जर्नल ऑफ एकेडमिक एडवांसमेंट

JOURNAL OF
ACADEMIC ADVANCEMENT

[Bi-Annual Peer Reviewed Refereed Journal]

Volume No. 4 | Issue No. 02 | December, 2025

Editor-in-Chief

PEMA LAMA

Kolkata, INDIA

EDITORIAL

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This Journal is the outcome of the contributions of insightful research-oriented papers/articles by various eminent academicians, and research scholars in a highly organized and lucid manner with a clear and detailed analysis related to the emerging areas in the fields of Social Sciences and Allied Areas.

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We also express our heartfelt gratitude to all the esteemed members of the Editorial Board, Esteemed Reviewer(s) who despite their busy schedules have given their valuable time, suggestions and comments to enrich the quality of the contributory resears paper(s) in bringing to light this June issue.

Last, but not least, we revere the patronage and moral support extended by our parents and family members whose constant encouragement and cooperation made it possible for us to complete on time.

We would highly appreciate and look forward to your valuable suggestions, comments and feedback at **editorbr2022@gmail.com**

December, 2025
West Bengal, India

PEMA LAMA
Editor-in-Chief

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RESEARCH ARTICLE

An Empirical Study on the Relationship of Profitability and Liquidity Management of some select Listed Oil Companies in India

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ABSTRACT

The study is related to the profitability and liquidity management of the Indian oil industry over 15 years (financial years 2009-10 through 2023-24). Liquidity management is also known as the management of working capital, which is represented by WCM. Using panel data from major oil-sector companies, profitability was measured by Return on Assets, Return on Capital Employed, Net Profit Ratio and Profit before Interest & Tax. Working-capital measures include Current Ratio, Quick Ratio, Debt-to-Equity Ratio, Proprietary Ratio, Inventory Turnover Ratio, Debtors Turnover Ratio, and Creditors Turnover Ratio. Firm size (log of assets) is included as a control. Correlation and company-fixed-effects regressions (OLS with clustering by company) were estimated.

Results show a significant inverse relationship between CTR (creditors' turnover) and PBIT, while most WCM variables do not show strong, consistent coefficients in the fixed-effects regressions. Inventory and receivables turnover show low positive correlation with ROA / ROCE, but are not robustly significant in the regressions. The composite company ranking (based on averaged profitability measures) places GSPL, IGL and OIL among the top performers. Managerial implications emphasise efficient inventory/receivables management and strategic use of payables without compromising supplier relationships.

1 INTRODUCTION

Working capital management (WCM) addresses short-term asset and liability choices that affect liquidity and operational efficiency (Deloof, 2003). For capital-intensive sectors such as oil and gas, effective WCM is crucial because large inventories, long receivable cycles, and supplier payment terms can materially influence profitability and cash flows. This paper examines which WCM components contribute most to profitability in the Indian oil sector companies and what drivers are responsible for minimising their investment in working capital management while preserving the profitability.

2 LITERATURE REVIEW

Empirical studies often find a balance between liquidity and profitability: high investment in current assets reduces returns (Lazaridis & Tryfonidis, 2006; Shin & Soenen, 1998). Conversely, efficient management of inventories and receivables tends to increase firm profitability (Deloof, 2003). In industry-specific studies, payables and supplier financing are discussed as low-cost working-capital sources but may come at the cost of strained supplier relationships if overused (Afza & Nazir, 2009; Ghosh & Maji, 2003). WCM components

depend heavily on model specification, sample heterogeneity, and whether endogeneity is addressed (Demiraj, 2022). Recent industry analyses highlight that for oil and gas companies, inventory levels and creditor terms interact with commodity price volatility, affecting liquidity and profitability simultaneously. The operational structure of oil firms limits the direct application of generic CCC rules (Sharma et al., 2025). Oil price and macroeconomic volatility significantly moderate working capital decisions in oil firms (Rashid et al., 2025).

India-specific studies show varied results. Some report a negative relationship between CCC and profitability, others find non-linear (inverted-U) effects, suggesting that moderate working capital improves performance up to a threshold (Patil & Reddy, 2024). For the oil sector, research on firms such as IOCL and ONGC finds that operational procurement cycles and regulatory price mechanisms significantly shape WCM choices (Gupta & Nair, 2025). However, systematic, multi-firm, multi-year studies focusing on the Indian oil sector remain rare.

Despite considerable progress, several gaps persist:

- Creditors turnover ratio (CTR) is understudied and inconsistently defined. Most studies prioritise inventory and receivables management, neglecting payables' role in short-term financing. This study explicitly examines CTR in the Indian oil context.

- Limited research links accounting ratios to operational drivers. This paper provides managerial interpretations of CTR, ITR, and DTR in operational terms.

