

What is debt?

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- General Rule: Debt generally has the following characteristics:
 - ▣ Commitment to make fixed payments in the future
 - ▣ The fixed payments are tax deductible
 - ▣ Failure to make the payments can lead to either default or loss of control of the firm to the party to whom payments are due.
- As a consequence, debt should include
 - ▣ Any interest-bearing liability, whether short term or long term.
 - ▣ Any lease obligation, whether operating or capital.

Estimating the Cost of Debt

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- If the firm has bonds outstanding, and the bonds are traded, the yield to maturity on a long-term, straight (no special features) bond can be used as the interest rate.
- If the firm is rated, use the rating and a typical default spread on bonds with that rating to estimate the cost of debt.
- If the firm is not rated,
 - and it has recently borrowed long term from a bank, use the interest rate on the borrowing or
 - estimate a synthetic rating for the company, and use the synthetic rating to arrive at a default spread and a cost of debt
- The cost of debt has to be estimated in the same currency as the cost of equity and the cash flows in the valuation.

The easy route: Outsourcing the measurement of default risk

- For those firms that have bond ratings from global ratings agencies, I used those ratings:

Company	S&P Rating	Risk-Free Rate	Default Spread	Cost of Debt
Disney	A	2.75% (US \$)	1.00%	3.75%
Deutsche Bank	A	1.75% (Euros)	1.00%	2.75%
Vale	A-	2.75% (US \$)	1.30%	4.05%

- If you want to estimate Vale's cost of debt in \$R terms, we can again use the differential inflation approach we used for the cost of equity:

$$\begin{aligned}\text{Cost of debt}_{RS} &= (1 + \text{Cost of debt}_{US\$}) \frac{(1 + \text{Expected Inflation}_{RS})}{(1 + \text{Expected Inflation}_{US\$})} - 1 \\ &= (1.0405) \frac{(1.09)}{(1.02)} - 1 = 11.19\%\end{aligned}$$

A more general route: Estimating Synthetic Ratings

- The rating for a firm can be estimated using the financial characteristics of the firm. In its simplest form, we can use just the interest coverage ratio:
$$\text{Interest Coverage Ratio} = \text{EBIT} / \text{Interest Expenses}$$
- For the non-financial service companies, we obtain the following:

Company	Operating income	Interest Expense	Interest coverage ratio
Disney	\$10.023	\$444	22.57
Vale	\$15,667	\$1,342	11.67
Tata Motors	Rs 166,605	Rs 36,972	4.51
Baidu	CY 11,193	CY 472	23.72
Bookscape	\$2,536	\$492	5.16

Interest Coverage Ratios, Ratings and Default Spreads- November 2013

<i>Large cap (>\$5 billion)</i>	<i>Small cap or risky (<\$5 billion)</i>	<i>Rating is (S&P/ Moody's)</i>	<i>Spread (11/13)</i>
>8.50	>12.5	Aaa/AAA	0.40%
6.5-8.5	9.5-12.5	Aa2/AA	0.70%
5.5-6.5	7.5-9.5	A1/A+	0.85%
4.25-5.5	6-7.5	A2/A	1.00%
3-4.25	4.5-6	A3/A-	1.30%
2.5-3	4-4.5	Baa2/BBB	2.00%
2.25-2.5	3.5-4	Ba1/BB+	3.00%
2-2.25	3-3.5	Ba2/BB	4.00%
1.75-2.25	2.5-3	B1/B+	5.50%
1.5-1.75	2-2.5	B2/B	6.50%
1.25-1.5	1.5-2	B3/B-	7.25%
0.8-1.25	1.25-1.5	Caa/CCC	8.75%
0.65-0.8	0.8-1.25	Ca2/CC	9.50%
0.2-0.65	0.5-0.8	C2/C	10.50%
<0.2	<0.5	D2/D	12.00%

Disney: Large cap, developed	22.57	→	AAA
Vale: Large cap, emerging	11.67	→	AA
Tata Motors: Large cap, Emerging	4.51	→	A-
Baidu: Small cap, Emerging	23.72	→	AAA
Bookscape: Small cap, private	5.16	→	A-

Synthetic versus Actual Ratings: Rated Firms

- Disney's synthetic rating is AAA, whereas its actual rating is A. The difference can be attributed to any of the following:
 - Synthetic ratings reflect only the interest coverage ratio whereas actual ratings incorporate all of the other ratios and qualitative factors
 - Synthetic ratings do not allow for sector-wide biases in ratings
 - Synthetic rating was based on 2013 operating income whereas actual rating reflects normalized earnings
- Vale's synthetic rating is AA, but the actual rating for dollar debt is A-. The biggest factor behind the difference is the presence of country risk, since Vale is probably being rated lower for being a Brazil-based corporation.
- Deutsche Bank had an A rating. We will not try to estimate a synthetic rating for the bank. Defining interest expenses on debt for a bank is difficult...

Estimating Cost of Debt

- For Bookscape, we will use the synthetic rating (A-) to estimate the cost of debt:
 - Default Spread based upon A- rating = 1.30%
 - Pre-tax cost of debt = Riskfree Rate + Default Spread = 2.75% + 1.30% = 4.05%
 - After-tax cost of debt = Pre-tax cost of debt (1- tax rate) = 4.05% (1-.40) = 2.43%
- For the three publicly traded firms that are rated in our sample, we will use the actual bond ratings to estimate the costs of debt.

