



Working Capital Management and Profitability: Evidence from Select BSE-Listed Metal and Mining Companies in India

Asst. Prof. (Dr.) Amit Das¹, Rajdeep Bhattacharjee²

¹ Assistant Professor, Department of Commerce, Surendranath Evening College, India email: dasamit0812@gmail.com

² Research Scholar, Department of Commerce, University of Kalyani, India email: rajdeepacademic@gmail.com

ABSTRACT

Effective working capital management enhances operational efficiency and financial performance for firms, especially in the metal and mining industries. Efficient management of current assets and current liabilities helps firms maintain financial stability and smooth operations of the firm. This study was conducted with the objective of analyzing the effect of working capital management on the financial performance of select Indian metal and mining companies. This study was based on panel data of 150 firm-year observations. As per the unit root test, it was confirmed that all of the variables were stationary at the level. The dataset remained suitable for regression analysis, and the possibility of misleading outcomes during estimation became lower. The panel regression analysis identified several aspects of working capital management and the financial performance of the selected metal and mining sectors. It showed that liquidity and the variables of efficiency in operations affected profitability in a dissimilar manner at various points in the period under review. Regression analysis showed that the Quick Ratio had a positive and significant relationship with Return on Total Assets and Net Profit Margin. Similarly, the Stock Turnover Ratio had a positive and significant relationship with Return on Total Assets, Net Profit Margin, and Return on Net Worth. The results also indicated that the Current Turnover Ratio was positively and significantly associated with Return on Total Assets, Net Profit Margin, and Return on Net Worth. On the other hand, the study found that the Current Ratio had a negative and significant impact on Return on Total Assets. It indicated that a higher current ratio reduced the efficiency of asset utilization. Further, the regression analysis revealed that the Cash Position Ratio did not have any significant relationship with the profitability ratios. It suggested that changes in cash position did not meaningfully influence the profitability performance of the firms. Proper control over liquidity and operational efficiency measures helped firms achieve better financial performance during the study period.

Keywords: Working Capital Management, Metal Companies, Mining Companies, Profitability, Panel Regression Analysis.

1. Introduction

Working capital management, usually called WCM, is a very important part of financial management because it affects how a business functions on a daily basis. A company may earn good profits on paper, but if it cannot manage its short-term funds properly, problems start appearing very quickly. Basically, working capital management deals with current assets and current liabilities, the things a firm needs regularly to keep operations running smoothly (Brigham & Houston, 2019). Think about the normal activities inside a business. Raw materials have to be purchased. Workers and employees must be paid on time. Inventory needs to be maintained. At the same time, money has to be collected from customers while payments to suppliers also continue. All these day-to-day activities depend heavily on proper working capital management. If liquidity is not maintained properly, even a financially strong company can face operational difficulties. In financial management studies, WCM is treated as one of the major elements influencing a firm's financial performance. The management of inventory, receivables, and payables plays a direct role in determining the cash conversion cycle. This cycle simply shows how long a company takes to turn its investment in stock and other operating resources into cash received from sales (Deloof, 2003). Usually, when the cash conversion cycle becomes shorter, it suggests that the firm is managing its working capital more efficiently, and that can improve profitability too. When a company fails to manage its working capital properly, financial problems begin to appear little by little. The business may face shortages of cash, borrowing costs can rise, and daily operations may not run smoothly. In many situations, these problems are not noticed at the beginning. These issues increase slowly and can affect the firm's success and financial stability in the long run.

Manufacturing industries usually need a large amount of money to keep their daily operations running properly. A major portion of this money goes into buying raw materials, maintaining inventories, and managing different stages of production. Because of this, working capital management becomes very important in such industries. The Indian metal and mining industry, which includes steel, aluminium, mining, and other diversified metal and mining companies, holds a major position in the country's economic growth. Metal products are widely used in infrastructure projects, construction work, automobile manufacturing, engineering sectors, and many other industrial activities. India is also considered one of the world's leading producers and users of steel and aluminium. So, the condition and performance of the metal and mining industry are closely linked with the country's industrial development and overall economic growth.