By filling these gaps, this study contributes to the understanding of WCM profitability dynamics in India's oil industry, highlighting CTR's crucial role in optimising working capital efficiency under volatile economic conditions.

3 DATA AND METHODOLOGY

- Data Period: 2009-10 to 2023-24 (15 financial years)

Sample: Major Indian oil sector companies (BPCL, GIL, GSPL, HPCL, HOEC, IGL, IOCL, PLNG, OIL, ONGC - the dataset contains these companies and year-wise observations).

Source: (Excel Panel Dataset).

- Variables

Dependent (profitability): ROA - Return on Assets, ROCE – Return on Capital Employed, NPR – Net Profit Ratio, PBIT – Profit Before Interest and Tax.

Independent (WCM measures): CR - Current Ratio, QR - Quick Ratio, DER - Debt-to-Equity Ratio, PPR - Payables Period Ratio, ITR - Inventory Turnover Ratio, DTR - Debtors Turnover Ratio, CTR - Creditors Turnover Ratio.

Control: SIZE (firm size; taken from the data as provided).

- Methods

Pearson correlation between WCM variables (CR, QR, DER, PPR, ITR, DTR, CTR, SIZE) and each profitability measure (ROA, ROCE, NPR, PBIT), with p-values.

Multiple regression (OLS) for each dependent variable with company fixed effects implemented via company dummies and robust standard errors clustered by company:

$$Y_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 QR_{it} + \beta_3 DER_{it} + \beta_4 PPR_{it} + \beta_5 ITR_{it} + \beta_6 DTR_{it} + \beta_7 CTR_{it} + \beta_8 SIZE_{it} + \alpha_i + \varepsilon_{it}$$

Where α_i are company fixed effects. We report coefficients, clustered standard errors (z-statistic), p-values, R^2 and sample size.

Company ranking: companies ranked by composite z-score computed from mean ROA, ROCE, NPR and PBIT across the 15 years (higher composite z → better performance).

4 DATA ANALYSIS

- Descriptive Analysis

Table 1 displays Pearson correlations (r) between

WCM variables and profitability measures. P-values are shown below (for quick reading, p < .05 indicates statistical significance). Significant relationships are interpreted conservatively.

Table 1
CORRELATIONS: WCM COMPONENTS VS. PROFITABILITY (PEARSON R)

WCM Var	ROA (r)	ROCE (r)	NPR (r)	PBIT (r)
CR	-0.0716	-0.1128	-0.0856	0.2917
QR	-0.0445	-0.0885	-0.0683	0.3239
DER	-0.0555	-0.0681	-0.0022	-0.3090
PPR	0.0672	0.0308	0.0151	0.5208
ITR	0.1328	0.1608	0.0519	-0.0594
DTR	0.0820	0.1372	0.0413	-0.2035
CTR	0.0098	0.0365	0.0383	-0.3812
SIZE	0.1827	0.2281	0.1888	-0.2906

Table 2
CORRELATION P-VALUES

WCM Var	ROA (p)	ROCE (p)	NPR (p)	PBIT (p)
CR	0.3837	0.1694	0.2975	0.0003
QR	0.5885	0.2816	0.4061	0.0001
DER	0.4999	0.4075	0.9789	0.0001
PPR	0.4139	0.7083	0.8541	0.0000
ITR	0.1053	0.0493	0.5285	0.4704
DTR	0.3183	0.0941	0.6162	0.0125
CTR	0.9056	0.6572	0.6418	0.0000
SIZE	0.0252	0.0050	0.0207	0.0003

Interpretation (Correlations)

The strongest and statistically significant simple correlation observed is between CTR (creditor turnover) and PBIT (r = -0.3812, p < 0.001). The negative sign indicates that higher creditors turnover (i.e., faster creditor turnover / perhaps faster payments to creditors depending on the conversion used) is associated with lower PBIT, or conversely, slower turnover (longer credit period) associated with higher PBIT. This requires careful economic interpretation (see Discussion).

Firm SIZE shows statistically significant positive simple correlations with ROA and ROCE and a negative correlation with PBIT (p-values small). A low positive correlations are found between ITR with ROA

and ROCE (p-values borderline for ROCE). Most other pairwise correlations are weak or not statistically significant at conventional levels.

Note: correlation does not imply causation - regression and fixed-effects control for company heterogeneity.

Regression Results (Company Fixed Effects; Clustered SEs)

We estimated four regressions, dependent variables: ROA, ROCE, NPR and PBIT. Regressions include CR, QR, DER, PPR, ITR, DTR, CTR, SIZE, and company fixed effects (implemented through company dummies). Standard errors are clustered by company.

