



RESEARCH ARTICLE INFORMATION

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Outlining the Profitability Analysis of Select Public Sector Fertilizer Companies in India



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ABSTRACT

Profitability analysis assists businesses in comprehending their ability to generate income by providing the necessary resources. This paper makes an attempt to find out which financial variables - including liquidity, solvency and management efficiency - have impact on the profitability of the selected fertilizer companies in India. Empirical data from 15 listed fertilizer companies over the period of 2010-11 to 2021-22 have been considered for the study. The study reveals that fixed effect is persistent in panel data, and from the results it is evident that cash to current assets ratio, proprietary ratio and total assets turnover ratio have significant impact on return on total assets at 1% level of significance. Whereas, cash to current assets ratio and proprietary ratio have significant impacts on return on capital employed at 1% level of significance, total assets turnover ratio is found to be significant at 5% level of significance. It is also found that all the three explanatory variables are positively influencing profitability, more so for cash to current assets ratio.

Keywords: Fertilizer companies, Profitability, Fixed effect, Panel data Regression.

1. INTRODUCTION

Indian agricultural sector relies heavily on the fertilizer business, which supports foodgrain production and contributes significantly to the country's economic development. (Khan, n.d.). Increased use of fertilizer throughout the years have resulted in increased production of foodgrains from 50.82 million tons in 1950-51 to 329.69 million tons in 2022-23. (Bishnoi et al., 2020) India is using 165.85 Kg of fertiliser per hectare of arable land. China stands at 1st rank and India ranks 2nd and in nitrogenous and phosphatic fertiliser consumption. The Indian fertiliser market was worth INR 5,437 Billion in 2018. Looking forward, the market is projected to reach INR 11,116 Billion by 2024, growing at a CAGR of 12.3% during 2019-2024. In case of Urea, India has achieved 80-85% of self-sufficiency, and rest is imported from our joint ventures in abroad. To meet the demand of urea by indigenous production and to reduce the imports, Government of India, is investing an amount of Rs. 37971 Crore Rupees for revival of five fertiliser plants in India.

Since FY 2016-17, the food grain production is increasing with the fertiliser consumption in India, because use of fertiliser is an important factor which impacts the food grain production in India. Unfortunately the, heavy use of urea is misbalancing the ideal fertiliser application ratio. To improve this ratio farmer's has to move from straight fertilisers towards NPKS complex fertilisers for supplying the essential nutrients required by the plants for growth." The agriculture and associated sectors contributes towards 18.3% of India's GDP and employ near about 45.76% of the total population. Presently, our nation is the second largest consumer and third largest manufacturer of fertilizer in the world. (Sowmiyaa et al., 2021).

In our country, crop yield is influenced by a number of variables, including rainfall, climate, soil characteristic, technology, etc., and quality fertilizer is one of them. (Kumar et al., 2017). The fertilizer industry has significantly boosted the Indian economy through increasing agricultural production, creating jobs and fostering corporate evolution. (Patel, 2019).

2. WHY FERTILIZER INDUSTRY?

The fertilizer industry in India is immensely essential as it manufactures important raw material required for the crop productivity. The main objective of this industry is to ensuring the necessary primary and secondary ingredients are available in the appropriate quantities for crop production. After harvesting crops, important nutrients are extracted from the soil. So, without fertilizers, it is difficult to replenish the soil with nutrients. If the nutrients are not replenished in the soil through fertilization, crop production will decline over time.

Plants require 17 different components to reach their maximum nutritional potential. Three of those are come from carbon, hydrogen and oxygen, all of which are found in the air and water. The other 14 elements are obtained from the soil through plant roots. In modern days, these nutrients are made by fertilizers. They are categorized into three groups: Macro-nutrients, Secondary nutrients and Micro-nutrients. Macro-nutrients such as Nitrogen (N), Phosphorus (P), and Potassium (K). Secondary nutrients such as Calcium (Ca), Magnesium (Mg), and Sulphur (S). Micro-nutrients namely Boron (B), Chlorine (Cl), Copper (Cu), Iron (Fe), Manganese (Mn), Molybdenum (Mo), Nickel (Ni), Zinc (Zn), etc.

