



Capital budgeting



Corporate Finance

The idea

- A company creates value by investing in a new asset/project if the present value of *incremental cash-flows* at the appropriate discount rate exceeds the acquisition cost
- Discount rate: opportunity cost of capital (= return on foregone projects)



(Unlevered) free cash flows

$$FCF = EBIT(1-\tau) + Dep - CAPEX - \Delta Working Capital$$

where τ is the tax rate on the corporation faces on its income

- These are the cash-flows a debt-free corporation would have available for distribution to its stake-holders



Free cash flows to equity

$$FCFE = FCF - Interest(1-\tau) + Net\ Borrowing$$

- These are the cash-flows the corporation would have available for distribution to equity holders



Project level incremental FCF (operations)

$$\begin{aligned} \text{Incremental FCF} = & \\ & \text{Change in EBIT}(1-\tau) \\ & + \text{Change in Dep} \\ & - \text{Change in CAPEX} \\ & - \text{Change in } \Delta WK \end{aligned}$$



Project level incremental FCFE (operations)

$$\begin{aligned} \text{Incremental FCFE} = & \\ & \text{Incremental FCF} \\ & - \text{Change in Interest}(1-\tau) \\ & - \text{Change in Net Borrowing} \end{aligned}$$



Cash flows from reversion

Incremental FCF from reversion =
Net disposition/salvage price
- Transaction costs (broker fee, e.g.)
- Capital gains taxes
- Depreciation recapture taxes

Incremental FCE from reversion =
Incremental FCF from reversion
- Debt principal due on sale



Bottom line

1. Invest if the present value of incremental *FCFs* discounted at *WACC* is non-negative (=invest if $NPV \geq 0$)
2. Invest if the PV of incremental *FCE* discounted at the required return on equity exceeds the equity cost (=cost of the investment –investment by debt-holders)



Capital budgeting credo

1. Ignore sunk costs

Ex: marketing study performed two years ago is not part of NPV calculation today

2. Include all opportunity costs

Ex: value of land the corporation already owns is part of NPV calculation today

3. Get a good tax accountant

Ex: cost segregation or default schedule?

4. Spend your time on make-or-break assumptions (= assumptions about which you are most uncertain AND move the dial)



Example 1: building a plastic injection plant

- Download case from my webpage
- Build the corresponding pro-forma



Example: buy or lease

- In our plastic injection plant example, assume that the corporation can lease the facility instead of building it
- Lease set-up (brokers, repurpose...) costs are \$1M
- Lease is \$1.2m a year
- Should the corporation buy or lease?
- Two steps (this part never changes):
 1. What are incremental cash flows?
 2. What is the appropriate discount rate?



Multiple projects

- Among mutually exclusive projects, pick the one with the highest NPV
- Even if the projects are of very different sizes, this is a (tautologically) sound decision rule as long as the opportunity cost of capital is properly measured
- Why?
- All independent projects with positive NPV should be undertaken

