



Summer 2005

EXPERT

AICPA Newsletter for Providers of Business Valuation & Litigation Services

Contents

- 5 Identifying and Measuring Personal Goodwill in a Professional Practice—Part II: Using the Single Period Capitalization Model
- 7 Reorganizing in Response to Accounting Industry Issues
- 8 *In the Know...*Ibbotson's Industry Risk Premiums Are Based on Betas
- 7 A Poor Growth Strategy for CPA Firms: M&As
- 11 Essential Tools for Valuation



USING ACCOUNTING DATA TO ESTIMATE A FIRM'S CREDIT-ADJUSTED RISK-FREE RATE

By Lindsey Lee, CPA/ABV, ASA, CFA

The credit-adjusted risk-free rate (CARFR) is a firm's interest rate based on its credit standing. A firm's CARFR is equal to the sum of the risk-free rate *plus* an adjustment for the firm's credit standing. The risk-free rate is the interest rate on risk-free securities with maturity dates coinciding with the expected timing of the cash flows underlying the liability. According to the Financial Accounting Standards Board (FASB), zero-coupon U.S. Treasury securities are the best example of risk-free securities in the United States.

The adjustment for credit standing measures the risk that a company will default on its debt. Such adjustment should take into account all items that would affect the underlying cash flows, such as loan terms, collateral, and existing guarantees. Many techniques are available to estimate an adjustment for risk or credit standing, such as matrix pricing, option-adjusted spread models, and fundamental analysis.¹ The FASB recognizes that, in many cases, a reliable estimate of the market risk premium may not be obtainable. Based on my experience, the Altman EM-Score model provides one of the most effective and efficient methods to determine a firm's credit standing. The following article presents the underlying principles in using present-value techniques

to measure the value of liabilities, discusses methods described by the FASB for determining a firm's CARFR, describes techniques to estimate a firm's credit standing, and presents an example of using Altman EM-Score to determine a firm's CARFR.

UNDERLYING PRINCIPLES OF USING PRESENT-VALUE TECHNIQUES TO MEASURE LIABILITIES

Currently, two FASB Statements of Financial Accounting Standards refer to using a credit-adjusted risk-free rate. FASB Statement No. 143, *Asset Retirement Obligations*, prescribes the policies for recognizing and measuring liabilities for an asset retirement obligation and the associated retirement costs. FASB Statement No. 146, *Accounting for Costs Associated with Exit or Disposal Activities*, sets the standards to recognize and measure the liability for costs associated with an exit or disposal activity. A proposed financial accounting standard, Exposure Draft 1201-100, *Proposed Statement of Financial Accounting Standards Fair Value Standards (ED 1201-100)*, also refers to using the credit-adjusted risk-free rate and describes its properties.

Both standards require a firm's CARFR to be used when the expected cash-flow approach² is used to measure a liability's fair value. The

¹ FASB Statement of Financial Accounting Concepts No. 7, paragraph 62.

² Also referred to as the *expected present value technique*.

expected cash-flow approach measures value by discounting expected cash flows rather than estimated cash flows. Expected cash flows are the probability-weighted average of a range of possible estimated cash flows. In contrast, estimated cash flows are the single most likely set of cash flows.

Both FASB Statements No. 143 and No. 146 allow either the expected cash-flow approach or the traditional approach³ to measure a liability's fair value. However, both Statements express a preference for the expected cash-flow approach. Regardless of which present value approach is used to measure a liability's fair value, both require a firm to use the CARFR to measure changes in the liability due to the passage of time.

FASB Statement of Financial Accounting Concepts No. 7, *Using Cash Flow Information and Present Value in Accounting Measurements*, provides the conceptual framework for using present-value techniques in accounting measurements. The Statement addresses only measurement issues, not reporting issues. Although it does not specifically refer to using CARFR, it does discuss the effect that an entity's credit standing has when using present-value techniques to measure liabilities.⁴ In an illustration of adjusting

the discount rate for a firm's credit standing, FASB Concepts Statement No. 7 acknowledges that adjustments for default risk can be reflected either in the discount rate or the estimated cash flows.⁵ The FASB believes it is easier and less complex to reflect the adjustment for default risk in the discount rate instead of the expected cash flows. To avoid double counting the effect of default risk, discount rates should reflect assumptions about default that are not included in assumptions regarding cash flows.⁶

ESTIMATING A FIRM'S CREDIT-ADJUSTED RISK-FREE RATE

The most effective method to determine a firm's CARFR is to observe the interest rate of a similar liability. However, it is highly unlikely that one can identify such a liability. In order for a liability to be considered similar to the liability being measured, the observed liability must meet the following criteria:

1. The observed liability's cash flows are similar to those of the liability being measured.
2. The borrower has a financial profile similar to that of the issuer.

