

Z-Score Model Version Selector

Worksheet & Reference Guide · TheFinSense · April 2026

Step 1 — Select Your Model Version

Firm Type	SIC / GICS	Model	Ratios	Safe Zone
Public Manufacturing	SIC 2000–3999 GICS: Industrials, Materials	Z (1968)	5 ratios (incl. Sales/Assets)	> 2.99
Private Manufacturing	SIC 2000–3999 (privately held)	Z' (1983)	5 ratios (book value equity)	> 2.9
Non-Manufacturing Tech / Healthcare Financials / Services	GICS: Technology, Financials, Healthcare	Z" (1995)	4 ratios (Sales/Assets removed)	> 2.6
Emerging Market Firms	Any sector, non-US domicile	Z" EM (1995)	4 ratios + 3.25 constant	> 2.6

★ Most S&P 500 stocks are non-manufacturing (Technology, Financials, Healthcare, Services)
→ use Z" by default unless SIC 2000–3999 confirmed.

Step 2 — Z" Formula (Non-Manufacturing)

$$Z'' = 6.56(X1) + 3.26(X2) + 6.72(X3) + 1.05(X4)$$

Ratio	10-K Line Items (from annual report)	Your Company	Coeff.	Weighted Score
X1 Working Capital / Total Assets	Current Assets – Current Liabilities divided by Total Assets	_____	x 6.56	= _____
X2 Retained Earnings / Total Assets	Retained Earnings (from Equity section) divided by Total Assets	_____	x 3.26	= _____
X3 EBIT / Total Assets	Operating Income (before interest & tax) divided by Total Assets	_____	x 6.72	= _____
X4 Book Value Equity / Total Liabilities	Total Stockholders Equity divided by Total Liabilities	_____	x 1.05	= _____
Z" Score	Sum of all weighted scores above		TOTAL:	= _____

Z" Threshold Interpretation

Z" Score	Zone	Interpretation	Action
> 2.6	Safe	Low predicted bankruptcy risk	Proceed with due diligence
1.1–2.6	Gray	Elevated risk — uncertainty zone	Require additional analysis
< 1.1	Distress	High predicted bankruptcy risk	Significant caution required

Step 2 Alternative — Z Formula (Manufacturing, SIC 2000–3999)

$$Z = 1.2(X1) + 1.4(X2) + 3.3(X3) + 0.6(X4) + 1.0(X5)$$

Ratio	10-K Line Items (from annual report)	Your Company	Coeff.	Weighted Score
X1 Working Capital / TA	Current Assets minus Current Liabilities / Total Assets	_____	× 1.2	= _____
X2 Retained Earnings / TA	Retained Earnings / Total Assets	_____	× 1.4	= _____
X3 EBIT / TA	Operating Income (before interest & tax) / Total Assets	_____	× 3.3	= _____
X4 Mkt Value Equity / TL	Market Capitalization / Total Liabilities	_____	× 0.6	= _____
X5 Sales / Total Assets	Revenue / Total Assets	_____	× 1.0	= _____
Z Score	Sum of all weighted scores above		TOTAL:	= _____

Z Thresholds (Manufacturing): > 2.99 Safe · 1.81–2.99 Gray · < 1.81 Distress (Altman 1968)

Accuracy by Model Version — Why Version Selection Matters

Study / Sample	Coefficient Set	Overall Accuracy	Mfg. Only	Non-Mfg.
Altman 1968 (33+33 public mfg firms, 1946–1965)	1968 Original	94%*	94%*	Not tested
Grice & Ingram 2001 (3,841 COMPUSTAT firms, 1985–1991)	1968 Original (out-of-sample)	57.8%	69.1%	~46% (implied)
Grice & Ingram 2001 (same 1985–1991 sample)	Re-estimated (sector-adjusted)	88.1%	86.4%	~89% (implied)
Altman et al. 2017 (34 countries, international)	Z" framework	0.75 AUROC	—	Primary target

* Altman 1968 accuracy on training sample only.

Non-manufacturing figures implied from overall and manufacturing rates.

Source: Grice & Ingram (2001) J. Business Research 54(1) 53–61, Tables 3 & 5. Verified April 2026.

The Cost of One Version Error — \$200K Portfolio / 7% / 30 Years

Scenario	Position Loss	30-Year Gap	Equivalent
Base case (single error)	\$20,000	\$162,330	120 months of rent
Two missed signals (career-long)	\$40,000	\$324,660	240 months of rent
Conservative return (5%)	\$20,000	\$89,355	66 months of rent
Larger position (15% of portfolio)	\$30,000	\$243,495	180 months of rent

$$FV = P(1+r/12)^{(12t)} + PMT \times [(1+r/12)^{(12t)} - 1] / (r/12)$$
 Python-verified ±\$10 tolerance · Rent basis: \$1,350/month US median.

TheFinSense Z-Score Model Version Selector Worksheet · thefinsense.io/blog/predict-company-bankruptcy/

Sources: Altman (1968) J. Finance · Grice & Ingram (2001) J. Business Research 54(1) 53–61 · Altman et al. (2017) J. Intl Fin Mgmt & Acct · April 2026 ·

Not investment advice.