Many studies over the years tried to explain how working capital management affects profitability of firms. Some researchers said companies perform better when cash, receivables, and inventory are managed in a proper way. It helps business continue daily activities smoothly and also reduces extra financing burden (Raheman & Nasr, 2007). But all findings were not same. In some industries the impact was strong, while in others the result was not very clear. Different countries also show different situation because market condition, business style, and financial system are not similar everywhere. For this reason, industry-based studies are important. One sector may react differently from another. Many companies still cannot maintain proper balance between liquidity and profit. Sometimes firms keep too much money in current assets for safety purpose. Liquidity increases, but profit may fall because that money stays unused for long time. On the other side, low working capital creates another type of problem. Day to day operations may suffer. Supplier payments get delayed. Short-term obligations sometimes become hard to manage properly. Gitman et al. (2015) explained that poor handling of current assets and current liabilities may create operational difficulties and financial pressure for the business.

The Indian metal and mining industry includes steel companies, aluminium producers, mining firms, and also a number of diversified metal, mining and energy companies. Managing working capital in this sector is not easy at all. In fact, these companies face many operational and financial pressures simultaneously, which makes day-to-day financial management quite complicated. If we look closely, demand for metal and mining products does not remain stable for long. It changes with infrastructure projects, industrial growth, automobile production, construction work, and even movements in global commodity prices. A slowdown in any one of these areas can quickly affect the industry. Sometimes production increases suddenly. At other times, companies are forced to cut back. Raw material prices also move up and down frequently, and inventory needs can change faster than expected. Credit sales become difficult to manage too. Because of this, firms in the metal and mining sector cannot follow one fixed working capital policy for years together. They have to adjust constantly according to market conditions. There is another side to the problem. Metal and mining companies usually operate on a very large scale. Their activities require huge investment, heavy use of energy, and continuous spending on raw materials. Competition is strong not only in the Indian market but also from foreign companies operating globally. All these pressures make financial management more difficult for firms in the metal and mining industry. Poor management of working capital can force companies to depend more heavily on external finance, and this ultimately increases their financing costs in future. Profitability and liquidity can also suffer. It happens quite in capital-intensive industries.

Many researchers have already studied working capital management and firm performance in different sectors. Still, when we specifically talk about Indian metal and mining companies, the amount of detailed research is comparatively limited. The lack of sufficient research in this area is an important concern. If we look at the Indian metal and mining industry carefully, there is still not enough detailed evidence showing how working capital practices affect the financial performance of companies. A few studies are available, yes, but the understanding is still incomplete. That is why examining the connection between working capital management and firm performance in this sector becomes necessary. The present study attempts to examine how working capital management influences the financial performance of companies in the Indian metal and mining sector. The study is expected to be useful not only from an academic angle but also from a practical managerial perspective. When managers clearly understand how working capital practices influence profitability and liquidity, they are usually in a better position to make practical financial decisions. They can manage stock properly, collect money faster from customers, and pay suppliers in a better way.

2. Literature Review

Numerous studies have examined the factors affecting profitability, especially those connected with working capital management. Wagh et al. (2024) mentioned that management of receivables can help metal and mining firms in India to improve their profit level. These companies were listed in the Bombay Stock Exchange. Sinha and Gupta (2023) also discussed inventory control, receivables, and the cash conversion cycle in the steel industry and proper handling of these areas supports operational activities and financial results. Diaz-Becerra et al. (2023) found that during the global boom period, mining firms in Peru performed comparatively better. Liquidity and solvency position became stronger and profitability also increased at that time. Al-Naif and Al Shra'ah (2019) explained that profitability decreases when cash conversion cycle components become longer in Jordanian mining and extraction firms. Sumathi (2018) studied Indian steel companies like JSW Steel and Tata Steel and found that better working capital practices helped firms maintain both liquidity and earnings. Panda and Nanda (2018) identified that working capital financing and profitability do not always move in a straight pattern in Indian manufacturing firms. Sometimes the effect changes depending on the financial situation of the company. Mengesha (2014) stated that Ethiopian metal manufacturing companies earned better profits when they collected receivables faster and reduced inventory holding period. Kaur and Singh (2013) also observed similar results among BSE 200 manufacturing firms in India. Efficient use of working capital improved company performance. Wansink (2013) highlighted the importance of proper cash flow movement and financing decisions in mining companies for maintaining stable profit. From most of the previous studies, it can be understood that working capital management and liquidity control are very important for the metal and mining industries. These factors help firms to maintain financial stability and improve overall business performance over time.

