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Project Report on:

"The COVID Impact on Profitability of Indian Steel Industries"

Prepared in partial fulfilment of B.COM (Hons.) 6th Semester Project Work.

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CERTIFICATE

This is to certify that Mr. Eshan Sen bearing Registration No: 202001016274 & Roll No: 200212400004 of Dr. Bhupendra Nath Dutta Smriti Mahavidyalaya of The University of Burdwan Was working under my supervision and guidance for his dissertation for the course of B.COM (Hons.), Paper: DSE-4. His dissertation titled as ''The COVID Impact on Profitability of Indian Steel Industries'' is an original work as per my knowledge. I hereby further certify that the work has not been submitted elsewhere. It is recommended that this dissertation may be placed before the examiner for evaluation.

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Date: _____

Eshan Sen

6th Semester, B.COM (Hons.)

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a. EXECUTIVE SUMMARY

Nowadays, due to excessive urban development, industrial development, architecture, etc., necessity in steel production has increased. Steel is an essential commodity in modern civilization which has been meeting the needs of human civilization since ancient times. Many people have implemented many projects on steel industry at different times. What has been the changes or impacts on the profit of the steel industries during the COVID-19 period? - this is the overall point I want to make through my project. For this I have first selected few ratios that may affect the steel industry then I have done various types of statistical analysis among them like standard division, mean etc. and done regression, correlation matrix with each other with the help of all those data. One major point to note in all is that profitability index of all steel companies was low during the covid 19 pandemic period. If they are compared with each other, it can be seen that JSW Ltd. and Tata Steel perform better than the rest.

Keywords: #Indian_steel_industry, #multiply_regression_technique, #profitability_index

Chapter 1: Introduction

Does the Covid impacts the Profitability dynamics of large companies? – A study on Indian Steel Sector during 2018 to 2022.

b. *Introduction:*

Steel industry plays a very significant role in the economic growth and development of a country. Steel is a fundamental material in construction of houses, bridges, roads, railways and other such works. Steel is widely used in a variety of industries including automotives, machineries, appliances and electronics. The steel industry requires a large number of skilled workers in coal mining, production engineering, research and development. That's why steel industries are directly and indirectly involved in job creation and employment for a country. Exporting a country's steel products to international markets helps improve business operations and increase revenue. A competitive steel industry helps strengthen the country's economy and foreign exchange earnings by connecting the country to the global market. Steel is used in the manufacturing of military vehicles, ships and other materials for tasks related to national security. If a country has its own domestic steel industry, it is convenient to get regular supply of machinery and weapons etc. for security purposes and the dependence on foreign imports is reduced. The steel industry drives innovation and technological advancements. Research and development efforts in steel production techniques, alloy development, and energy efficiency can enhance the competitiveness of the industry and contribute to the overall technological progress of the country. The steel industry helps some of its ancillary industries grow, including iron ore, coal mining, transportation, logistics, and equipment manufacturing.

Steel industries refer to sectors or companies involved in the production, processing, and manufacturing of steel products. Steel is an alloy primarily composed of iron and carbon, along with other elements such as manganese, chromium, and nickel, among others. It is a widely used material in various industries due to its strength, durability, and versatility.

Overall, a strong steel industry is crucial for a country's economic development, infrastructure growth, job creation, and national security. It contributes to the country's industrial base, technological advancement, and global competitiveness.

The Indian steel industry is one of the largest and fastest-growing steel industries in the world. India is the second-largest steel producer globally, after China. The country has witnessed significant growth in steel production over the years. In 2020, India produced around 105 million metric tons of crude steel. Several major steel-producing states in India include Odisha, Jharkhand, Chhattisgarh, Karnataka, and West Bengal. India has both public and private sector steel companies. Indian Steel Industry contributes to all the facets of economy, including GDP, industrial and infrastructural development. The steel industry contributes approx. 2.5% to national GDP, employing 2.5 million people, directly & indirectly. The output effect of steel on Indian economy is approx.1.4 times, with an employment multiplier of 6.8 times.

As of December 2022, India was the world's second-largest producer of crude steel. In FY22, the production of crude steel and finished steel stood at 133.596 MT and 120.01 MT, respectively. In April-November 2022, the production of crude steel and finished steel stood at 81.96 MT and 78.09 MT respectively.

c. *A brief overview of some Steel Companies:*

JSW Steel Ltd.: The flagship company of JSW Group, JSW Steel is one of India's leading integrated steel manufacturers with a capacity of 18 MTPA. It is one of the fastest growing companies in India with a footprint in over 100 countries. With state-of-the-art manufacturing facilities located in Karnataka, Tamil Nadu and Maharashtra, it is recognized for its innovation and quality. JSW offers a wide gamut of steel products that includes Hot Rolled, Cold Rolled, Bare & Pre-painted Galvanized & Galvalume®, TMT Rebars, Wire Rods and Special Steel. JSW Steel continues to enhance its capabilities to meet the rapidly changing global market needs. To stay on the leading edge of technical advancement, JSW has entered into technological collaboration with JFE Steel Corp, Japan to manufacture high strength and advanced high strength steel for the automobile sector.

TATA Steel Ltd.: Tata Steel was established in India as Asia's first integrated private steel company in 1907. With this, we also developed India's first industrial city at Jamshedpur. Today, they are among the leading global steel companies. Their annual crude steel capacity across Indian operations is nearly 20 MnTPA and they registered a turnover of INR 91,037 crore in FY21. They also set up their second greenfield steel plant of 3 MnTPA in the eastern state of Odisha in 2016; the expansion to 8 MnTPA in currently underway. They possess and operate captive mines that help them maintain cost-competitiveness and production efficiencies through an uninterrupted supply of raw material. This is how they ensure that they remain the lowest cost producer of steel in Asia.

SAIL: Steel Authority of India (SAIL) is a steel manufacturing enterprise owned and operated by the Ministry of Steel, Government of India. Ever since its establishment on 24 January 1973, it has had over 65,807 employees. With an annual production of 16.30 million metric tons, it is the 20th largest steel firm in the world and the largest in India. Smt Soma Mondal is the current Chairman of SAIL beginning her tenure with effect from April 1 2021. Steel Authority of India can trace its origins back to the Hindustan Steel Limited (HSL) which was set up on 19 January 1954. It was intended to manage only one plant being set up in Rourkela.

JSPL: JSPL is an industrial powerhouse with a dominant presence in steel, power, mining and infrastructure sectors. Led by Mr Naveen Jindal, the company's enviable success story has been scripted essentially by its resolve to innovate, set new standards, enhance capabilities, enrich lives and to ensure that it stays true to its cherished value system. JSP has grown into a large and profitable enterprise. He has transformed JSP into an industrial powerhouse with a dominant presence in steel, power, mining and infrastructure sectors. With an investment of 12 billion USD across the globe, the company is continuously scaling its capacity utilisation and efficiencies to capture opportunities for building a self-reliant India.

