

## Bond Ratings and the Cost of Debt

**Objective:** The purpose of this assignment is to introduce you to how to calculate a synthetic bond rating and also the cost of debt. We will look at two companies in helping you to understand the interrelationship between the financial statements, financial ratios, bond ratings, the term structure of interest rates, and the cost of debt.

### Companies:

**Disney (DIS):** The first company we will look at is the Walt Disney Company (<http://disney.go.com/>), The Walt Disney Company is the #2 media conglomerate in the world. Disney owns the ABC television network, 10 broadcast TV stations, 55 radio stations as well as having stakes in cable channels such as ESPN(80%) and A&E(38%). It also produces films through Touchstone, Hollywood Pictures, and Miramax studios. In addition to this, it owns theme parks around the world including Walt Disney World and Disneyland.



On Monday, August 5, 2002 at 4 p.m. Reuters reported that the company was put on review for a possible downgrade. The move by Moody's followed a similar move by Standard & Poor's last week (Friday, August 2, 2002). Currently, Moody's rates the credit of Disney at A3 while Standard & Poor's rates the company an A- and has put Disney on CreditWatch with negative implications. Moody's said its review was prompted by "ongoing concerns about the outlook for the company's theme park operations, uncertainty about viewer advertiser share momentum at its ABC networks, and the company's high debt burden versus operating and free cash flow for the A3



**Sprint (SDE):** The second firm that we will focus on is Sprint Corporation. Sprint Corporation is the holding company for its two divisions. Its larger division, Sprint FON, includes local access, long-distance, and Internet transport among its wireline services. This operating unit also includes product distribution, directory publishing, and stakes in other telecom operations. Sprint PCS, the other division, operates a nationwide digital wireless network. Each division trades on the NYSE as a tracking stock with the ticker symbols FON and PCS respectively.

On June 7, 2002 at 4 p.m. Reuters reported that Sprint's credit ratings on Sprint's senior unsecured debt were cut to "Baa3" one notch above "junk" status by Moody's Investors Service. Moody's said the number 3 U.S. long-distance phone company may struggle to raise cash amid weak demand and intense pressure to cut prices. The downgrade affects about \$22 billion in debt. Sprint's senior debt is rated "BBB+" by Standard & Poor's with a negative outlook.

**Assignment:** Download the fm\_debt2003.xls data file from my website and use it to answer the following questions. Please do all calculations on the downloaded spreadsheet in the templates provided (fill in the yellow boxes).

1. Impact of the news of a downgrade of debt on a firm's stock price.
  - a. Graph the stock price of Disney starting several days prior to the downgrade and continuing a few days after the downgrade. Highlight the impact of the news announcement of a debt downgrade on the price. Did the news of the S&P downgrade have any impact on the stock price? Did the news of the Moody's downgrade the next day also have an impact on the stock? Did the market anticipate the news of a downgrade on the stock i.e., did the stock price react more than one day before the news of a downgrade? Please explain if the answer is yes to the previous question.
  - b. Provide a separate graph the historical stock price of each of Sprint's tracking stocks, FON and PCS. Highlight the impact of the news announcement of a debt downgrade on the price of the tracking stock. Did the news have any impact on the stock price of either tracking stock? Did the market anticipate the news of a downgrade on the stock i.e., did the stock price react more than one day before the news of a downgrade?
  - c. Why would news about debt have an impact on equity? Please explain.
2. Imputed bond ratings using z-scores.
  - a. Calculate the z-scores for Disney for the trailing twelve months using the two versions of the Altman z-score model located in the Appendix to this handout (use the DIS\_10Q worksheet). Next, do the same calculations for each of the years in the 10K (use the DIS\_10K worksheet). Graph your results. What is the bond rating for the most recent (3/30/2002) quarter using the first model (EM model)? If it is between two bond ratings, please give the range that it is between. What is the condition of Disney's financial health according to the Altman's original model (model 2)?
  - b. Calculate the z-scores for Sprint for the trailing twelve months using the two versions of the Altman z-score model located in the Appendix to this handout (use the SDE\_10Q worksheet). Next, do the same calculations for each of the years in the 10K (use the SDE\_10K worksheet). Graph your results. What is the bond rating for the most recent (3/30/2002) quarter using the first model (EM model)? If it is between two bond ratings, please give the range that it is between. What is the condition of Sprint's financial health according to the Altman's original model (model 2)?

