Optimal Capital Budget

Definition

Total cost of all acceptable investment projects

Issue

MCC (and NPV) dependent on level of financing

Combine

Marginal Cost Schedule (MCC)

Investment Opportunity Schedule (IOS)

Extensions

Mutually exclusive projects
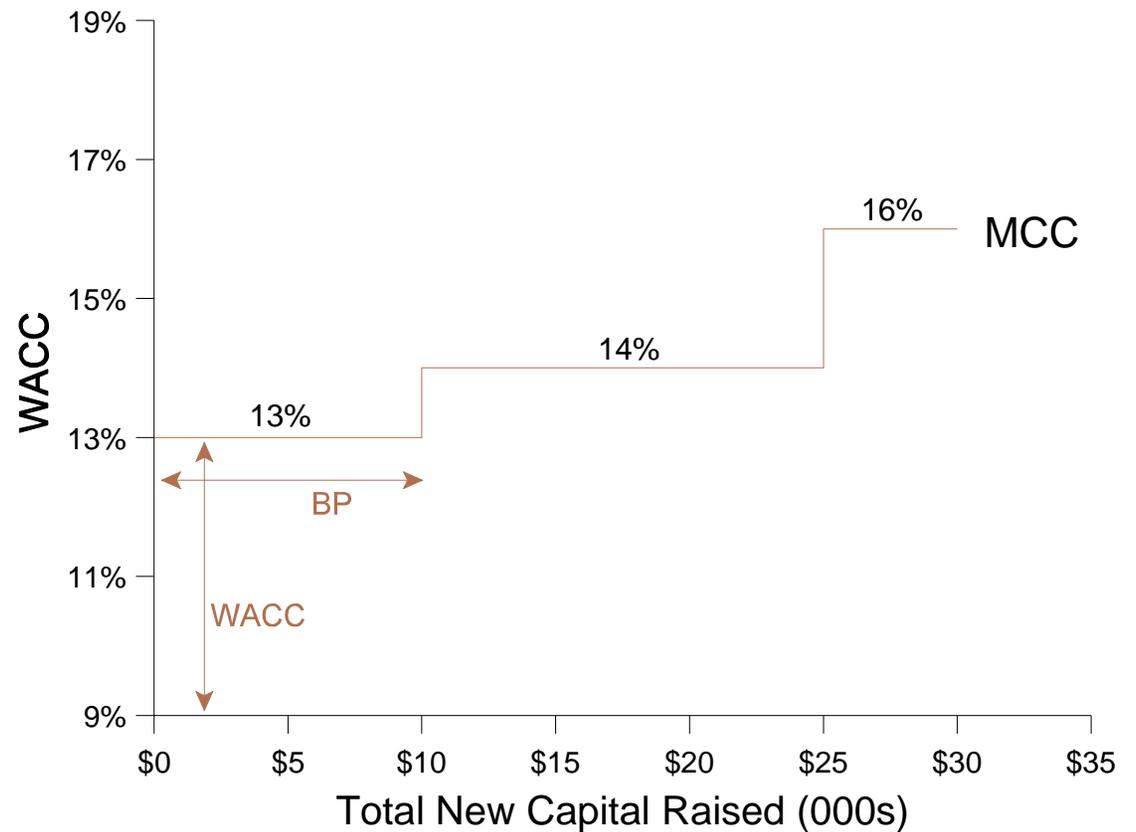
Marginal projects

Project risk

Capital rationing

Marginal Cost of Capital (MCC)

