

THE EFFECT OF LEVERAGE, INVENTORY TURNOVER RATIO, AND CASH TURNOVER RATIO ON LIQUIDITY WITH PROFITABILITY AS A MODERATING VARIABLE IN TRANSPORTATION AND LOGISTICS COMPANIES LISTED ON THE INDONESIA STOCK EXCHANGE DURING THE 2022–2025 PERIOD

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Abstract

This study examines the effect of leverage, the inventory turnover ratio, and the cash turnover ratio on liquidity, with profitability positioned as a moderating variable, in transportation and logistics companies listed on the Indonesia Stock Exchange (IDX) during the 2022–2025 period. This issue is important because several logistics firms recorded a Current Ratio below the ideal threshold despite rising revenues, indicating inefficiency in managing short-term financial obligations. Liquidity was measured by the Current Ratio, leverage by the Debt to Equity Ratio, inventory turnover by the Inventory Turnover Ratio, cash turnover by the Cash Turnover Ratio, and profitability by Return on Assets. Using purposive sampling, 25 companies were selected from a population of 39, yielding 100 firm-year observations analyzed through panel data regression and Moderated Regression Analysis (MRA) with EViews 12. The Random Effect Model was chosen as the best estimator based on the Chow and Hausman tests. The results indicate that leverage has a significant negative effect on liquidity, the inventory turnover ratio has a significant positive effect on liquidity, while the cash turnover ratio has no significant effect on liquidity. Profitability significantly moderates the relationship between all three independent variables and liquidity, strengthening the negative effect of leverage and the effect of cash turnover, while weakening the positive effect of inventory turnover.

Keywords: Cash Turnover Ratio; Inventory Turnover Ratio; Leverage; Liquidity; Profitability.

INTRODUCTION

As business competition intensifies, particularly among firms operating in the same industry, companies are required to sustain their operations through strategies that support the achievement of long-term objectives, thereby strengthening their competitive capacity (Silvia et al., 2020). In evaluating financial performance, firms must pay close attention to liquidity, especially regarding their priority to meet short-term obligations. From a creditor's perspective, a highly liquid firm is considered safer because sufficient current assets guarantee the repayment of short-term debt. However, from an internal management perspective, excessively high liquidity may reflect inefficient managerial performance, arising from idle cash, accumulated inventory, or suboptimal receivables management that leads to a high amount of uncollected trade receivables (Fatahillah et al., 2024).

According to Nasution et al. (2023), sound liquidity reflects efficiency in managing current assets and cash flow. Internal factors affecting corporate liquidity include leverage (the ratio of debt to capital), the inventory turnover ratio, and the cash turnover ratio, which are all important indicators for assessing managerial efficiency in handling obligations and current assets. Liquidity refers to a firm's ability to meet its short-term obligations using its current assets. Meirina and Reflina (2023) state that high liquidity indicates sound financial condition because the firm can meet its obligations on time, whereas low liquidity may indicate difficulty in paying short-term debt, disrupting operational activities and potentially triggering bankruptcy risk. Liquidity is commonly measured using the Current Ratio (CR), the comparison between current assets and current liabilities. A higher ratio indicates a better liquidity position, although an excessively high ratio may indicate that current assets are not being used productively (Irsyad et al., 2023). The transportation and logistics sector has exhibited liquidity pressure due to an inefficient

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capital structure and high operating costs. Based on financial statement data for 2022–2025 from several IDX-listed logistics companies, significant fluctuations were found in liquidity and profitability ratios. In the first semester of 2023, the transportation and logistics sector recorded weak stock market performance compared with the energy and infrastructure sectors, pressured by high operating costs, fluctuating fuel prices, and weakening demand for logistics services following the 2021–2022 surge (CNBC Indonesia, 2023, as cited in Taufani, 2023). Several transportation and logistics firms experienced declining liquidity ratios during 2020–2022 despite revenue growth, indicating a mismatch between earned revenue and cash flow management used for operations and short-term obligations.

