

Applications of Credit Scoring Models;
The GTI Case

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Presented by

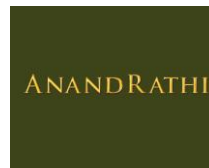


CEDAR
WE MAKE STRATEGY WORK

The Cedar Edward Altman Event

Rooftop, Trident, Nariman Point – Mumbai
January 27, 2011

Partners



Financial Distress Prediction Users

- Lenders
- Investors
- Security Analysts
- Regulators
- Auditors
- Legal Direction – e.g. “Deepening Insolvency”
- Bond Raters
- Advisors
- Government Officials
- Researchers
- M&A
- Purchasers, Suppliers
- Managers

Managing a Financial Turnaround: The GTI Case

Caveats for a Successful Turnaround

Objectives

- To demonstrate that specific management tools which work are available in crisis situations
- To illustrate that predictive models can be turned “inside out” and used as internal management tools to, in effect, reverse their predictions
- To illustrate an interactive, as opposed to a passive, approach to financial decision making

Physical & Financial Facilities

- 7 Manufacturing facilities (California to New York)
- 3 Offices locations (California to Germany)
- American Stock Exchange Listed Company
- Incorporated in late 1960's
- Successful IPO through early 1970's

Financial Changes at GTI during 1st half of 75

- Working Capital decreased by \$6 million
- Retained Earnings decreased by \$2 million
- A \$2 million loss incurred
- Net Worth decreased from \$6,207 to \$4,370
- Market Value of Equity decreased by 50%
- Sales decreased by 50%

Ethical Consideration

- Pressure led to “Corner Cutting”
- Returns not reported
- Bad inventory (and too much of it)
- Questionable Deferrals and Reserves levels

Employee Moral & Attitude

- Internally Competitive
- Angry
- Insecure

Management's Responsibility

- “PROTECT and ENHANCE
the Stockholders Investment in GTI”
(Words of the new CEO)