"Supply" of New Capital

Plot WACC against capital raised

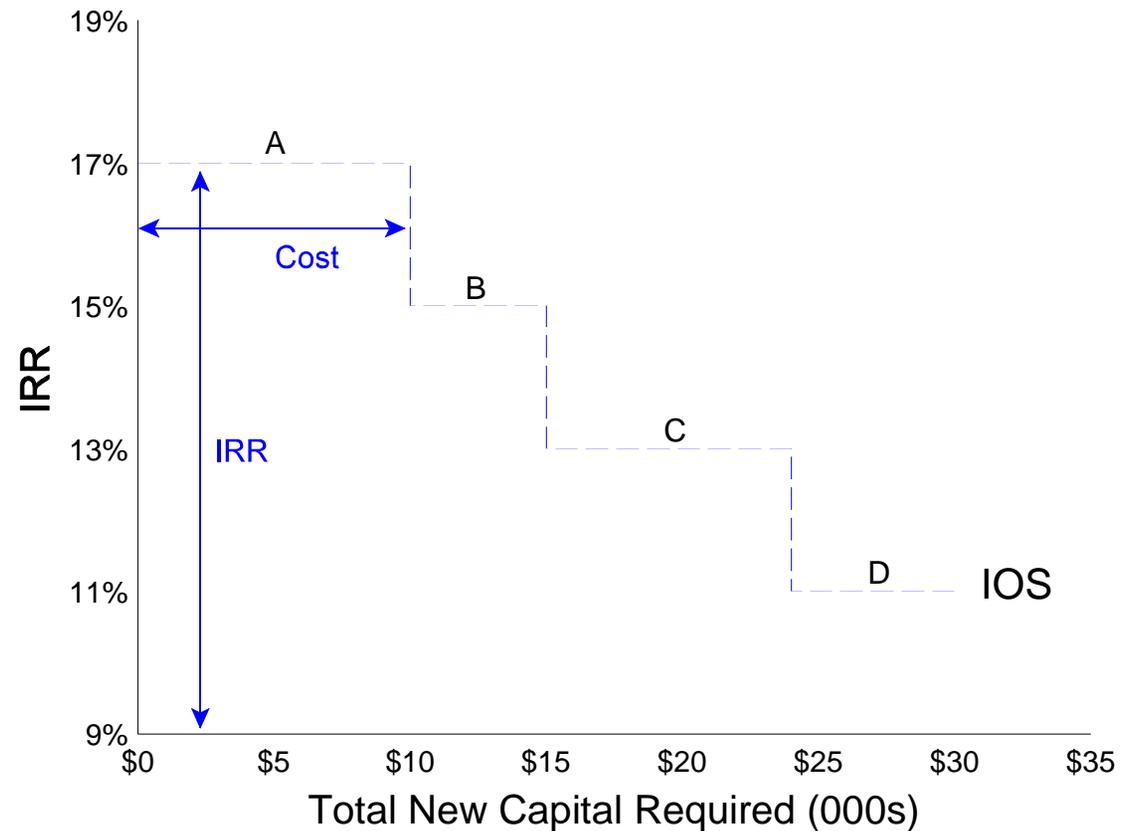| New Funds Raised		
From	**To**	**WACC**
$0	$10,000	13%
$10,000	$25,000	14%
$25,000	$30,000	16%

Investment Opportunity Schedule (IOS)

