Financial Soundness Of Power Generation Companies In India- An Empirical Study

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ABSTRACT

The power sector has been identified as a critical component of infrastructure for any country's long-term economic growth. Electricity is a critical input factor for the country's economic development. The full and effective utilization of an economy's other input factors, such as land, labor, and capital-related resources, is heavily reliant on the uninterrupted availability of electricity. The Indian power sector is widely regarded as the most diverse in the world, with conventional and non-conventional sources of power generation. The nation's demand for electricity has significantly increased, and it is anticipated that it will continue to do so in the future. To meet the rising electricity demand, massive increases in installed power-producing capacity is required. As a result, the current study attempts to examine the financial performance of India's top six electricity companies based on market capitalization using the Zmijewski X-Score model and financial ratios from 2017-18 to 2021-22. The liquidity position of all the selected companies was not satisfactory except for NHPC and the profitability performance of public companies was healthy as compared to private companies. All the selected companies except Adani Power were found in a better and sound financial position as per the X-Score model.

KEYWORDS: Economic growth, Electricity, Profitability, Liquidity, Market Capitalisation, Power Sector, Zmijewski model.

INTRODUCTION:

Electricity has become the modern world's lifeblood, without which the world would come to a halt. Any slowdown in the growth of the electricity industry in any part of the world can cause the region to lag far behind other regions in terms of industrial, economic, and social development (Bharathi, 2016). Power is a catalyst for any nation's development, whether developed, developing, or underdeveloped. Developed, developing, and underdeveloped nations can be distinguished by their per-capita electricity consumption. Over time, one can observe and experience the importance of electricity. “The stone era didn't come to an end because of a scarcity of stones, but because of the discovery of more productive alternatives such as copper, iron, and bronze,” according to one famous remark. Similar to how electricity is a more effective alternative than crude oil, even though crude oil usage is high at the moment, the era of crude oil will come to an end as well (Rai, 2020). An important metric for determining a country's size and overall level of development is the amount of electricity produced. While other nations import a lot of electricity, some nations export a lot of it. Despite its low revenue rate, India's agricultural sector drives the majority of consumption. Expanding the power supply to meet rising demand in an increasingly urbanised Indian economy without incurring unacceptable high costs is a significant challenge. The standard of living of people is impacted by energy consumption in general and access to electricity in particular. It is an important factor on which policymakers should concentrate their efforts. India lags behind several other countries in terms of per capita energy production and consumption (Pravinbhai & Kshatriya, 2022).

A wide variety of consumers use electricity, which has grown to be significant and essentially necessary in almost every sphere of activity. There are many devices that are powered by electricity, not just domestic ones, power can be used in a plethora of industrial applications. Different types of power-driven machinery are used in small, medium, and large-scale industries, which have historically been major consumers of power, power is required to run computers and robots etc. Anyone can

nowadays be reached and communicated with from any location in the world using various modern technologies like the phone, internet, e-mail, e-commerce, video conferences, etc. Modern communication systems have advanced to the point where distance between locations is no longer particularly important. The supporting satellites for all of these communication channels are controlled from earth stations with the help of both conventional and unconventional power systems. People use more energy as their standard of living rises to provide various comforts through energy-guzzling appliances like air conditioners and electrical appliances. However, India's energy production has been able to meet the power needs of various consumer groups (Prof. S. K Shukla &, 2017).

The outlook for the industry has changed as a result of the significant change in the Indian power sector. Consistent economic growth is what is driving India's demand for electricity. The emphasis placed by the Indian government on achieving "Power for All" has accelerated capacity expansion in the nation. The level of competition is rising at the same time on the demand and supply sides of the market (fuel, logistics, money, and manpower) (IBEF, 2019). Every country's economic development is dependent on the availability of electricity. As a result, Indian economic growth is also dependent on the development of the country's power sector. Thus, the main focus of this paper is to analyze the financial performance of selected public and private sector electricity companies in India by using the financial ratios and the Zmijewski model.

LITERATURE REVIEW:

To understand the research work done in this field, this study reviewed research papers from the existing literature. A few studies relevant to this research topic are highlighted below.

