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Financial Performance Analysis of the Steel Industry in India

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Abstract: The government of India has taken major initiative to bolster the growth of this industry as it plays a pivotal role in some of the flagship project that it embarks. The present study makes a humble attempt to assess the financial performance from 2013 to 2022 with respect to some financial indicators retrieved from Prowess, CMIE database. The study finds significant relationship between profitability and liquidity with respect to certain variable. We have employed panel regression analysis specifically, to address the issue of performance of steel industry in general. Using systematic sampling technique, we have taken 24 steel companies in the final selection. We have employed eight independent variables, which have a nexus with profitability and performance most of them are activity ratio, and three profitability ratio such as NPM, ROCE and ROA. Thus, the problem related to the financial performance of the steel industry is interlinked to many aspects like cost, revenue, capital, assets and other related variables.

Keyword: Financial performance analysis, steel companies, India, profitability, panel regression analysis.

1. INTRODUCTION

Steel is considered to be one of the world's most critical and strategic metal. It has always been regarded as the core drivers to the growth of any economy which forms the pillar of industrialization (Vadde & Srivastava, 2012). India is the second largest steel producing country accounting for 6% of global production, and it is on course to become the second largest consumer of steel globally. India is also the 4th largest steel exporter country in the world (World Steel

Association, 2022**)**. The recent policy initiative undertaken by the Government; the sector has undergone major transformation process to a technologically advanced, globally competitive and self-sustaining steel production facility to stimulate economic growth. Presently steel sectors roughly contribute around 2% of GDP. The National Steel Policy (NSP), envisage accomplishing 300 MTPA by 2030-31 from the current level of 120 MTPA in 2021. This planned capacity enhancement is expected to leverage Rs. 10 lakh crore incremental capital infusions and 30 GW power supply to the steel business. India's steel sector employs more than 2 million individuals through direct and indirect means and by 2031 nearly an estimated 3.6 million people will be employed and absorbed in this industry. As per the report published by PwC (2019), steel finds usage in plethora of sectors such as construction, capital goods, automobile etc. Bhunia (2010) observed that India's steel firm is not able to harness its full capacity and which is demonstrated by per capita consumption of steel as per the report of Ministry of Steel (2022) the per capita steel consumption in India is 77.2 kg. against the world average of 233 kg. Steel is crucial for infrastructure augmentation programme initiative undertaken by Government of India to Gati-Shakti Master plan, Make in India initiative and other flagship programme like Bharatmal, Sagarmala and Dedicated Freight Corridor. However, the Indian steel industry is also replete with problems such as poor demand, competition from cheap imports, inadequate supply of power and coal, obsolete technology, underutilisation of capacity etc. to address this issue NSP (2017) recommended certain measures. The survival, growth and organizational success of business enterprises are greatly depended on the efficient management of its finance. Devi & Maheswari (2015) reported that financial performance is a subjective measure of how well a company manage its assets from each of its main business modes and generate revenue. Studies have found that there are four types of financial ratios used in measuring financial performance as observed by Herdiananda (2017), which includes: analysis of liquidity ratios, activity ratios, solvency ratios and profitability ratios. Majumder & Rahaman (2011) suggested that to measure performance, the analysis of financial statements using liquidity ratios, activity ratios, solvency ratios and profitability ratios and the DuPont system can be used conveniently.

2. REVIEW OF LITERATURE

Bhunia (2010) examined the management of short-term liquidity trends of the private sector companies as a factor accountable for poor performance in