Below are compact coefficient tables for the WCM variables and SIZE (coefficients, clustered standard errors, z-statistic, p-value). Full model diagnostics (R^2 and N) are reported below each table.

Table 3
REGRESSION COEFFICIENTS - DEPENDENT VARIABLE: ROA

Variable	Coef.	Std. Err.	z	p-value
CR	-66.9816	47.6307	-1.4063	0.1596
QR	71.0064	50.9106	1.3947	0.1631
DER	7.4168	8.6283	0.8596	0.3900
PPR	40.9048	25.5027	1.6039	0.1087
ITR	-0.2412	0.1893	-1.2744	0.2025
DTR	0.0803	0.1107	0.7254	0.4682
CTR	0.2937	0.9899	0.2967	0.7667
SIZE	13.3209	7.5464	1.7652	0.0775

Model Statistics: R^2 = 0.2009, N = 150 (observations across companies and years)

Table 4
REGRESSION COEFFICIENTS - DEPENDENT VARIABLE: ROCE

Variable	Coef.	Std. Err.	z	p-value
CR	-78.9007	50.0406	-1.5767	0.1149
QR	82.7018	53.4282	1.5479	0.1216
DER	39.6597	33.6432	1.1788	0.2392
PPR	188.1684	175.1998	1.0736	0.2836
ITR	-2.3298	2.0228	-1.1517	0.2494

Variable	Coef.	Std. Err.	z	p-value
DTR	0.8141	1.1320	0.7191	0.4721
CTR	3.8457	8.8056	0.4367	0.6623
SIZE	126.0791	65.5381	1.9238	0.0544

Model Statistics: R^2 = 0.2477, N = 150.

Table 5
REGRESSION COEFFICIENTS - DEPENDENT VARIABLE: NPR

Variable	Coef.	Std. Err.	z	p-value
CR	-16.0899	11.8101	-1.3627	0.1736
QR	20.0927	12.6729	1.5852	0.1139
DER	-3.5138	9.2282	-0.3807	0.7034
PPR	74.5775	66.2380	1.1261	0.2602
ITR	-0.3402	0.7763	-0.4380	0.6612
DTR	0.3660	0.6825	0.5362	0.5918
CTR	0.0615	5.2370	0.0117	0.9906
SIZE	21.9386	28.0716	0.7816	0.4346

Model Statistics: R^2 = 0.1571, N = 150.

Table 6
REGRESSION COEFFICIENTS - DEPENDENT VARIABLE: PBIT

Variable	Coef.	Std. Err.	z	p-value
CR	-44.3852	23.4520	-1.8926	0.0584
QR	50.2254	26.7813	1.8754	0.0607
DER	-3.1009	7.0569	-0.4394	0.6604
PPR	66.9278	66.3764	1.0083	0.3133
ITR	-0.2409	0.1760	-1.3691	0.1710
DTR	0.1108	0.1195	0.9276	0.3536
CTR	0.0624	0.9641	0.0647	0.9484
SIZE	8.9879	6.8778	1.3068	0.1913

Model statistics: R^2 = 0.5404, N = 150.

Regression Interpretation (Summary)

The regression results show no strong, uniformly significant coefficients across all profitability measures at conventional 5% levels for the principal WCM variables. In the PBIT regression, CR (current ratio) has a marginally significant negative coefficient (coef = -44.385, z = -1.893, p = 0.058), suggesting that higher short-term liquidity may be associated with lower PBIT, consistent with the notion of idle resources depressing profitability. QR shows a marginal positive coefficient in the PBIT model (p ≈ 0.061).

SIZE shows a marginal positive association with ROA and ROCE (p-values ~0.08 and 0.054, respectively), suggesting economies of scale may be beneficial. Importantly, creditors' turnover (CTR) is not significant in the fixed-effects regressions, though it displayed a negative simple correlation with PBIT. This difference (correlation vs. regression) suggests company-specific heterogeneity/omitted variables explain some of the bivariate relationship, hence the importance of fixed effects.

Overall, the regressions explain modest variation in ROA/ROCE/NPR (R^2 ~ 0.16–0.25) and a higher share of variation in PBIT (R^2 ~ 0.54) - note fixed effects and company dummies increase model R^2.

Company Ranking (Composite Score)

We computed mean ROA, ROCE, NPR and PBIT for each company across the 15-year panel and converted each mean to a z-score. The composite z-score (average of the four z-scores) ranks overall profitability performance.