Pravinbhai & Kshatriya, (2022) studied the financial performance of selected power companies in India for the period from 2018-19 to 2020-21. It has been found from the study that the net profit margin ratio of selected companies has a significant difference and no significant

difference has been found between the return on assets of the selected companies.

Tomczak, (2019) compared the financial standings of Companies generating power from Fossil fuels and renewable sources. The study concluded by saying that investing in renewable energy sources is not a money-making business.

Mushahid, (2018) Evaluated the Financial Health of National Thermal Power Corporation Limited (NTPC) for a period from 2011-12 to 2015-16. The study reveals that the overall financial performance of NTPC Limited was sound and satisfactory for the study period and it has also been found that sales have no impact on the liquidity, profitability, and solvency ratios of NTPC.

Azhar, (2018) examined and compared the Profitability, Solvency, and Working capital management of private and state-owned power distribution utilities using the MANN Whitney U Test.

Prof. S. K. Shukla &, (2017) Analysed the financial performance of NTPC by using different financial ratios. It has been revealed from the study that the overall financial performance of NTPC was satisfactory during the initial years of the study but deteriorated in later years.

M. M. Khan & Dr. S. K. Safiuddin (2016) measured the liquidity and profitability performance of selected Pharmaceutical Companies. They stated that A company's financial soundness can be achieved by maintaining the company's liquidity and profitability.

Vintila & Alexandra Nenu, (2016) Measured the Liquidity and Profitability performance of Romanian Listed Companies for a period from 2005 to 2014. The study reveals that the Liquidity and Corporate financial performance of the selected companies have shown a negative correlation for the period.

OBJECTIVES OF THE STUDY:

1. To Evaluate the liquidity and profitability performance of selected companies.
2. To Know the financial soundness of the selected companies using the Zmijewski X-score model.
3. To Assess the impact of liquidity and profitability on the X-Score of selected companies.

HYPOTHESIS:

1. There is a significant impact of liquidity on X-Score.
2. There is no significant impact of profitability on X-Score.

THE STUDY'S SCOPE:

The scope of the study is limited to liquidity, profitability performance, and the Zmijewski X-Score of selected Indian electricity companies. The research will last for five years, from 2017/18 to 2021/22.

LIMITATIONS OF THE STUDY:

Secondary data will be used to carry out the study. The validity of the data gathered will determine how reliable the results are. Due to limited access to primary financial data for the company, secondary data is mostly accessed.

RESEARCH METHODOLOGY:

The research is descriptive and analytical. This study is based on secondary data that has been procured from annual financial reports of the selected electricity companies for a period of five years from 2017-18 to 2021-22.

DATA SET:

The data used in this study was obtained from the annual reports of the top six power generation companies in India, three of which are public and three of which are private and were chosen based on market capitalization. Power Grid Corporation of India, National Thermal Power Corporation Limited (NTPC), and National Hydroelectric Power Corporation (NHPC) are public sector companies, while Tata Power, JSW Energy, and Adani Power are private sector companies selected for the study.

VARIABLES:

The current study addresses the issue of identifying key variables that affect financial performance. All of the variables listed below were used to test the study's hypotheses.

LIQUIDITY RATIOS:

Liquidity refers to a company's ability to pay its short-term liabilities. The inability to pay off short-term liabilities has an impact on its credibility. The liquidity ratios measured in the present study are:

- **Current Ratio** = Current Assets/Current Liabilities
- **Quick Ratio/Acid Test Ratio** = Quick Assets/Current Liabilities

PROFITABILITY RATIOS:

Profitability ratios assess the firm's operational efficiency and profitability. These ratios reflect the overall outcome of business operations. They are among the most closely followed and frequently quoted ratios. The Profitability ratios that are being used in the present study are:

- **Return on Assets Ratio (ROA) =** Net Profit after taxes/Average total assets
- **Return on Equity Ratio (ROE)**
  ROE = Net profit after taxes-Preference dividend/Net worth/Equity shareholders fund X 100
- **Net Profit Margin Ratio =** Net profit/Sales X 100
- **Return on Capital employed Ratio (ROCE) =** PAT+Interest/Capital employed X 100

