FINANCIAL INVESTMENT TECHNIQUES

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Several slides in this section are adapted from Sam Weaver, *Financial Management for the Non-Financial Manager*, McGraw Hill Irwin

Overview of Investment Process

- Evaluation of Projected Future Cash Flows
- Major Techniques
  - ○ Pay Back Period
  - ○ Net Present Value
  - ○ Internal Rate of Return
- Subject to Hurdle Rate
  - ○ Cost of Capital

Pay Back Period

- Simplest of the three financial evaluation techniques presented here
- Represents the number of years required to return the original investment
- Does not require a present value or internal rate of return calculation
- Popular with smaller capital projects
- For companies in a tight cash position it is often of interest to know how soon funds investment funds will be recovered

Hypothetical Projects

A	Projects	B
$(400)	Cost (Outflow Year 0)	$(400)
300	Cash Inflow Year 1	100
200	Cash Inflow Year 2	200
100	Cash Inflow Year 3	300

Pay Back Period

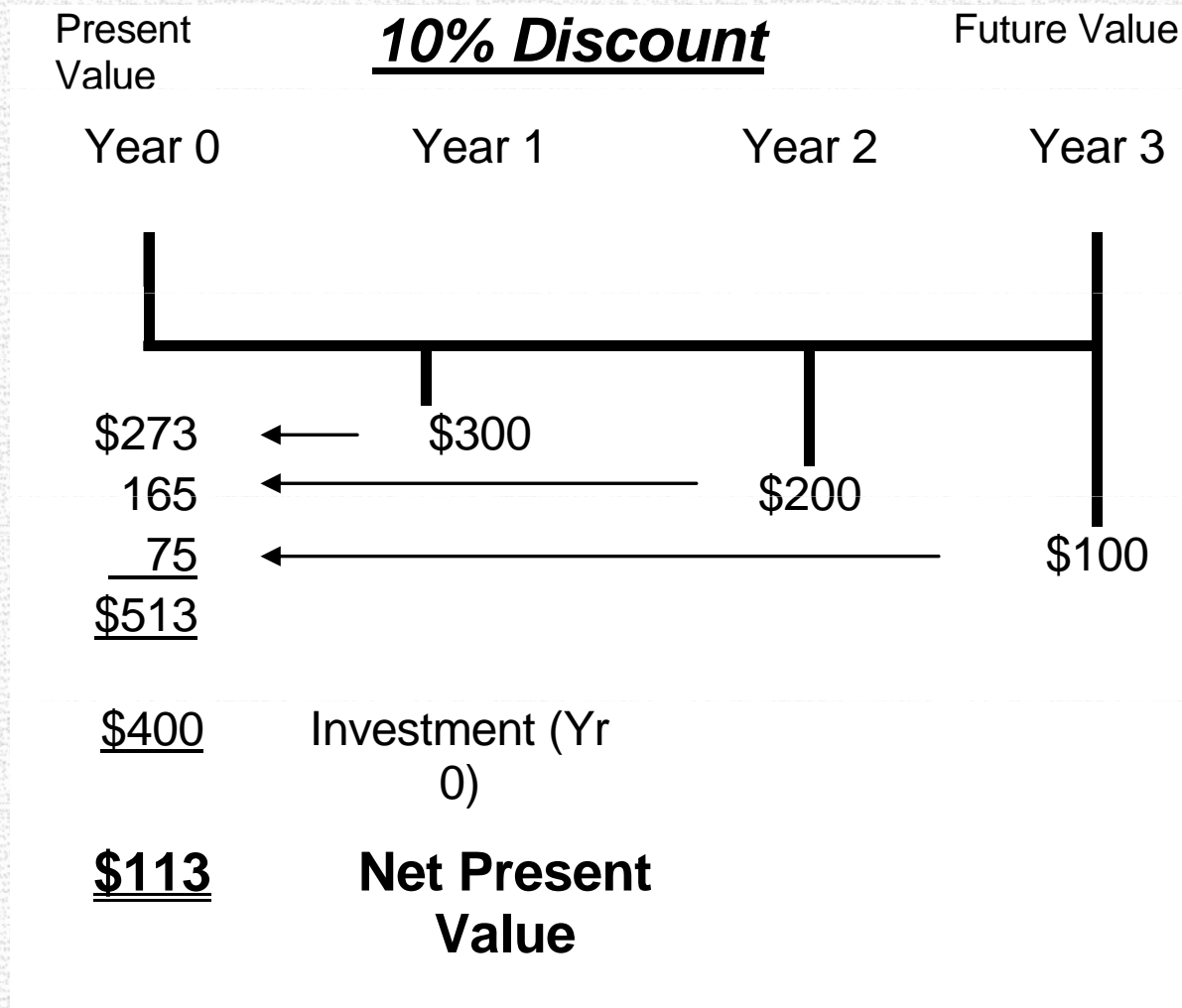| A	Projects	B
$(400)	Cost (Outflow Year 0)	$(400)
300	Cash Inflow Year 1	100
200	Cash Inflow Year 2	200
100	Cash Inflow Year 3	300
	Accumulated Cash Inflow	
$300	Year 1	$100
500	Year 2	300
600	Year 3	600
1.50 Years	Pay Back Period	2.33 Years