2.1 Research Gap

While there is plenty of research on working capital management and financial performance, few studies look closely at the profitability of BSE-listed metal and mining companies in India. The Indian metal and mining industry, including steel, aluminium, mining, and related metal sectors, operates under heavy competition and requires huge capital investment for regular operations. Profit levels of these firms are influenced by fluctuations in raw material prices, changes in international demand, rising energy expenses, and infrastructure conditions in the country. Sometimes, even small market disturbances create pressure on their financial performance. The sector also faces uncertainty because global economic conditions directly affect production and sales activities. Despite the growing importance of this industry in the Indian economy, limited research is available regarding the major

determinants of profitability among metal and mining companies. Therefore, this study attempts to reduce this gap by examining the profitability factors of selected metal and mining companies listed on the Bombay Stock Exchange in India.

2.2 Research Questions

- I. What are the observed profitability trends among selected BSE-listed metal and mining companies during the study period?
- II. What are the major factors affecting profitability in the metal and mining industry in India?

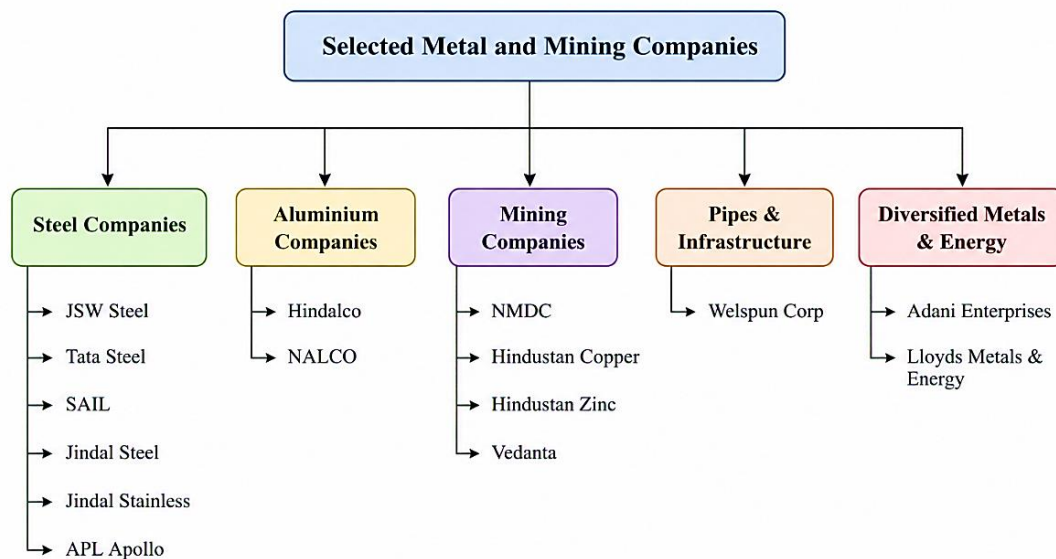
2.3 Research Objectives

- I. To study the profitability pattern of selected Bombay Stock Exchange-listed metal and mining companies in India during the study period.
- II. To understand the important factors that influence profit performance in the Indian metal and mining sector and examine their impact on sampled companies.

3. Data and Methodology

An explanatory research design was used in this study to examine the profitability performance of selected metal and mining companies in India listed on the Bombay Stock Exchange. The research mainly focused on identifying the important factors that affect profitability in the Indian metal and mining industry. A total of 15 companies were selected from different segments of the sector. These included steel, aluminium, mining, and diversified metal and mining companies operating in India. The study tried to understand how financial conditions and different business factors are connected with profit performance over the period. Secondary data on profitability and working capital management were collected from the CMIE Prowess database for the period 2016 to 2025.

Figure 1: Classification of Selected Metal and Mining Companies



Source: Compiled by the Researchers.

