Capital Investment Decisions and the Time Value of Money

Chapter 20

Learning Objective 1

Describe the importance of capital investments and the capital budgeting process

Capital Budgeting

- Making capital investment decisions
- Affects operations for many years
- Requires large sums of money

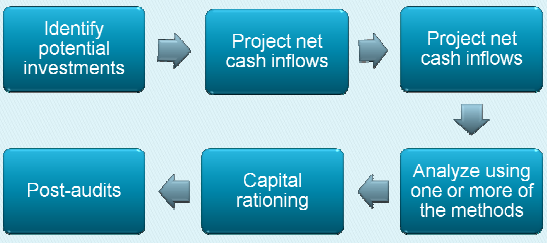
Methods of Capital Budgeting

- Payback period
- Accounting rate of return
- Net present value
- Internal rate of return

Focus on Cash Flows

- Operating income differs from cash flows
- Cash inflows
- Cash outflows

Capital Budgeting Process



Learning Objective 2

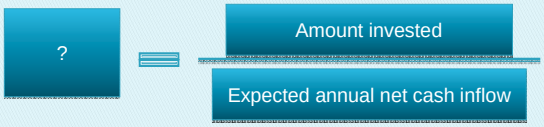
Use the payback and accounting rate of return methods to make capital investment decisions

Payback Period

- Length of time it takes to recover the cost of the capital outlay
- Measures how quickly the amount invested will be recovered
- The shorter the payback period, the more attractive the asset

Calculating Payback Period

Equal annual net cash inflows



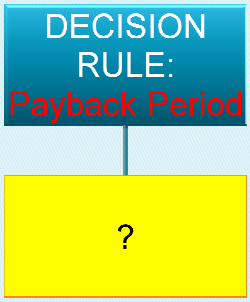
Unequal annual net cash inflows

Total net cash inflows until amount equals investment

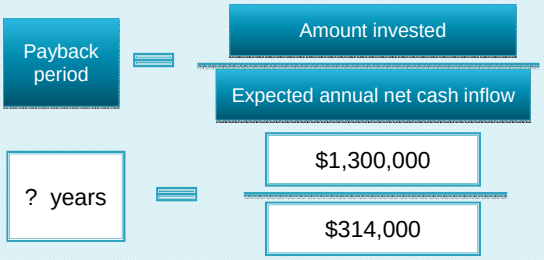
Criticisms of the Payback Period Method

- Focuses only on time, not profitability
- Ignores cash flows after the payback period

Payback Period



Exercise 20-15



Accounting Rate of Return

Average annual operating income from asset

Average amount invested in asset

Original investment + Residual value

2

Accounting Rate of Return

DECISION RULE: Invest in capital assets?

If expected accounting rate of return exceeds the required rate of return?

If expected accounting rate of return is less than required rate of return?

?

?

Objective 3

Use the time value of money to compute the present and future values of single lump sums and annuities

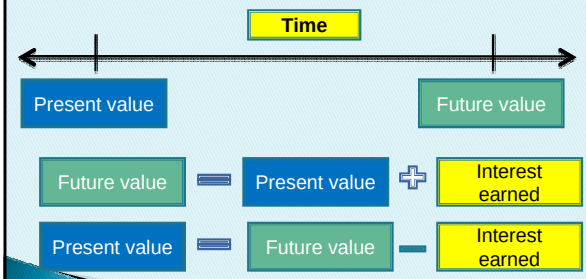
Time Value of Money

- Invested money earns income over time

Factors That Affect Time Value of Money

- Principal (p) – amount of the investment
- Number of periods (n)
- Interest rate (i) – annual percentage

Present and Future Value Along a Time Continuum



Factors for Present Value and Future Value

- Mathematical formulas developed to compute present and future values
- These factors are programmed into business calculators and spreadsheet programs

Using PV and FV factors

- Lump sum
- Annuity

Objective 4

Use discounted cash flow models to make capital investment decisions

Discounted Cash Flows Models

- Recognize time value of money
- Two methods:
  - Net present value (NPV)
  - Internal rate of return (IRR)
- Compare amount of investment with its expected net cash inflows
- Companies use present value to make the comparison

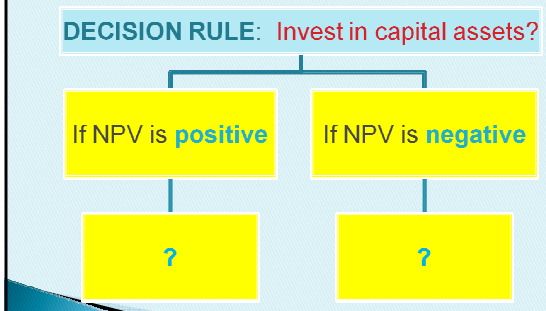
Net Present Value (NPV)

Present value of net cash inflows
Less: Investment cost
Equals: Net present value

Interest rate used is desired rate of return

The higher the risk, the ? the rate

Net Present Value



Equal and Unequal Cash Flows

- If investment is expected to bring in even cash flows:
  - Use Present Value of Annuity (PVA) table
- If amounts are unequal:
  - Present value of each individual cash flow is computed
  - Use Present Value of $1 (PV) table

Exercise 20-23

Project A	
Present value of net cash inflows	
57,000 x 4.639 (PVA 14%, 8 periods)	$ 264,423
Investment cost	(290,000)
Net present value	(?)

Exercise 20-23 (continued)

Project B	
Present value of net cash inflows	
77,000 x 5.328 (PVA 12%, 9 periods)	$410,256
Investment cost	(380,000)
Net present value	?

Profitability Index

- Number of dollars returned for every dollar invested

Present value of net cash inflows

Investment

Internal Rate of Return (IRR)

- Rate of return a company can expect to earn by investing in the project
- The interest rate that will cause the present value to equal zero

Investment's cost = Present value of net cash flows

Computing IRR: Equal Cash Flows

Investment's cost / Annual net cash inflow = PVA Factor

Internal Rate of Return

DECISION RULE: Invest in capital assets?

If the IRR exceeds the required rate of return?	If the IRR is less than required rate of return?
?	?

Comparing Capital Budgeting Methods

Methods that *Ignore* the Time Value of Money	
Payback Period	**Accounting rate of return**
Simple to compute	Uses accrual accounting
Focuses on time it takes to recover cost of asset	Shows how investment will impact operating income, which is important to investors
Ignores cash flows after the payback period	
Highlights risks of assets with longer cash recovery periods	Measures the profitability over the asset's life
Ignores time value of money	Ignores time value of money

Comparing Capital Budgeting Methods

Methods that *Incorporate* the Time Value of Money	
Net present value	**Internal rate of return**
Uses time value of money and asset's cash flows over its entire life	Uses time value of money and asset's cash flows over its entire life
Indicates whether the asset will earn the minimum required rate of return	Computes the project's unique rate of return
Shows excess or deficiency of asset's present value of net cash flows over its initial cost	
Profitability index should be computed when assets have differing investment amounts	No additional steps needed for capital rationing decisions

End of Chapter 20