3. CONCEPTUAL FRAMEWORK

In the world of finance, a company's profitability analysis is a crucial subject. It assists businesses in determining future strategies, investments and corporate performance by analysing the existing financial situation. Thus, to explore the profitability, the following two major aspects are often used by the firms:

Return on Assets (ROA): It refers to a profitability ratio that shows how much revenue a business can make from its total assets. Specifically, it measures how well a business's management uses its financial resources or assets to generate a profit. Higher ROA percentage indicates that the management of the company is managing its assets more efficiently.

$$\text{ROA} = \text{Net Income} / \text{Total Assets}$$

Return on Capital Employed (ROCE): This is another financial measure that evaluates the profit earning ability and capital efficiency of a business. In different terms, this ratio can help to evaluate how effectively a business uses its capital to make profits. A greater ROCE value signifies that stronger profitability over the company comparisons.

$$\text{ROCE} = \text{Earnings Before Interest and Tax} / \text{Capital Employed}$$

Different Profitability Influencers of Firms: As we know, there are several profitability influencers in the firms, especially liquidity, solvency and management efficiency which have great impacts on the company's profitability. So, as per the existing theories of profitability analysis, we have considered some influencer indicators to find out the impact of those indicators on profitability. Following are the several profitability influencers followed by most of the firm:

Cash to Current Assets Ratio (CCA):

This liquid ratio tells us what portion of the company's total current assets is made up of its most liquid assets – cash and cash equivalents and marketable securities. The relevance of this ratio is that a current asset can readily be sold or consumed in less than a year. The main thing is that they are used to pay for daily operations of a business.

$$\text{CCA} = \text{Cash \& Cash Equivalents} + \text{Marketable Securities} / \text{Total Current Assets}$$

Proprietary Ratio (PR): It is one kind of solvency ratio, that can be used to determine how much a proprietor or shareholder has contributed to the overall assets of the business. A high PR indicates the company's strength and ability to provide relief to its creditors, whereas, a low PR demonstrates the company's reliance on debt financing to fund its operations.

$$\text{PR} = \text{Shareholders Equity} / \text{Total Assets}$$

Total Assets Turnover Ratio (TATR):

This is commonly referred to as the efficiency ratio, which measures how well a business uses its resources to generate sales. A company with a greater assets turnover ratio indicates, efficiently uses of resources and vice-versa.

$$\text{TATR} = \text{Net Sales} / \text{Total Assets}$$

4. LITERATURE REVIEW

Several research with ties to the fertilizer sector have been published, each showing a distinct viewpoint, such as:

Indian Studies

Singh (2014) analysed "Evaluation of the Financial and Operating Performance of Fertilizers and Chemical & Pharmaceutical Sectors of Indian Public Sector Enterprises

after Disinvestment” and observed that the operating performance of the units has collapsed in the post disinvestment period.

Ambika and Sengottaiyan (2015), in “Determinants of Profitability of Selected Fertilizer Companies in India”, found that the industry must make steps to increase its competitive strengths with government assistance.

Punjabi and Khandelwal (2019), in “Profitability Analysis of the Prominent Fertilizer Companies in India”, discovered that there is a significant demand for fertilizer across the country, but only a part of it is produced by Indian fertilizer manufacturing companies, and that keeps the industry profitable.

Pandya (2019) studied “Financial Performance Analysis of Fertilizer Industry in Gujarat” and said that overall financial performance of companies is good enough but return on capital employed is not sufficient.

Patel (2019), in “Net Profit Analysis of Selected Fertilizer Companies in India” shows that all the companies fail to get adequate return, so these companies should try to enhance their net profit through increasing their efficiency.

Husain and Arif (2020), in “Performance Analysis of Indian Farmers Fertilizers Co-operative Limited (IFFCO) in Satisfying its Vision”, concluded that the company has performed well during the year 2018-19 and has consistently achieved its goals since its inception in 1967.

Sowmiyaa et al. (2021), in “Financial Performance of Indian Fertilizer Industry - A Comparative Evaluation of Private, Public and Co-operative Sector Companies” observed that the whole of the fertilizer industry is financially in a weak state.

Foreign Studies

Norazlina et al. (2012), in “An Examination of Marketing Strategies on Financial Performance within the Context of the Fertilizer Industry in Malaysia: A Conceptual Framework”, observed that marketing strategy has a significant effect on an organization’s financial performance.