The present study considered four profitability indicators as dependent variables, namely Return on Capital Employed (ROCE), Return on Total Assets (ROTA), Net Profit Margin (NPM), and Return on Net Worth (RONW). Further, seven working capital factors were selected as independent variables, namely Current Ratio (CR), Quick Ratio (QR), Cash Position Ratio (CPR), Debt-Equity Ratio (DER), Stock Turnover Ratio (STR), Debtors Turnover Ratio (DTR), and Creditors Turnover Ratio (CTR). These variables were selected to examine the influence of liquidity, solvency, and operational efficiency on the profitability of metal and mining companies. Descriptive statistics, correlation analysis, and panel regression analysis were conducted for data analysis. Panel data regression models identified the relationship between working capital management variables and profitability indicators. The following regression models were constructed for the study:

Model 1

$$ROTA_{it} = \beta_0 + \beta_1(CR_{it}) + \beta_2(QR_{it}) + \beta_3(CPR_{it}) + \beta_4(DER_{it}) + \beta_5(STR_{it}) + \beta_6(DTR_{it}) + \beta_7(CTR_{it}) + \eta_i + \varepsilon_{it}$$

Model 2

$$NPM_{it} = \beta_0 + \beta_1(CR_{it}) + \beta_2(QR_{it}) + \beta_3(CPR_{it}) + \beta_4(DER_{it}) + \beta_5(STR_{it}) + \beta_6(DTR_{it}) + \beta_7(CTR_{it}) + \eta_i + \varepsilon_{it}$$

Model 3

$$RONW_{it} = \beta_0 + \beta_1(CR_{it}) + \beta_2(QR_{it}) + \beta_3(CPR_{it}) + \beta_4(DER_{it}) + \beta_5(STR_{it}) + \beta_6(DTR_{it}) + \beta_7(CTR_{it}) + \eta_i + \varepsilon_{it}$$

Where,

$ROTA_{it}$ = Return on Total Assets

NPM_{it} = Net Profit Margin

$RONW_{it}$ = Return on Net Worth

β_0 = Intercept coefficient

$\beta_1 - \beta_7$ = Slope coefficients of independent variables

CR_{it} = Current Ratio

QR_{it} = Quick Ratio

CPR_{it} = Cash Position Ratio

DER_{it} = Debt-Equity Ratio

STR_{it} = Stock Turnover Ratio

DTR_{it} = Debtors Turnover Ratio

CTR_{it} = Creditors Turnover Ratio

η_i = Unobservable heterogeneity

ε_{it} = Residual error term

4. Empirical Results and Interpretations

Table – 1: Descriptive Statistics (Independent Variables)

	CR	QR	CPR	DER	STR	DTR	CTR
Mean	1.20	0.71	0.41	0.64	56.20	30.95	5.48
Median	1.01	0.50	0.19	0.47	17.94	17.79	4.74
Maximum	4.64	4.28	4.20	6.20	1289.59	249.61	30.38
Minimum	0.37	0.09	0.00	0.00	3.59	2.52	1.16
Std. Dev.	0.71	0.72	0.70	0.72	138.73	40.74	3.84
Skewness	2.06	2.49	3.26	3.86	6.07	3.28	3.63
Kurtosis	8.89	10.27	14.71	27.10	47.69	15.41	21.90
Jarque-Bera	323.14	485.53	1122.57	4004.88	13405.34	1230.45	2563.24
Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Observations	150	150	150	150	150	150	150

Descriptive statistics of independent variables were presented in Table 1. The results indicated that the current ratio and quick ratio exhibited moderate mean values, suggesting that the selected metal and mining firms maintained adequate liquidity to meet short-term obligations. The comparatively low mean value of the cash position ratio indicated that liquid cash components within working capital were limited among the metal and mining firms analyzed. The average debt-to-equity ratio indicated moderate reliance on debt financing, suggesting the metal and mining companies maintained a balanced capital structure between borrowed funds and shareholders' equity. The high mean indicates that the stock turnover ratio showed significant fluctuations in inventory movement across the selected metal and mining firms, suggesting considerable variation in inventory management practices within the industry. The debtors' turnover ratio exhibited a relatively high average value, indicating greater collection efficiency from customers among the selected metal and mining firms. In contrast, the creditors' turnover ratio demonstrated moderate variation, implying that most metal and mining firms

adopted similar payment practices toward suppliers. All variables exhibited positive skewness values, indicating that the distributions were positively skewed. The kurtosis values exceeded the normal benchmark, suggesting a leptokurtic distribution and the presence of extreme observations in the data. The Jarque-Bera statistics and associated probability values were highly significant, with p-values below 0.05. This provided strong evidence that the data did not follow a normal distribution. The descriptive statistics revealed considerable variation and non-normality among the financial variables, a pattern commonly observed in financial panel data analysis.