Company	S&P Rating	Risk-Free Rate	Default Spread	Cost of Debt	Tax Rate	After-Tax Cost of Debt
Disney	A	2.75% (US \$)	1.00%	3.75%	36.1%	2.40%
Deutsche Bank	A	1.75% (Euros)	1.00%	2.75%	29.48%	1.94%
Vale	A-	2.75% (US \$)	1.30%	4.05%	34%	2.67%

- For Tata Motors, we have a rating of AA- from CRISIL, an Indian bond-rating firm, that measures only company risk. Using that rating:

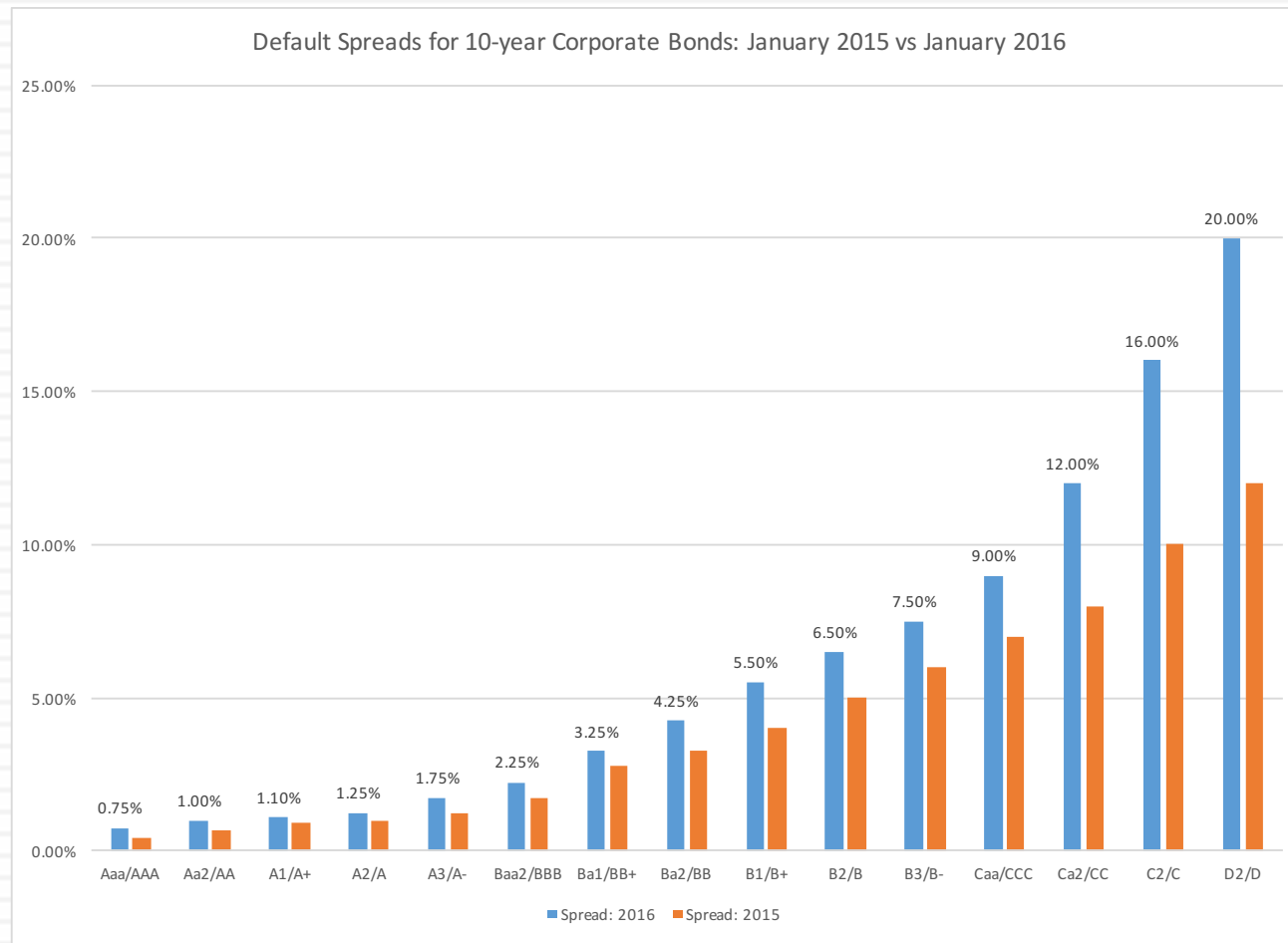
$$\text{Cost of debt}_{\text{TMT}} = \text{Risk free rate}_{\text{Rupees}} + \text{Default spread}_{\text{India}} + \text{Default spread}_{\text{TMT}}$$

$$= 6.57\% + 2.25\% + 0.70\% = 9.62\%$$
 After-tax cost of debt = 9.62% (1-.3245) = 6.50%

Updated Default Spreads – January 2016



Default Spreads – January 2016



Application Test: Estimating a Cost of Debt

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- Based upon your firm's current earnings before interest and taxes, its interest expenses, estimate
 - ▣ An interest coverage ratio for your firm
 - ▣ A synthetic rating for your firm (use the tables from prior pages)
 - ▣ A pre-tax cost of debt for your firm
 - ▣ An after-tax cost of debt for your firm