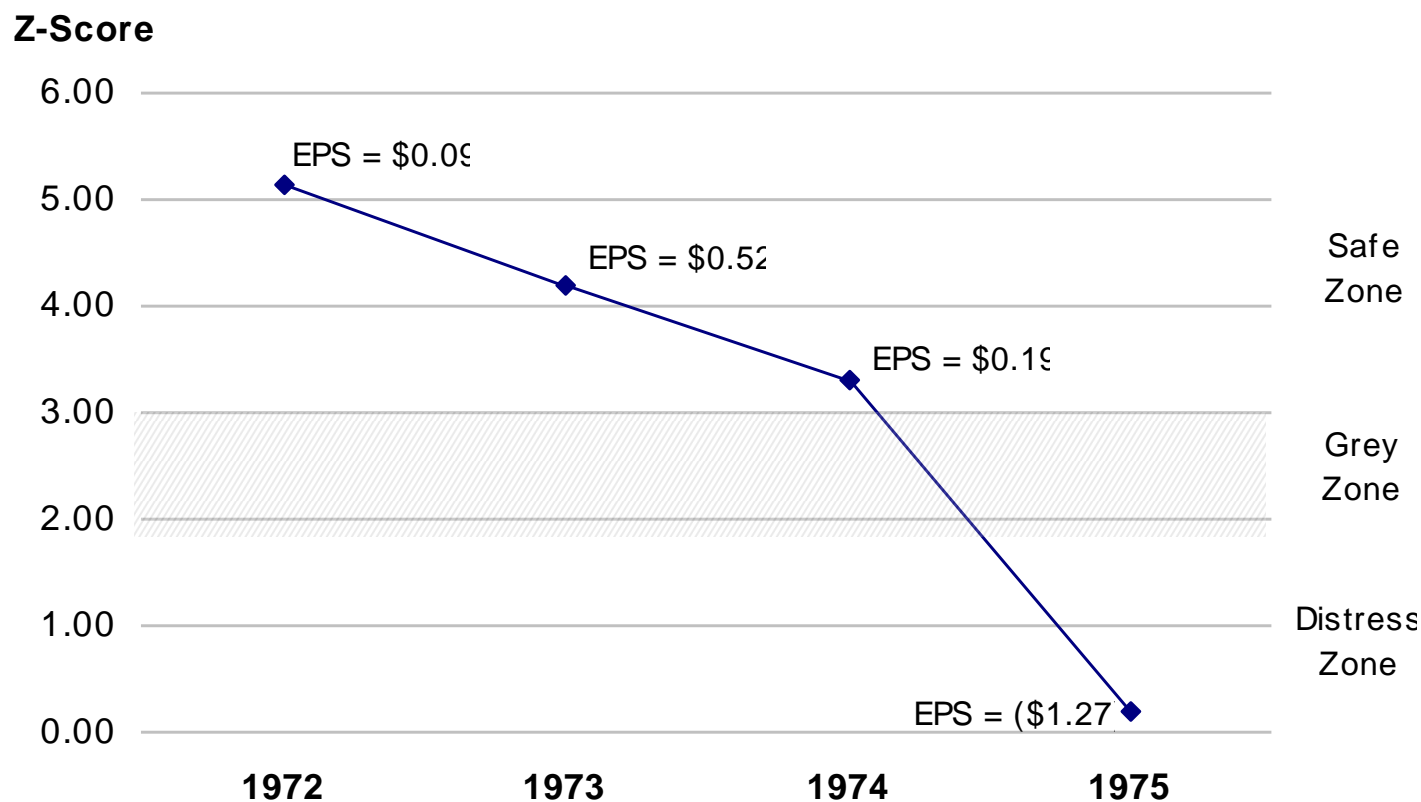
Material to be Covered

- Condition of GTI in June of 1975
- Management & Control changes
- Definition of Management's Responsibility
- Description of Management tools used
- Caveats for a successful Turnaround

