

# MEASURING FINANCIAL PERFORMANCE OF NSE LISTED SELECTED FERTILIZER COMPANIES IN INDIA BASED ON ALTMAN'S Z SCORE

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# ABSTRACT

This study focuses on eight selected leading fertilizer companies in India listed on the National Stock Exchange (NSE). The aim of the study is to assess the financial performance of the selected companies in the past five years. Mostly, the health of the companies is assessed using traditional methods such as ROIC, EPS, ROA, ROS and ROE. These traditional models do not accurately predict whether the companies are heading for bankruptcy. In this study, data from eight companies - Coromandel International, Chambal Fertiliser, Gujrat Narmada Valley Fertilizers and Chemicals, Deepak Fertilizers and Petrochemicals, Fertilizers and Chemicals Travancore, Tata Chemicals, National Fertilizers and Rashtriya Chemicals and Fertilizers - are analyzed using the Altman's Z Score. Financial stability is calculated based on Altman's Z Score and to foresee if the company is not heading towards bankruptcy. This study supports the claim that Altmans Z Score accuracy is over 80%. The trend analysis in this study provides a meaningful result for predicting the financial performance of selected companies.

Keywords: Fertilizer companies, Altman's Z Score, bankruptcy, subsidy, distress

### Introduction

India's main source of income is agriculture. As per the Fertiliser Association of India, the sector contributes about 18.8% to India's GDP (for the Financial Year 2021-2022). And about, India's 58% of population is engaged in agriculture activities. Even though Indian agricultural production is independent, cultivation varies from region to region and requires a high labor input. Many rural households depend mainly on agriculture for their livelihood. Farmers for increasing their income mostly use fertilizer made from chemicals and organic material for better crop production. Organic and chemical fertilizers affect the productive land through soil degradation and erosion. The success of the agricultural sector depends mainly on the fertilizer industry. The fertilizer industry produces important plant nutrients that support the cultivation of crops. The Indian fertilizer industry produces phosphorus-containing fertilizers like diammonium hydrogen phosphate, Ammonium Dihydrogen Phosphate, Potassium, Nitrogen and Phosphorus and mono superphosphate, which contribute to healthy crops. The Indian government supervises and regulates the fertilizer industry and offers fertilizers to farmers at subsidized prices. Farmers are offered subsidies and the government reimburses fertilizer producers for the difference between the cost of manufacturing and the selling price. Based On the government figures, total output of fertilizer in 2021-22 was 43.66 million metric tons. India currently imports about 38% of the country's fertilizer requirements. The Chemical and Fertiliser Department of the Indian government has launched various initiatives to make the country self-reliant in fertilizer production. The government has prepared the following road map:

- Phosphorus fertilizer at further subsidized prices
- Expanding production of phosphorite deposits
- Exploration of potential potassic ore resources
- Encouraging joint ventures abroad
- the acquisition of fertilizer raw material producers worldwide

By the year 2023, India has plans to be reliant on all fertilizer production. To curb imports, the government is planning greenfield projects for fertilizer production. Records show that about two trillion rupees were planned for fertilizers as subsidies to farmers in FY 2021. The 'Aatmanirbhar Bharat' programmed and the outlined roadmap for the fertilizer industry will help India become an independent producer of phosphate-based fertilizers in the years to come and accelerate agricultural production.

#### Literature Review

There are some research papers about the topic in the literature. In 1968, Altman published the Altman's Z Score for predicting bankruptcy. For the analysis of the company's financial situation, Z Score uses key figures from the company balance sheets and the profits and losses statements. The Z Score formula can be used to forecast the possibility that a corporation may go bankrupt in the next few years. Speculative studies are conducted using the Z Score formula to forecast the bankruptcy of companies. The Z Score can be effortlessly calculated to



analyze financial distress and to determine whether control measures can be adopted.

Since, the Indian fertilizer industry is dynamic and the sales of fertilizer companies largely depends on seasonal conditions, Altman's Z Score model proved more suitable than the traditional methods. Also, looking at the measures taken by the Government of India to be self-reliant in fertilizer production have led to numerous investments and technology transfers in recent years. The literature review included the study of the Altman's Z Score model and past application for various industries worldwide. Few segments that were studied were banks, pharmaceutical companies, manufacturing companies, hospitality companies, agricultural companies and few more.