- c. Discuss which firm (Disney or Sprint) is in worst financial condition based on the Altman EM score. Based on the results of the Altman EM score model, were the rating agencies slow to “pull the trigger” in downgrading both companies? If so, why? Please explain.

### 3. Imputed bond ratings using the interest coverage ratio.

- a. Calculate the interest coverage ratio (EBIT/Interest Expense) for Disney for the trailing twelve months and also for each of the years in the 10K. Graph your results. What is the bond rating for the trailing twelve months using the information on your data worksheet?
- b. Calculate the interest coverage ratio (EBIT/Interest Expense) for Sprint for the trailing twelve months and also for each of the years in the 10K. Graph your results. What is the bond rating for the trailing twelve months using the information on your data worksheet?
- c. Discuss to what extent the imputed bond ratings using the interest coverage ratio are similar or different from those using the Altman EM-score method. Which one would you use if there were differences in the results? Why?

### 4. Calculating the Cost of Debt.

- a. Calculate the before tax and after tax cost of debt of Disney for the trailing twelve months (TTM) using the implied bond rating from the EM model, the interest coverage approach, and the actual bond rating. Assume that Disney's marginal tax rate is 40%. Use the 5-year and also the 10-year Treasury bonds as the benchmarks in calculating the cost of debt. Please discuss how the actual bond rating compares to the imputed bond rating from using the Altman model and also the interest coverage approximation. Your discussion should include how the cost of debt varies with the bond rating and also the maturity. Be specific.
- b. Calculate the before tax and after tax cost of debt of Sprint for the trailing twelve months (TTM) using the implied bond rating from the EM model, the interest coverage approach, and the actual bond rating. Assume that Sprint's marginal tax rate is 31%. Use the 5-year and also the 10-year Treasury bonds as the benchmarks in calculating the cost of debt. Please discuss how the actual bond rating compares to the imputed bond rating from using the Altman model and also the interest coverage approximation. Your discussion should include how the cost of debt varies with the bond rating and also the maturity. Be specific.

Please turn in a hard copy of your work together with your disk. This is an individual project. Anyone caught cheating will be given an F on this project.

## Appendix A: Altman Z-Score Model

There are several versions of the Altman z-score model. We will use two versions of his model. Professor Edward Altman of NYU developed these models using multiple discriminant analysis in conjunction with financial ratios to predict the probability of business failure leading to bankruptcy.

**Model 1:** The EM-score (emerging markets) model is defined as

$$\text{EM Score} = 3.25 + 6.56(X_1) + 3.26(X_2) + 6.72(X_3) + 1.05(X_4)$$

where  $X_1 = \text{Working Capital/Total Assets} = (\text{Current Assets} - \text{Current Liabilities})/\text{TA}$   
 $X_2 = \text{Retained Earnings/Total Assets}$   
 $X_3 = \text{EBIT/Total Assets}$   
 $X_4 = \text{Book Value of Equity/Total Liabilities}$

Bond Rating	Altman Z-Score	Bond Rating	Altman Z-Score
AAA	8.15	BB+	5.25
AA+	7.60	BB	4.95
AA	7.30	BB-	4.75
AA-	7.00	B+	4.50
A+	6.85	B	4.15
A	6.65	B-	3.75
A-	6.40	CCC+	3.20
BBB+	6.25	CCC	2.50
BBB	5.85	CCC-	1.75
BBB-	5.65	D	0.00



Ed Altman, NYU

**Model 2:** This is the original version of Altman's model that is on the Bloomberg machine and websites such as <http://www.jaxworks.com/calc2.htm> as a worksheet.

$$Z = 1.21(Y_1) + 1.4(Y_2) + 3.3(Y_3) + .6(Y_4) + 1.0(Y_5)$$

where  $Y_1 = \text{Working Capital/Total Assets}$   
 $Y_2 = \text{Retained Earnings/Total Assets}$   
 $Y_3 = \text{EBIT/Total Assets}$   
 $Y_4 = \text{Book Value of Equity/Total Liabilities}$   
 $Y_5 = \text{Sales/Total Assets}$

A Z-Score  $\geq 2.99$  indicates that the firm is solvent (e.g., is in good shape)

$1.81 \leq \text{Z-Score} \leq 2.99$  indicates a warning

Z-Score  $< 1.81$  indicates that the firm could be heading towards bankruptcy

Note: The z-score represents a point in time. As such, the z-scores should be examined over time. Consistently low scores each year are more of a concern than a one time low score. The model is applicable to *manufacturing* firms.