An ideal CR is generally ≥ 1 ; a CR below 1 indicates that current assets are insufficient to cover current liabilities (Ahkam, 2019), while a healthy range is generally between 1 and 3 (Bustillo et al., 2022). Based on a sample of nine logistics companies observed for the 2022–2025 period (Table 1), several firms such as PT Adi Sarana Armada Tbk (ASSA) and PT Soechi Lines Tbk (SOCI) recorded a CR below the ideal threshold in certain years, while others such as PT Mitra Pinasthika Mustika Tbk (MPMX) and PT Buana Lintas Lautan Tbk (BULL) maintained liquidity above the ideal level. This fluctuation indicates that internal factors influence a firm's ability to maintain liquidity, including funding structure, operational efficiency, and cash-management policy (Fatahillah et al., 2024).

Table 1. Current Ratio of Logistics Companies, 2022–2025

No	Company	2022	2023	2024	2025
1	PT Blue Bird Tbk (BIRD)	1.58	1.45	1.41	1.55
2	PT Mitra Pinasthika Mustika Tbk (MPMX)	1.69	1.62	1.58	1.55
3	PT Adi Sarana Armada Tbk (ASSA)	1.10	1.02	0.97	0.98
4	PT Indah Prakasa Sentosa Tbk (INPS)	1.15	1.12	1.10	1.18
5	PT Trimuda Nuansa Citra Tbk (TNCA)	1.28	1.23	1.18	2.85
6	PT Buana Lintas Lautan Tbk (BULL)	1.52	1.45	1.34	1.41
7	PT Samudera Indonesia Tbk (SMDR)	1.55	1.50	1.47	2.15
8	PT Pelayaran Tempuran Emas Tbk (TMAS)	1.62	1.50	1.38	1.34
9	PT Soechi Lines Tbk (SOCI)	1.00	0.93	0.87	1.00

Source: Data processed by the researcher, 2025

Three internal factors were selected to explain the non-ideal CR observed among logistics companies: leverage, the inventory turnover ratio, and the cash turnover ratio. Leverage, measured through the Debt to Equity Ratio (DER), reflects the extent to which a firm depends on external financing; an ideal DER generally ranges between 1 and 1.5 times. According to Mahasin et al. (2025), a high DER signals greater financial risk because larger interest and debt obligations reduce the cash available to meet short-term liabilities, and Fatahillah et al. (2024) found that leverage negatively and significantly affects liquidity. The inventory turnover ratio (ITO), calculated by dividing sales by inventory, reflects how quickly funds tied up in stock can be converted into cash; a higher ITO indicates faster liquidity conversion (Kasmir, 2019), while a lower ratio indicates excess stock accumulation that impairs cash flow (Hidayatullah et al., 2021). For the transportation and logistics industry, an ideal ITO is generally around 5 times per year. The cash turnover ratio (CTO), obtained by dividing net sales by average cash, reflects how efficiently a firm uses cash to generate sales; Gill (2019) states that a higher CTO strengthens liquidity, while a low CTO indicates inefficient cash management that may delay short-term payments. This study uses $CTO > 7$ times per year as an ideal threshold for the sector. Table 2 compares CR with DER, ITO, and CTO for the sampled logistics companies in 2025, showing that firms with a high DER (such as ASSA and SOCI) tend to have a low CR, indicating a negative relationship between leverage and liquidity, whereas firms with high ITO and CTO (such as SMDR and BIRD) tend to have a better CR, supporting the notion that operational efficiency through inventory and cash turnover can improve liquidity conditions regardless of leverage levels.

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Table 2. Comparison of CR with DER, ITO, and CTO, 2025

No	Company	CR	DER	ITO	CTO
1	BIRD	1.55	0.44	3.96	4.69
2	MPMX	1.55	1.10	7.20	8.90
3	ASSA	0.98	0.78	27.50	0.23
4	INPS	1.18	1.90	4.80	7.30
5	TNCA	2.85	0.21	26.30	5.00
6	BULL	1.41	1.25	6.20	8.20
7	SMDR	2.15	0.25	8.40	5.60
8	TMAS	1.34	0.54	1.90	29.50
9	SOCI	1.00	2.50	4.10	5.50