Altman's Z-Score consists of a formula that includes several variables to predict the Z-Score value. All the research studied used the same formula with the variables required for each industry. The accuracy of Altman's Z Score formula is between 80 and 90% for predicting insolvencies a year before they occur.

Khande (2019)note in their paper on profitability analysis of fertilizer companies state that while several large fertilizer companies are profitable overall, however, profitability increases only marginally over a period of time. They also claim that there has been a significant amount of raw material imported each year for fertilizer production. This also suggests that profitability is affected as the raw material is imported and purchased at a higher cost.

(FAI, 2022)Indian Fertiliser Association said at a press release that margins for fertilizer manufacturers are very low and new investments will be difficult in the near future unless subsidies are revised. This also indicates that the fertilizer industry needs a proper assessment of the financial strength of each manufacturing company to determine whether they are heading for bankruptcy.

(Sowmiyaa, 2021) have analyzed in their study of the Indian fertilizer industries on their financial performance, which consists of the private, state, and cooperative enterprises. Their conclusions state that most of the companies are in distress zone and immediate action is required. Their study compares all the three segments and analyzes the extent of distress levels amongst the three segments. The samples were randomly selected across all vertical segments. They used Altman's Z Score for prediction. However, a lot has happened in the last three years since their study was published. The government's data shows that fertilizer companies in India have received significant support post-Covid. Their report will help in analyzing the trends of similar companies selected for this study.

(Batchelor, 2018) conducted detailed research to predict the efficacy of Altman's ZScore. Five unsuccessful and five successful enterprises were selected for the study. Based on the five successful and five unsuccessful enterprises tested, the analysis showed that the modified Z Score model yielded significant results indicating failure. The results concluded that Altman's ZScore is a very reliable method to determine whether a company will go bankrupt.

Swaliha (2020) has studied the Indian automobile industry to assess financial soundness. Altman's Z-Score calculated the most accurate results and predicted that Indian automobile companies are safe, and investors can safely invest. Their study found that the Altman's Z-Score model proved to be an extensively useful and excellent model for analyzing the financial stability of companies. It is an excellent tool for analysts working in finance and investors to assess the financial status of companies and to take appropriate measures to overcome insolvencies.

### **Objectives Of This Study**

- Financial performance evaluation of NSE listed selected fertilizer companies.
- Applying the Altman's Z Score method, examine the financial performance of the fertilizer companies selected above.
- Perform a trend analysis for the selected fertilizer companies based on Altman's Z Score method.
- And finally, assess whether the companies are financially stable and not heading for bankruptcy.

### Methodology

The samples of fertilizer companies were selected on the basis of their sales and stock performance in the past 3 years. The selected companies are listed on the National Stock Exchange (NSE) and are members of the Fertiliser Association of India. Based on the past financial performance and market capitalization in recent years, 8 companies were selected. Data was collected from annual reports and company websites. The quantitative analysis was carried out on the basis of the figures available in the balance sheets. Data for the last



five years was obtained for the companies studied. The analysis of the Z Score was evaluated for the financial years from 2018 to 2022. The survey period covers the pre covid and the post covid years. This also will help to understand if there was any impact on the fertilizer industry post covid. This research uses an exploratory and analytical method to evaluate the conclusions.

# Fertilizer Companies Selected for Study:

- 1. Chambal Fertilizers & Chemicals Ltd
- 2. Coromandel International Ltd
- 3. Gujarat Narmada Valley Fertilisers & Chemicals Ltd
- 4. Deepak Fertilizers & Petrochemicals Corporation Ltd
- 5. Fertilisers & Chemicals Travancore Ltd
- 6. Tata Chemicals Ltd
- 7. National Fertilisers Ltd
- 8. Rashtriya Chemicals & Fertilisers Ltd

# **Application of Altman Z Score Model**

The following techniques are used to obtain the variables listed in the Z Score formula and arrive at the conclusions:

1) Review of financial statements to determine the availability of data required for the Z Score analysis