1.6.1 Zmijewski Model (X-Score)

Zmijewski, (1984) uses a probit method to model bankruptcy, which employs financial ratios to assess a firm's performance, leverage, and liquidity. The ratios were selected based on their performance in the previous studies. For the period 1972–1978, the model used data from 40 bankrupt and 800 non-bankrupt industrial firms. The following is the generated probit function, along with the variables and estimated coefficients from Zmijewski's (1984) study:

X-score = -4.3 - 4.5X1 + 5.7X2 - 0.004X3

Where:

X1 = Net income / Total assets = **ROA**
X2 = Total liabilities / Total Assets
X3 = Current assets / Current liabilities = Current ratio

Unlike Altman's Z-model, Zmijewski X-Score has no qualifying cutoff values against which the results can be compared. Many researchers, including Djamaluddin et al. (2017), classified the X-score obtained from the Zmijewski model into two categories. If the X-Score is negative (X-Score <0), the company is considered to be in a healthy condition. Contrariwise, if the X-score is positive (X-Score ≥ 0) then the company can be classified under unsanitary conditions or likely to lead to financial distress.

1.7 DATA ANALYSIS AND INTERPRETATION:

Liquidity Ratios:

Table 1.1: Liquidity Ratios of Selected Companies calculated from the annual reports

Ratio	Companies	2017-18	2018-19	2019-20	2020-1	2021-22	Mean	SD
Current Ratio	POWERGRID	0.40	0.62	0.71	0.91	0.94	0.71	0.22
	NHPC	1.79	2.07	2.43	2.50	1.93	2.14	3.10
	NTPC	0.84	0.79	1.01	0.97	0.95	0.91	0.92
	Tata Power	0.58	0.55	0.51	0.50	0.58	0.54	0.37
	JSW Energy	0.48	0.53	1.01	0.87	2.92	1.16	1.00
	Adani Power	0.43	0.05	0.14	0.15	0.04	0.16	0.15
Quick Ratio	POWERGRID	0.36	0.59	0.68	0.87	0.90	0.68	0.22
	NHPC	1.77	2.05	2.41	2.48	1.91	2.12	3.10
	NTPC	0.70	0.65	0.82	0.82	0.80	0.75	0.78
	Tata Power	0.55	0.51	0.45	0.44	0.42	0.47	0.54
	JSW Energy	0.33	0.40	0.79	0.73	2.44	0.93	0.86
	Adani Power	0.42	0.05	0.14	0.15	0.04	0.16	0.15

Source: Data extracted from Annual reports of the companies (various issues).

The current ratio and Quick ratio of Power Grid Corporation, NTPC, TATA Power, JSW Energy, and Adani Power were below the standard of 2:1 for all the years of study, which indicates the companies' liquidity position is not satisfactory. The quick and current ratio of NHPC was above the standard for all five years of the study which indicates that the company has better liquidity. NHPC was

the only company that showed a better liquidity position for all the years of the study.

