

Synergies: basic calculations

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How to measure the Net Present Value of an investment

- To measure the NPV we need to calculate the following variables:
 - ✓ The FREE CASH FLOW TO FIRM (FCFF) or the FREE CASH FLOW TO EQUITY
 - ✓ The WEIGHED AVERAGE COST OF CAPITAL
- In its turn, to measure the WEIGHED AVERAGE COST OF CAPITAL we need to measure:
 - ✓ The cost of debt
 - ✓ The cost of equity
- Such variables serve to measure the Discount Cash Flow of an investment.

Measuring the FCF

- The two different types of cash flow have a different use.
- FCFF is a measurement of a company's profitability after all expenses and reinvestments. It's used to analyze financial health.
- FCFE is a metric of how much cash can be distributed to the equity shareholders of the company as dividends or stock buybacks—after all expenses, reinvestments, and debt repayments.

FCFF

Revenues

- Cost of sold goods
- Other operating costs
- Amortizations

= EBIT

- Taxes on Operating Income

= NOPAT

- + Amortizations - Appreciations in receivables and inventories
- + Appreciations in commercial liabilities – Net Investment Flow

= Free Cash flow to Firm (FCFF)

FCFE

Revenues

- Cost of sold goods
- Other operating costs
- Amortizations

= EBIT

- Interest and taxes

= Net Profit

- + Amortizations - Appreciations in receivables and inventories
- + Appreciations in commercial liabilities – Net Investment Flow

= Free Cash flow to Equity (FCFE)

The Weighed Average Cost of Capital

$$WACC = k_d * (1-t) * \frac{D}{E+D} + k_e * \frac{E}{E+D}$$



Cost of Debt after taxes

Cost of Equity

The cost of debt

- Calculate the total amount of interest the company is paying on each of its debts for the year.
- Then divide this number by the total of all debt.
- **The quotient is its cost of debt.**
- To calculate after-tax cost of debt: subtract a company's effective tax rate from 1, and multiply the difference by its cost of debt.

The cost of Equity

$$\mathbf{E}[r_i] = \beta_{im} (\mathbf{E}[r_m] - r_f) + r_f$$

Cost of equity

Systematic risk of the firm

Average cost of Equity for the industry/business (considering the peer group of comparables companies)

Risk free rate, usually assumed equal to 10-Year Government Bond Yields

The cost of Equity

$$\beta_{im} = \frac{\text{cov}(r_i, r_m)}{\text{var}(r_m)}$$

$$\text{Var}(X) = \left(\sum_{i=1}^n p_i x_i^2 \right) - \mu^2,$$

$$\text{cov}(X, Y) = \sum_{i=1}^n p_i \cdot (x_i - E(X)) \cdot (y_i - E(Y)).$$

The DCF

- (see the specific set of slides): Prof. A. Renzi, basic venture evaluation metrics (title of the set of slides), topic DCF, course Entrepreneurship and New Ventures Finance, published on the website of the Department.

Evaluating synergies: the linear approach

- First, we need to measure the DCF for each business under evaluation
- Second, we need to compare the value basing on the one-sided/two-sided approach.
- Though, this is a very imprecise and rough metric for evaluating synergies, since it doesn't consider the value of strategic flexibility and other non-linear relationships and implications.
- Also, an accurate evaluation of synergies consider the type of synergy, and, thus, the cost of modication of resources required for implemetation, as well as other costs, as instance, governance cost.