

Corporate Finance

Capital Budgeting

Capital Budgeting is the process that the companies use for decision making on capital projects – those projects with a life of a year or more.

Process of Capital Budgeting

1. Generating Ideas.
2. Analyzing Individual Proposals
3. Planning the Capital Budget
4. Monitoring and Post-auditing

Categories of Projects for analysis

1. Replacement projects
2. Expansion Projects
3. New Products and Services
4. Regulatory, safety and environmental projects

Assumptions of Budgeting Capital

1. Decisions are based on Cash Flows
2. Timing of Cash Flow is crucial
3. Cash Flows are based on opportunity Costs
4. Cash Flows are analyzed after-tax basis.
5. Financing Costs are ignored.
6. Capital Budgeting cash flows are not accounting net income.

Capital Budgeting takes required rate of return as discounting rate of return. The required **rate of return** is the discount rate that investors should require given the riskiness of the project.

Budgeting Concepts

1. Sunk Costs that has already been incurred.
2. Opportunity Cost – what a resource is worth in its next best use.
3. Incremental Cash Flow is the cash flow that is realized because of a decision.
4. Externality is the effect of an investment on other things. **Cannibalization** is one externality. It occurs when an investment takes customers and sales away from another part of the company.
5. **Conventional** cash flow is a pattern with an initial outflow followed by a series of inflows. In **Non-Conventional** cash flow pattern, the initial outflow is not followed by inflows only, but the cash flows can flip from positive to negative again.

Types of Projects

1. **Independent projects** whose cash flows are independent of each other.
2. **Mutually Exclusive** projects compete directly with each other.
3. **Project Sequencing** in which projects are financed in sequence and next project is dependent on the success and failure of the previous project.
4. **Unlimited Funds** assumes that company can raise the fund it wants for all profitable projects by paying the required rate of return.
5. **Capital Rationing** exists when company has a fixed amount of funds to invest.

Investment Decision Criteria

- **Net Present Value** is the present value of the future after-tax cash flows minus the investment outlay.

$$NPV = \sum_{t=0} \frac{CF_t}{(1+r)^t}$$

Invest if	$NPV > 0$
Do not Invest if	$NPV < 0$

NPV declines at a decreasing rate as the discount rate increases.

- **Internal rate of Return** is the discount rate that makes the present value of the future after-tax cash flows equal that investment outlay.

$$\sum_{t=1} \frac{CF_t}{(1+IRR)^t} - \text{Outlay} = 0$$

Invest if	$IRR > r$
Do not Invest if	$IRR < r$

- **Payback Period** is the number of years required to recover the original investment in a project. Its drawback includes the ignorance of the time value of money and the risk of the project. It ignores the cash flows after the payback period is reached. It a measure of payback and not profitability. Its advantage includes its easy calculation and indicator of project liquidity.

- **Discounted Payback Period** is the number of years it takes for the cumulative discounted cash flows a project to equal the original investment. It considers the time value of money and risk. However, it ignores cash flows after the discounted payback period is reached.

- **Average Accounting rate of return**

$$AAR = \frac{\text{Average Net Income}}{\text{Average Book Value}}$$

It is easy to understand and calculate. It does not account for time value of money. There is no conceptually for profitable or non-profitable investments.

- **Profitability Index** is the present value of a project's future cash flows divided by the initial investment.

$$PI = \frac{\text{PV of future cash flows}}{\text{Initial Investments}} = 1 + \frac{NPV}{\text{Initial Investments}}$$

Invest if	$PI > 1$
Do not Invest if	$PI < 1$

If NPV is positive, the PI will be greater than 1, conversely, if NPV is negative, the PI will be less than 1. It is sometimes used in Capital rationing.

Whenever NPV and IRR rank two mutually exclusive projects differently, you should choose the project based on the NPV because of the reinvestment assumption.

Because the NPV criterion uses the most realistic discount rate – the opportunity cost of funds – the NPV criterion should be used for evaluating mutually exclusive projects.

Multiple IRR can occur in Non-Conventional Projects i.e +ve and –ve cash flow patterns.