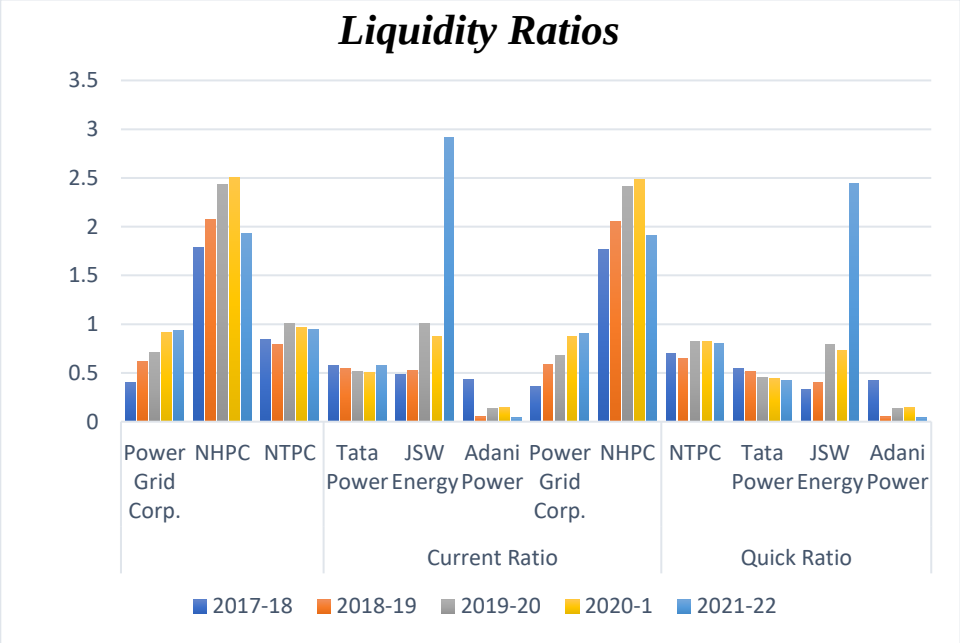
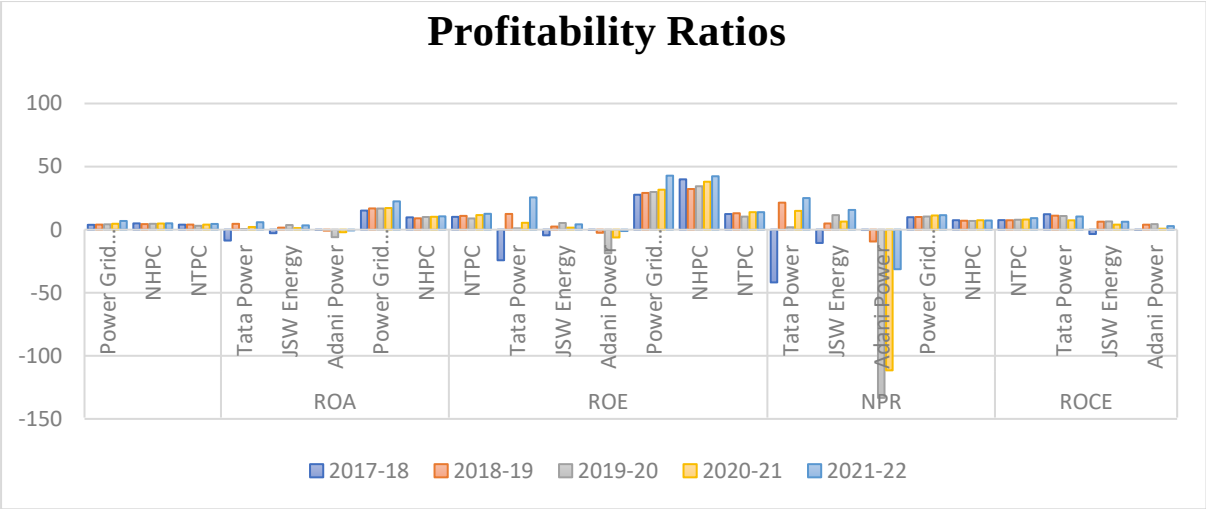


Table 1.2: Profitability Ratios of Selected Companies calculated from the annual reports

Ratio	Companies	2017-18	2018-19	2019-20	2020-21	2021-22	Mean	SD
ROA (%)	POWERGRID	3.86	4.03	4.23	4.69	6.89	4.74	1.24
	NHPC	4.98	4.41	4.65	4.87	5.03	4.78	2.56
	NTPC	3.97	4.03	3.08	4.01	4.54	3.92	5.27
	Tata Power	-8.63	4.63	0.39	2.14	5.90	0.88	5.73
	JSW Energy	-2.79	1.62	3.67	1.26	3.41	1.43	2.58
	Adani Power	-0.12	-0.77	-5.95	-2.04	-0.61	-1.89	2.37
ROE (%)	POWERGRID	15.14	16.84	16.77	17.15	22.44	17.66	2.78
	NHPC	9.76	9.00	10.02	10.21	10.56	9.91	5.86
	NTPC	10.16	10.93	8.90	11.57	12.58	10.82	1.39
	Tata Power	-24.25	12.46	1.07	5.45	25.57	4.06	18.34
	JSW Energy	-4.49	2.47	5.29	1.60	4.22	1.81	3.81
	Adani Power	-0.24	-2.46	-18.68	-6.17	-1.07	-5.72	5.72
Net Profit Margin %	POWERGRID	27.69	29.12	29.87	31.68	42.81	32.23	6.08
	NHPC	39.90	32.23	34.42	38.01	42.34	37.38	4.08
	NTPC	12.39	13.01	10.35	13.87	13.87	12.69	1.45
	Tata Power	-41.80	21.42	1.91	14.90	25.05	4.29	27.23
	JSW Energy	-10.54	4.91	11.53	6.42	15.64	5.59	9.97
	Adani Power	-0.28	-9.36	-133.34	-111.53	-31.34	-57.72	61.12
	POWERGRID	9.86	10.04	10.42	11.25	11.49	10.61	0.72
	NHPC	7.49	7.09	6.91	7.46	7.27	7.24	2.46