Table – 2: Descriptive Statistics (Dependent Variables)

	ROCE	ROTA	NPM	RONW
Mean	10.11	6.87	9.69	13.20
Median	7.90	5.15	6.12	12.47
Maximum	82.46	62.86	44.15	89.20
Minimum	-27.48	-19.64	-68.71	-70.13
Std. Dev.	12.03	8.70	13.37	17.18
Skewness	1.89	2.37	-0.63	-0.23
Kurtosis	12.02	15.07	9.99	10.74
Jarque-Bera	597.40	1051.16	315.48	375.40
Probability	0.00	0.00	0.00	0.00
Observations	150	150	150	150

Descriptive statistics of dependent variables were presented in Table 2. The results indicated that the selected metal and mining firms generated moderate profitability during the study period. The mean value of return on capital employed suggested that the metal and mining firms earned satisfactory returns from their capital investments. Similarly, the average value of return on total assets indicated reasonable efficiency in utilizing total assets for profit generation among the selected metal and mining firms. The mean net profit margin indicated moderate profitability from sales activities, while the average return on net worth indicated satisfactory returns to shareholders during the study period. The skewness values indicated mixed distribution patterns among the variables. Return on capital employed and return on total assets exhibited positive skewness, while net profit margin and return on net worth demonstrated slight negative skewness. The kurtosis values exceeded the normal benchmark, suggesting leptokurtic distributions and the presence of extreme observations in the data. The Jarque-Bera statistics and associated probability values were highly significant, with p-values below 0.05. This provided strong evidence that the variables did not follow a normal distribution. The descriptive statistics revealed considerable variation and non-normality among the profitability variables, which is commonly observed in firm-level financial panel data analysis.

Table – 3: Correlation Analysis

	CR	QR	CPR	DER	STR	DTR	CTR	ROCE	ROTA	NPM	RONW
CR	1										
QR	0.93	1									
CPR	0.89	0.93	1								
DER	-0.38	-0.32	-0.31	1							
STR	0.12	0.20	0.29	-0.03	1						
DTR	0.23	0.21	0.35	-0.24	0.49	1					
CTR	0.10	-0.04	0.00	-0.16	-0.07	0.30	1				
ROCE	0.31	0.35	0.32	-0.42	0.33	0.46	0.32	1			
ROTA	0.33	0.38	0.37	-0.40	0.36	0.48	0.34	0.99	1		
NPM	0.46	0.58	0.52	-0.48	0.30	0.26	0.00	0.71	0.72	1	
RONW	0.18	0.21	0.22	-0.50	0.38	0.39	0.26	0.91	0.88	0.70	1

Correlation analysis was presented in Table 3. The findings showed that the liquidity variables, namely current ratio, quick ratio, and cash position ratio, were moderately and positively related to profitability indicators such as return on capital employed, return on total assets, net profit margin, and return on net worth among the selected metal and mining firms. This indicated that firms with moderate liquidity positions generally maintained similar movement across all liquidity measures. The debt-equity ratio showed a negative relationship with major profitability indicators. This suggested that higher dependence on debt financing reduced the profitability performance of metal and mining firms. The stock turnover ratio and the debtors' turnover ratio were positively associated with profitability variables. Particularly, the positive relationship between debtors' turnover ratio and profitability indicated that efficient receivable management helped firms improve operational performance and earnings. In contrast, the creditors' turnover ratio showed only a weak relationship with profitability variables, suggesting a limited influence on financial performance. A strong positive relationship was also observed among the profitability indicators themselves, especially between return on capital employed and return on total assets.