- 2) Estimation of the market capitalization and other variables of each company for the last five years
- 3) Estimation of the relationships between the variables
- 4) Normalization of the data
- 5) Draft analysis to check whether the results are conclusive
- 6) Evaluation and interpretation of the results using the formula

The formula for the Altman's Z Score is as below:

 $Z = 0.012V_1 + 0.014V_2 + 0.033V_3 + 0.006V_4 + 0.999V_5$ Based on the above formula, the following derived formula is obtained:  $Z = 1.2V_1 + 1.4V_2 + 3.3V_3 + 0.6V_4 + 1.0V_5$ 

The variables (V) in the above formula are described below:

 $V_1$ = working capital divided by total assets (where, working capital = current assets divided by current liabilities)

 $V_2$  = retained earnings divided by total assets (where retained earnings = net income divided by loss plus retained earnings of previous years minus the net dividends)

 $V_3 = EBIT$  divided by total asset (Where, EBIT = Earnings Before Interest and Taxes)

 $V_4$  = market capitalization (market value) divided by book value (Where: Market capitalization = Present Market Price of every share multiplied by Aggregate Number of shares outstanding. And Book value = total assets minus the total liabilities)

X5 = Sales divided by total assets

Z = Z Score index

The Z Score method has shown an accuracy level of 80-90% and is more reliable than traditional methods of assessing financial stability. A high Z Score suggests a good corporate health, while a low Z Score suggests a greater risk of bankruptcy

# The explanation of Altmans Z Score method can be found below:

 $V_1$ = working capital divided by total assets (where, working capital = current assets divided bycurrent liabilities) : This formula is used to assess the short period financial strength of a company. A positive result indicates that the company will be able to sustain the short-term commitments, and a negative result indicates the company will strive to meet the present needs.

 $V_2$  = retained earnings divided by total assets (where retained earnings = net income divided by loss plus retained earnings of previous years minus net dividends): This formula assesses the retained earnings or any loss to the company. A high value implies that the retained profits are used for expenditure and a low value implies



that the retained profits are saved.

 $V_3 = EBIT$  divided by total asset (Where, EBIT = Earnings Before Interest and Taxes): This formula signifies the profitability of the company. It determines whether the company can generate enough income from the business to meet the present needs.

 $V_4$  = market capitalization (market value) divided by book value (Where: Market capitalization = Present Market Price of every share multiplied by aggregate number of shares outstanding. And, Book value = total assets minus total liabilities): This formula measures the degree of impairment of market value when the company files for insolvency. A high ratio means that investors have more confidence in the company's shares. X5 = Sales divided by total assets: This formula implies that the company is able to generate revenue based on its assets. A high ratio indicates the financial strength of the company.

# Below are details on interpreting the results based on Altman's ZScore analysis.



# Fig -1Altman's Z-Score Method of interpretation

# Analysis Of The Data

Altman's Z Score analysis for the selected Fertilizer companies in India (2018-2022).

Companies	2018	2019	2020	2021	2022	Average (mean of 5 years)	Analysis
Chambal Fertilisers and Chemicals Limited	1.451	1.195	1.485	2.537	2.253	1.78	Distress
Coromandel International Limited	1.795	1.947	2.32	3.269	3.29	2.52	Grey
Deepak Fertilisers and Petrochemicals Corporation Limited	1.279	1.703	1.681	1.942	2.294	1.78	Distress
The Fertilizers and Chemicals Travancore Ltd	0.397	1.33	2.229	1.539	2.01	1.50	Distress
Gujarat Narmada Valley Fertilizers & Chemicals Limited	2.269	2.287	1.851	2.265	2.961	2.33	Grey
National Fertilizers Limited	1.307	1.213	1.074	1.914	1.984	1.50	Distress
Rashtriya Chemicals and Fertilisers Limited	2.078	1.666	1.516	2.106	2.135	1.90	Grey
Tata Chemicals Limited	2.706	3.381	4.309	4.744	4.665	3.96	Safe

Table no.1

The Z Score formula uses the five variable ratios which are multiplied and added together to give a single

number. This single number is termed as the Z Score and assesses the financial health of the organization. Z Score is computed by multiplying each variable (financial ratios) by a given constant number and finally summing the values to obtain the results. In this study, balance sheet figures for the last five years from each of the companies studied were used for all Z Score calculations.

