

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:

Maytag (MYG): The first company we will look at is Maytag. Maytag, which commenced operations under the name of Parsons Bandcutter and Self Feeder Company, is the #3 US manufacturer of home appliances, after Whirlpool and GE. It not only sells washers, dryers, dishwashers, refrigerators, and cooking appliances under high-end brand names Maytag, Amana, and Jenn-Air and lower-priced brands Magic Chef and Admiral but it also makes Hoover vacuums (#1 in the US) and Dixie-Narco beverage



vending machines. Maytag is part of the S&P500 and is one of the Fortune 500 companies. The firm has had some difficulties recently. On March 11th, Maytag announced that its first quarter earnings will not meet expectations of 71 cents. On May 8, 2003 Moody's placed Maytag Corporations Baa1 long term ratings on review for a possible downgrade. On April 16th Maytag announced that it expects full year 2003 reported earnings to be in the range of \$1.80 to \$1.90 per share missing Wall Street analysts expectations of \$2.70 per share in the same period. The Company cited

challenging business conditions as the primary reason for its expected shortfall. As a result, Maytag will eliminate about 500 jobs, or 8% of its salaried positions during the second quarter.

Wackenhut (WHC): The second firm that we will focus on is Wackenhut Corrections Corporation. Wackenhut Correction Corporation is one of the largest operators of private correctional facilities in the US offering a range of correctional and related institutional services to government agencies. Danish security firm Group 4 Falck, which acquired the company's former parent, Wackenhut Corporation, owns 56% of Wackenhut Corrections. In addition to prison management, Wackenhut Corrections provides its government clients with facility design, construction, and help with financing. The company also operates psychiatric hospitals and immigration facilities. On May 2, 2003 Moody's placed Wackenhut's Ba3 rating under review for a possible downgrade.



Assignment: Download the fm_debt_fall2003.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 Maytag starting several days prior to the downgrade and continuing a few days after the downgrade. Highlight the impact of the news announcement of a possible debt downgrade on the price. Did the news of the Moody's possible downgrade 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 graph of the stock price for Wackenhut Corrections. Highlight the impact of the news announcement of a possible debt downgrade on the price of the stock. Did the news have any impact on the stock price? 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? Was there any other news announcement around the time of the news concerning the possible downgrade? If so, what was the other news announcement and what impact would this news announcement have on the stock price.
 - 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 Maytag for the trailing twelve months using the two versions of the Altman z-score model located in the Appendix to this handout (use the MYG_10Q worksheet). Next, do the same calculations for each of the years in the 10K (use the MYG_10K worksheet). Graph your results. What is the bond rating for the most recent (3/31/2003) 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 Maytag's financial health according to the Altman's original model (model 2)?
 - b. Calculate the z-scores for Wackenhut Corrections for the trailing twelve months using the two versions of the Altman z-score model located in the Appendix to this handout (use the WHC_10Q worksheet). Next, do the same calculations for each of the years in the 10K (use the WHC_10K worksheet). Graph your results. What is the bond rating for the most recent (12/29/2002) 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 Wackenhut's financial health according to the Altman's original model (model 2)?

- c. Discuss which firm (Maytag or Wackenhut) 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 Maytag 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 Wackenhut Corrections 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 Maytag 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 Maytag'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 Wackenhut 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 Wackenhut'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 ≥ 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.