**Chapter Five**

**Measuring Investment Returns**

Measures of return:

1. Accounting earnings
2. Cash flows

Why not to use Accounting earnings?

1. Accrual basis of Accounting
2. According to accounting principles, expenses are classified into two categories which are:
3. Operating expenditures (Income statement)
4. Capital expenditures (Balance Sheet)

The conversion of earnings into cash flows:

1. Add back non-cash expenses.
2. Subtract out the capital expenditures.
3. Consider the change in net working capital

Cash flows should be:

1. Time weighted
2. Incremental
* FCFF = free cash flow to the firm = measures cash flow generated by a project (cash flow available to all investors (creditors and stockholders)

FCFF= EBIT(1-t) + Depreciation (non-cash expenses) – Capex (capital expenditures) +/- change in net working capital

Net operating profit after tax = EBIT(1-t)

Capex = NFAI= net fixed asset investment = change in net fixed assets + Depreciation

Net working capital = current assets – current liabilities

* FCFE = free cash flow to equity holder= measures cash flow generated by a project for equity investors in the firm after taxes, debt payments and investment needs.

FCFE = Net income + depreciation (non-cash expenses) - Capex +/- change in net working capital + net debt (new debt issues – debt payments)

**Investment decision rules:**

1. Accounting based investment decision rules.
2. Return on Capital (ROC) = EBIT(1-t)/average book value of capital

If ROC > WACC, then accept the project

If ROC < WACC, then reject the project

1. Return on equity (ROE) = Net Income/ average book value of equity

If ROE > cost of equity, then accept the project

If ROE < cost of equity, then reject the project

1. Cash flow based investment decision rules.
2. Payback period
3. Net present value (NPV)
4. IRR (internal rate of return)
5. Profitability index

Project: any decision that results in using the resources of business.

* Types of projects:

Projects can be divided based on:

1. How the projects affect other projects?
2. Independent projects: the acceptance of one does not eliminate the others from further acceptance.
3. Mutually exclusive projects: the acceptance of one project eliminates the others from further acceptance.
4. Complementary projects
5. Pre-requisite projects.
6. Ability to generate revenues or reduce costs.

**Cash flow based investment decision rules:**

**Cash flow patterns:**

1. **Conventional pattern.**
2. **Non-conventional pattern.**
3. Net Present value (NPV): the sum of the present value of expected cash flows.

When calculating the present value of expected cash flows, they will be discounted at WACC (hurdle rate)

NPV decision rule:

If NPV > = 0 then accept the project

IF NPV < 0 then reject the project

Example:

WACC = 15%

Year Cash flow

1. ($1000)
2. $500
3. $500
4. $400

Calculate NPV?

PV = Cf/(1+r)^n

NPV = (1,000)/(1.15)^0 + 500/(1.15)^1 + 500/(1.15)^2 +400/(1.15)^3 = $75.86

* 1. 0 then accept the project

🡪The higher the NPV the better

**Properties of NPV:**

1. Additive 🡪 The value of any firm = the present value of projects in place + the net present value of future projects.
2. Cash flows are reinvested at hurdle rate.
3. NPV calculations allow for interest rate to shift.

**Limitations:**

1. The NPV is stated in absolute rather than relative term.
2. The NPV rule does not control for the life of the project 🡪( biased toward accepting long-term projects ( mutually exclusive)

**2) Payback period:** the period of time needed to recover the initial investment.

(the sooner the better)

The manager determines the maximum acceptable payback period.

**Decision rule:**

1. If the payback period of the project =< maximum acceptable payback period, then accept the project.
2. I f the payback period > maximum acceptable payback period, then reject the project.

Example:

Initial investment = ($10,000)

Year cash flow

1. $4,000
2. $4,000
3. $2,000
4. $3,000

Payback period =?

(4000+4,000+2000)🡪(1+1+1) = 3 years

**Properties of payback period:**

1. Simple to calculate.
2. It considers cash flows (cash flow based investment decision rule)
3. It considers risk.

**Limitations of the payback period:**

1. It is subjective.
2. It does not consider time value of money.
3. It ignores the cash flows to be received after the payback period
4. Does not work with non-conventional cash flow pattern

**3)IRR: Internal Rate of Return**

IRR is the rate of return🡪 NPV of the project = 0

The sum of present value of expected cash flows =0

IRR decision rule:

If IRR of the project >= WACC 🡪 accept the project

If IRR of the project < WACC🡪 reject the project

The higher the IRR the better

**Properties of IRR:**

1. Uses cash flows
2. Considers time value of money.
3. Scaled (relative measure)

**Limitations of IRR:**

1. Biased towards shorter projects.
2. IRR cannot be calculated🡪 Special cases: IRR =0/ Multiple IRR