Awan (2014), in “The Impact of Corporate Social Responsibility (CSR) on Profitability of Firms: A Case Study of Fertilizer & Cement Industry in Southern Punjab, Pakistan”, determined that organisations should work towards improving society in the broader interest of the country so that not only will businesses thrive economically, but communities will also be strengthened side by side.

Ashraf and Shaheen (2016), in “Is Leverage Magnifying the Profitability of a Company? (Some Facts About Pakistan’s Fertilizer Sector)”, shows that fertilizer companies must choose the debt financing option in order to improve profitability.

Khalid and Khan (2017), in “Impact of Operating and Financial Expenses on Sales Revenue: The Case of Fauji Fertilizer Company Limited”, found that changes in operating expenses led to considerable rise in the company’s sales revenue. But there isn’t as much a correlation between financial expenses and sales revenue.

Wangui and Eliud (2018), in “Strategic Responses and Performance of Fertilizer Manufacturing Industry in Nairobi”, discovered that Michael Porter’s generic competitive advantage strategies such as low-cost leadership strategy, differentiation strategy, and focus strategy - had a major effect on the organisational performance of fertilizer enterprises registered in Nairobi.

Pamoengkas (2020), in “Market Orientation and Value Creation in Improving Business Performance of the Fertilizer Industry in Indonesia”, concludes that both had a substantial impact on enhancing business performance in Indonesia’s fertilizer industry.

Chen et al. (2020), in their report, “Energy evaluation and economic analysis of compound fertilizer production: A case study from China”, recommends boosting the environmental efficiency of the sulphur-based fertilizer subsystem and raising compound fertilizers costs, as well as encouraging sustainable procurement of primary raw materials.

5. RESEARCH GAP

From the above literature review related to the fertilizer industry, it is observed that most of the studies have been done on various perspectives but no study appears to have been found to examine the profitability through different indicators of listed public sector fertilizer companies in India. It is also found that profitability analysis through panel data regression model is hardly available.

6. RESEARCH OBJECTIVES

The research objectives are as follows-

- ☑ To analyse the financial situation of fertilizer companies with respect to profitability, liquidity, solvency and management efficiency.
- ☑ To find out the impact of liquidity, solvency and management efficiency on profitability of fertilizer companies.

7. RATIONALE OF THE STUDY

The empirical results of this study will give an insight to the managers of fertilizer companies that those factors are to be kept in mind to make a decision on manufacturing project and how to make it even better.

Further, it will make it easier for them to continue earning a steady return.

8. RESEARCH METHODOLOGY

Type of Study: This is a descriptive type of research and the study is entirely dependent on secondary sources. The selected fertilizer companies and financial data has been extracted from PROWESS-CMIE database and companies’ annual report have also been considered.

Period of the study: The time period of the study is 12 years, from 2010-11 to 2021-22.

Sample size: We have found a total number of 28 listed companies for selection of the sample. However, we have selected 15 out of 28 listed fertilizer companies that have covered the criterion of a turnover of over Rs. 300 crore for the year ended 31.03.2022 and having complete financial data throughout period of study. For running regressions, a micro-panel has been composed with 15 cross-sections (N) and 12 periods (T). So, the total observations are 180 (15 × 12) has been considered for the study. Name of the sample companies:

TABLE 1: NAME OF THE SAMPLE COMPANIES

Sl. No.	Name of Companies	Turnover (Rs. in crore) for the year ended 31.03.2022
1.	Coromandel International Ltd.	19088.00
2.	Chambal Fertilisers & Chemicals Ltd.	16073.40
3.	National Fertilizers Ltd.	15651.44
4.	Rashtriya Chemicals & Fertilizers Ltd.	12780.16
5.	Gujarat State Fertilizers & Chemicals Ltd.	9009.99
6.	Fertilisers & Chemicals, Travancore Ltd.	4436.37

Sl. No.	Name of Companies	Turnover (Rs. in crore) for the year ended 31.03.2022
7.	Mangalore Chemicals & Fertilisers Ltd.	2896.68
8.	Nagarjuna Fertilizers & Chemicals Ltd.	2692.33
9.	Southern Petrochemical Inds. Corpn. Ltd.	1911.75
10.	Rama Phosphates Ltd.	878.31
11.	Khaitan Chemicals & Fertilizers Ltd.	823.78
12.	Aries Agro Ltd.	547.55
13.	Basant Agro Tech (India) Ltd.	448.24
14.	Madras Fertilizers Ltd.	346.99
15.	Krishana Phoschem Ltd.	319.36

Accounting Tools: In this study, we have considered Return on Total Assets and Return on Capital Employed as dependent variables, whereas Cash to Current Assets Ratio, Proprietary Ratio and Total Assets Turnover Ratio as independent variables to find out the impact of different indicators on profitability.