Net Present Value

- NPV is defined as the value of future cash flows, discounted at an appropriate cost of capital or hurdle rate, less the cost of the investment

- NPV is often used when a company requires a more complex financial assessment of its capital projects, such as the calculation of the net present value (NPV) of a project or competing alternatives

Net Present Value

- Net present value requires a multiple step process

    1. Estimate the initial cash outlay

    2. Determine annual operating incremental cash flows

    3. Project the terminal cash flow or expected salvage value

        - Salvage value is added to the terminal year cash flow

    4. Determine the present value of the future cash flows

    5. Determine the net present value of the project

Net Present Value

Present Value	**10% Discount**		Future Value
Year 0	Year 1	Year 2	Year 3

$273 ← $300

165 ← $200

75 ← $100

$513

$400   Investment (Yr 0)

$113   **Net Present Value**

Present Value of Single Sum: *Equation*

$$PV \;=\; FV \;/\; (1 + r)^N$$

Where: PV = Present Value

             FV = Future Value   = $100

             r = Return   = .10

             N = Number of Years = 3

$$PV \;=\; \$100 \;/\; (1 + .10)^3$$
$$\;=\; \$100 \;/\; (1.3310)$$
$$\;=\; \$75.13$$

Evaluating Capital Projects Using NPV

Capital Project Options

Project A		Project B
($600)	Cash Outflow Year 0	($645)
$200	Cash Inflow Year 1	$250
$300	Cash Inflow Year 2	$330
$300	Cash Inflow Year 3	$330
$225	Cash Inflow Year 4	$250