the steel Industry in India. He observed that there is a scope for improvement in the management of inventory by infusing additional investment in working capital. The rise of private sector investment in steel sector was considered and it was observed that the production capacity remains underutilised and growth rate in the private sector did not picked up as anticipated, among the various other reasons, poor financial management is identified to be a prominent factor. He concluded that improper management of working capital in terms of liquidity, solvency, operating efficiency and profitability is accountable for inadequate financial performances. Eljelly (2004) inspected the relationship between profitability and liquidity by employing correlation and regression techniques, concluded that the cash conversion cycle was vital as a measure of liquidity and then current ratio that influences profitability Balakrishnan (2016) used ratio analysis and had employed eight such ratios and used multiple regression models to capture the financial performance of the steel industry. It also exhibits that the growth of company is greatly influenced by externalities like a capital structure, expenditure, income, expected earnings and optimum utilization of assets. Das (2018) also conducted performance analysis of the steel industry using financial information and framed hypothesis using ANOVA test, the ratio employed is liquidity, solvency, profitability and efficiency by using the financial ratios and to measure the contribution of Company to the economic growth. Similar study was conducted by Rooh Ollah Arab *et al.* (2015) they have used sixteen financial ratios (variable) selected from different segments like liquidity, solvency, activity, and profitability and accordingly they have formulated four hypothesis based on the ratio involved. Using they have evaluated the impact of selected variables on the financial performance of identified units in the sample steel industry. Bhunia & Bagchi (2011) studied financial distressed using financial ratios for pharmaceutical sectors have successfully demonstrated that sixteen financial ratios to be significant enough in to predict accurately with accuracy rates as high as 86% to 96 % about the possible financial failure due to financial distress. Similar study was conducted by Paul (2013) on study of financial distress on steel sectors. She emphasised that profitability and efficiency ratios especially, return on investment, debtor turnover ratio and fixed assets turnover ratio are great indicator to distinguish between financially healthy and financially weak companies therefore, to become financially viable the steel companies must try to improve these financial indictors to avoid possible distress. Shukla *et al.* (2021) they have assessed the financial performance in terms of productivity, liquidity, liquidity

and solvency to reveal about the organisations rating and execution. They have framed their hypothesis based on the seven ratios and concluded that the entire sampled firm exhibited poor liquidity position. Ghosh *et al.* (2021) measured the efficiency of five big steel companies using data envelop analysis and factor analysis using equity capital as input variable and PAT as output, likewise they have used working capital, total assets as input variable, these efficiency measurements, better managerial decisions can be taken to improve operational performance thereby improving the ranks. Ramaratnam &Jayaraman (2010) employed various financial performance ratios to determine the financial strength of selected companies and exhibited that the sector facing a problem due to mass production and less demand. Mayers & Rajan (1988) reported that there exists adverse relationship between liquidity and capital structure in their study. Patjoshi (2016) investigated liquidity management and financial performance of selected steel companies through the correlation, regression analysis for finding out the influence of liquidity on profitability. Correlation analysis has been used for finding out the connection between liquidity with profitability. Paul (2012) in her study on the performance of Indian steel companies suggested that sales are not the sole determinant for the profit maximization. There are other factors which can influence the profitability of the concerned company either in a positively or negatively. She concluded that the overall profitability depends on the other financial indicators like liquidity, profitability, activity, and financial leverage. The research study tries to find out the impact of liquidity, solvency and management efficiency on profitability of sampled companies

The main objective of the present study is to examine the financial performance of the steel companies in India. More specifically it seeks to dwells upon mainly the following issues:

(i) To examine the liquidity and solvency position of the selected companies under the study;

(ii) To search the causal relationship between profitability and working capital indicators.

3. DATA AND METHODOLOGY

The present study aspires to delve into the performance of steel industry. There are 566 steel companies during the study period from 2013 to 2022. The data used in the present study was retrieved from CMIE database. The systematic sample design method was applied in this analysis. In order to determine

and selection of sample size of the steel companies we have employed the Yamane's formula for estimating sample size in respect to the population under study. The determination of sample size is paramount which ensure that the conclusions gained after analysis can be reliably applied to the full population under investigation. Using Yameen's formula we have selected around 81 companies, out of which complete dataset for 24 steel companies were available. Not all the companies are survived during the study period. The data have been obtained from the Centre for Monitoring Indian Economy's (CMIE) Prowess database.

The study employs 11 financial ratios to assess the performance of the steel industry in India, in order to address the overall performance and to examine the factors which have relevance on the performance; we have employed Panel data regression technique. The panel data study is a technique that employs cross section data of the time dimension to forecast the efficient associations. Since the data is pooled time-series and cross-sectional, panel data methodology is helpful to describe the causal relationship between working capital management and profitability in this study. While studying the performance, we have used return on capital employed (ROCE), return on assets (ROA) and net profit margin (NPM) as dependent variable. The other independent variable selected for the study are, Current Ratio (CR), Acid-test ratio (QR), Cash to current asset (CCL), creditor turnover ratio (CTR), debtor turnover ratio (DTR), debt equity ratio (DER) and stock turnover ratio (STR) and interest coverage ratio. Accordingly, we have framed three models.