Welspun Corp Ltd: Welspun Corp Ltd (WCL) is a manufacturer and supplier of large-diameter pipes. Its product portfolio includes HSAW pipes, LSAW pipes, ERW pipes and Ductile Iron Pipes. The company's service portfolio comprises Coating systems and Ancillary services. Coating systems comprise of External 3-Layer Polyethylene (3LPE), 3-Layer Polypropylene System (3LPP), Internal Epoxy, Inside Cement Mortar Lining, Coal Tar Enamel, Solvent-free Coating and Weight Coating. Ancillary services comprise of Double Jointing, Pipe Bending, ID Machining, Dump Site & Inventory Management. WCL provides its products to oil and gas, and water transmission industries. The company has production facilities in India, the US and Saudi Arabia. The company has operations in Europe, the Americas, the Middle East, Africa, Asia and Oceania. WCL is headquartered in Mumbai, Maharashtra, India.

Chapter 2: Literature Review

d. *Literature Review:*

Many studies have been done on steel industries, some of them are summarized below:

Dr. Amalendu Bhunia and Islam Uddin Khan (2011) has conducted a study on "liquidity management efficiency of Indian steel companies". And they used some ratios, shown corelation, regression, standard deviation as methodology. A descriptive statistic discloses that liquidity and solvency position in terms of debt is very satisfactory and relatively efficient liquidity management is found but liquidity position has no impact on profitability.

Prof. ketan H. Popat (2012) has conducted study on "A comparative study of Profitability analysis of selected steel industries" and he used different kinds of ratio, also shown ANOVA as methodology. Authors found that profitability of TATA steel company is better, JINDAL steel shows next to TATA steel while major fluctuation in profitability shown in JSW and SAIL but Uttam shows decrease trend in profitability.

Prof. Ata Takeh and Dr. Jubiliy Navaprabha (2015) started a study on "Capital Structure and its impact on financial of Indian steel industry" using some ratios, standard deviation, correlation, regression, ANOVA as methodology and they found a great impact on financial performance of Indian steel industry.

Dr. Mohd Yamen and Dr. Asif Pervez (2016) has conducted research to "Impact of liquidity, solvency and efficiency on profitability of Steel Authority of India Limited (SAIL)" and they used some ratios, shown correlation and regression as methodology. They found the overall financial performances of SAIL was satisfactory during initial years of the study but deteriorated in subsequent years.

Prof. Pinku Paul and Paroma Mitra (2017) investigated on "Effect of working capital management on profitability of the firm of Indian steel industries". They used different ratios, mode, mean, standard deviation, regression as methodology. And they found that his sample companies of the steel industry have enough scope to enhance their profitability by the use of working capital in a more efficient way.

Prof. Shrabanti Pal (2010) has completed study on "A comparative financial analysis between public and private sector steel companies in India. And he used different kinds of ratio, ANOVA, regression as methodology. He found profitability of Indian steel companies is quiet impressive up to 2007 as it follows the increasing trend.

Dr. Pramod Kumar Patjoshi (2016) highlighted a study on "Liquidity management and financial performance of selected steel companies in India". He used some liquidity and profitability ratios, shown ANOVA, correlation, regression as methodology. And he found both current and liquid ratio are highly corelated to return on total assets and inventory turnover ratio is highly correlated with return on investment. It also reveals that all the liquidity ratios measured by ANOVA are significant associations on the firm's profitability.

Dr. Biswanath Sukal (2015) studied on "A comparative financial analysis of TATA steel Ltd. and SAIL" using current ratio, quick raio, EPS, DPR, ROCE, NPR, GPR, interest coverage ratio, debtors turnover ratio, inventory turnover ratio etc. and at conclusion he find out that TATA steel Ltd. could be judged as better performance than its rival SAIL.

Prof. Shrabanti Pal (2011) developed a model on "Financial distress in Indian steel industry under globalisation". He used group statistics between some ratios and pooled within groups Matrices as

methodology & finally he found profitability and operational efficiency ratios are helpful in predicting the overall financial health of the companies under this study.

Rooh Ollah Arab, Seyed Saadat Masoumi and Azadeh Barati (2015) analyzed "Financial performance of the steel industry in India". They used liquidity, solvency and profitability ratio and shown ANOVA as methodology. And testing of hypotheses gave the conclusion that there is significant difference in the financial performance of identified units in the steel industry in India with regard to liquidity, solvency and profitability position.

Steel Pipes

TATA Steel Industry

Chapter 3:

Objective and Methodology

e. *Objective of the Study:*

The objective of the present study is to find out the COVID impact on profitability of Indian Steel industries.

f. *Methodology:*

a) Data Collection

The study is mainly based on secondary data. Relevant secondary data have been collected from Money Control website, Financial annual reports and Internet etc. as and when required.

b) Period of Study

The time period of the study is designed from 2018 up to 2022.

c) Sampling Design

I have selected five major steel Industries as a sample on the basis of availability of data. The companies that have been chosen for the study are: Jindal South West Steel Ltd (JSW Steel Ltd), TATA Steel Ltd, Steel Authority of India Limited (SAIL), Jindal Steel & Power Ltd (JSPL) and Welspun Corp Ltd.

d) Mode of Analysis

In order to derive the accurate results, I have applied various statistical tools like Mean, Standard Deviation (S.D), Max, Min, to analysis the Correlation, Regression are employed for test of hypothesis with the help of GRETL software.

e) Research Model

Regression analysis was used to find out the effect of profitability on financial performance of selected steel industries. Correlation analysis was used to examine the relationship between dependent and independent variables.