"Demand" for New Capital
Rank projects by IRR
Plot IRRs against cumulative cost

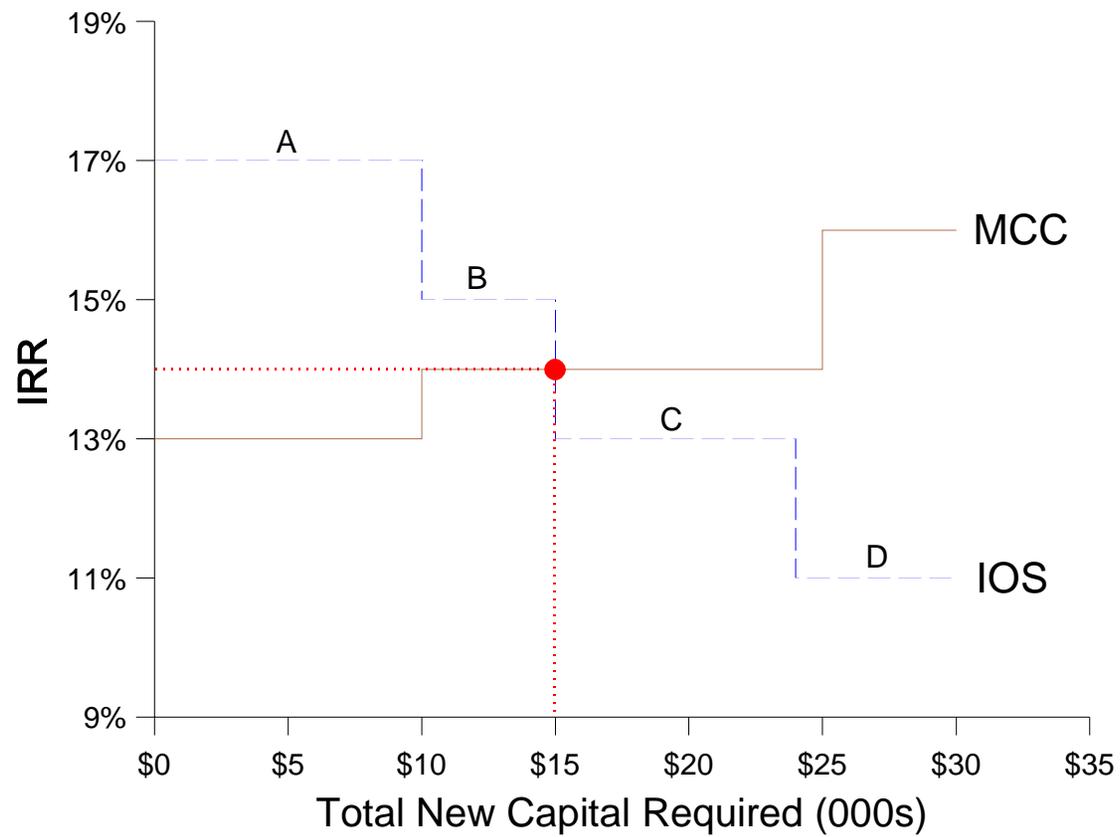| Project	IRR	Cost
A	17%	$10,000
B	15%	$5,000
C	13%	$9,000
D	11%	$6,000

Optimum

At Intersection
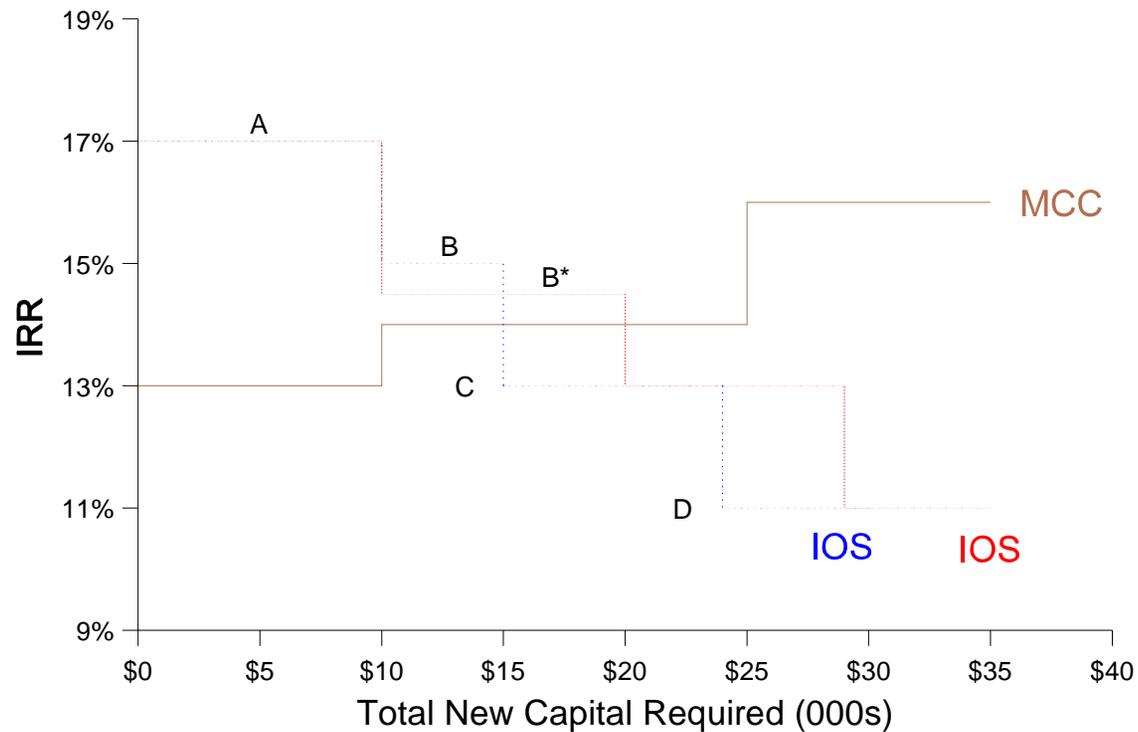Optimal capital budget
Firm's MCC