4. RESULTS AND FINDINGS

In order to ascertain the firm-specific factors of working capital management and profitability relationship, we have used panel data methodology as an important econometric technique. The panel data study is a technique that employs cross section data of the time dimension to forecast the efficient associations. Generally, panel data recommends that companies are heterogeneous. Time-series and cross-section analysis are not helpful in managing the heterogeneity. As the objective of the study is to observe the causal relationship between working capital management and profitability, panel regression analysis can detect the cause and influence of the relationship between working capital management and profitability through pooled ordinary least squares, fixed effects and random effects models.

4.1. Correlation analysis

Before conducting panel regression analysis, it is obligatory to check correlation analysis whether there is a relationship between working capital management indicators and profitability indicators or not. By and large, correlation attempts to observe the strength and direction of the relationship between two variables. In a bivariate analysis, if the variables have the cause and effect association, they have a high degree of association between them. Correlation statistics of steel companies in India is outlined in the subsequent sub-sections.

Table 1: Correlation Matrix

	CCL	*CR*	*CTR*	*DER*	*DTR*	*ICR*	*NPM*	*QR*	*ROA*	*ROCE*	*STR*
CCL	1.00										
CR	0.70	1.00									
CTR	0.17	0.43	1.00								
DER	-0.08	-0.13	-0.11	1.00							
DTR	0.00	0.02	0.23	0.02	1.00						
ICR	0.63	0.81	0.35	-0.14	0.02	1.00					
NPM	0.08	0.17	0.18	-0.32	0.11	0.31	1.00				
QR	0.80	0.87	0.25	-0.14	-0.19	0.79	0.14	1.00			
ROA	0.19	0.29	0.29	-0.38	0.12	0.53	0.79	0.29	1.00		
ROCE	0.16	0.23	0.23	-0.35	0.15	0.48	0.77	0.24	0.96	1.00	
STR	-0.04	-0.08	0.04	-0.05	0.24	-0.01	0.11	-0.03	0.12	0.18	1.00

From the results of the correlation matrix it is amply clear that certain ratio does not have an impact on the overall scheme of things and the objectives we have framed, so we have decided to drop ICR, QR and CCL ratios for further analysis on the assumption that they have negligible impact on the overall performance of steel industry.

4.2. Panel regression analysis

With the aim of addressing the findings of the panel regression that may give us the possible answer about the indicators which are appropriate and adequate for the steel industry in India. The random effects model has been used. Each of the three profitability indicators (ROCE, ROA, NPM) individually have been considered as dependent variables in each model and five working capital management indicators have been considered as independent variables in each model. Primarily, two panel regression models, that is, fixed effects model

and random effects model have been considered for elucidating the causal relationship between working capital management indicators and profitability indicators.

Therefore, three panel regression models have been structured for panel regression analysis. These are:

Model 1:

$ROCE_{it} = \beta_0 + \beta_1(CR_{it}) + + \beta_2(DER_{it}) + \beta_3(DTR_{it}) + \beta_4(CTR_{it}) + \beta_5(STR_{it}) + \eta i + \varepsilon_{it}$

Model 2:

$ROA_{it} = \beta_0 + \beta_1(CR_{it}) + + \beta_2(DER_{it}) + \beta_3(DTR_{it}) + \beta_4(CTR_{it}) + \beta_5(STR_{it}) + \eta i + \varepsilon_{it}$

Model 3:

$NPM_{it} = \beta_0 + \beta_1(CR_{it}) + + \beta_2(DER_{it}) + \beta_3(DTR_{it}) + \beta_4(CTR_{it}) + \beta_5(STR_{it}) + \eta i + \varepsilon_{it}$

Where,

$ROCE_{it}$ = Return on Capital Employed of Steel Company i in year t;

ROA_{it} = Return on Assets of Steel Company i in year t;