Interest rate return requirement: 12%
*all figures are in thousands

Evaluating Capital Projects Using NPV

PROJECT "A" CALCULATIONS

Present Value for Year 1 Inflow: PV = $200/(1+.12)^1 =$ $178.57

Present Value for Year 2 Inflow: PV = $300/(1+.12)^2 =$ $239.16

Present Value for Year 3 Inflow: PV = $300/(1+.12)^3 =$ $213.54

Present Value for Year 4 Inflow: PV = $225/(1+.12)^4 =$ $142.99

Present Value of Inflows: $774.26

     Less Year 0 Outlay: $600

     Project "A" Net Present Value: **$174.26**

Evaluating Capital Projects Using NPV

PROJECT "B" CALCULATIONS

Present Value for Year 1 Inflow: PV = $250/(1+.12)^1 =$ $223.21

Present Value for Year 2 Inflow: PV = $330/(1+.12)^2 =$ $263.07

Present Value for Year 3 Inflow: PV = $330/(1+.12)^3 =$ $234.89

Present Value for Year 4 Inflow: PV = $250/(1+.12)^4 =$ $158.88

Present Value of Inflows: $880.05

Less Year 0 Outlay: $645

Project "B" Net Present Value: **$235.05**
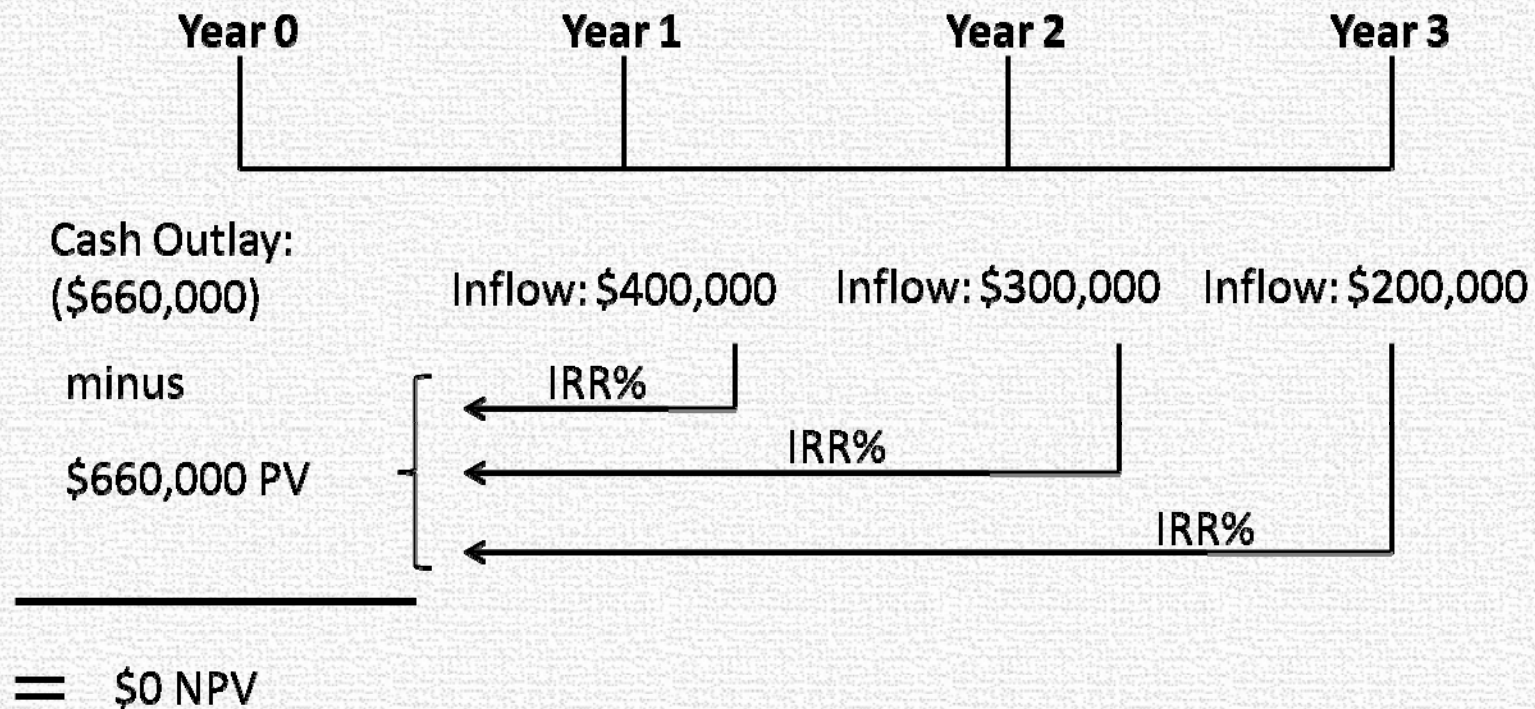
Internal Rate of Return

- IRR considers discounted cash flows

- The point of the IRR exercise is to identify the return rate where the present value of future inflows equals the initial investment outlay in Year 0

- IRR is different conceptually from Return on Investment (ROI)

Internal Rate of Return

- Each benefit and cost from a capital project should be quantified or modeled before making a financial assessment

- This will involve, at a minimum, the participation of finance, purchasing, operations, and engineering

- These groups will each bring some relevant information to help arrive at the net savings realized from a project

Internal Rate of Return

The internal rate of return that results in a present value stream of $660,000 and an NPV of $0 is **19.7%**.