Extensions: Mutual Exclusion
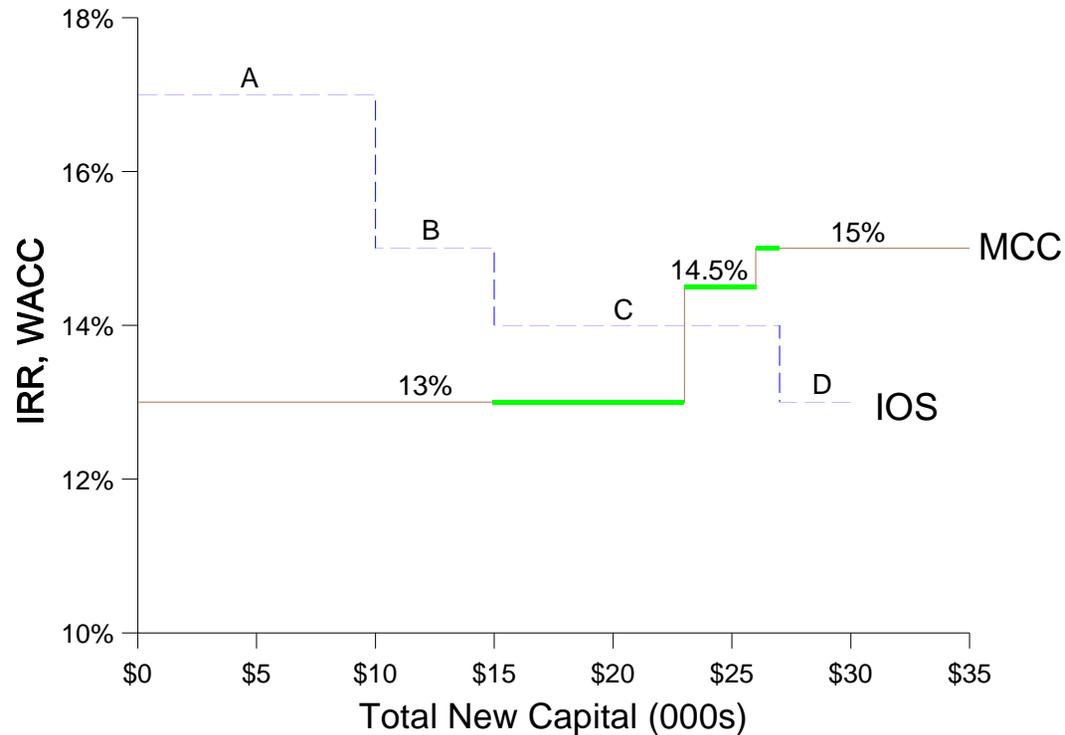
Mutually Exclusive Projects
Use NPV
(Often easier to use separate IOS for each combination)