Regression models are:

Model 1:

$$\text{Net Profit Margin (NPM)} = \alpha_0 + \beta_1 GPM + \beta_2 EPS + \beta_3 DividendPayout + \beta_4 OperatingProfitMargin + \beta_5 ROCE + \beta_6 ROA + \beta_7 EVNetOperatingRevenue + \beta_8 MarketCapNetOperatingRevenu + \beta_9 PBV + \beta_{10} LnSales + e$$

Model 2:

$$\text{Return On Capital Employed (ROCE)} = \alpha_0 + \beta 1 NPM + \beta_2 GPM + \beta_3 ROA + \beta_4 EPS + \beta_5 DividendPayout + \beta_6 OperatingProfitMargin + \beta_7 EVNetOperatingRevenue + \beta_8 MarketCapNetOperatingRevenu + e$$

Model 3:

$$\text{Dividend Payout} = \alpha_0 + \beta_1 NPM + \beta_2 GPM + \beta_3 EPS + \beta_4\ ROCE + \beta_5 ROA + \beta_6 OperatingProfitMargin + \beta_7 EVNetOperatingRevenue + \beta_8 MarketCapNetOperatingRevenu + \beta_9 PBV + e$$

All the ratios that I have worked with are briefly described below:

Net Profit Margin Ratio (NPM): Net profit margin is a financial metric that measures the profitability and efficiency of a company's operations. The formula for calculating net profit margin is as follows:

NPM = (Net Profit / Net Sales) x 100

Return on Capital Employed (ROCE): It is a financial ratio that measures the profitability and efficiency of a company's capital investments. ROCE is calculated by dividing the company's operating profit (or earnings before interest and taxes, EBIT) by its capital employed. The formula for ROCE is as follows:

ROCE = (Operating Profit / Capital Employed) x 100

Return on Assets (ROA): It is a financial ratio that measures a company's profitability by comparing its net income to its total assets. ROA indicates how effectively a company is utilizing its assets to generate profits. The formula for calculating ROA is:

ROA = Net Income / Total Assets

Earnings Per Share (EPS): It is a financial metric used to measure the profitability of a company. EPS is calculated by dividing the net earnings of a company by the number of outstanding shares of its common stock. The formula for calculating EPS is:

EPS = (Net Earnings - Preferred Dividends) / Average Outstanding Shares

Dividend Payout Ratio: It is a financial metric that measures the proportion of a company's earnings that are distributed to shareholders in the form of dividends. It is calculated by dividing the total dividends paid by the company by its net income. The formula for the dividend payout ratio is:

Dividend Payout Ratio = Dividends / Net Income

Gross Profit Margin Ratio: It is a financial metric that measures the profitability of a company's core operations by comparing the gross profit generated from sales to the revenue. It indicates the percentage of revenue that is retained as gross profit after deducting the cost of goods sold (COGS). The formula for calculating the Gross Profit Margin Ratio is as follows:

Gross Profit Margin Ratio = (Gross Profit / Net Sales) x 100

Operating Profit Margin Ratio: It is a financial metric used to measure a company's profitability and efficiency in generating operating profits from its core business operations. It indicates the percentage of revenue that remains as operating profit after deducting all variable and fixed operating expenses. The formula for calculating operating profit margin ratio is:

Operating Profit Margin Ratio = (Operating Profit / Net Sales) x 100

Current Ratio: It is a financial ratio that measures a company's ability to meet its short-term obligations with its short-term assets. It is calculated by dividing a company's current assets by its current liabilities. The formula for the current ratio is:

Current Ratio = Current Assets / Current Liabilities

EV/Net Operating Revenue: It is a financial metric used to assess the valuation of a company relative to its net operating revenue. It is a variation of the commonly used valuation multiple EV/Revenue. The EV/Net Operating Revenue ratio is calculated by dividing the enterprise value of a company by its net operating revenue. The formula for the EV/Net Operating Revenue ratio is as follows:

EV/Net Operating Revenue = Enterprise Value / Net Operating Revenue

Market Cap/Net Operating Revenue: Market Capitalization/Net Operating Revenue is also known as the Price-to-Sales (P/S) ratio, is a financial metric used to assess the valuation of a company. It is calculated by dividing the market capitalization (market cap) of a company by its net operating revenue. The formula for Market Cap/Net Operating Revenue (P/S ratio) is as follows:

P/S ratio = Market Capitalization / Net Operating Revenue

Price/BV: Price-to-Book Value is a financial ratio used to evaluate the valuation of a company. It is calculated by dividing the market price per share of a company's stock by its book value per share. Book value per share is calculated by dividing the total book value of a company by the number of outstanding shares. The book value represents the net assets of a company, which is the difference between its total assets and total liabilities. The formula for Price-to-book value is as follows:

Price to Book Value ratio = Market Price Per Share/Book Value Per Share

Log transformation is done for variables such as sales, current assets, current liabilities, fixed assets and interest.

JSW Steel Products

Chapter 4: Result and Analysis

g. *Result and Analysis:*

First we present the data and descriptive statistics of our variables at the individual level. NPM shows highest standard deviation for JSPL (9.70) whereas JSW reports lowest standard deviation (2.49) among the sample companies. Tata Steel reports highest mean return (NPM) among the sample companies. The highest mean ROCE is reported by JSW (18.56) that indicates the capital efficiency but when we look at the volatility the standard deviation of ROCE is highest in Welspun Crop (14.62). ROA measures the assets efficiency. The highest average ROA is reported by Tata Steel (7.96). When we look at the stability of ROA, we find the lowest SD is reported by JSW (2.28) whereas the highest is reported by Welspun Crop (9.42). Tata Steel reports moderate level of stability in its asset efficiency. The following Tables (Table 1.1 to Table 1.16) report the descriptive statistics of all the variable.

Table: 1.1: Net Profit Margin Ratio (NPM in Percent) of Indian Steel Companies

Companies	2022	2021	2020	2019	2018	Mean	S.D	Min	Max
JSW Steel Ltd.	14.05	11.86	8.23	10.52	7.11	10.35	2.49	7.11	14.05
Tata Steel Ltd.	25.58	20.29	11.15	14.91	6.99	15.78	6.57	6.99	25.58
SAIL	11.61	5.57	3.27	3.25	-0.83	4.57	4.08	-0.83	11.61
JSPL	16.75	21.47	2.35	-0.94	-2.11	7.50	9.70	-2.11	21.47
Welspun Crop Ltd.	9.18	19.26	6.3	-6.7	2.41	6.09	8.49	-6.7	19.26

Table: 1.2: Return on Capital Employed (ROCE in Percent) of Indian Steel Companies

Companies	2022	2021	2020	2019	2018	Mean	S.D	Min	Max
JSW Steel Ltd.	25.08	16.78	11.13	21.75	18.06	18.56	5.28	11.13	25.08
Tata Steel Ltd.	27.99	14.89	9.49	17.12	12.87	16.47	7.02	9.49	27.99
SAIL	23.06	13.63	9.26	9.19	2.87	11.60	7.47	2.87	23.06
JSPL	21.74	20.22	8.06	8.97	4.63	12.72	7.73	4.63	21.74
Welspun Crop Ltd.	16.79	37	23.81	-2.28	10.84	17.23	14.63	-2.28	37