Based on the results, it is evident most businesses are in distress. The analysis also suggests that the companies are not financially stable. With the exception of Tata Chemicals, all the other seven companies are either in distress or in the grey zone.

Looking only at the last two years, all the companies have achieved a positive result. This could be due to the government's initiative to focus on the agricultural sector to make it self-sufficient. The companies included in the analysis generate most of the turnover in the fertiliser business in India. Hence, these results can be extrapolated to other fertilizer companies in India.

Another important point is that the fertilizer industry has shown a positive trend after the Covid period. The pre-Covid figures are too low and every company seems to have been in distress. The companies in distress areas are Chambal Fertilizers, Deepak Fertilizers, The Fertilizers and Chemicals Travancore and National Fertilizers. They may have to look for other options to improve their financial performance. Other options may include diversification and investment in greenfield projects. Coromandel International, Gujarat Narmada Valley Fertilizers & Chemicals and Rashtriya Chemicals and Fertilizers are in the grey zone, which means they could fall in distress if they do not act on their performance metrics now. The companies in the grey zone are also the fence-sitters.

# Conclusions

Based on the study findings, the fertilizer industry is currently in the distress area, but the situation seems to have improved in the last two years. Tata Chemicals is the only company that is in the safe zone. This study also supports the claim that Altman model is a precise tool for understanding the financial performance of companies. According to the Fertiliser Association of India, a healthy compound annual growth rate (CAGR) of about 12% is expected for the years 2020 – 2025. Increasing demand and population growth, restrictions on raw material imports, procurement of raw materials from domestic sources, changing customer needs and Government of India initiatives will boost the fertiliser industry scenario in India. New areas of diversification based on research and technology transfer seem to be fueling the growth of the fertiliser industry. Government initiatives regulate subsidies and several of the companies are government owned, which played a crucial role for the fertiliser industry development in India. With the advent of organic fertilizer, there seems to be a strong growth potential for the fertilizer industry in India soon.

#### References

- Alka Khatri, D. A. (2023). Measuring financial performance of selected fast moving consumer goods companies in india. International Journal of Advanced Research in Commerce, Management & Social Science, 6.
- Altman, E. I. (2020). Predicting financial distress of companies. Journal of Banking & Finance, 54.

Altman's Z-Score Model. (2023, January 9). Retrieved from Altman's Z-Score Model:

- https://corporatefinanceinstitute.com/resources/commercial-lending/altmans-z-scoremodel/#:~:text=Altman's%20Z%2DScore%20model%20is,the%20financial%20stability%20of%20comp anies.
- Batchelor, T. (2018). Corporate Bankruptcy: Testing the Efficacy of the Altman Z-Score. International Research Journal of Applied Finance, 12.
- FAI, F. A. (2022, December 22). Fertilizer subsidy bill in FY23 seen at ₹2.3-2.5 lakh cr.; may drop 25% in FY24: FAI. Retrieved from https://www.thehindu.com/: https://www.thehindu.com/business/fertilizersubsidy-bill-in-fy23-seen-at-23-25-lakh-cr-may-drop-25-in-fy24-fai/article66230904.ece
- https://groww.in/. (2023, January 09-01-2023). Retrieved from Grow: https://groww.in/blog/best-fertilizerstocks-in-india
- https://www.faidelhi.org/. (2023, January 9). Retrieved from Fertiliser Association of India: https://www.faidelhi.org/info/reports

Khande, D. L. (2019). Profitability analysis of the prominent fertilizer. International Journal of Advanced Research in Commerce, Management & Social Science, 10.

- M. M. Swaliha, K. A. (2020). A study on the financial soundness of Indian automobile industries using Altman Z-Score. Contents lists available at GrowingScience, 4.
- S. Sowmiyaa, S. M. (2021). 2 Financial Performance of Indian Fertilizer Industry A Comparative Evaluation of Private, Public and Cooperative Sector Companies. Biological Forum An International Journal , 5.