

Altman's Z-Score

Altman's Z-score were developed in 1968 by Edward Altman to quantify the financial health of a firm. Using five financial ratios and multiple discriminant analysis, Altman developed a formula to predict a firm's likelihood of bankruptcy within two years.

In its initial test, the Z-score was found to be 72 percent accurate. Over the years, the Altman Z-score has been tested repeatedly and it has found to be 80 – 90 percent accurate.

The formula looks like this:

$$Z = 1.2 * x_1 + 1.4 * x_2 + 3.3 * x_3 + 0.6 * x_4 + 0.999 * x_5$$

$$x_1 = \frac{(Current\ Assets - Current\ Liabilities)}{Total\ Assets}$$

$$x_2 = \frac{Retained\ Earnings}{Total\ Assets}$$

$$x_3 = \frac{(Earnings\ Before\ Interest\ and\ Taxes)}{Total\ Assets}$$

$$x_4 = \frac{(Market\ Value\ of\ Equity)}{(Book\ Value\ of\ Debt)}$$

$$x_5 = \frac{Sales}{Total\ Assets}$$

Altman also developed the following table:

Z Score	Probability of Failure
3.0 or higher	Unlikely
1.81 – 2.99	Not Sure
1.8 or less	Very Likely

Altman Z Scores are not recommended to be used with financial companies.

For a more detailed discussion of the Altman Z-Scores read Edward I. Altman, "Financial Ratios, Discriminant Analysis, and the Prediction of Corporate Bankruptcy," *Journal of Finance*, September 1968.