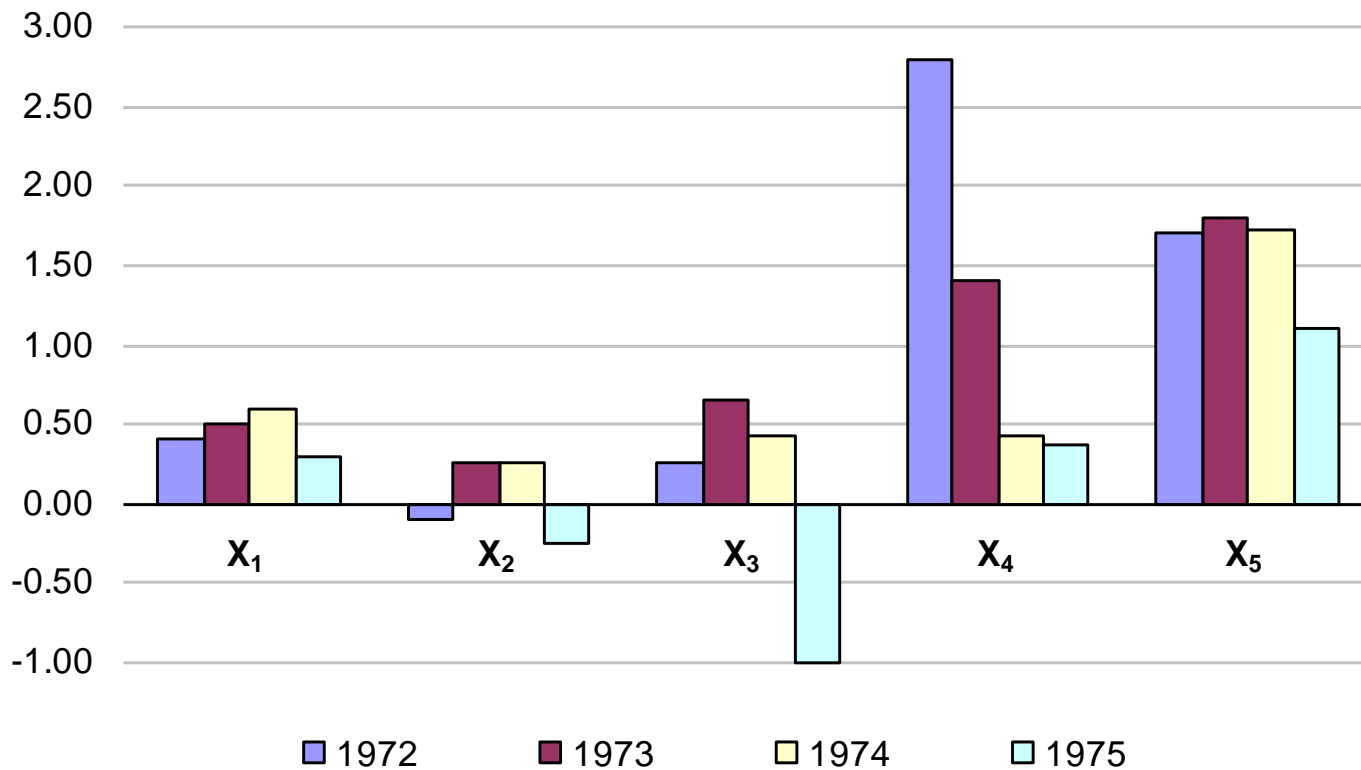
Z-Score Component Definitions

<u>Variable</u>	<u>Definition</u>	<u>Weighting Factor</u>
X_1	$\frac{\text{Working Capital}}{\text{Total Assets}}$	1.2
X_2	$\frac{\text{Retained Earnings}}{\text{Total Assets}}$	1.4
X_3	$\frac{\text{EBIT}}{\text{Total Assets}}$	3.3
X_4	$\frac{\text{Market Value of Equity}}{\text{Book Value of Total Liabilities}}$	0.6
X_5	$\frac{\text{Sales}}{\text{Total Assets}}$.999

Z-Score Distressed Firm Predictor: Application to GTI Corporation (1972 – 1975)



Components of Z-Score Distressed Firm: *Predictor as Applied to GTI Corporation*



Management Tools Used

- Altman's Distressed Firm Predictor (Z-Score)
- Function / Location Matrix
- Financial Statements
- Planning Systems
- Trend Charts

Strategy

- **Strategy #1:** Reduce Personnel & Eliminate Capital Spending
- **Reason:** Reverse Cash drain
- **Tool:** Source and Application of Funds
- **Timing:** Immediate

Strategy

- **Strategy #2:** Consolidate Locations
- **Reason:** Reduce Management Costs
- **Tool:** Function Location Matrix
- **Timing:** Short and Long Term Planning

Function / Location Matrix

	Pennsylvania	Indiana	New York	California	West Germany	
Operations	\$1	\$1	\$1	\$1	\$1	\$5
Marketing	\$1	\$1	\$1	\$1	\$1	\$5
Engineering	\$1	\$1	\$1	\$1	\$1	\$5
Finance	\$1	\$1	\$1	\$1	\$1	\$5
	\$4	\$4	\$4	\$4	\$4	\$20

Key Actions - 1975

- Immediate Reduction of Personnel
- Stop Capital Spending
- Consolidate Profitable Product Lines

