## Capital Budgeting Analysis

**Topics**

- Cost of Capital
- Capital Budgeting Problems
- Issues in Capital Budgeting

## Cost of Capital and Capital Budgeting

- Cost of Capital: Expected return on a portfolio of all the company's existing securities.
  - It is used to discount the cash flows on projects that has similar risk to that of the company as a whole.
  - If the new project has more (or less) risky than the company's existing business(es), then appropriate adjustment to its cost of capital has to be made.
- Capital Budgeting Process: Analyzing the list of planned investment projects.
  - Matching capital budget to the company's strategic plans is a critical portion of company's financial planning process.

## Cost of Capital

- The expected return on any capital budgeting project should be greater or equal to the expected return on an asset of similar risk. **(Otherwise, pay dividends!)**
- A project's required return depends on the *project's* b. **(Not company's β!)**
- A project's b can be estimated by considering comparable industries or the cyclicality of project revenues and the project's operating leverage.
- If the company uses debt, the discount rate to use is the company's **weighted average cost of capital (WACC)**.

## Weighted Average Cost of Capital

$$r_{WACC} = \left(\frac{E}{E+D}\right) \times r_E + \left(\frac{D}{E+D}\right) \times r_D \times (1 - T_C)$$

$r_D$: cost of debt, YTM

$T_c$: corporate tax rate

$r_E$: cost of equity, $E(R_j) = R_f + \beta_j \times [E(R_m) - R_f]$

where,

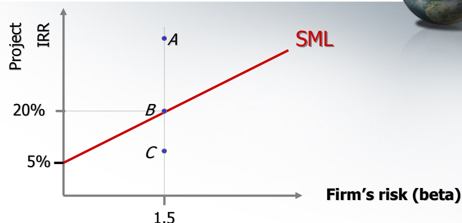
$E(R_j)$: the expected returns on the $j^{th}$ security

$R_f$: risk-free rate

$E(R_m)$: the expected return on a market portfolio

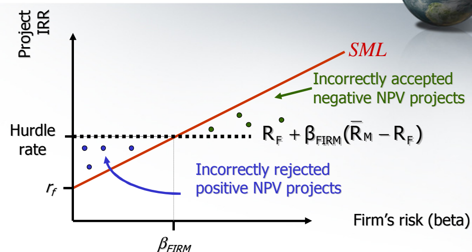
$\beta_j$ = covariance($r_j$, $R_m$)/variance($R_m$)

## Using the SML




An all-equity firm should accept a project whose IRR exceeds the cost of equity capital and reject projects whose IRRs fall short of the cost of capital.

## Capital Budgeting & Project Risk




A firm that uses one discount rate for all projects may over time increase the risk of the firm while decreasing its value.

## Capital Budgeting

- General rules

1. Focus on cash flows, not accounting earnings.
2. Analyze "incremental" cash flows.
3. Ignore sunk costs.
4. Incorporate opportunity costs.
5. Include cannibalization and erosion.
6. Consider impacts of inflation and taxes.

## Capital Budgeting

- Capital Budgeting Problems
  - Consistent forecasts
  - Conflict of interest
  - Forecast bias
  - Selection criteria (NPV, IRR, Payback …)

## Other Issues in Capital Budgeting

- Investment decisions vs. financing decisions
- Forecasting errors
- Innovation
- Competition

## Corporate Strategy and Positive NPV

- Introduce new products
- Develop core technology
- Create barrier to entry
- Introduce variations on existing products
- Create product differentiation
- Utilize organizational innovation
- Exploit a new technology