Statistical Tools Used

- ☑ Panel Regression Analysis – to determine the impact of independent variables on dependent variables.
- ☑ Correlated Housman Test - to find the effect consistency in panel data models.
- ☑ Unit Root Test – to check data stationarity.
- ☑ Multi-collinearity – to test the correlation between independent variables.
- ☑ Auto-correlation – to test the correlation

of a time series.

9. DATA ANALYSIS AND INTERPRETATION

Profitability analysis of a firm is a very important matter in the field of finance. Usually, lucrative and consistent performance indicators make the investors attracted towards the firm. Thus, to explore our objective, we have taken dependent variables (Return on Total Assets and Return on Capital Employed) and independent variables (Cash to Current Assets Ratio, Proprietary Ratio and Total Assets Turnover Ratio) which are often used by firms. Here, we have conducted panel data regression model to examine the effect of independent variables on dependent variables.

☑ Panel Regression Analysis

To determine the impact of explanatory variables on response variables, we have constructed two panel models to run regression. The models are as below:

Model - 1

$$ROA_{it} = \alpha + \beta_1 * CCA_{it} + \beta_2 * PR_{it} + \beta_3 * TATR_{it} + \varepsilon_{it} \dots \dots \dots (1)$$

(Where, α is the intercept of company i , i = each company, t = time, ε_{it} = error term)

Model - 2

$$ROCE_{it} = \alpha + \beta_1 * CCA_{it} + \beta_2 * PR_{it} + \beta_3 * TATR_{it} + \varepsilon_{it} \dots \dots \dots (2)$$

(Where, α is the intercept of company i , i = each company, t = time, ε_{it} = error term)

TABLE 1: IMPACT OF EXPLANATORY VARIABLES ON RETURN ON TOTAL ASSETS OF FERTILIZER COMPANIES

Dependent Variable	Explanatory Variable	Fixed Effects Model			
		Coefficient	Std. Error	t-Statistic	Prob.
Return on Total Assets (ROA)	CCA	27.22597	4.525491	6.016136	0.0000
	PR	10.38049	1.969328	5.271085	0.0000
	TATR	3.360553	0.957146	3.511015	0.0006
	C	-5.075617	1.180740	-4.298674	0.0000
	Effects Specification				
	R-squared				0.619147
	Adjusted R-squared				0.579181
	S.E. of regression				4.647993
	F-statistic				15.49183
	Prob(F-statistic)				0.000000
	Durbin-Watson stat				1.266652

(N.T: *p*-value significant at 1% level)

From Table-1, considering the cross-section fixed effect, it is observed that Cash to Current Assets Ratio, Proprietary Ratio and Total Assets Turnover Ratio have significant impact on Return on Total Assets at 1% level of significance. It is also found that all the three explanatory variables are positively influencing the Return on Total Assets. Model-1 is having explanatory power of 61.91% variation on Return on Total Assets. Durbin-Watson stat 1.2667 indicates that there is no significant autocorrelation issue with this model.

TABLE 2: IMPACT OF EXPLANATORY VARIABLES ON RETURN ON CAPITAL EMPLOYED OF FERTILIZER COMPANIES

Dependent Variable	Explanatory Variable	Fixed Effects Model			
		Coefficient	Std. Error	t-Statistic	Prob.
Return on Capital Employed (ROCE)	CCA	55.46999	9.415307	5.891469	0.0000*
	PR	24.62106	4.097197	6.009244	0.0000*
	TATR	4.995552	1.991347	2.508630	0.0131**
	C	-11.49748	2.456536	-4.680365	0.0000
	Effects Specification				
	R-squared				0.602600
	Adjusted R-squared				0.560898
	S.E. of regression				9.670174
	F-statistic				14.45001
	Prob(F-statistic)				0.000000
	Durbin-Watson stat				1.351792