NPM_{it} = Net Profit Margin of Steel Company i in year t;

β_0 = Intercept coefficient of Steel Company;

β_1 = Slope coefficient of independent variable CR;

β_2 = Slope coefficient of independent variable DER;

β_3 = Slope coefficient of independent variables (DTR);

β_4 = Slope coefficient of independent variables (CTR);

β_5 = Slope coefficient of independent variable (STR)

CR_{it} = Current ratio of Steel Company i in year t;

DER_{it} = Debt-equity ratio of Steel Company i in year t;

STR_{it} = Stock turnover ratio of Steel Company i in year t;

DTR_{it} = Debtors' turnover ratio of Steel Company i in year t;

CTR_{it} = Creditors' turnover ratio of Steel Company i in year t;

η_i = Unobservable heterogeneity (measuring the particular characteristics of each steel Company);

ε_{it} = Residual errors of steel Company i in year t;

In model 1, ROCE has been considered as a dependent variable; five working capital management indicators (CR, DER, CTR, DTR and STR) have been considered as independent variables. Two panel regression models, that is, fixed effects model and random effects model using model 1have been presented in the following table.

Table 2: Panel Regressions Test Results (Dependent Variable: ROCE)

	Fixed Effect			*Random Effect*		
Variable	*Coeff.*	*t-stat*	*Prob.*	*Coeff.*	*t-stat*	*Prob.*
Intercept	0.0323	0.023	0.981	0.0323	0.023	0.981
CR	0.6357	1.217	0.224	0.6357	1.217	0.224
CTR	0.0210	1.947	0.052	0.0210	1.947	0.052
DER	-0.3608	-4.16	0	-0.3608	-4.166	0
DTR	0.0667	1.715	0.087	0.0667	1.715	0.087
STR	0.0369	2.196	0.029	0.0369	2.196	0.029

Table 3: Hausman Test Results

Test Summary	*Chi-Sq. Statistic*	*d.f.*	*Prob.*
Cross-section random	3.404	5	0.638

The Hausman test detects endogenous regressors (predictor variables) in a regression model and since the p value is not significant as the probability is 0.638, we therefore, accept the null hypothesis that direct us to go for Random Effect Model for the panel data as all of the individual effects in these models are random. Specifically, the null hypothesis tells that random effects model is more useful than fixed effects model. Accordingly, the panel data regression has been described by the random effects model in the present research work.

Panel regression analysis based on random effects model illustrates that ROCE is positively related to four working capital indicators. These are CR, CTR, DTR, and STR however, none of them are significant at 1 % level. When CR is increased by one unit, ROCE is increased by 0.63 units that are not significant statistically even at 10% level of significance. This indicates that sample steel companies not able to manage their short-term obligations efficiently through proper utilisation its own financial resources. However, when DER is increased by one unit, ROCE is decreased by 0.36 units. This indicates that the sample steel companies are being financed by outsiders rather than its own economic sources. Also, signalled that the sampled steel

companies have been aggressive in financing its growth with borrowed funds. When DTR is increased by one unit, ROCE is increased by 0.067 units that are significant statistically at 10% level of significance. This indicates that the sampled steel companies used its economic resources efficiently. When CTR is increased by one unit, ROCE is increased by 0.021 units that are significant statistically at 10% level of significance. This indicates that the payment policy of the sampled steel companies is good and managing effectively. Finally, a positive coefficient of STR of 0.036 indicates that when STR is increased by 1 unit ROCE is increased marginally by 0.036 units however, this results is statistically significant at 5% level of significance.

In model 2, ROA has been considered as a dependent variable; five working capital management indicators (CR, DER, CTR, DTR and STR) have been considered as independent variables. Two panel regression models, that is, fixed effects model and random effects model using model 2 have been presented.