Source: Data processed by the researcher, 2025

Beyond leverage and operational efficiency, profitability appears to explain why some firms maintain adequate liquidity despite high leverage while others struggle despite efficient operations. Profitability, measured by Return on Assets (ROA), reflects a firm's ability to generate profit from its assets. Brigham and Houston (2014) argue that highly profitable firms possess stronger internal funding sources, reducing dependence on debt and strengthening liquidity, while under Signaling Theory a high ROA signals financial resilience to investors (Sari & Wirananda, 2025). Table 3 presents CR, DER, ITO, CTO, and ROA jointly for 2025, showing that firms with high ROA (SMDR, MPMX, TMAS) tend to maintain good liquidity even at moderate leverage, whereas firms with low ROA (SOCI, ASSA) show weak liquidity compounded by high leverage and low operational efficiency. This study therefore uses $ROA \geq 5\%$ as a conservative benchmark of adequate profitability (Ahkam, 2019).

Table 3. Comparison of CR, DER, ITO, CTO, and ROA, 2025

No	Company	CR	DER	ITO	CTO	ROA (%)
1	BIRD	1.55	0.44	3.96	4.60	6.6
2	MPMX	1.58	1.10	7.20	8.90	7.1
3	ASSA	0.98	0.78	27.50	0.23	7.0
4	INPS	1.10	1.90	4.80	7.30	4.1
5	TNCA	2.85	0.21	26.30	5.00	7.0
6	BULL	1.34	1.25	6.20	8.20	5.6
7	SMDR	2.15	0.25	8.40	5.60	5.5
8	TMAS	1.34	0.54	1.91	29.50	10.0
9	SOCI	0.87	2.50	4.10	5.50	2.5

Source: Data processed by the researcher, 2025

Under Signaling Theory, financial ratios such as leverage, inventory turnover, cash turnover, and profitability constitute information conveyed by management to external parties, used by investors and creditors to assess performance and risk (Sari & Wirananda, 2025). Given the importance of liquidity and the influence of these financial ratios, an in-depth study is required on how leverage, inventory turnover, and cash turnover affect liquidity, and how profitability may strengthen or weaken these relationships. The transportation and logistics sector was chosen because it is highly dependent on operational efficiency and cash-flow management, and prior studies examining these variables simultaneously with a profitability-moderation approach remain limited. This study therefore investigates "The Effect of Leverage, Inventory Turnover Ratio, and Cash Turnover Ratio on Liquidity with Profitability as a Moderating Variable in Transportation and Logistics Companies Listed on the Indonesia Stock Exchange during the 2022–2025 Period." Based on this background, the research questions are formulated as follows: (1) Does leverage affect liquidity? (2) Does the inventory turnover ratio affect liquidity? (3) Does the cash turnover ratio affect liquidity? (4) Does profitability moderate the effect of leverage on liquidity? (5) Does profitability moderate the effect of the inventory turnover ratio on liquidity? (6) Does profitability moderate the

effect of the cash turnover ratio on liquidity? Accordingly, this study aims to analyze the direct effects of leverage, inventory turnover ratio, and cash turnover ratio on liquidity, as well as the moderating role of profitability in each of these relationships, among transportation and logistics companies listed on the IDX during 2022–2025.

LITERATURE REVIEW

a) Agency Theory

Agency Theory, developed by Jensen and Meckling (1976), explains the relationship between owners (principals) and managers (agents), which often generates conflicts of interest because each party pursues different goals. In corporate finance, this theory explains how management handles leverage, cash, inventory, and profitability to preserve the trust of investors and creditors (Brigham & Houston, 2019). Adinegara and Sukamulya (2021) found that sound corporate governance reduces agency risk and enhances firm value through transparent and efficient financial management, while Fajrin and Priyawan (2021) argue that efficient management of cash and inventory strengthens investor confidence by demonstrating agency responsibility in maintaining liquidity. Yudha et al. (2021) further found that profitability can mediate the relationship between leverage and liquidity, indicating that well-performing managers can balance debt utilization and operational efficiency to preserve financial health, which supports the theoretical basis for positioning profitability as a moderating variable in this study.