ROCE (%)	**NTPC**	7.57	7.45	7.86	8.04	9.15	8.01	6.76
	Tata Power	12.25	11.09	10.82	7.41	10.44	10.40	1.80
	JSW Energy	-3.45	6.33	6.52	4.00	6.28	3.93	4.25
	Adani Power	-0.20	3.96	4.38	0.77	2.83	2.34	1.99

Source: Data extracted from Annual reports of the companies (various issues).



The asset turnover ratio of Power Grid Corporation, NHPC, and NTPC has shown an increasing trend, NHPC has shown the highest ROA among all the selected companies for the period. TATA Power has shown a negative ROA in 2017-18 and then shows an increasing trend but the mean value shows that the company's ROA was not up to the mark for the study. ROA of JSW energy was also negative in the year 2017-18 which then shows an increasing trend but overall ROA was not sound. Adan Power has shown a decreasing trend and negative ROA for all the years of the study. Overall NHPC had the highest ROA among all the companies with a mean value of 4.78 followed by Power Grid Corporation at 4.74, and NTPC at 3.92. JSW Energy had 1.43, TATA Power 0.88, and Adani Power -1.89 which was the lowest among all the selected companies for the period.

ROE of Power Grid Corporation has shown an increasing trend for all the years of the study. ROE of NHPC was 9.76% in the year 2017-18 which then decreased to 9% in the year 2018-19 and then shows an increasing trend for all the years of the study. ROE of NTPC has shown an increasing trend for the initial years of the study which then decreased to 8.90% lowest among all the years in 2019-20 but again shows an increasing trend for the years.

TATA Power showed negative ROE (-24.25%) in the year 2017-18 and then increased to 12.46% for the year 2018-19 but then again showed a decreasing trend and decreased to 1.07 % in 2019-20 and then again showed an increasing trend and was 5.45% for the year 2020-21 and 25.57% for the year 2021-22. JSW shows negative ROE with -4.49 % in the year 2017-18 which then shows an increasing trend for the year 2018-19 and 2019-20 and then again decreased for the later years of the study. Adani Power has shown a negative and decreasing trend for all the years of the study.

The Net Profit Margin of Power Grid corporation has shown an increasing trend for the years of the study. The net profit margin ratio of NHPC has decreased from 39.90 % to 32.23 % and then shows an increasing trend for all the years of the study. NPR of NTPC was 12.39 in the year 2017-18 and 13.01% in the year 2028-19 and then decreased to 10.35 % in the year 2019-20 and then again showed an increasing trend for the later years of the study. The net profit margin ratio of TATA Power was negative -41.80% in the year 2017-18 and increased to 21.42% for the year 2019-20 and then decreased to 1.91% in the years 2020-21 and shows an increasing trend in the later years of the study. NPR of JSW Energy was negative in the year 2017-18 which then shows a decreasing trend for all the years of the study except the year 2020-21. NPR of Adani's power was negative and showed a decreasing trend for all the years of the study.