If a comparable liability cannot be identified, the yield corporate bonds with comparable credit ratings as the issuer and similar term as the liability being measured can be used as

proxy for a firm's CARFR.⁷ In such a case, the adjustment for a firm's credit standing is the average spread for bonds with the same term as the liability being measured and with similar credit ratings as the company.

One of the best indicators of a company's credit standing is its bond rating. Many companies, however, do not have debt rated by an independent ratings agency. As a proxy for a credit rating, an analyst can derive a synthetic credit rating for the company. A synthetic rating is an estimate of the rating that would be assigned to a firm's bonds if such bonds were rated by a ratings agency. Synthetic credit ratings use financial ratios to estimate the credit rating that would be assigned to a company. By examining financial characteristics shared by firms within each ratings class, the most likely credit rating for a company can be determined. With the company's synthetic credit rating, an analyst can determine the spread to apply to the risk-free rate to determine the entity's CARFR.

The interest coverage ratio⁸ is one of the most effective ratios to estimate a firm's synthetic credit rating. This method is described in *Investment Valuation* by Dr. Aswath Damodaran. Although very easy to apply, a single financial ratio may

3 When using the traditional approach to measure fair value, estimated cash flows are discounted at a "rate commensurate with the risk."

4 FASB Concepts No. 7, paragraphs 78-88.

5 See Financial Accounting Standard No. 143, paragraph A21 describing FASB Concepts No. 7, Appendix A.

6 Exposure Draft 1201-100, *Proposed Statement of Financial Accounting Standards Fair Value Standards*, paragraph A.3.c.

7 See FASB Concepts No. 7, paragraph 118.

8 Interest Coverage ratio = Earnings before Interest and Taxes ÷ Interest Expense.

CPA Expert, Summer 2005, Volume 11, Number 1. Published by the American Institute of Certified Public Accountants. Copyright © 2005, by the American Institute of Certified Public Accountants, Harborside Financial Center, 201 Plaza Three, Jersey City, N.J. 07311-3881. Printed in the U.S.A. Subscription rates: \$76 a year; for AICPA members, \$72; for members of the AICPA BV/FLS Section, \$36. To order call 888-777-7077. *CPA Expert* is designed to provide timely nonauthoritative information only. It does not provide legal advice. The views of the authors and editors are their own, not those of the AICPA.

EDITORIAL ADVISERS

R. James Alerding, CPA/ABV
Clifton Gunderson, LLC
Indianapolis, IN

Thomas F. Burrage, CPA/ABV
Meyners & Company
Albuquerque, NM

Mark O. Diehrich, CPA/ABV
Diehrich & Wilson, P. C.
Framingham, MA

Robert E. Duffy, CPA/ABV, CFA, ASA
Brueggeman and Johnson, PC
Seattle, WA

Ronald L. Durkin, CPA, CFE, CIRA
KPMG
Los Angeles, CA

Nancy J. Fannon, CPA/ABV
Fannon Valuation Group
Portland, MA

Thomas E. Hilton, CPA/ABV
Anders, Minkler & Diehl, LLP
St. Louis, MO

Sandra K. Johnign, CPA
Dallas, TX

Harold G. Martin, Jr.
Keiter, Stephens, Hurst, Gary & Shreaves, PC
Glen Allen, VA

Susan L. Mueller, ASA
The Phoenix Group, Inc.
Cincinnati, OH

James S. Rigby, Jr., CPA/ABV
The Financial Valuation Group
Los Angeles, CA

Michael G. Ueltzen, CPA
Ueltzen & Company
Sacramento, CA

CONTRIBUTING EDITORS

Gary R. Trugman, CPA/ABV
Trugman Valuation Associates, Inc.
Rockaway, NJ

James R. Hitchner, CPA/ABV
The Financial Valuation Group
Atlanta, GA

Eva M. Long, CPA, ASA
The Financial Consulting Group
Memphis, TN

Mark L. Zyla, CPA/ABV
Acuitas, Inc.
Atlanta, GA

MANAGING EDITOR

William Moran
wmoran@aicpa.org

Table 1: Altman EM-Scores and Bond Ratings

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

Source: Edward I. Altman, *Predicting Financial Distress of Companies: Revisiting the Z-Score and Zeta® Models*, July 2000, <http://pages.stern.nyu.edu/~ealtman/Zscores.pdf>

not be the most reliable method to estimate a firm's credit rating. Analysts for credit ratings agencies rely on a much larger number of financial ratios to analyze a company's financial position and assign a credit