Z-Score Component Definitions

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StrategyReasonImpact

Consolidated Locations

Eliminate Underutilized
Assets

Z-Score

Drop Losing
Product Lines

Eliminate Unprofitable
Underutilized Assets

Z-Score

Reduce Debt Using
Funds Received from
Sale of Assets

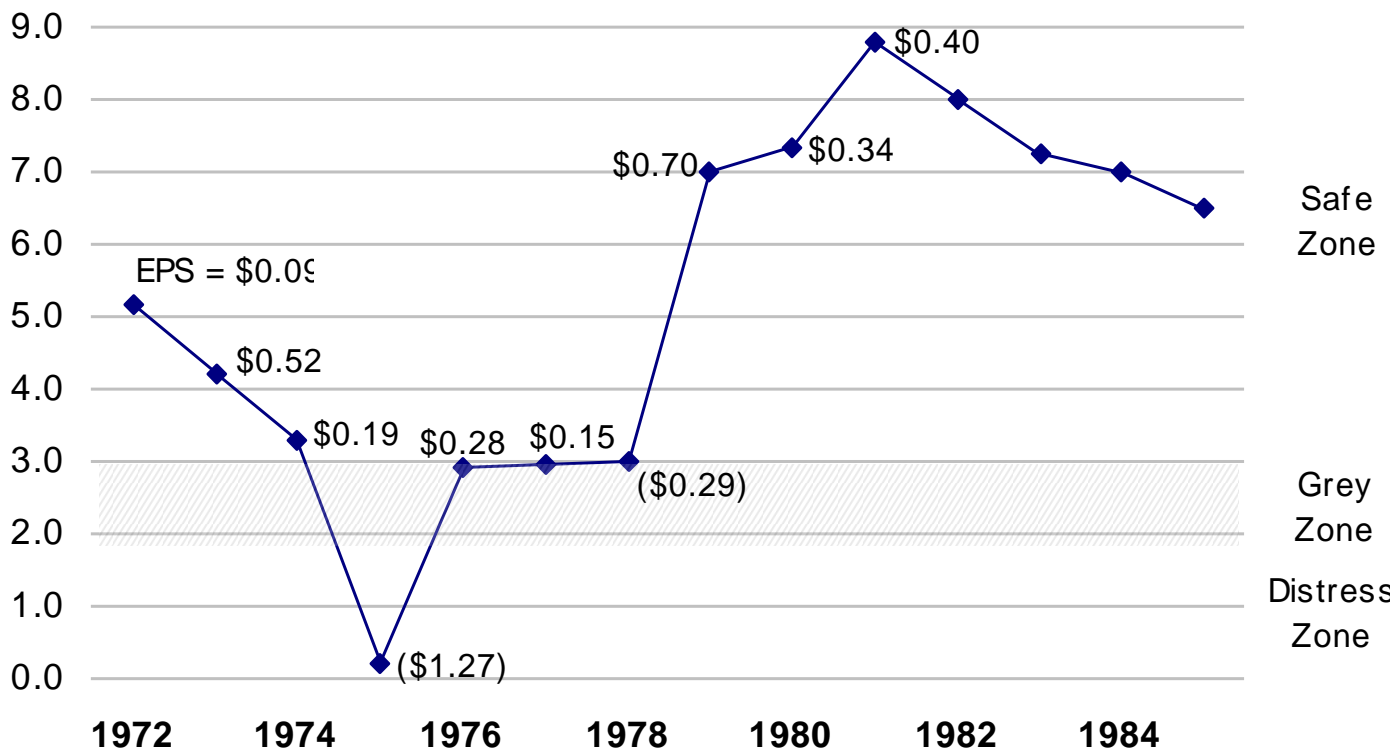
Reduce Liabilities
and Total Assets

Z-Score

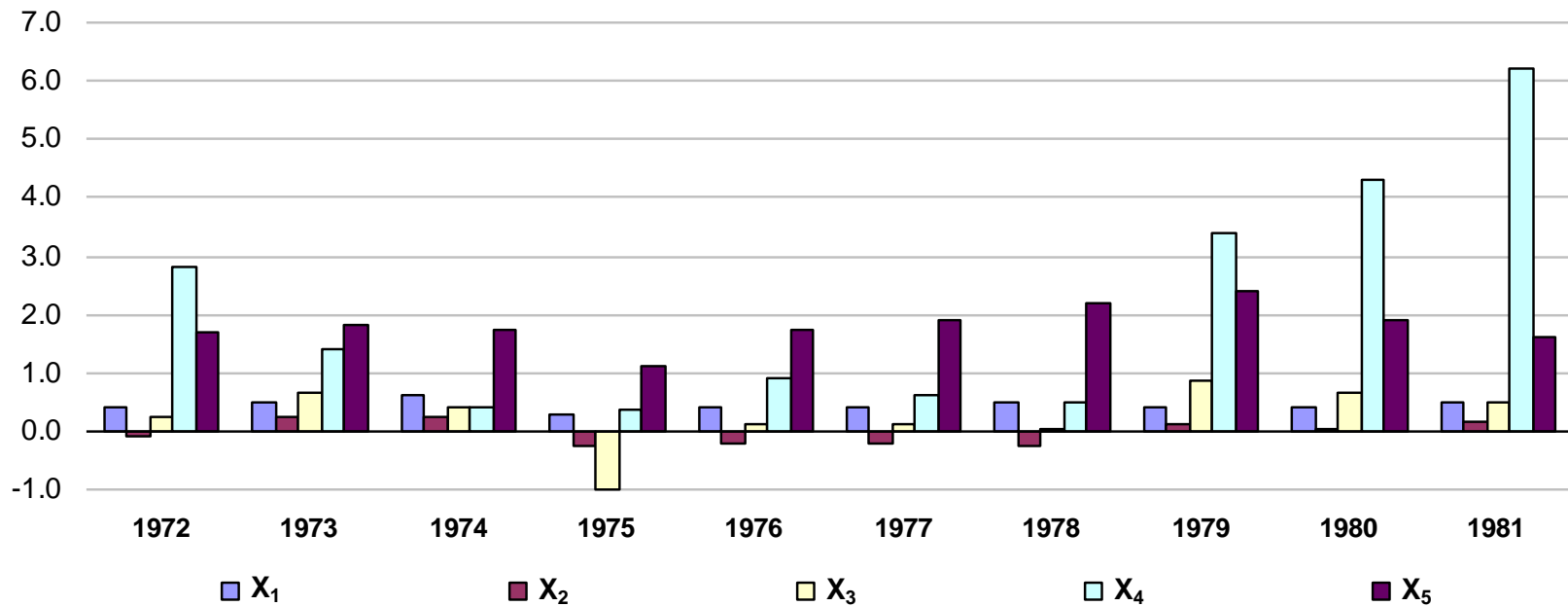
Z-Score Distressed Firm Predictor

Application to GTI Corporation (1972 – 1984)