Table: 1.3: Return on Assets (ROA in Percent) of Indian Steel Companies

Companies	2022	2021	2020	2019	2018	Mean	S.D	Min	Max
JSW Steel Ltd.	10.25	6.29	4.33	7.55	5.4	6.764	2.28	4.33	10.25
Tata Steel Ltd.	14.87	9.46	4.48	7.66	3.33	7.96	4.57	3.33	14.87
SAIL	10.2	3.28	1.61	1.87	-0.42	3.308	4.07	-0.42	10.2
JSPL	11.02	10.34	1.04	-0.45	-0.6	4.27	5.89	-0.6	11.02
Welspun Crop Ltd.	7.55	19.68	5.5	-6.3	2.28	5.742	9.42	-6.3	19.68

Table: 1.4: Earning Per Share (EPS in Rupees) of Indian Steel Companies

Companies	2022	2021	2020	2019	2018	Mean	S.D	Min	Max
JSW Steel Ltd.	69.48	34.92	22.03	33.77	19.24	35.89	20.02	19.24	69.48
Tata Steel Ltd.	270.33	145	57.11	90.41	38.57	120.28	93.12	38.57	270.33
SAIL	29.09	9.32	4.89	5.27	-1.17	9.48	11.58	-1.17	29.09
JSPL	81.21	70.14	6.09	-2.72	-3.95	30.15	41.92	-3.95	81.21
Welspun Crop Ltd.	18.61	39.02	10.18	-10.45	4.74	12.42	18.25	-10.45	39.02

Table: 1.5: Dividend Payout Ratio (DPR in Percentage) of Indian Steel Companies

Companies	2022	2021	2020	2019	2018	Mean	S.D	Min	Max
JSW Steel Ltd.	9.4	5.75	22.49	11.18	14.16	12.60	6.31	5.75	22.49
Tata Steel Ltd.	0	9.1	6.7	22.08	10.87	9.75	8.03	0.00	22.08
SAIL	28.53	0	0	0	0	5.71	12.76	0.00	28.53
JSPL	1.23	0	0	0	0	0.25	0.55	0.00	1.23
Welspun Crop Ltd.	26.86	1.28	102.23	-4.78	10.53	27.22	43.59	-4.78	102.23

Table: 1.6: Gross Profit Margin Ratio (GPM in Percentage) of Indian Steel Companies

Companies	2022	2021	2020	2019	2018	Mean	S.D	Min	Max
JSW Steel Ltd.	28.44	28.17	20.45	24.5	21.47	24.61	3.69	20.45	28.44
Tata Steel Ltd.	40.75	33.13	25.25	32.52	25.2	31.37	6.48	25.20	40.75
SAIL	21.61	19.88	18.13	15.33	8.86	16.76	4.99	8.86	21.61
JSPL	30.62	41.19	22.02	21.76	23.28	27.77	8.33	21.76	41.19
Welspun Crop Ltd.	14.88	27.96	16.14	1.38	11.1	14.29	9.58	1.38	27.96

Table: 1.7: Operating Profit Margin Ratio (OPM in Percentage) of Indian Steel Companies

Companies	2022	2021	2020	2019	2018	Mean	S.D	Min	Max
JSW Steel Ltd.	24.64	22.83	14.97	20.07	16.77	19.86	4.04	14.97	24.64
Tata Steel Ltd.	24.05	40.75	33.13	25.25	32.52	31.14	6.77	24.05	40.75
SAIL	17.48	13.94	12.04	10.27	3.53	11.45	5.17	3.53	17.48
JSPL	26.11	34.45	13.3	13.43	12.09	19.88	9.96	12.09	34.45
Welspun Crop Ltd.	12.7	25.88	13.24	-1.34	6.55	11.41	10.01	-1.34	25.88

Table: 1.8: Current Ratio of Indian Steel Companies

Companies	2022	2021	2020	2019	2018	Mean	S.D	Min	Max
JSW Steel Ltd.	1.03	0.8	0.83	0.78	0.76	0.84	0.11	0.76	1.03
Tata Steel Ltd.	0.58	0.97	0.65	0.67	1.35	0.84	0.32	0.58	1.35
SAIL	0.85	0.78	0.91	0.78	0.68	0.80	0.09	0.68	0.91
JSPL	1.12	1.33	0.74	0.58	0.62	0.88	0.33	0.58	1.33
Welspun Crop Ltd.	1.59	2.33	1.53	1.64	1.23	1.66	0.40	1.23	2.33

Table: 1.9: EV/Net Operating Revenue of Indian Steel Companies

Companies	2022	2021	2020	2019	2018	Mean	S.D	Min	Max
JSW Steel Ltd.	2.15	2.41	1.23	1.49	1.82	1.82	0.48	1.23	2.41
Tata Steel Ltd.	1.47	1.52	1.14	1.21	1.44	1.36	0.17	1.14	1.52
SAIL	0.52	0.98	0.98	0.95	1.23	0.93	0.26	0.52	1.23
JSPL	1.3	1.38	0.88	1.26	2.49	1.46	0.61	0.88	2.49
Welspun Crop Ltd.	1	0.76	0.52	1	0.76	0.81	0.20	0.52	1.00

Table: 1.10: Market Cap/Net Operating Revenue of Indian Steel Companies

Companies	2022	2021	2020	2019	2018	Mean	S.D	Min	Max
JSW Steel Ltd.	1.86	2	0.69	1.14	1.34	1.41	0.54	0.69	2.00
Tata Steel Ltd.	1.14	1.16	0.51	0.85	1.1	0.95	0.28	0.51	1.16
SAIL	0.39	0.47	0.15	0.33	0.5	0.37	0.14	0.15	0.50
JSPL	1.09	1.05	0.32	0.63	1.24	0.87	0.38	0.32	1.24
Welspun Crop Ltd.	0.83	0.69	0.38	0.87	0.68	0.69	0.19	0.38	0.87

Table: 1.11: Price/BV (book value) of Indian Steel Companies

Companies	2022	2021	2020	2019	2018	Mean	S.D	Min	Max
JSW Steel Ltd.	3.47	3.01	1.15	2.53	3.12	2.66	0.91	1.15	3.47
Tata Steel Ltd.	1.27	1.03	0.41	0.85	1.06	0.92	0.32	0.41	1.27
SAIL	0.78	0.75	0.24	0.58	0.81	0.63	0.24	0.24	0.81
JSPL	1.34	1.07	0.35	0.77	0.93	0.89	0.37	0.35	1.34
Welspun Crop Ltd.	1.43	1.34	1.04	2.2	1.86	1.57	0.46	1.04	2.20

