

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:

- **Xerox (XRX):** The first company we will look at is Xerox (<http://www.xerox.com/>), a leader in the global document market. Xerox has recently fallen on hard times due in part to "aggressive" acquisitions (paying too much of a premium) and too many acquisitions. For example, on January 3, 2000 Xerox completed the acquisition of Tektronix Inc.'s Color Printing and Imaging Division for \$925 million. On March 31st, the company embarked on a restructuring program announcing that it would take a pre-tax charge of approximately \$625 million in the first quarter of 2000. This charge includes the elimination of 5,200 positions and \$175 million related to facility closings. G. Richard Thoman, the president, CEO, and COO of Xerox, resigned on May 11th. Paul A. Allaire replaced him as president and CEO. On September 7th, Moody's lowered its long term rating of Xerox to Baa2 from A3. On October 9th, Xerox cut its quarterly dividend per share from 20¢ to 5¢ (-75%) to reduce cash requirements by approximately \$400 million on an annualized basis. This has led to market rumors that Xerox may soon file for Chapter 11 bankruptcy. On October 19th, Moody's placed Xerox's credit rating under review for a possible further downgrade. On October 24th, Xerox outlined an even more aggressive turnaround program that includes cutting \$1 billion in costs and selling off assets to raise \$2 billion to \$4 billion.



- **Zany Brainy (ZANY):** The second firm that we will focus on is Zany Brainy, (<http://www.zanybrainy.com/>) which recently completed its acquisition of Noodle Kidoodle on July 27, 2000. It is a specialty retailer of high quality toys, games, books and multimedia products for kids up to 12 years of age. As of September 5, 2000, the Company operated 179 stores in 34 states.

Date went public: June 3, 1999

Proposed offer price: \$10-\$12 per share

Actual offer price: \$10

First day close: \$11.38

Shares offered: 6.1 million

Offering amount (mil): \$61

Underwriters: DLJ, BT Alex Brown, William Blair & Co., U.S. Bancorp Piper Jaffray



Assignment: Download the fm_XRX2000.xls data file from my website and use it to answer the following questions. Please do all calculations on the downloaded spreadsheet.

1. Calculate the z-scores for Xerox for the trailing twelve months using the two versions of the Altman z-score model located in the Appendix to this handout (use the XRX 10Q worksheet). Next, do the same calculations for each of the years in the 10K (use the XRX 10K worksheet). (**Note:** The cost of goods sold figure for Xerox includes depreciation and amortization). Graph your results. What is the bond rating for the most recent (6/30/2000) quarter using the first model (EM model)? Is Xerox heading towards bankruptcy according to the Altman's original model (model 2)?

2. Calculate the interest coverage ratio (EBIT/Interest Expense) for Xerox 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? Set any NA in the worksheet to zero e.g., NA = 0.

3. Calculate the before tax and after tax cost of debt for the trailing twelve months (TTM) using the implied bond rating from the EM model, the interest coverage approach, and the actual bond rating? For actual bond rating with respect to the TTM, use the bond rating as of September 7th of 2000. Assume that Xerox's marginal tax rate is 30%. Use the 10-year Treasury bond as the benchmark.

	Before Tax Cost of Debt		After Tax Cost of Debt	
	1999	TTM	1999	TTM
Altman EM model				
Interest coverage				
Actual bond rating from Moody's				

4. Calculate the z-score for Zany Brainy for the most recent 10K (1/29/2000) using Altman's original model (model 2). Was Zany Brainy in good health as of 1/29/2000? (**Note:** The cost of goods sold figure includes depreciation and amortization). What is the implied bond rating using the interest coverage ratio applied to the most recent 10K?

5. Calculate the z-score for Zany Brainy for the trailing twelve months (TTM) using Altman's original model (model 2). Is Zany Brainy currently in good health? (**Note:** The cost of goods sold figure includes depreciation and amortization). What is the implied bond rating using the interest coverage ratio applied to the TTM? What is the cost of debt for Zany Brainy based on the interest coverage ratio based on the TTM? Assume a marginal tax rate of 30% and use the 10-year Treasury bond as the benchmark. Use the bond spread that is the closest to your imputed bond rating.

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 = Working Capital/Total Assets = (Current Assets - Current Liabilities)/TA
 X_2 = Retained Earnings/Total Assets
 X_3 = EBIT/Total Assets
 X_4 = 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 = Working Capital/Total Assets
 Y_2 = Retained Earnings/Total Assets
 Y_3 = EBIT/Total Assets
 Y_4 = Book Value of Equity/Total Liabilities
 Y_5 = 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.