b) Working Capital Theory

Working Capital Theory emphasizes the importance of managing current assets such as cash, receivables, and inventory to support smooth operations and meet short-term obligations. Jin et al. (2014) explain that effective use of working capital directly affects the stability of a firm's cash flow and, consequently, its liquidity level. A faster inventory turnover accelerates the conversion of stock into sales and cash, thereby improving liquidity (Aiken et al., 2011), while a high cash turnover indicates effective use of cash to support operations, strengthening the firm's ability to meet short-term obligations. Nasution et al. (2023) found that cash turnover and inventory turnover affect liquidity among IDX-listed companies, and Söylemez (2025) similarly notes that working capital components support liquidity conditions, which subsequently affect financial performance.

c) Signaling Theory

Signaling Theory, developed by Spence (1973), explains that management, possessing more complete internal information, can convey signals to external parties such as investors and creditors through published financial reports and corporate actions (Brigham & Houston, in Apriliyani & Muniroh, 2021). According to Fatahillah et al. (2024), when information regarding profitability and financial ratios is disclosed, it becomes a signal that can influence capital market movements; a high profitability level signals to investors that the firm possesses the financial resilience to manage pressure arising from high leverage or inefficient operations (Sari & Wirananda, 2025).

d) Liquidity

Liquidity reflects a firm's capacity to meet short-term obligations using its current assets. According to Kariyoto (in Irsyad et al., 2023), liquidity is a firm's ability to pay short-term financial obligations on time, while Anggraini and Septiano (in Ramadani et al., 2023) define liquidity as the extent to which a firm can cover short-term debt using current assets. The most common measure is the Current Ratio, the ratio of current assets to current liabilities; a ratio that is too low indicates risk of default, while a ratio that is too high may indicate underutilized current assets and inefficient cash management (Harmono, in Runtulalo et al., 2018).

e) Leverage

Leverage describes the extent to which a firm uses debt to finance its operations and investments, commonly measured by the Debt to Equity Ratio (DER), the ratio of total liabilities to total equity. A higher DER indicates greater proportion of debt relative to equity in the capital structure. High leverage can burden a firm with interest and principal payments, disrupting cash flow and reducing liquidity. Fatahillah et al. (2024) found that DER has a negative and significant effect on liquidity, meaning that a higher DER lowers a firm's ability to meet current obligations.

f) Inventory Turnover Ratio

The inventory turnover ratio measures how efficiently a firm manages and sells its inventory within a period, calculated by dividing sales by average inventory. According to Kasmir (2019), a higher ratio indicates that funds tied up in stock are converted into cash more quickly, thereby improving liquidity, whereas a lower ratio indicates excessive stock accumulation. Lukna et al. (2024) emphasize that sound inventory management is essential to avoid high storage costs and the risk of inventory value depreciation. However, Hidayatullah et al. (2021) found that in industries with longer operating cycles, such as cement, inventory turnover does not always significantly affect liquidity, underscoring the importance of industry context.

g) Cash Turnover Ratio

The cash turnover ratio measures the efficiency of cash utilization in generating sales during a given period, calculated by dividing net sales by average cash. A higher ratio indicates more efficient use of cash to support revenue generation, positively affecting liquidity (Gill, 2019), whereas a low ratio indicates suboptimal cash use that may hinder timely payment of short-term obligations. Nasution et al. (2023) found that cash turnover has a positive and significant effect on liquidity, and Lukna et al. (2024) similarly found that efficient cash management is essential in maintaining financial stability, particularly in sectors with high working-capital requirements.

h) Profitability

Profitability is a firm's ability to generate profit from its operating activities, commonly measured by Return on Assets (ROA), the ratio of net income to total assets. Firms with high ROA tend to have sound financial conditions, stable cash flow, and stronger resilience to financial risk. Fatahillah et al. (2024) note that profitable firms possess greater financial flexibility because they can fund obligations from internal earnings without excessive reliance on debt, positioning profitability not only as a performance indicator but also as a buffer against liquidity deterioration.

i) Previous Research

Prior studies examining the determinants of liquidity report mixed findings. Fatahillah et al. (2024) found that DER and inventory turnover negatively and significantly affect liquidity in trading companies, while ROA has no significant effect. Hidayatullah et al. (2021, 2024) found that receivables and inventory turnover do not significantly affect liquidity in the cement subsector due to its long operating cycle. Lukna et al. (2024) and Nasution et al. (2023) found that cash turnover positively and significantly affects liquidity, a result echoed by Sari and Wirananda (2025), whereas Silvia et al. (2020) found that cash turnover negatively affects liquidity in a single-firm case study, indicating a possible cash-pressure effect from high operating activity. Rafli et al. (2024) found that current ratio and inventory turnover positively affect profitability, suggesting a reciprocal relationship between liquidity and earnings performance, which supports the relevance of profitability as a moderating variable. These inconsistent findings indicate a research gap regarding the effect of leverage, inventory turnover, and cash turnover on liquidity, motivating this study to incorporate profitability as a moderating variable to obtain a more comprehensive understanding of liquidity determinants in the transportation and logistics sector.