Table: 1.12 Natural Log of Sales Value of Indian Steel Companies

Companies	2022	Ln figure	2021	Ln figure	2020	Ln figure	2019	Ln figure	2018	Ln figure
JSW Steel Ltd.	118,820.00	11.69	70,727.00	11.17	64,262.00	11.07	77,187.00	11.25	64,975.00	11.08
Tata Steel Ltd.	129,021.00	11.77	84,132.00	11.34	60,435.00	11.01	70,610.00	11.16	58,550.00	10.98
SAIL	103,473.00	11.55	69,110.00	11.14	61,660.00	11.03	66,967.00	11.11	57,558.00	10.96
JSPL	49,431.00	10.81	33,307.00	10.41	26,228.00	10.17	27,715.00	10.23	17,065.00	9.74
Welspun Crop Ltd.	5,287.00	8.57	5,285.00	8.57	4,253.00	8.36	4,136.00	8.33	5,215.00	8.56

Table: 1.13: Natural Log of Current Liabilities of Indian Steel Companies

Companies	2022	Ln figure	2021	Ln figure	2020	Ln figure	2019	Ln figure	2018	Ln figure
JSW Steel Ltd.	57,551.00	10.96	43,299.00	10.68	43,688.00	10.68	42,008.00	10.65	28,964.00	10.27
Tata Steel Ltd.	53,664.00	10.89	30,067.00	10.31	30,871.00	10.34	25,593.00	10.15	25,607.00	10.15
SAIL	39,317.00	10.58	46,488.00	10.75	44,951.00	10.71	41,597.00	10.64	43,401.00	10.68
JSPL	15,814.00	9.67	12,389.00	9.42	15,573.00	9.65	16,157.00	9.69	15,588.00	9.65
Welspun Crop Ltd.	2,434.00	7.80	1,473.00	7.30	2,503.00	7.83	1,960.00	7.58	2,356.00	7.76

Table: 1.14: Natural Log of Current Assets of Indian Steel Companies

Companies	2022	Ln figure	2021	Ln figure	2020	Ln figure	2019	Ln figure	2018	Ln figure
JSW Steel Ltd.	65,374.00	11.09	35,852.00	10.49	36,478.00	10.50	33,555.00	10.42	23,192.00	10.05
Tata Steel Ltd.	31,289.00	10.35	29,274.00	10.28	20,009.00	9.90	17,035.00	9.74	34,643.00	10.45
SAIL	33,232.00	10.41	36,212.00	10.50	40,918.00	10.62	32,249.00	10.38	29,638.00	10.30
JSPL	17,781.00	9.79	16,443.00	9.71	11,511.00	9.35	9,421.00	9.15	9,711.00	9.18
Welspun Crop Ltd.	3,866.00	8.26	3,436.00	8.14	3,831.00	8.25	3,211.00	8.07	2,889.00	7.97

Table: 1.15: Natural Log of Fixed Assets of Indian Steel Companies

Companies	2022	Ln figure	2021	Ln figure	2020	Ln figure	2019	Ln figure	2018	Ln figure
JSW Steel Ltd.	116,666.00	11.67	97,147.00	11.48	88,861.00	11.39	73,693.00	11.21	63,091.00	11.05
Tata Steel Ltd.	108,832.00	11.60	108,051.00	11.59	79,480.00	11.28	77,081.00	11.25	77,402.00	11.26
SAIL	77,673.00	11.26	76,478.00	11.24	77,770.00	11.26	77,372.00	11.26	77,006.00	11.25
JSPL	42,117.00	10.65	43,325.00	10.68	45,323.00	10.72	45,986.00	10.74	48,325.00	10.79
Welspun Crop Ltd.	1,012.00	6.92	1,104.00	7.01	884.00	6.78	813.00	6.70	2,212.00	7.70

Table: 1.16: Natural Log of Interest of Indian Steel Companies

Companies	2022	Ln figure	2021	Ln figure	2020	Ln figure	2019	Ln figure	2018	Ln figure
JSW Steel Ltd.	3,849.00	8.26	3,565.00	8.18	4,022.00	8.30	3,789.00	8.24	3,591.00	8.19
Tata Steel Ltd.	2,792.00	7.93	4,541.00	8.42	3,031.00	8.02	2,823.00	7.95	2,810.00	7.94
SAIL	1,697.00	7.44	2,817.00	7.94	3,486.00	8.16	3,154.00	8.06	2,822.00	7.95
JSPL	1,414.00	7.25	2,186.00	7.69	2,610.00	7.87	2,895.00	7.97	2,391.00	7.78
Welspun Crop Ltd.	76.00	4.33	57.00	4.04	111.00	4.71	117.00	4.76	145.00	4.98

Following this we report Correlation matrix in Table 2.

Table:2 Correlation coefficients, using the observations 1 - 25
5% critical value (two-tailed) = 0.3961 for n = 25

NPM	ROCE	ROA	EPS	DividendPayout	
1.0000	0.7972	0.9176	0.8062	0.0325	NPM
	1.0000	0.9416	0.4941	0.2926	ROCE
		1.0000	0.6319	0.1084	ROA
			1.0000	-0.0928	EPS
				1.0000	DividendPayout

In Table 3 we report the result of regression considering NPM as the dependent variable. The model shows good fit as the reported *R* squared value is 0.99 with *F* statistic 238.43 which is highly significant at 1% level. In our result GPM, ROA is positively associated with NPM and coefficient values are highly significant at 1% level. ROCE reports highly significant negative association with NPM that indicates steel sector being a capital-intensive sector requires more capital for higher value of absolute profit. Other important variables like EPS, dividend pay-out, operating profit margin etc shows significant association.

Table 3: Regression result of Model 1: Dependent Variable: NPM

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
GPM	0.383274	0.0943321	4.063	0.0010	***
EPS	0.0206784	0.00747332	2.767	0.0144	**
DividendPayout	0.0449480	0.0168744	2.664	0.0177	**
OperatingProfitMargin	0.0590822	0.0574309	1.029	0.3199	
ROCE	−0.646512	0.149703	−4.319	0.0006	***
ROA	1.54038	0.223870	6.881	<0.0001	***
EVNetOperatingRevenue	−3.65985	1.59440	−2.295	0.0365	**
MarketCapNetOperatingRevenue	−0.191367	2.77271	−0.06902	0.9459	
PBV	2.25548	0.968921	2.328	0.0343	**
LnSales	0.0666320	0.145425	0.4582	0.6534	

Mean dependent var	8.861200		S.D. dependent var	8.039636
Sum squared resid	21.97054		S.E. of regression	1.210249
Uncentered R-squared	0.993748		Centered R-squared	0.985837
F(10, 15)	238.4313		P-value(F)	1.17e-14
Log-likelihood	−33.85880		Akaike criterion	87.71759
Schwarz criterion	99.90635		Hannan-Quinn	91.09824

In Table 4 we report the result of regression considering ROCE as the dependent variable. The model shows good fit as the reported *R* squared value is 0.98 with *F* statistic 176.22 which is highly significant at 1% level. In our result GPM, ROA, Dividend Payout is positively associated with ROCE and coefficient values are highly significant at 1% level. NPM reports highly significant negative association with ROCE. Other important variables like Market Cap Net Operating Revenue shows significant association.