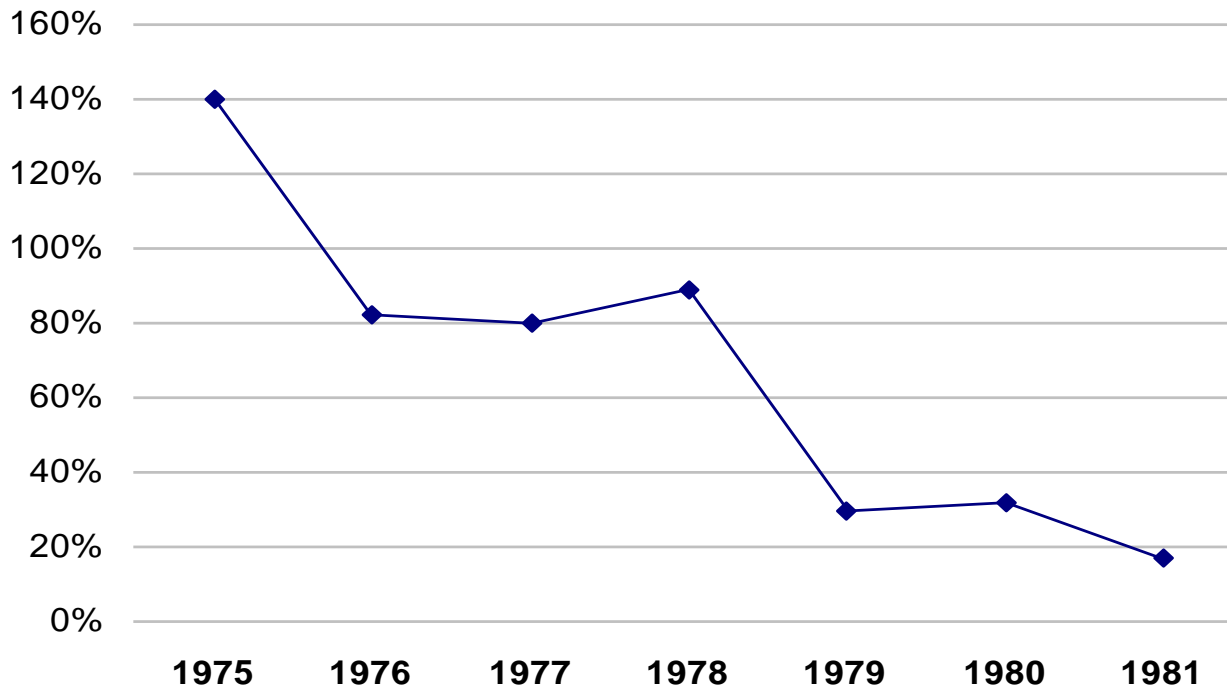
Z-Score



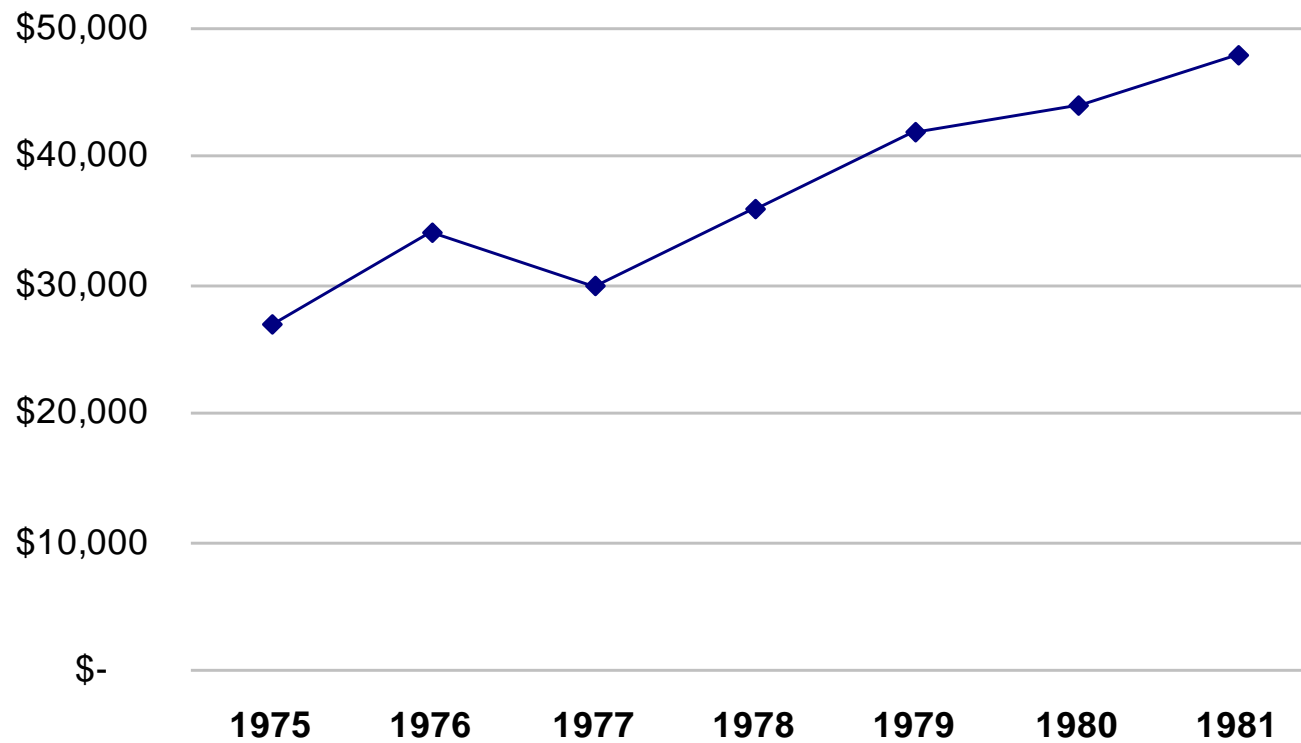
Components of Z-Score Distressed Firm: *Predictor as Applied to GTI Corporation*



