

Original z-score component definitions variable definition

NOTE: The symbol " / " means the same thing as " ÷ ", representing division.

- X_1 = working capital / total assets
- X_2 = retained earnings / total assets
- X_3 = earnings before interest and taxes / total assets
- X_4 = market value of equity / total liabilities
- X_5 = sales / total assets

Z score bankruptcy model:

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 0.999X_5$$

Zones of discrimination:

- $Z > 2.99$ – "Safe" Zone
- $1.81 < Z < 2.99$ – "Gray" Zone
- $Z < 1.81$ – "Distress" Zone

Z-score estimated for private firms

NOTE: The symbol " / " means the same thing as " ÷ ", representing division.

- X_1 = (current assets – current liabilities) / total assets
- X_2 = retained earnings / total assets
- X_3 = earnings before interest and taxes / total assets
- X_4 = book value of equity / total liabilities
- X_5 = sales / total assets

Z' Score bankruptcy model:

$$Z' = 0.717X_1 + 0.847X_2 + 3.107X_3 + 0.420X_4 + 0.998X_5$$

Zones of discrimination:

- $Z' > 2.9$ – "Safe" Zone
- $1.23 < Z' < 2.9$ – "Grey" Zone
- $Z' < 1.23$ – "Distress" Zone

Z-score estimated for non-manufacturers & emerging markets

NOTE: The symbol " / " means the same thing as " ÷ ", representing division.

- X_1 = (current assets – current liabilities) / total assets
- X_2 = retained earnings / total assets
- X_3 = earnings before interest and taxes / total assets
- X_4 = book value of equity / total liabilities

Z-Score bankruptcy model:

$$Z = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4^{[4]}$$

Z-Score bankruptcy model (emerging markets):

$$Z = 3.25 + 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$$

Zones of discriminations:

- $Z > 2.6$ – "Safe" Zone
- $1.1 < Z < 2.6$ – "Grey" Zone
- $Z < 1.1$ – "Distress" Zone