The ROCE ratio of the Power grid corporation shows an increasing trend for all the years of the study. ROCE of NHPC shows a decreasing trend for the year 2018-19 and 2019-20 and then again shows an increasing trend. NTPC has shown an increasing trend in its ROCE ratio for all the years of the study. TATA power shows a decreasing trend in its ROCE ratio in the initial years of the study but shows an increasing trend in the year 2021-22. The ROCE ratio of JSW Energy was negative in the year 2017-18 (-3.45%) and then increased to 6.32% in the year 2018-19 and 6.52% in the year 2019-20 then decreased to 4% in the year 2020-21 and then again shows an increasing trend in the year 2021-22. The ROCE ratio of Adani power of negative for the year 2017-18 and then shows an

increasing trend for the year 2018-19 and 2019-20 and decreased to 0.77% in the year 2020-21 but shows an increasing trend in the year 2021-22.

Table 1.3: X- Score of Selected Companies calculated from the annual reports

Year	POWERGRID	NHPC	NTPC	TATA Power	JSW Energy	Adani Power
2017-18	-17.45	-23.98	-18.74	-18.74	10.36	-0.85
2018-19	-18.10	-21.30	-18.84	-19.13	-9.65	1.44
2019-20	-19.11	-22.21	-14.45	-14.80	-19.10	24.12
2020-21	-21.30	-23.61	-18.64	-19.09	-8.83	6.58
2021-22	-31.37	-23.97	-21.14	-20.40	-18.57	0.89
Mean	-21.47	-23.01	-18.36	-18.43	-9.16	6.44
SD	5.72	1.20	2.42	2.12	11.92	10.26

Source: Data extracted from Annual reports of the companies (various issues).

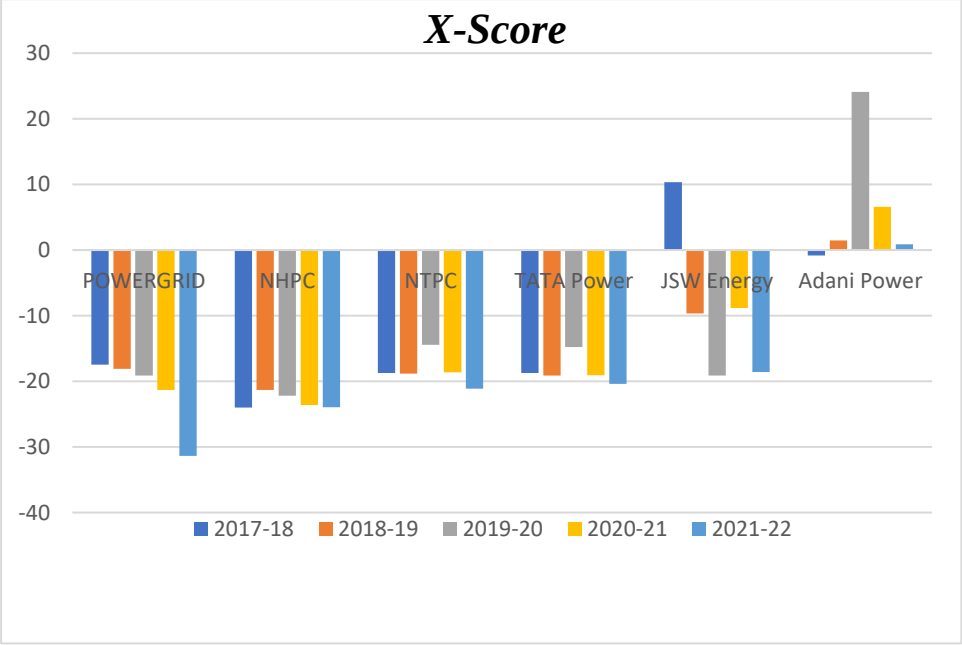


Table 1.3 above represents the Zmijewski X-Score of all the selected companies. It has been found that all the selected companies performed well and were found in a healthier and sound financial position as per the model except Adani Power. The X- Score of Adani Power was 6.44 which is way beyond zero, hence the company was in financial distress for the period.

HYPOTHESES TESTING:

Ho1- There is no significant impact of liquidity on X-Score

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.544[a]	.296	.244	10.53540

a. Predictors: (Constant), QR, CR

It has been observed in the table that, the coefficient of multiple determination (R2) of the X-Score model is .296, which indicates that 29.6% of the variation in X-Score can be clarified jointly with the help of given financial ratios (independent Variables) while the remaining 70.4% is attributed to the different other variables outside the model. Adjusted R (24.4%) is the explanatory power that penalizes the addition of extraneous indicators to the model.