Debt / Equity Ratio



Sales Dollars / Employee





Distress Prediction Model
For Chinese Companies

Z_{China} Model for Chinese Companies

Model Development and Test Results

- **Training:** **30** “ST” (Special Treatment Distressed Companies) based on
Sample two consecutive years of negative earnings or NAV below par value
 listed on Sheuzhen or Shanghai Stock Exchanges (1998,1999).
 30 “Non – ST” listed companies (Healthy)
 60
- **Holdout (Test) :** **21** “ST” Companies (1998,1999)
Sample 39 “Non – ST” Companies (Randomly Selected)
 60
- **Variable Selection:** 15 Financial Ratios from one year before “ST,” including Profitability, Solvency, Liquidity and Asset Management Measures. Based on their acceptance in China as well as from several prior distress prediction models outside of China.

Based on a study, “Corporate Financial Distress Diagnosis in China,” L. Zhang, J. Yen and E. Altman, Summer 2007.

Model for Distress Prediction in China

$$Z_c = 0.517 - 0.388 (X_1) + 1.158 (X_2) + 9.320 (X_3) - 0.460 (X_4)$$

Where:

	<u>Mean "ST"</u>	<u>Mean "Non-ST"</u>
$X_1 = \text{Working Capital} / \text{Average Total Assets (ATA)} =$	• -0.17	0.12
		(F = 5.8)
$X_2 = \text{Retained Earnings} / \text{TA} =$	• -0.33	0.22
		(F = 19.8)
$X_3 = \text{Net Profit} / \text{ATA} =$	• -0.36	0.26
		(F = 139.1)
$X_4 = \text{Total Liabilities} / \text{TA} =$	• 0.75	0.42
		(F = 42.4)

Classification Accuracy

Training Sample

<i>Actual Classification</i>		<i>Predicted Classification</i>	
		<u>Distressed</u>	<u>Non-Distressed</u>
Distressed ("ST")	30	30 (100%)	0
Non-Distressed	0	0	30 (100%)

Accuracy Over Time

<u>Years Prior to "ST"</u>	<u>Accuracy Level</u>
1	100%
2	87%
3	70%
4	60%
5	22%

Holdout Sample Accuracy

		Predictive Accuracy	
	<u># of Firms</u>	<u>(0.5) Cutoff</u>	<u>(0.3) Cutoff</u>
Distressed	21	21 (100%)	19 (90%)
Non-Distressed	39	34 (87%)	39 (100%)

Rating Distribution of Listed Chinese Companies

Rating Level	Z _c -Score Interval	Percentage Each Year							
		1998	1999	2000	2001	2002	2003	2004	2005
AAA	≥ 1.8	6.3%	4.3	2.3	0.9	1.0	1.2	2.8	2.5
AA	1.3–1.8	17.5	11.0	9.2	5.9	4.2	5.8	5.4	5.7
A	0.9–1.3	31.6	31.3	27.6	18.5	15.3	14.8	15.1	12.4
BBB	0.5–0.9	24.7	29.3	37.8	40.2	39.6	36.3	34.4	31.8
BB	0.0–0.5	10.7	16.1	15.2	22.4	25.6	28.8	28.2	28.8
B	-1.0–0.0	4.9	5.0	4.6	7.3	8.1	1.5	6.8	9.4
C	-2.0– -1.00	2.7	1.6	1.6	2.6	2.8	1.0	2.6	3.7
D	Z _c < -2.0	1.6	1.6	1.7	2.2	3.5	10.6	4.6	5.8

Credit Ratings of “ST” Companies Announced in 2002

Rating Level	2002 (#)	2002 (%)	2001 (%)	2000 (%)	1999 (%)	1998 (%)
AAA	0	0	0	3.6	3.5	7.1
AA	0	0	0	3.6	7.1	7.1
A	0	0	0	10.7	3.6	10.7
BBB	1	3.6	0	14.3	21.4	28.6
BB	6	21.4	14.3	14.3	39.3	21.4
B	8	28.6	25.0	46.4	17.9	10.7
C	5	17.9	28.6	3.6	7.1	10.7
D	8	28.6	32.1	3.6	0.0	3.6

Total 28 Companies