Table 4: Regression result of Model 2: Dependent Variable: ROCE

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
NPM	−0.947636	0.325777	−2.909	0.0098	***
GPM	0.556300	0.142453	3.905	0.0011	***
ROA	2.09646	0.273930	7.653	<0.0001	***
EPS	−0.00380343	0.0165389	−0.2300	0.8209	
DividendPayout	0.0965957	0.0226557	4.264	0.0005	***
OperatingProfitMargin	−0.0963467	0.104220	−0.9245	0.3682	
EVNetOperatingRevenue	−4.04538	2.66553	−1.518	0.1475	
MarketCapNetOperatingRevenue	5.78680	2.71379	2.132	0.0479	**

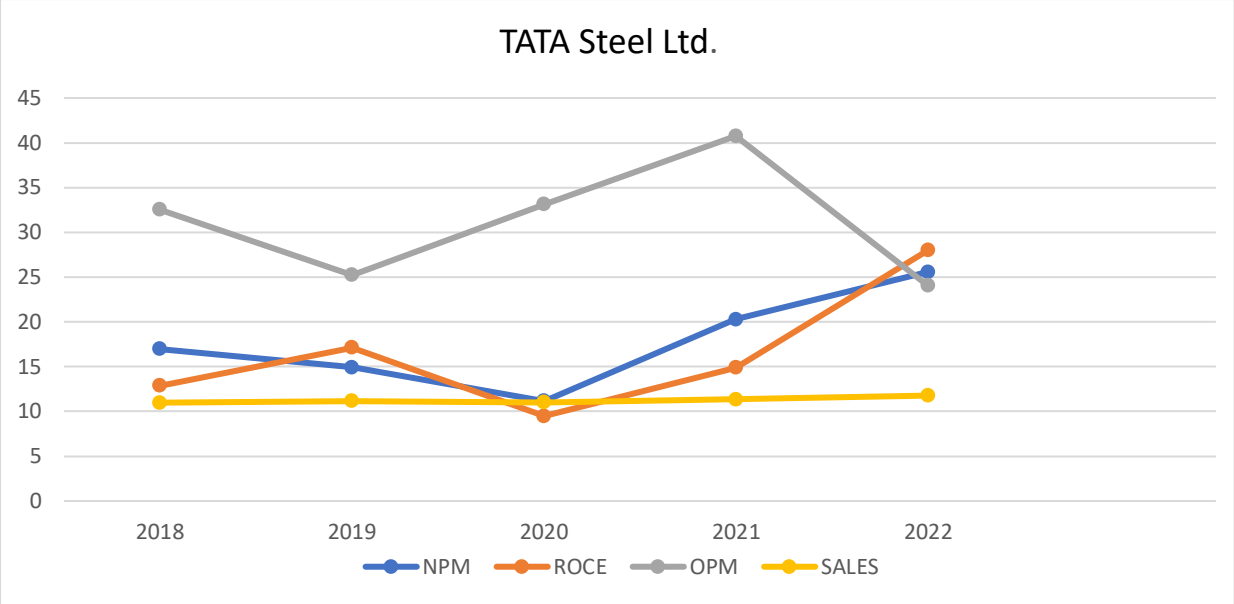
Mean dependent var	15.31800		S.D. dependent var	8.675723
Sum squared resid	91.41433		S.E. of regression	2.318903
Uncentered R-squared	0.988085		Centered R-squared	0.949395
F(8, 17)	176.2276		P-value(F)	8.21e-15
Log-likelihood	−51.68004		Akaike criterion	119.3601
Schwarz criterion	129.1111		Hannan-Quinn	122.0646

In Table 5 we report the result of regression considering Dividend Payout as the dependent variable. The model shows good fit as the reported *R* squared value is 0.74 with *F* statistic 5.15 which is highly significant at 1% level. In our result ROCE is positively associated with Dividend Payout and coefficient values are highly significant at 1% level. GPM, ROA reports highly significant negative association with Dividend Payout. Other important variables like NPM, PBV etc shows significant association.

Table 5: Regression result of Model 3: Dependent Variable: Dividend Payout

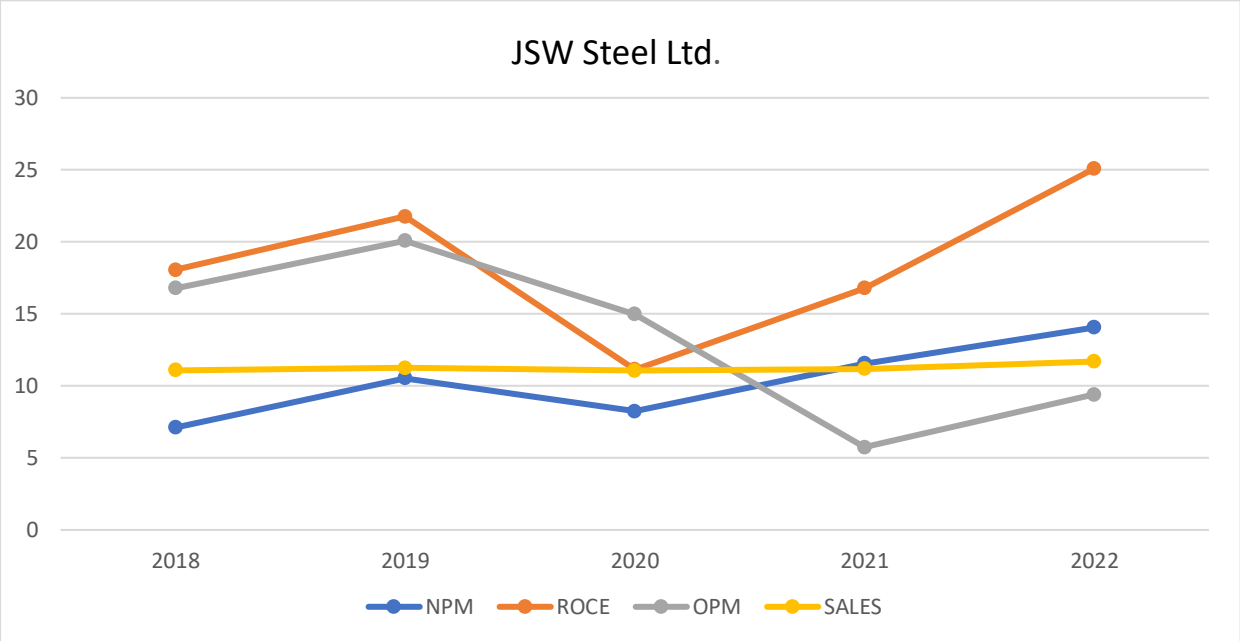
	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
NPM	7.06760	2.60954	2.708	0.0155	**
GPM	−4.18685	1.31111	−3.193	0.0057	***
EPS	−0.0941482	0.109915	−0.8566	0.4043	
ROCE	8.40555	1.58956	5.288	<0.0001	***
ROA	−15.8504	3.63575	−4.360	0.0005	***
OperatingProfitMargin	0.168552	0.695241	0.2424	0.8115	
EVNetOperatingRevenue	17.2958	18.1003	0.9556	0.3535	
MarketCapNetOperatingRevenue	25.8441	26.7044	0.9678	0.3476	
PBV	−28.9723	11.0445	−2.623	0.0184	**