4.3 Panel Unit Root Test Results

Before conducting a panel data regression analysis, it is necessary to examine the stationarity properties of the variables included in the study. Testing stationarity has helped to avoid misleading or spurious regression results in panel data analysis. Levin, Lin and Chu (LLC) panel unit root test has been used to examine the stationarity of the panel data. In the LLC test, the null hypothesis states that the panel data series contains a unit root and is non-stationary, whereas the alternative hypothesis states that the series is stationary (no unit root). Levin, Lin, and Chu have assumed a common process across all cross-sectional units when testing for unit roots in the panel data set.

Table – 4: Panel Unit Root Test Results (Levin, Lin & Chu t)

Variable	At Level			At 1st Differenced		
	Statistic	Prob.	Remarks	Statistic	Prob.	Remarks
CR	-2.40	0.01	S	-5.86	0.00	S
QR	-3.80	0.00	S	-9.23	0.00	S
CPR	-4.82	0.00	S	-10.22	0.00	S
STR	-2.73	0.00	S	-8.76	0.00	S
CTR	-3.92	0.00	S	-7.79	0.00	S
ROTA	-1.90	0.03	S	-9.26	0.00	S
NPM	-2.59	0.00	S	-6.96	0.00	S
RONW	-157	0.05	S	-8.67	0.00	S

Table 4 presented the Levin, Lin and Chu (LLC) panel unit root test results for the selected variables. The findings showed that most variables were stationary at level form, as their probability values remained below 0.05. However, debt equity ratio, debtors' turnover ratio, and return on capital employed were non-stationary at level. After taking first difference, all variables became stationary with significant probability values below 0.05. This indicated that the panel data did not suffer from unit root problems after transformation and the variables were suitable for panel regression analysis.

4.4 Panel Regression Test Results

The panel regression test results presented the estimated coefficients for each independent variable, along with standard errors, t-statistics, and p-values. These values helped to identify the significance and impact of the independent variables on the dependent variables in the study. In this analysis, return on capital employed (ROCE), return on total assets (ROTA), net profit margin (NPM), and return on net worth (RONW) were considered dependent variables representing profitability. On the other hand, current ratio (CR), quick ratio (QR), cash position ratio (CPR), debt-equity ratio (DER), stock turnover ratio (STR), debtors' turnover ratio (DTR), and creditors' turnover ratio (CTR) were considered as independent variables representing working capital indicators of the selected metal and mining firms.

4.4.1 Panel Regression Analysis between Working Capital Indicators and Profitability (ROTA)

Return on total assets (ROTA) is considered as the dependent variable in Model 1, while the selected working capital indicators are treated as independent variables. To examine the relationship between the variables, both fixed effects model and random effects model are applied in the panel data analyses, which are presented below.

Table – 5: Panel Regressions Test Results (DV: ROTA)

	Fixed Effect			Random Effect		
Variable	Coeff.	t-stat	Prob.	Coeff.	t-stat	Prob.
Intercept	1.27	0.48	0.63	0.46	0.20	0.84
CR	-7.94	-2.29	0.02	-6.82	-2.33	0.02
QR	8.59	1.61	0.11	10.51	2.75	0.01
CPR	3.04	0.60	0.55	-0.41	-0.13	0.90
STR	0.02	3.38	0.00	0.02	4.08	0.00
CTR	1.19	6.33	0.00	1.12	6.51	0.00
Panel observation	150			150		
R ²	0.54			0.33		
Adjusted R ²	0.47			0.31		
F-statistic (prob.)	0.00			0.00		

Hausman test has been applied to determine the most appropriate model between the fixed effects model and random effects model for panel data analysis. In this test, the null hypothesis states that the fixed effects model is not appropriate, whereas the alternative hypothesis suggests that the fixed effects model is appropriate. The test has helped to select a suitable model for obtaining reliable regression results.

Table – 6: Hausman Specification Test Results

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	2.33	5	0.80

Table 5 presented the panel regression results where return on total assets (ROTA) was considered as the dependent variable. The Hausman test p-value was 0.80, indicating that the random-effects model was more appropriate for interpretation. The regression results showed that the current ratio negatively affected ROTA and was statistically significant, whereas the quick ratio positively influenced ROTA with a significant impact. Cash position ratio showed a negative but insignificant relationship with ROTA. Stock turnover ratio and creditors' turnover ratio positively affected ROTA and were statistically significant, suggesting that efficient inventory and payment management improved firm performance. The significant F-statistic with probability value 0.00 confirmed that the selected working capital indicators collectively had a meaningful relationship with return on total assets.

