX= PV of Cash inflows/Initial investment

=68691/60000=1.145

NET PROFITABILITY INDEX = NPV/Initial investment

=8691/60000=0.145

decision ... NPV and IRR. ... accept/reject

■ **Dissimilarities**

Net Present Value Method	Internal Rate of Return Method
(i) The difference between the present value of cash inflows which take place from a project and the initial investment which is required for accepting the project, is called Net Present Value.	(i) The discount rate which equates the present value of future inflows of cash from a project with the initial investment as a result of discounting the inflows of cash, is called Internal Rate of Return.
(ii) With the help of the Net present value, it is possible to know whether the money which will be invested in a project can be recovered fully or not.	(ii) With the help of Internal rate of return, it is possible to know the rate of return which will be obtained on the invested money in a project.
(iii) In case of evaluating a project, it is necessary to know the cost of capital (K) but not the internal rate of return (r).	(iii) In case of evaluating a project, it is necessary to know both the cost of capital (K) and the internal rate of return (r), because, if the IRR of project is less than the cost of capital (K), then it is not profitable to accept the project.
(iv) The net present value is expressed in terms of money unit.	(iv) The internal rate of return is expressed in terms of percentage.
(v) The net present value may be negative.	(v) The internal rate of return can never be negtative.
(vi) It is assumed in this method that the returns which are obtained in different years are reinvested at the rate of cost of capital.	(vi) It is assumed in this method that the returns which are obtained in different years are reinvested at the internal rate of return.

3.2. Distinctions between Payback Period Method and ARR Method

Payback Period Method	Accounting Rate of Return Method
(i) The lengths of time period within which the invested money can be recovered fully is known with the help of this method.	(i) The rate of return which will be obtained from a project can be determined with the help of this method.
(ii) The returns of entire economic life of a project are not considered in this method.	(ii) The returns of entire economic life of a project are considered in this method.
(iii) Here returns refer to the inflows of cash.	(iii) Here returns refer to the after tax profit.
(iv) In this case, depreciation is added with the after tax profit in order to determine the return.	(iv) In this case, depreciation is not added with the after tax profit in order to determine the return.