Cost of Capital

- **Cost of capital** is the rate of return that the suppliers of capital require as compensation for the contribution of their capital. It is the opportunity cost of funds for the suppliers of capital.
- **Weighted Average Cost of Capital (WACC)** is used to calculate the cost of capital of the company. It is referred to as the Marginal Cost of Capital (MCC) since it is the cost that company incurs for additional capital.

$$\text{WACC} = w_d r_d (1-t) + w_p r_p + w_e r_e$$

Where, W_d = proportion of debt

r_d = before-tax marginal cost of debt.

t = company's marginal tax rate

w_p = proportion of preferred stock

r_p = marginal cost of preferred stock

w_e = proportion of equity

r_e = marginal cost of equity

- **Optimal Capital Budget** is that amount of capital raised and invested at which the marginal cost of capital is equal to the marginal return from investing.
- **Cost of debt** is the cost of debt financing to a company. There are two methods to estimate the before-tax cost of debt.

1) **Yield to maturity Approach (YTM)** is the annual return earned if the investor purchase bond today and hold it until maturity. In other words, it is the yield r_d , that equates the present value of the bond's promised payments to its market place.

$$P_0 = \frac{PMT_1}{(1+r_d/2)} + \dots + \frac{PMT_n}{(1+r_d/2)^n} + \frac{FV}{(1+r_d/2)^n} = \left\{ \sum \frac{PMT_t}{(1+r_d/2)^t} \right\} + \frac{FV}{(1+r_d/2)^n}$$

2) **Debt-Rating Approach** is based on company's debt rating, estimate the before-tax cost of debt by using the yield on comparably rated bonds for maturities that closely match that of the company's existing debt.

- **Cost of Preferred Stock** is the cost that the company has committed to pay to preferred shareholders.

$$r_p = \frac{D_p}{P_p}$$

- **Cost of Common Equity** is the return required by a company's common shareholders.

1) Capital Asset Pricing Model Approach

$$\bar{r}_a = r_f + \beta_a (\bar{r}_m - r_f)$$

Where:

r_f = Risk free rate

β_a = Beta of the security

$\bar{r}_m$ = Expected market return

2) Dividend Discount Model Approach states that the intrinsic value of a share of stock is the present value of the share's expected future dividends.

$$V_0 = \sum_{t=1}^{\infty} \left\{ \frac{D_t}{(1+r_e)^t} \right\} = \frac{D_1}{(1+r_e)} + \frac{D_2}{(1+r_e)^2} + \dots$$

$$r_e = \frac{D_1}{P_0} + g$$

➤ **Floatation Cost** is the fee, the investment bankers charge based on the size and type of the offering.

$$r_e = \frac{D_1}{(P_0 - F)} + g$$

➤ **Asset Beta** is the unlevered beta that reflects the business risk of the asset, the asset's systematic risk.

$$\beta_{\text{asset}} = \beta_{\text{debt}} w_d + \beta_{\text{equity}} w_e \text{ or } \beta_{\text{asset}} = \beta_{\text{debt}} \left(\frac{D}{D+E} \right) + \beta_{\text{equity}} \left(\frac{E}{D+E} \right)$$

➤ **Marginal Cost of Capital** > The amount of capital at which the WACC changes i.e that the cost of one of the sources of capital changes is referred to as a Break Even point.

$$\text{Break Even Point} = \frac{\text{Amount of Capital at which the source's cost of capital changes}}{\text{Proportion of new capital raised from the source.}}$$

Working Capital Management

➤ **Liquidity Management** refers to the ability of an organization to generate cash when and where it is needed.

Primary Sources of liquidity >

- Ready cash balance
- Short term Funds
- Cash Flow Management

Secondary Sources

- Negotiating Debt contracts
- Liquidating assets
- Filing of bankruptcy protection and reorganization

➤ **Drags on liquidity** is when receipts lag, creating pressure from the decreased available funds.

- Uncollected Receivables
- Obsolete Inventory
- Tight Credit

➤ **Pulls on liquidity** is when disbursements are paid too quickly or trade credit availability is limited

- Making Payment early
- Reduced Credit Limits
- Limits on short term lines of credit
- Low Liquidity positions