4.4.2 Panel Regression Analysis between working capital indicators and Profitability (NPM)

Net Profit Margin (NPM) is considered as the dependent variable in Model 1, while the selected working capital indicators are treated as independent variables. To examine the relationship between the variables, both fixed effects model and random effects model are applied in the panel data analysis, which is presented below.

Table – 7: Panel Regressions Test Results (DV: NPM)

	Fixed Effect			Random Effect		
Variable	Coeff.	t-stat	Prob.	Coeff.	t-stat	Prob.
Intercept	4.07	1.08	0.28	3.81	1.08	0.28
CR	-3.66	-0.74	0.46	-7.58	-1.78	0.08
QR	10.32	1.36	0.18	17.48	3.07	0.00
CPR	-2.29	-0.32	0.75	-2.57	-0.52	0.61
STR	0.01	0.65	0.52	0.01	2.02	0.04

	Fixed Effect			Random Effect		
Variable	Coeff.	t-stat	Prob.	Coeff.	t-stat	Prob.
CTR	0.60	2.27	0.03	0.51	2.07	0.04
Panel observation	150			150		
R ²	0.61			0.19		
Adjusted R ²	0.55			0.16		
F-statistic (prob.)	0.00			0.00		

Hausman test has been applied to determine the most appropriate model between the fixed effects model and random effects model for panel data analysis. In this test, the null hypothesis states that the fixed effects model is not appropriate, whereas the alternative hypothesis suggests that the fixed effects model is appropriate. The test has helped to select a suitable model for obtaining reliable regression results.

Table – 8: Hausman Specification Test Results

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	6.81	5	0.24

Table 7 presented the panel regression results where net profit margin (NPM) was considered as the dependent variable. The Hausman test p-value was 0.24, indicating that the random-effects model was more appropriate for interpretation. The regression results showed that the current ratio negatively affected NPM, but the relationship was statistically insignificant. In contrast, the quick ratio positively influenced NPM with a significant impact, indicating that higher liquidity improved profitability among the selected metal and mining firms. Cash position ratio showed a negative and insignificant relationship with NPM. Stock turnover ratio and creditors' turnover ratio positively affected NPM and were statistically significant, suggesting that efficient inventory movement and proper trade credit management improved profit margin and overall financial performance. The significant F-statistic with probability value 0.00 confirmed that the selected working capital indicators collectively had a meaningful relationship with net profit margin.

4.4.3 Panel Regression Analysis between working capital indicators and Profitability (RONW)

Return on Net Worth (RONW) is considered as the dependent variable in Model 1, while the selected working capital indicators are treated as independent variables. To examine the relationship between the variables, both fixed effects model and random effects model are applied in the panel data analysis, which is presented below.

Table – 9: Panel Regressions Test Results (DV: RONW)

	Fixed Effect			Random Effect		
Variable	Coeff.	t-stat	Prob.	Coeff.	t-stat	Prob.
Intercept	1.95	0.33	0.74	2.35	0.48	0.63
CR	-4.42	-0.57	0.57	-6.31	-1.02	0.31
QR	-4.75	-0.40	0.69	9.12	1.15	0.25
CPR	15.20	1.35	0.18	0.14	0.02	0.98
STR	0.06	4.25	0.00	0.05	4.69	0.00
CTR	1.85	4.40	0.00	1.66	4.42	0.00
Panel observation	150			150		
R ²	0.41			0.24		
Adjusted R ²	0.32			0.21		
F-statistic (prob.)	0.00			0.00		

Hausman test has been applied to determine the most appropriate model between the fixed effects model and random effects model for panel data analysis. In this test, the null hypothesis states that the fixed effects model is not appropriate, whereas the alternative hypothesis suggests that the fixed effects model is appropriate. The test has helped to select a suitable model for obtaining reliable regression results.