Mean dependent var	11.10440		S.D. dependent var	21.14108
Sum squared resid	3540.122		S.E. of regression	14.87473
Uncentered R-squared	0.743644		Centered R-squared	0.669971
F(9, 16)	5.157013		P-value(F)	0.002212
Log-likelihood	−97.38647		Akaike criterion	212.7729
Schwarz criterion	223.7428		Hannan-Quinn	215.8155



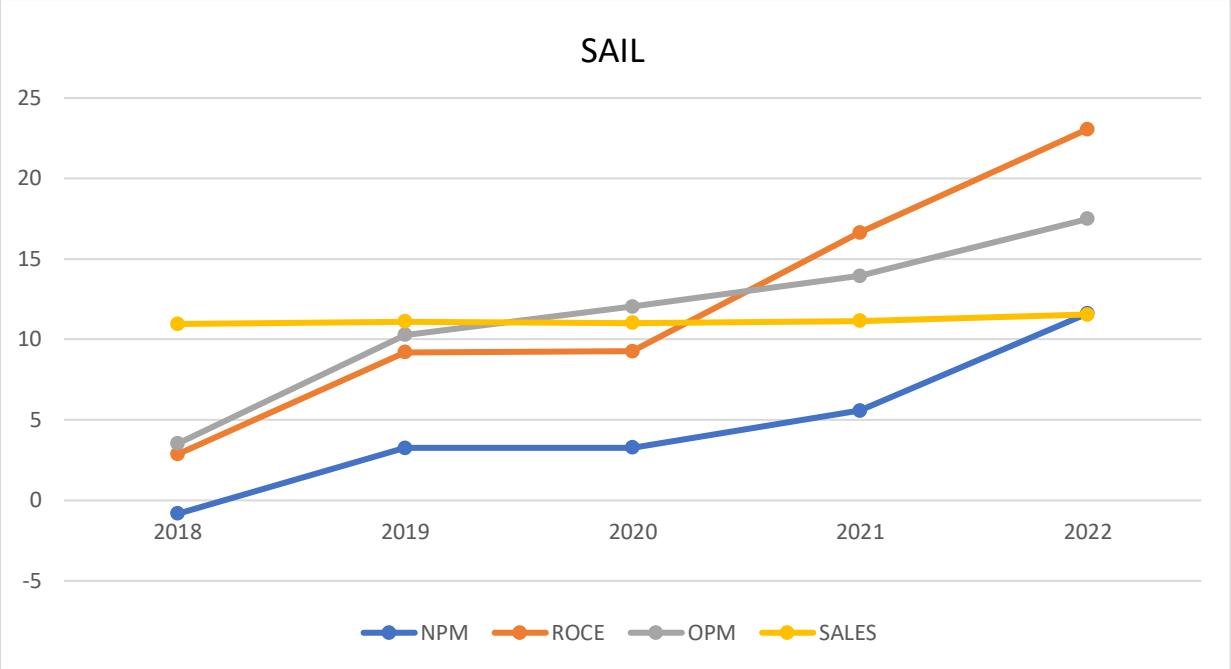
A Line chart diagram of TATA Steel Ltd.

Through the above diagrams, we can see that in the case of Tata Steel Ltd. both NPM & ROCE are showing relatively low values especially in the year of 2020. The fluctuation of OPM is quite high but no such difference is noticeable in case of sales.



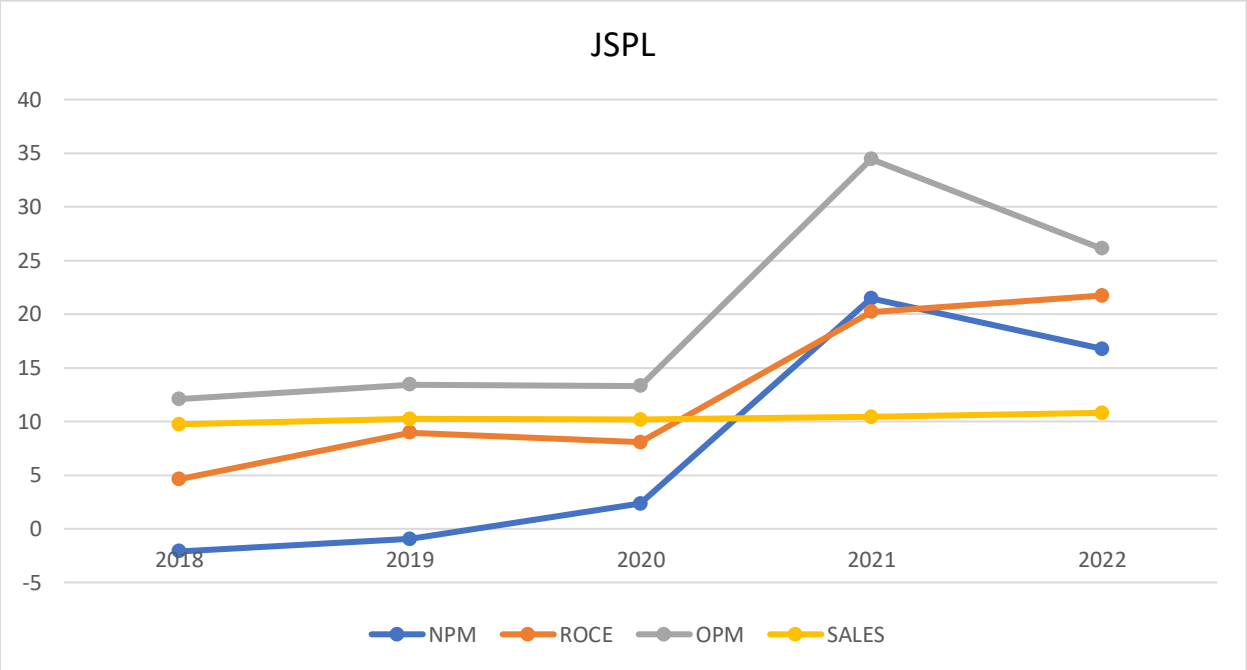
A Line chart diagram of JSW Steel Ltd.