(N.T: *p-value significant at 1% level, **p-value significant at 5% level)

From Table-2, considering the cross-section fixed effect, it is observed that Cash to Current Assets Ratio and Proprietary Ratio have significant impacts on return on capital employed at 1% level of significance, Total Assets Turnover Ratio is determined to be significant at 5% significance level. Additionally, it is also discovered that the Return on Capital Employed is favourably influenced by each of the three explanatory variables. Model-2 can explain 60.26% variation in Return on Capital Employed. Durbin-Watson stat 1.3518 indicates that this model is free from significant autocorrelation issues.

☒ **Correlated Hausman Test**

Hausman Test is used to determine the impact consistency and the presence of endogeneity in the panel models. The following results are-

Hypothesis

H_0 : There is random effect in panel data.

H_1 : There is no random effect in panel data.

TABLE 3: HAUSMAN TEST RESULT

Dependent Variable	Cross-section random (Chi-Sq. Statistic)	Prob.
ROA	9.693520	0.0214
ROCE	10.844137	0.0126

(N.T: p-value significant at 5% level)

Table-3 represents that in both the two models, i.e. ROA and ROCE, p-values of Cross-section Chi-Sq. of Hausman test is significant at least at 5% level. Hence, Fixed Effect is persistent in panel data.

☑ Unit Root Test

To ensure the data stationarity, we have applied Levin-Lin-Chu unit-root test at level including individual intercept and trend –

Hypothesis

H_0 : Panels contain unit roots.

H_1 : Panels are stationary.

TABLE 4: LEVIN, LIN, CHU UNIT ROOT TEST (COMMON UNIT ROOT)

Variable	Statistic	Prob.
ROA	-5.5283	0.0000
ROCE	-4.3194	0.0000
CCA	-12.9695	0.0000
PR	-16.7503	0.0000
TATR	-2.6922	0.0035

(N.T: p-value significant at 1% level)

Table-4 exhibits the result of Common Unit Root process (Levin, Lin, & Chu Unit Root Test). According to the null hypothesis (H_0), there is presence of unit root means data is not stationary and on the other side, alternative hypothesis (H_1) refers there is no unit root in the panel data means data is stationary. It is found that all of the variables are significant at 1% level in the common unit root process. Hence, all the variables are therefore stationary at level, at 1% level of significance.

☑ Multi-collinearity

In regression analysis, the degree of multicollinearity is represented by a variance inflation factor (VIF). Multicollinearity occurs when numerous independent variables in a multivariate regression model are correlated.

TABLE 5: VARIANCE INFLATION FACTORS OF INDEPENDENT VARIABLES

Variable	Variance Inflation Factors (VIF)
CCA	1.005466
PR	1.018466
TATR	1.012965

Table-5 shows the result of multicollinearity, i.e., Variance Inflation Factor (VIF). It is better that if the value variance inflation factor is less than 3, then there is no correlation between multiple independent variables. It is found that all the VIF value of independent variables is less than 3, so there is no multicollinearity.

10. LIMITATIONS OF THE STUDY

Continuity of data is hardly available.

If more data of listed public sector fertilizer companies are available, there would be possibility of getting better results.

CONCLUSION

Profitability analysis refers to the earning of profits or gains through the process of business by the companies. It assists businesses to identify their revenue streams and how they can minimize business expenses and improve their management system to achieve the maximum level of profit. In this study, we have made an attempt to find out which variable mostly influences the profitability of fertilizer companies. So, after running the panel data regression model, as per Hausman's Test, we found that Fixed Effects Model is appropriate for regression analysis.

The outcome shows that Cash to Current Assets Ratio, Proprietary Ratio and Total Assets Turnover Ratio have significant impacts on Return on Total Assets at 1% level of significance. Whereas, Cash to Current Assets Ratio and Proprietary Ratio have significant impacts on Return on Capital Employed at

1% level of significance, Total Assets Turnover Ratio is found to be significant at 5% level of significance. Furthermore, it is discovered that each of the three explanatory variables is positively influencing profitability, more so for Cash to Current Assets Ratio. ■

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