Table – 10: Hausman Specification Test Results

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	4.54	5	0.47

Table 9 presented the panel regression results where return on net worth (RONW) was considered as the dependent variable. The Hausman test p-value was 0.47, indicating that the random-effects model was more appropriate for interpretation. The regression results showed that the current ratio negatively affected RONW, but the relationship was statistically insignificant. Quick ratio positively influenced RONW; however, the relationship was also insignificant. Cash position ratio showed a negligible and insignificant impact on shareholder returns among the selected metal and mining firms. Stock turnover ratio positively affected RONW and was highly statistically significant, suggesting that efficient inventory management improved shareholder returns and overall firm performance. Creditors' turnover ratio also showed a positive and significant relationship with RONW, indicating that effective payable management enhanced financial performance. The significant F-statistic with probability value 0.00 confirmed that the selected working capital indicators collectively had a meaningful relationship with return on net worth.

5. Conclusion

This study examined the relationship between working capital management and financial performance of selected metal and mining companies in India. The panel regression results showed that working capital indicators had significant influence on profitability performance during the study period. The findings indicated that quick ratio, stock turnover ratio, and creditors' turnover ratio positively affected profitability indicators such as return on total assets, net profit margin, and return on net worth. This suggested that proper liquidity management, efficient inventory control, and better management of trade credit helped metal and mining companies improve their financial performance. The study also found that current ratio negatively affected profitability in some cases. This indicated that excessive investment in current assets might reduce profitability and operational efficiency of metal and mining companies. On the other hand, cash position ratio did not show significant impact on most profitability measures under the study.

The results further suggested that stock turnover ratio and creditors' turnover ratio played an important role in improving firm performance. Therefore, selected metal and mining companies should focus more on effective inventory management, proper utilization of current assets, and efficient credit management for improving profitability and maintaining financial stability. The study concluded that efficient working capital management remained an important factor in determining the profitability and financial performance of selected metal and mining companies in India.

References

- Brigham, E. F., & Houston, J. F. (2019). *Fundamentals of Financial Management* (15th ed.). Cengage Learning.
- Deloof, M. (2003). Does working capital management affect profitability of Belgian firms? *Journal of Business Finance & Accounting*, 30(3–4), 573–588.
- Gitman, L. J., Juchau, R., & Flanagan, J. (2015). *Principles of Managerial Finance*. Pearson Education.
- Raheman, A., & Nasr, M. (2007). Working capital management and profitability: Case of Pakistani firms. *International Review of Business Research Papers*, 3(1), 279–300.
- Wagh, K. N., Gidwani, J. N., & Wachasundar, S. (2024). *Examining the influence of receivables management on profitability: An analysis of metal and mining companies listed on the Bombay Stock Exchange in India*. IPE Journal of Management, 14(11), 121–126.
- Sinha, H., & Gupta, A. (2023). *The effect of working capital management on the profitability of steel industry: A comparative analysis*.
- Diaz-Becerra, O. A., Cruz Talla, J. H., & Cabañas, M. A. (2023). *Analysis of the liquidity, solvency and profitability of the mining companies listed on the S&P/BVL Mining Index during the 2004–2020 period*. Multidisciplinary Business Review, 16(1), 108–123.
- Al-Naif, K., & Al Shra'ah, A. (2019). *Working capital management and profitability: Evidence from Jordanian mining and extraction industry sector*. IUG Journal of Economics and Business, 27(1), 42–60.
- Sumathi, N. (2018). *Comparative study of working capital management on profitability of JSW Steel Ltd and Tata Steel Ltd*. International Journal of Research in Applied Management, Science & Technology, 3(2).
- Panda, A. K., & Nanda, S. (2018). *Working capital financing and corporate profitability of Indian manufacturing firms*. Management Decision.

-
11. Mengesha, W. (2014). *Impact of working capital management on firms' performance: The case of selected metal manufacturing companies in Addis Ababa, Ethiopia* (Master's thesis). Jimma University.
 12. Kaur, H. V., & Singh, S. (2013). *Managing efficiency and profitability through working capital: An empirical analysis of BSE 200 companies*. Asian Journal of Business Management, 5(2), 197–207.
 13. Wansink, J. D. (2013). *A cash-flow analysis and profitability study on a peer-group of mining companies* (Master's thesis).