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What Are DCF And WACC?

A DCF takes a cash flow occurring in the future and calculates how much would be paid for it today.

Imagine investing 100.0 today with a 10.0% return.

Time	0	1	2	3
Cash flow	100.0	110.0	121.0	133.1

x (1+10.0%) x (1+10.0%) x (1+10.0%)

But what if it happened in reverse? You are offered 133.1 in 3 years time, and you require a 10.0% return. How much should you pay *now* ?

Time	0	1	2	3
Cash flow	100.0	110.0	121.0	133.1

/ (1+10.0%) / (1+10.0%) / (1+10.0%)

The 100.0 represents the present value of a 133.1 future cash flow.

The investor's 10.0% *required return* also represents a *cost of capital* of 10.0% for the company being invested in.

When the company sources cash from a variety of places, a *weighted average cost of capital* (or WACC) is calculated.

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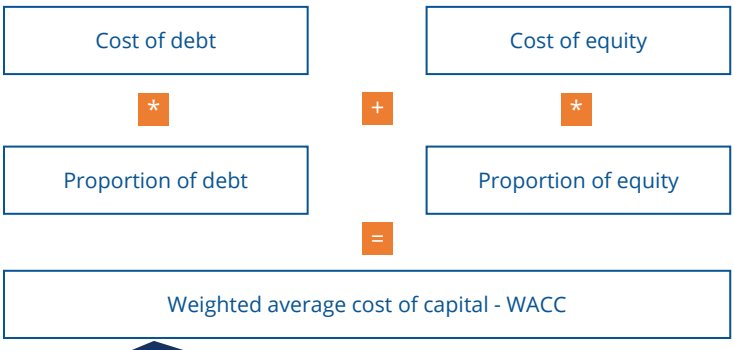
Weighted Average Cost of Capital



The valuation is very sensitive to WACC
Cost of debt and especially cost of equity are difficult to accurately calculate

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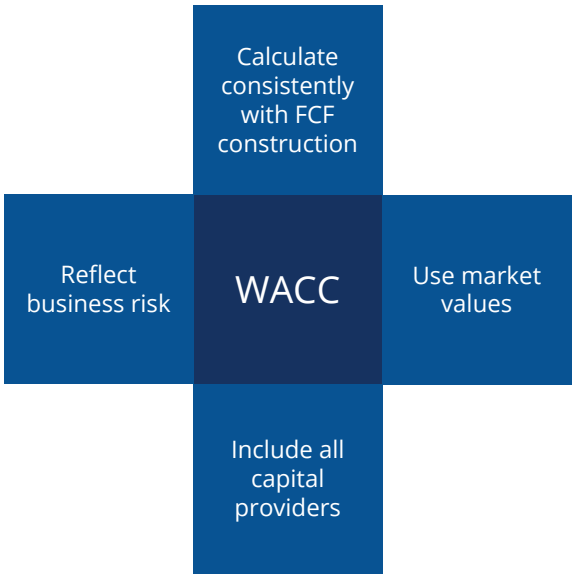

WACC Formula

$$WACC = K_e * \frac{E}{E+D} + K_d * (1 - tax) * \frac{D}{E+D}$$

- K_e: Required return on equity
- $\frac{E}{E+D}$: Market value of equity
- K_d: Cost of debt
- $(1 - tax)$: MTR
- $\frac{D}{E+D}$: Market value of debt

Cost of Debt

The financial markets help us price risk - what return do investors expect for investing in company debt?

Ensure your cost of debt reflects the long-term capital structure

Use a current market cost of debt for ten year

Maturity	Yield	S&P Rating
1.0	0.87%	BBB
2.0	1.54%	BBB
3.0	1.60%	BBB
3.0	2.23%	BBB
5.0	2.77%	BBB
7.0	3.63%	BBB
10.0	4.67%	BBB
16.0	5.01%	BBB
22.0	5.02%	BBB
23.0	5.07%	BBB

Closest to the ten year maturity

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Cost of Debt

Only use IS / BS numbers as a last resort!

Publicly traded debt	Rated debt but not publicly traded	Not rated, not traded
• Use observed market data	• Benchmark to similar credits	• Benchmark to companies with similar risk profiles

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Cost of Equity – CAPM

$$K_e = r_f + \beta \times (r_m - r_f)$$

The return investors require for taking "no" risk. Typically 10 year benchmark government bond yields

Risk free returns (r_f)

+

The additional risk investors require to compensate for non-diversifiable, stock specific risk

The additional risk investors require to invest in the overall stock market

Risk premium for taking equity risk ($r_m - r_f$)