A. Research Framework

This study is developed based on a conceptual framework synthesizing research variables derived from the theories discussed previously. As stated by Helwig et al. (2021), these theories were systematically analyzed to provide an understanding of the relationships among the variables under study. Based on this framework, the study aims to examine the effect of leverage, inventory turnover ratio, and cash turnover ratio on liquidity, with profitability as a moderating variable, in transportation and logistics companies listed on the Indonesia Stock Exchange during the 2022–2025 period.

The framework posits that firm liquidity is influenced by financing policy and the efficiency of current asset management. Leverage reflects a firm's financing structure, which may affect its ability to meet short-term obligations, while inventory turnover and cash turnover ratios indicate the firm's effectiveness in managing working capital components. Profitability is positioned as a moderating variable, as it reflects a firm's ability to generate profit from its managed assets, thereby potentially strengthening or weakening the effect of leverage, inventory turnover, and cash turnover on firm liquidity.

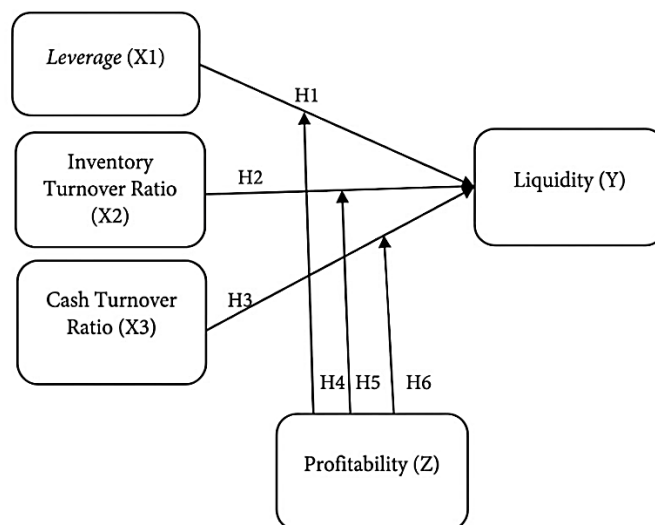


Figure 1. Research Framework

B. Hypothesis Development

H1: Leverage has a negative effect on liquidity in transportation and logistics companies.

H2: The inventory turnover ratio has a positive effect on liquidity in transportation and logistics companies.

H3: The cash turnover ratio has a positive effect on liquidity in transportation and logistics companies.

H4: Profitability moderates the effect of leverage on liquidity in transportation and logistics companies.

H5: Profitability moderates the effect of the inventory turnover ratio on liquidity in transportation and logistics companies.

H6: Profitability moderates the effect of the cash turnover ratio on liquidity in transportation and logistics companies.

Based on Agency Theory, Working Capital Theory, and Signaling Theory, high leverage increases financial risk and interest burden, reducing available cash for short-term obligations (Brigham & Houston, 2019; Fatahillah et al., 2024). Efficient inventory turnover accelerates the conversion of working capital into cash, supporting liquidity (Kasmir, 2019; Hidayatullah et al., 2021; Lukna et al., 2024). Efficient cash turnover reflects effective use of the most liquid asset in meeting obligations (Gill, 2019; Aiken et al., 2011; Riskiya et al., 2020). Profitability, as a moderating variable, is expected to strengthen or weaken these relationships because profitable firms possess greater internal financial flexibility, enabling them to manage the pressure of leverage and to better capitalize on operational efficiency (Fatahillah et al., 2024; Pratama & Andini, 2023; Sari & Nugroho, 2022; Rachmawati & Putri, 2021; Adi & Kurniawan, 2022; Amaliah & Darmawan, 2019).