From the above diagram it can be seen that the amount of NPM in case of JSW Steel Ltd was relatively high in 2019 but it was low in 2020 and again started to increase from 2021. OPM was high in 2019, relatively low in 2020, very low in 2021 and started to increase again in 2022. But there is big no changes in sales.



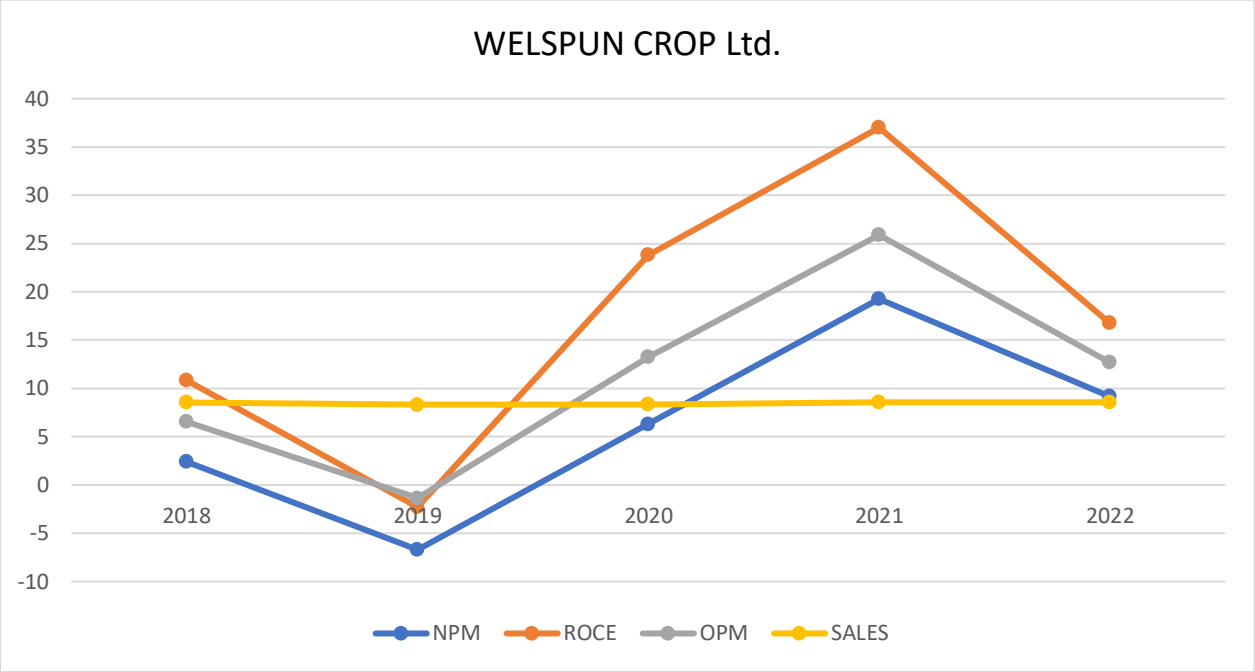
A Line chart diagram of SAIL

The issue is seen in the case of Steel Authority of India Limited is that the amount of ROCE and NPM was almost same in 2029 and 2020 but started increasing gradually from 2021. OPM has started increasing gradually since 2019 but no special difference is visible in the sales this year as well.



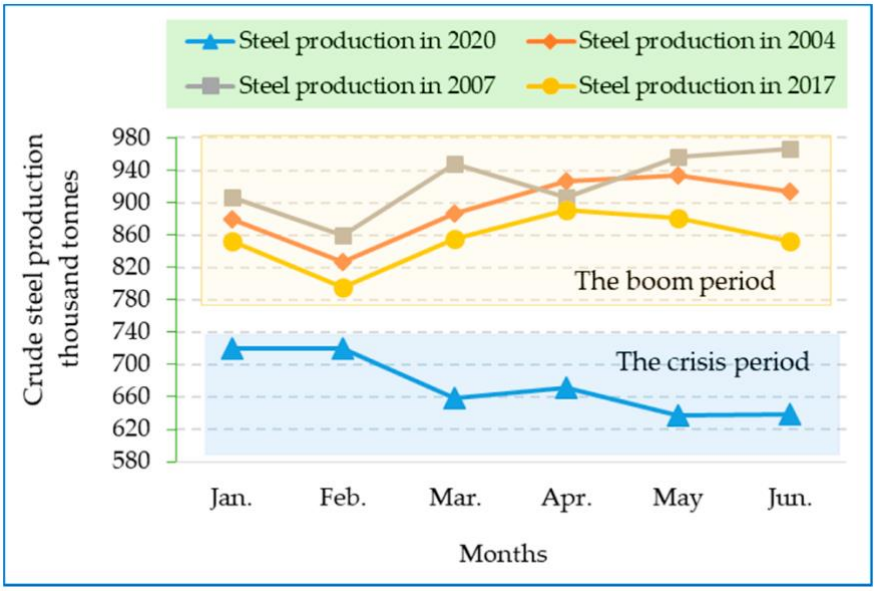
A Line chart diagram of JSPL.

In the case of JSPL the of value ROCE is highly fluctuate. OPM shows the high value in the year of 2021. In 2019 and 2020 the value of NPM remain lower than 2021. There is not such a big difference is visible in Sales.



A Line chart diagram of Welspun Crop Ltd.

This is what is visible in the above diagram in case of Welspun Crop Ltd., NPM, ROCE and OPM in the year of 2019 was very low as compared to comparable years. In case of this company, the amount of NPM, ROCE and OPM was quite high in 2021 and again from the year of 2022, their amount started to decrease. In this case too, there is no significant change in sales are visible.



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Chapter 5: Conclusion

h. *Conclusion:*

We all more or less understand the necessity of steel in the present age. Overall I have sought to highlight the impact or change on the profitability of the steel industry during the pandemic period. By presenting the regression model by NPM, ROCE etc. it was found that coefficient values were significant in all cases. The Coefficient of determination or R square value provides information about goodness of fit of each model in before and after Covid. NPM of TATA steel indicates highest mean among the sample companies. Capital efficiency indicates by highest ROCE of JSW. In this case, we can see that the financial performance or profitability of the steel industry was quite good till the beginning of 2019. But during the pandemic period i.e. 2019 and 2020, the profitability of some companies have become relatively low. Again from 2021 better financial solvency has again been observed in the Indian Steel Industry. It is expected that the Indian steel industries overall will be strong in the near future.

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