Table 2: Reuters Corporate Spreads for Industrials (June 19, 2005)

Rating	1yr	2yr	3yr	5yr	7yr	10yr	30yr
Aaa/AAA	5	10	15	20	25	30	56
Aa1/AA+	10	15	20	30	35	40	65
Aa2/AA	15	25	30	35	44	50	70
Aa3/AA-	20	30	35	45	52	61	81
A1/A+	25	35	40	50	55	67	88
A2/A	35	44	55	60	65	75	93
A3/A-	45	59	68	75	80	94	120
Baa1/BBB+	55	65	80	90	94	110	135
Baa2/BBB	60	75	100	105	112	129	155
Baa3/BBB-	75	90	110	115	124	152	185
Ba1/BB+	115	125	145	180	190	225	255
Ba2/BB	140	185	215	225	230	285	350
Ba3/BB-	165	205	235	255	260	310	375
B1/B+	190	215	250	260	285	370	400
B2/B	215	220	260	300	315	375	450
B3/B-	265	310	350	400	435	480	525
Caa/CCC	1125	1225	1250	1200	1200	1275	1400

Source: www.bonds-online.com/asp/corp/spreadbank.html

rating. For a more dependable estimate of a firm's credit standing, an analyst should rely on a model that uses multiple financial ratios.

THE ALTMAN EM-SCORE

The Altman EM-Score is one of the most recognized methods to estimate a firm's credit rating using multiple financial ratios. The Altman EM-Score is a derivative of the Altman Z-score, one of the best known bankruptcy prediction models. The model takes into account cash flow, operating earnings, liquidity, and debt to score a company's financial strength. Initially, Dr. Altman developed the Altman Z-Score to predict the probability of bankruptcy in publicly traded manufacturing firms. Since then, Dr. Altman has developed additional bankruptcy prediction models for service companies and privately held businesses.⁹ Dr. Edward Altman presented the first form of the Altman Z-Score in the late 1960s.

Currently, there are three forms of the Altman Z-Score. The Altman EM-Score is based on the most recently developed form, the Altman Z"-model. The Altman Z"-Model uses four financial ratios to predict the probability of default for manufacturers, non-manufacturer industrials, and emerging market credits. The table below presents the method to calculate a firm's Altman EM-Score

$$\begin{aligned}
 & 3.25 \text{ (Constant)} \\
 & + 6.56^* \text{ (Working Capital/Total Assets)} \\
 & + 3.26^* \text{ (Retained Earnings/Total Assets)} \\
 & + 6.72^* \text{ (EBIT/Total Assets)} \\
 & + 1.05^* \text{ (Book Value of Equity/Total Liabilities)} \\
 & = \text{Altman EM-Score}
 \end{aligned}$$

Table 1 presents the average Altman EM-Score by each S&P rat-

ings class. Based on this table, a company with an Altman EM-Score of 6.70 would have a synthetic credit rating of A.

Table 2 presents the average spread for industrial corporate bonds by rating and term. Cross-referencing to this table, the spread for a bond maturing in three years issued by a company with a current credit rating of A would be 0.44 percent.

EXAMPLE

Your firm has been engaged to audit a manufacturing company. At the beginning of the year, the client closed a manufacturing line because of a change in strategy. At that time, there was a remaining life of three years on the lease of equipment used to manufacture the line, with annual lease payments of \$425,000. As required by FASB Statement No. 146, the client recorded a liability for the costs associated with closing the line. The client used a credit-adjusted risk-free rate of 6.00% to discount the remaining cash flows under the operating lease.

The manager leading the audit has asked you whether the client's credit-adjusted risk-free rate is reasonable. The manager has provided you with the following information about the company's financial position when it closed the facility.

Table 3 on page 4 presents the client company's financial information as of the end of the previous year, which is used to calculate the company's EM-Score.

Your first step is to determine the risk-free rate for three-year U.S.

Treasury securities around the date the client closed the facility. During January 2004, the average interest rate on three-year constant maturity treasury securities was 2.27%.