Extensions: Marginal Project

When MCC crosses IOS in mid-project

Find *average* marginal cost of capital invested in marginal project
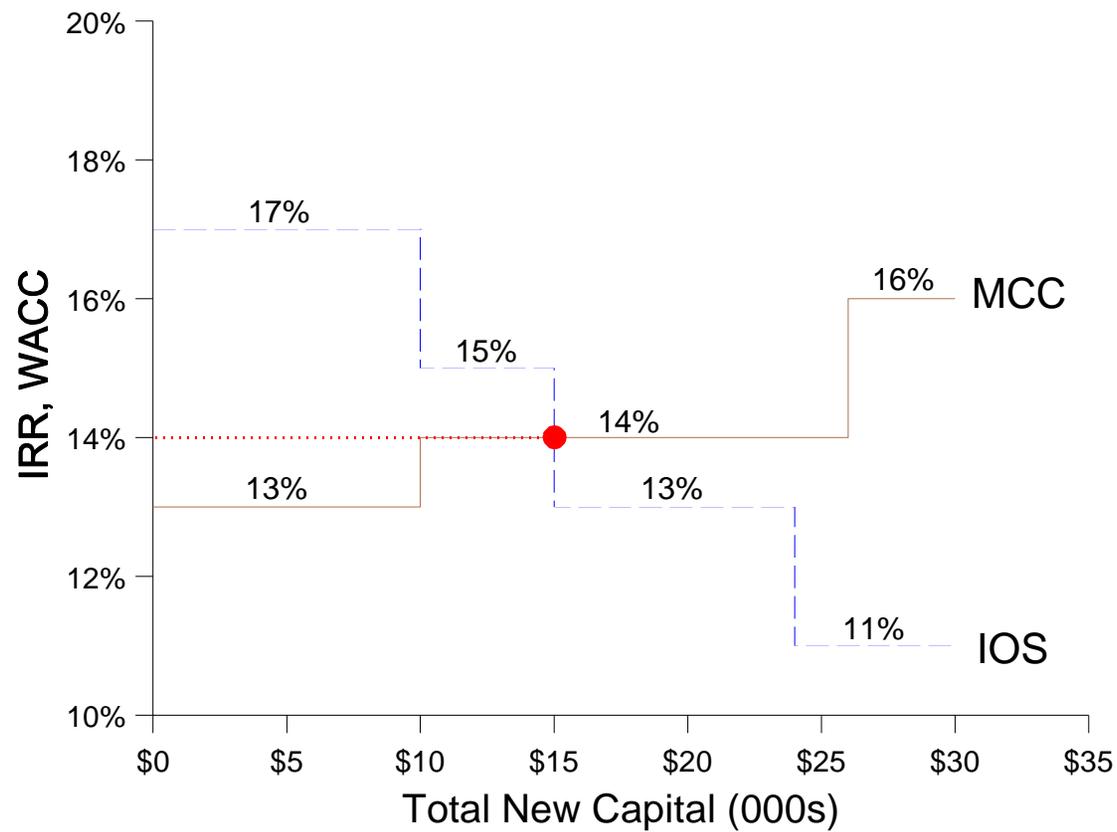

$$MCC_C = \left(\frac{8,000}{12,000}\right)13\% + \left(\frac{3,000}{12,000}\right)14.5\% + \left(\frac{1,000}{12,000}\right)15\% = 13.5\%$$

Extensions: Project Risk

Project MCC
Add risk premium to *firm's MCC* under (over) project

Extensions: Capital Rationing

Definition

Dollar limit on capital budget
  Hard or Soft
  Binding or Non-binding

Problem

If binding, violates NPV rule: doesn't max shareholder wealth because can't take all positive-NPV projects

Solution

1. Relax constraint
2. find group of projects with maximum *joint* NPV