Table 4: Panel Regressions Test Results (Dependent Variable: ROA)

Variable	Fixed Effect			Random Effect		
	Coeff.	*t-stat*	*Prob.*	*Coeff.*	*t-stat*	*Prob.*
Intercept	0.592	0.617	0.538	0.428	0.411	0.681
CR	0.537	1.257	0.210	0.676	1.764	0.079
CTR	0.024	2.909	0.004	0.023	2.910	0.004
DER	-0.273	-4.148	0.000	-0.297	-4.726	0.000
DTR	0.029	0.929	0.354	0.026	0.918	0.360
STR	0.010	0.720	0.473	0.013	1.017	0.310

Hausman specification test has been employed to find out which panel model (fixed effects model and random effects model) among the three panel regression models should be used. In connection with this, H_0 hypothesis asserts that "random effects model is suitable" and H_1 hypothesis asserts that "random effects model is not suitable". The Hausman specification test results are given the following table.

Table 5: Hausman Test Results

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	3.54	5	0.61

Table 5 demonstrates that null hypothesis is not rejected because the probability is 0.61; therefore, all of the individual effects in these models are

random. More specifically, the null hypothesis tells that random effects model is more useful than fixed effects model. Panel regression analysis based on random effects model shows that ROA is positively related to four liquidity indicators. When CR is increased by one unit, ROA is increased by 0.67 units that are significant statistically at 10% level of significance. However, when DER is increased by one unit, ROA is decreased by -0.29 units, which is also significant statistically at 1% level. This indicates that the sample steel companies are being financed by outsiders because of company's aggressive financial policy rather than its efficient management of total assets. For, STR and DTR negligible increased in ROA is observed and none of them are statistically significant. When CTR is increased by one unit, ROA is increased by 0.022 units that are significant statistically at 5% level of significance. This indicates that the payment policy of the sampled steel companies is good and managing effectively.

In model 3, NPM has been considered as a dependent variable; five working capital management indicators (CR, DER, CTR, DTR and STR) have been considered as independent variables. Two panel regression models, that is, fixed effects model and random effects model have been presented.

Table 6: Panel Regressions Test Results (Dependent Variable: NPM)

Variable	Fixed Effect			Random Effect		
	Coeff.	*t-stat*	*Prob.*	*Coeff.*	*t-stat*	*Prob.*
Intercept	-0.184	0.780	-0.236	-0.295	-0.386	0.7
CR	0.274	0.348	0.788	0.322	1.077	0.283
CTR	0.008	0.007	1.224	0.008	1.278	0.203
DER	-0.140	0.054	-2.619	-0.174	-3.468	0.001
DTR	0.028	0.026	1.083	0.024	1.073	0.284
STR	-0.003	0.011	-0.269	0.003	0.350	0.727

Table 7: Hausman Test Results

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	6.53	5	0.25

Hausman Test demonstrates that null hypothesis is not rejected because the probability is 0.257; therefore, all of the individual effects in these models are random. More specifically, the null hypothesis tells that random effects model is more useful than fixed effects model. Panel regression analysis based on random

effects model shows that NPM is positively related to four liquidity indicators. When CR is increased by one unit, NPM is increased by 0.32 units that are not significant statistically significant. However, when DER is increased by one unit, NPM is decreased by -0.174 units, which is also significant statistically at 1% level. This indicates that the sample steel companies are being financed by outsiders because of company's aggressive financial policy rather than its net profit margin. STR, CTR and DTR observed negligible increased with respect to NPM, it is observed and none of them are statistically significant.

5. CONCLUSION

The study employed panel regression analysis to gauge the extent of association between profitability and working capital it observes during the study period from 2013 to 2022. As the method of panel regression with random effect, it is observed that when we consider ROCE an important profitability indictor we found that it has a positive association except with debt-equity ratio. However, while studying the level of significance it was observed that CTR, DTR and STR are statistically significant at 10 % level of significance. While considering ROA as a dependent variable with same parameters as independent variable we found CTR results to be statistically significant at 5% level of significance, the other independent variables are not statistically significant. However, when we consider, the NPM as a dependent variable and other five variables as independent variable, we found except debt equity (DER, significant at 1% level) none of the selected independent variable is statistically significant. Therefore, we can conclude that steel companies usually have negative DER coefficient which suggest that all the selected dependent variable has inverse association with DER and it is significant thereby indicating the presence of debt burden on the steel industry. It is also shown that CR and DTR has significant positive relation with ROA, to manage assets efficiently they can be used as a positive authority.

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