The next step is to estimate the

⁹ A detailed discussion of the Altman Z-Score can be found in Gregory J. Eidleman, "Z Scores—A Guide to Failure Prediction," *The CPA Journal*, February 1995. www.nysscpa.org/cpajournal/old/16641866.htm.

company's credit rating. As presented in Table 4 below, the Altman EM-Score for the client company is 3.80. Referring to Table 1, a company with an Altman EM-Score of 3.80 would have a bond rating of B-.

Cross-referencing to Table 2, bonds with a term of three years that are rated B- have an average spread of 350 basis points. Adding the 350-basis-point spread to the risk-free rate of 2.27% results in the client company having an estimated credit-adjusted risk-free rate on a three-year liability of 5.77%.

Comparing the results of the analysis to the client's assumed credit-adjusted risk-free rate of 6.0%, the CARFR selected by the client is .23% higher than the one estimated using the client's Altman EM-Score. Based on this analysis, it appears the client's estimated CARFR may be reasonable.

CONCLUSION

The credit-adjusted risk-free rate represents a firm's interest rate based on its credit standing. As applied under FASB Statements No. 143 and No. 146, the CARFR is used to measure the fair value of certain liabilities and the interest expense to charge to those liabilities.

The best source of a company's CARFR is the interest rate charged on a similar liability of a company with a similar credit standing as the issuer. Finding such an observation is highly unlikely. The next best source is the interest rate of corporate bonds with ratings similar to the company and with a similar term as the liability being measured.

Most companies do not have rated debt. For such a company, the analyst can calculate the issuer's "synthetic rating." Synthetic ratings are estimates of a company's credit rating based on analysis of one or more financial ratios. Synthetic ratings are derived by analyzing the correlation between financial ratios and bond ratings.

This article has identified two methods to determine a company's synthetic bond rating which in turn is used to estimate the company's credit-adjusted risk-free rate. Both methods—the interest coverage ratio method and the Altman EM-Score method—rely on a company's accounting data to develop the synthetic bond rating and the credit adjustment to apply to the risk-free rate. The interest coverage ratio is simple to use. It requires only two pieces of data, namely, earnings before interest and taxes and interest expense.

The simplicity of the interest coverage ratio method is also its limitation. Relying on only one financial ratio does not take into account other information about a company's financial position. The Altman EM-Score method allows the analyst to consider four financial ratios that reflect the overall financial strength of the company.

This article presents an example using the Altman EM-Score to determine a company's synthetic credit rating. The synthetic credit rating is then used to determine the spread for bonds with similar credit ratings as the company's synthetic rating. This spread is the adjustment to the risk-free rate described for an entity's credit standing to calculate the firm's CARFR. The risk-free rate is usually the rate on U.S. Treasury securities with the same term as the liability in question. The sum of the spread and the risk-free rate is the CARFR. Many valuation specialists use this method to determine a firm's pre-tax cost of debt. The process can be used by a company to determine its CARFR or by an auditor as a reasonableness test.

Table 3: Client Company Selected Financial Data

(In Thousands)


	Year Ended 12/31/200X
Statement of Income Data:	
EBIT	\$5,981
Balance Sheet Data:	
Current Assets	\$32,556
Total Assets	\$52,352
Current Liabilities	\$17,854
Total Liabilities	\$17,922
Retained Earnings	(\$65,570)
Total Equity	\$34,430

Table 4: Client Company Altman EM-Score

Description	Ratio	Coefficient	Product
Constant		3.25	3.25
Working Capital/Total Assets	0.2808	6.56	1.84
Retained Earnings/Total Assets	(1.2525)	3.26	(4.08)
EBIT/Total Assets	0.1142	6.72	0.77
Total Equity/Total Liabilities	1.9211	1.05	2.02
Altman EM-Score			<u>3.80</u>

Table 5: Client Company Credit-Adjusted Risk-Free Rate Based on Altman EM-Score

Credit Adjustment	3.50%
Risk-Free Rate	<u>2.27%</u>
Credit-Adjusted Risk-Free Rate	<u>5.77%</u>

It should be noted that the Altman EM-Score method is not perfect at estimating a company's bond rating. If such were the case, there would not be a need for the credit ratings agencies such as Standard & Poor's, Moody's and Fitch. However, it is widely used and accepted as a reasonable indicator of a company's financial strength. Thus, the Altman EM-Score method provides a framework for estimating a company's CARFR. Estimates developed using this method should be much more reliable than ones based solely upon judgment and guesswork. 

10 The Federal Reserve Board provides historical data for interest rates of U.S. treasury securities at its Web site (www.federalreserve.gov/releases/h15/data.htm.)