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1258.084	2	629.042	5.667	.009[b]
	Residual	2996.854	27	110.995		
	Total	4254.938	29			

a. Dependent Variable: X-Score

b. Predictors: (Constant), QR, CR

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.961	3.229		-1.846	.076
	CR	-4.367	20.120	-.271	-.217	.830
	QR	-4.600	20.921	-.274	-.220	.828

a. Dependent Variable: X-Score

It has been found from the output above that the current ratio has negatively affected X-Score, a coefficient value of -4.367 indicates that for every one unit of variation in the current ratio, there is a -4.367 variation in X-Score. The coefficient of the quick ratio has also negatively affected the X-Score. The coefficient value of -4.600 shows that for every unit of variation in quick ratio, there is a -4.600 variation in X-Score.

The output above demonstrates the significance of the predictor variables' current ratio and quick ratio because their p-values are less than the conventional alpha level of 0.05, indicating statistical significance. so, Liquidity has a significant impact on the X-Score of the chosen companies.

Ho2:- There is no significant impact of profitability on X-Score

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.955[a]	.911	.893	3.96625

a. Predictors: (Constant), ROCE, CR, ROA, NPR, ROE

The table above shows that the coefficient of multiple determination (R2) of the X-Score model is 91.1, which indicates that 91.1% of the variation in X-Score can be clarified jointly with the help of given financial ratios (independent Variables) while the remaining 8.9% is attributed to the different other variables outside the model. Adjusted R (89.3%) is the explanatory power that penalizes the addition of extraneous indicators to the model.

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3877.391	5	775.478	49.296	.000[b]
	Residual	377.546	24	15.731		
	Total	4254.938	29			

a. Dependent Variable: X-Score

b. Predictors: (Constant), ROCE, CR, ROA, NPR, ROE

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.223	2.169		1.025	.316
	ROA	.766	.411	.204	1.864	.075
	ROE	-.303	.188	-.268	-1.607	.121
	NPR	-.096	.044	-.319	-2.178	.039
	ROCE	-1.635	.232	-.495	-7.038	.000

a. Dependent Variable: X-Score

It has been found from the output above that the ROA ratio has positively affected X-Score, a coefficient value of .766 indicates that for every unit of variation in the ROA ratio, there are .766 units of variation in X-Score. The coefficient of ROE shows that it has negatively affected the X-Score. The coefficient value of -303 shows that for every unit of variation in the ROE ratio, there are -.303 units of variation in the X-Score. The net profit ratio has also negatively affected X-Score, a coefficient value of -.096 means for every unit of variation in NPR there are -.096 units of variation in X-Score. The coefficient of the ROCE ratio is -1.635 which shows that for every one-unit variation in ROCE, there is -1.635 units variation in X-Score.

As can be seen from the output above, the predictor variables ROA, ROE, NPR, and ROCE ratio are significant because their p-value is 0.000, which is less than the usual alpha level of 0.05, proving that they are statistically significant. So, there is a significant impact of profitability on the X-Score of selected companies.

CONCLUSION:

This study attempts to measure the financial soundness of selected electricity companies in India using liquidity ratio, profitability ratio, and Zmijewski X-Score for the period of five years from 2017-18 to 2021-22. The results of liquidity ratios (current and quick ratio) show that the liquidity position of Power Grid Corporation, NTPC, TATA Power, JSW Energy, and Adani Power was not satisfactory for the period. These companies were not in a position to meet their short-term obligations. NHPC was the only company among the selected companies with a sound liquidity position. The results of profitability ratios (ROA, ROE, NPR

& ROCE) show that the profitability performance of public sector companies was sound and healthier as compared to private sector companies. From the output of the X-score, it has been observed that all the selected companies were in a financially sound and healthier position except Adani Power, which was in a financial distress position as per the model. It has also been found from the study that liquidity ratios have a significant impact on the X-Score of the selected companies while profitability has not shown a significant impact on the X-Score as per the results above.

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