Top Companies by composite z-score (Top 10 shown)

Rank	Company	ROA (Mean)	ROCE (Mean)	NPR (Mean)	PBIT (Mean)	Composite _z
1	GSPL	9.77	17.49	46.98	74.18	1.0638
2	IGL	13.77	22.42	14.05	20.61	0.5675
3	OIL	8.80	12.62	26.71	41.27	0.4586
4	ONGC	9.24	12.94	25.20	37.25	0.4279
5	PLNG	11.50	18.05	5.49	8.38	0.2161
6	GIL	8.28	11.62	8.12	11.93	0.0091
7	BPCL	6.34	15.40	2.61	3.99	-0.0727
8	IOCL	4.65	12.80	2.92	5.06	-0.1755
9	HPCL	3.84	10.93	1.64	2.86	-0.2768
10	HOEC	-16.17	-17.47	-208.43	15.74	-2.2180

Interpretation

GSPL stands out as the top performer by this composite metric, driven by very high average PBIT

and NPR, followed by IGL and OIL. HOEC's negative composite arises from large negative averages in ROA/ROCE/NPR driven by outlier years in the panel. Use caution with companies that have extreme swings and small sample sizes.

5 DISCUSSION

Which WCM components contribute most?

Bivariate Evidence: the most notable simple relationship is a moderately strong negative correlation between CTR (creditors turnover) and PBIT (r = -0.381, p < .001). Economically, this suggests companies that have slower creditor turnover (longer payable days, assuming CTR is computed as payables turnover, where a lower CTR implies longer payment periods) may exhibit higher PBIT because they retain cash longer. Short-term financing is supported by credit allowed by the suppliers. Alternatively, if CTR is defined differently in your dataset, the interpretation should be adjusted accordingly. Always verify the exact operational definition of CTR (e.g., whether CTR = purchases/creditors or creditors/turnover; note direction matters).

Multivariate Evidence: The study found that after controlling for company fixed effects, most WCM components are not statistically significant at conventional levels, and that higher CR is negatively associated with PBIT (p ≈ 0.058), consistent with prior studies indicating excess liquidity negatively impacts profitability. (Deloof, 2003; Lazaridis & Tryfonidis, 2006).

Why differences between Correlation and Regression?

Fixed effects absorb time-invariant company heterogeneity (e.g., business model, long-term supplier terms), which may explain why CTR's bivariate correlation with PBIT weakens in regressions. The correlation may partly reflect cross-sectional differences (some companies use supplier credit more than others) rather than within-company temporal variation.

6 MANAGERIAL RECOMMENDATIONS

Based on the empirical findings and literature -

Review creditor payment policies strategically, supplier credit can be a valuable short-term financing source. But pushing payables too far can harm supplier relations and long-term supply security. Companies should find a balance: negotiate longer payment terms where feasible, but maintain supplier partnerships.

Avoid excessive liquidity; the marginal negative association between CR and PBIT suggests holding unnecessarily high current assets reduces profitability. Firms should optimise cash buffers and invest idle cash where returns exceed short-term borrowing costs.

Focus on inventory and receivables processes, while not strongly significant in fixed-effects regressions, ITR/DTR have positive correlations with ROA / ROCE. Improve demand forecasting, JIT procurement, and receivables collection to release working capital.

Use payables as part of a working-capital strategy, use negotiated supplier credit as low-cost financing, but tie it to performance metrics and maintain transparency with suppliers.

Monitor firm-specific factors company heterogeneity matters, therefore, benchmarking against similar firms is recommended rather than a one-size-fits-all policy.

7 LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

- *Measurement and Definition:* Ensure CTR is consistently defined across companies (creditor turnover can be measured in different ways). The direction of the metric affects interpretation.

- *Endogeneity:* Working capital decisions may be endogenous with profitability(reverse causality).

- *Additional Controls:* Include macro variables (oil prices, interest rates), firm-specific investments, and year fixed effects to capture systematic shocks.

- *Deeper firm-level study:* A qualitative inquiry into company procurement and payment policies would complement the quantitative analysis.

8 CONCLUSION

Using 15 years of panel data for major Indian oil sector firms, we find limited evidence that any single

WCM component consistently predicts profitability after controlling for company fixed effects. Bivariate evidence indicates that creditors' turnover (CTR) is strongly correlated with PBIT, but that relationship attenuates in firm-fixed-effects regressions, indicating that cross-sectional differences drive part of that correlation. Managers should therefore focus on operational improvements (inventory and receivables management) and use payables strategically, while being cautious about excess liquidity.

9 APPENDIX: KEY STATISTICAL TABLES

[These tables were derived from the provided Excel dataset using OLS regressions with company fixed effects and SEs clustered by company]

- Correlation able (Table 1) and p-values - see above under Section 4.1.

- Regression coefficient tables (Tables 3-6) - see Section 4.2.

- Company ranking (top companies) - see Section 4.3.

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