➤ **Liquidity Ratios**

Current Ratio	Quick Ratio
$\frac{\text{Current Assets}}{\text{Current Liabilities}}$	$\frac{\text{Cash} + \text{Short term Marketable Securities} + \text{Receivables}}{\text{Current Liabilities}}$
Accounts Receivable Turnover	No. of Days of Receivables
$\frac{\text{Credit Sales}}{\text{Average Receivables}}$	$\frac{\text{Accounts Receivables}}{\text{Avg. days sales on credit}} \times \frac{\text{Accounts Receivables}}{\text{Sales on credit} / 365}$
Inventory Turnover	Number of Days of Inventory
$\frac{\text{Cost of Goods Sold}}{\text{Average Inventory}}$	$\frac{\text{Inventory}}{\text{Average day's cost of goods sold}} \times \frac{\text{Inventory}}{\text{Cost of Goods sold} / 365}$
Accounts Payable Turnover	No. of Days of Payable
$\frac{\text{Credit Purchases}}{\text{Average Payables}}$	$\frac{\text{Accounts Payables}}{\text{Avg. days purchase}} \times \frac{\text{Accounts Payables}}{\text{Purchases} / 365}$
Operating Cycle	Net Operating Cycle
$\text{No. of Days of Inventory} + \text{No. of Days of Receivables}$	$\text{No. of Days of Inventory} + \text{No. of Days of Receivables} - \text{No. of Days of Payables}$

➤ **Yield on Short term Investments**

Money Market Yield is typically annualized using the ratio of 360 to the number of days to maturity. $\text{Money Market Yield} = \left(\frac{\text{Face Value} - \text{Purchase Price}}{\text{Purchase Price}} \right) \left(\frac{360}{\text{No. of Days to Maturity}} \right)$
Bond Equivalent Yield is typically annualized using the ratio of 365 to the number of days to maturity. $\text{Bond Equivalent Yield} = \left(\frac{\text{Face Value} - \text{Purchase Price}}{\text{Purchase Price}} \right) \left(\frac{365}{\text{No. of Days to Maturity}} \right)$
US T Bills are generally annualized using Discount basis yield which is calculated using the face value as the basis for the yield and then using 360 day year. $\text{Discount Basis Yield} = \left(\frac{\text{Face Value} - \text{Purchase Price}}{\text{Face Value}} \right) \left(\frac{360}{\text{No. of Days to Maturity}} \right)$

➤ Strategies

Passive strategies is characterized by one or two decision rules for making daily investments. They are less aggressive and place top priorities on safety and liquidity.

Matching strategy is the more conservative and use many of the same investment types as are used with passive strategies.

Active strategies involves constant monitoring and are more aggressive and may involve, mismatching or laddering strategies.

Mismatching strategy is riskier and requires very accurate and reliable cash forecasts.

Laddering strategy entails scheduling maturities on a systematic basis within the investment portfolio such that investments are spread out equally over the term of the ladder. It falls between matching and passive strategy.

➤ Trade Discount

$$\text{Cost of Trade Credit} = \left(1 + \frac{\text{Discount}}{1 - \text{Discount}} \right)^{(365 / \text{No. of days beyond discount period})} - 1$$

➤ Sources of Short-term Financing

- **Uncommitted lines of Credit** – Weakest form of bank borrowings, right to refuse, very unstable & not reliable very much, cannot show as footnote in the company accounts, do not require any compensation.
- **Committed line of Credit** – More stronger, included in the foot notes in the company accounts.
- **Regular lines** – Unsecured and are pre-payable, requires compensation.
- **Revolving Credit agreements** – Strongest form, formal legal agreements, effective for multiple years.

$$\text{Cost of Borrowings} = \frac{\text{Interest} + \text{Dealer's commission} + \text{Backup Costs}}{\text{Loan Amount} - \text{Interest}}$$

➤ Financial statements Analysis

DuPont Analysis – The basis of this approach are the linkages made through financial ratios between the Balance Sheet and the Income Statement.

$$\text{Return on assets} = \frac{\text{Net Income}}{\text{Average Total Assets}} = \frac{\text{Net Income}}{\text{Revenues}} \times \frac{\text{Revenues}}{\text{Average Total Assets}}$$

OR

$$\text{Return on assets} = \text{Net profit Margin} \times \text{Total asset turnover}$$

Five Component DuPont Model

$$\begin{aligned} \text{Return on equity} = & \frac{\text{Operating Income}}{\text{Revenues}} \times \frac{\text{Income before taxes}}{\text{Operating Income}} \times \left\{ 1 - \frac{\text{Taxes}}{\text{Income before taxes}} \right\} \\ & \times \frac{\text{Revenues}}{\text{Average Total Assets}} \times \frac{\text{Average Total Assets}}{\text{Average Shareholder's Equity}} \end{aligned}$$

Pro Forma Analysis – Pro Forma statements are income statements and balance sheets based on projections