X

Beta adjustment
>1, riskier
<1, less risky

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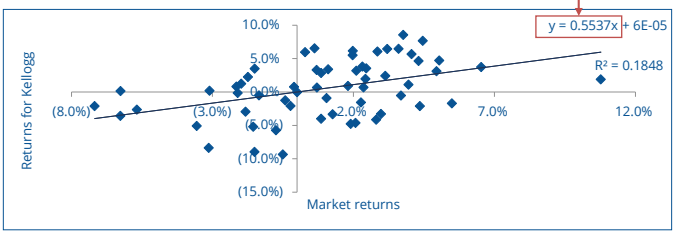
Beta

Ticker	Company Name	Levered Beta
NYSE:k	Kellogg Company	0.55367
NYSE:CAG	ConAgra Foods, Inc.	0.39296
NYSE:GIS	General Mills, Inc.	0.34355
NYSE:CPB	Campbell Soup Company	0.54608
NYSE:HSY	The Hershey Company	0.34460
NasdaqGS:MDLZ	Mondelez International, Inc.	0.97002
NYSE:HRL	Hormel Foods Corporation	0.71835
NYSE:DF	Dean Foods Company	0.96572
NYSE:WWAV	The WhiteWave Foods Company	1.76027

The slope of the line in the correlation is the beta



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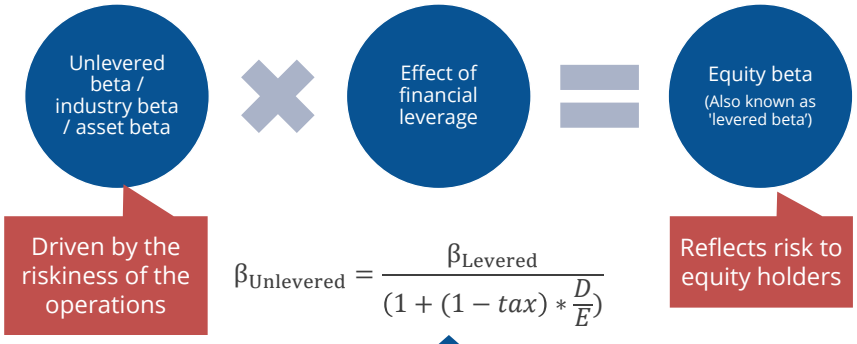
Beta



$$\beta_{Unlevered} = \frac{\beta_{Levered}}{(1 + (1 - tax) * \frac{D}{E})}$$

$$\beta_{Levered} = \beta_{Unlevered} * (1 + (1 - tax) * \frac{D}{E})$$

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Risk Premium – Historical

Arithmetic average returns

	S&P 500	10-Yr T. bond	Risk premium
1928-2015	11.41%	5.23%	6.18%
1965-2015	11.01%	7.12%	3.89%
2005-2015	9.03%	5.16%	3.88%

Geometric average returns

	S&P 500	10-Yr T. bond	Risk premium
1928-2015	9.50%	4.96%	4.54%
1965-2015	9.61%	6.71%	2.90%
2005-2015	7.25%	4.71%	2.53%

$$K_e = r_f + \beta \times (r_m - r_f)$$

Equity return minus T-bond return = equity risk premium

Source: Aswath Damodaran

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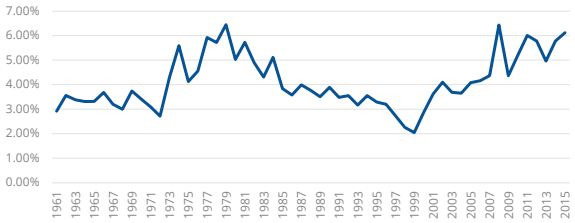
Risk Premium – Implied

$$Aggregate\ value\ of\ equities = \frac{Aggregate\ Dividend_{t+1}}{Ke\ -\ LT\ growth\ rate}$$

$$K_e = \frac{Aggregate\ Dividend_{t+1}}{Aggregate\ Value\ of\ equities} + LT\ growth\ rate$$



Source: Aswath Damodaran

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Capital Structure – Current Versus Target

WACC calculation should be based on target capital structure

A peer group analysis can give guidance as to expected long term capital structure

Outlier

	Debt / (debt + equity)
Mondelez International, Inc.	21.9%
ConAgra Foods, Inc.	30.2%
Kellogg Company	23.9%
General Mills, Inc.	21.4%
Campbell Soup Company	20.5%
Danone	26.2%

The food industry comparables indicate that the optimal capital structure for the industry is 20 – 25% debt / capital

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WACC Sensitivity Analysis

WACC, along with long term growth rate is hugely important in a DCF valuation

A sensitivity table will allow you to get a sense of the impact

		Long term growth rate				
		2.4%	**2.2%**	**2.0%**	**1.8%**	**1.6%**
WACC	**8.1%**	16.03	15.40	14.80	14.25	13.73
	8.3%	15.00	14.42	13.87	13.36	12.88
	8.5%	14.04	13.50	13.00	12.53	12.08
	8.7%	13.14	12.64	12.18	11.74	11.33
	8.9%	12.29	11.84	11.41	11.00	10.62

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