METHOD

This study employs an associative quantitative design with a causal approach, using secondary data obtained from the annual financial statements of transportation and logistics companies listed on the Indonesia Stock Exchange (IDX) for the 2022–2025 period, accessed through www.idx.co.id and the respective companies' official websites.

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a) Operational Definition of Variables

Table 4. Operational Definition of Variables

Variable	Indicator	Formula	Scale
Liquidity (Y)	Current Ratio (CR)	Current Assets / Current Liabilities	Ratio
Leverage (X1)	Debt to Equity Ratio (DER)	Total Debt / Total Equity	Ratio
Inventory Turnover (X2)	Inventory Turnover Ratio (ITO)	Sales / Inventory	Ratio
Cash Turnover (X3)	Cash Turnover Ratio (CTO)	Net Sales / Average Cash	Ratio
Profitability (Z)	Return on Assets (ROA)	Net Income / Total Assets	Ratio

Source: Data processed by the researcher, 2025

b) Population and Sample

The population consists of all 39 transportation and logistics companies listed on the IDX during 2022–2025. Sampling was conducted using purposive sampling based on the following criteria: (1) companies consecutively listed on the IDX during 2022–2025; (2) companies that published complete annual financial statements during the period; and (3) companies that were delisted or had incomplete data during the period were excluded. Applying these criteria, 25 companies were selected, yielding 100 firm-year observations (25 companies × 4 years).

c) Data Collection and Analysis Technique

Data were collected through documentary study of published annual reports and financial statements, supplemented by library research from scientific journals and prior studies. Data were analyzed using quantitative panel-data regression processed with EViews 12 and Microsoft Excel. The analysis included descriptive statistics; classical assumption tests (normality via the Jarque–Bera test, multicollinearity via correlation coefficients below 0.80, and heteroskedasticity via the White test); panel-data regression comprising the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM); model-selection tests comprising the Chow test (CEM vs FEM) and the Hausman test (FEM vs REM); Moderated Regression Analysis (MRA) to test the moderating role of profitability using the model $Y = \alpha + \beta_1X + \beta_2Z + \beta_3(X \times Z) + \varepsilon$, where Y is liquidity (CR), X represents the independent variables (leverage, ITO, CTO), Z is the moderating variable (ROA), and $X \times Z$ is the interaction term; the coefficient of determination (R^2); and the F-test and t-test for simultaneous and partial significance, with a significance threshold of 0.05.

RESULTS AND DISCUSSION

A. Descriptive Statistics

Descriptive statistics for the 100 firm-year observations are presented in Table 5.

Table 5. Descriptive Statistics

Statistic	CR	DER	ITO	CTO	ROA
Mean	2.371.226	2.242.412	2.510.768	7.215.275	0.030414
Maximum	2.525.072	7.985.565	1.262.835	2.952.174	0.599300
Minimum	0.038560	-5.895.800	0.230329	0.230330	-0.502750
Std. Dev.	3.555.689	9.187.723	2.566.931	6.267.083	0.130648
Observations	100	100	100	100	100

On average, the sample firms recorded a CR of 2.37, indicating an ability to cover short-term obligations 2.37 times over with current assets. The mean DER of 2.24 indicates that debt usage generally exceeded equity, while the mean ITO of 25.11 times and mean CTO of 7.22 times reflect the operational and cash-management efficiency of the sector. The mean ROA of 0.030 (3.04%) indicates the sample firms' average profitability. The wide range in DER (from -5.90 to 79.86) and the relatively high standard deviations for DER, ITO, and CTO indicate considerable heterogeneity among the sampled companies.

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a) Panel Data Regression Model Selection

Three panel-data regression models were estimated: the Common Effect Model (CEM), the Fixed Effect Model (FEM), and the Random Effect Model (REM), summarized in Table 6.

Table 6. Panel Data Regression Estimation Results (CEM, FEM, REM)

Variable	CEM Coef.	CEM Prob.	FEM Coef.	FEM Prob.	REM Coef.	REM Prob.
C	0.978	0.031	1.491	0.024	1.002	0.038
DER	-0.407	0.000	-0.308	0.014	-0.389	0.000
ITO	0.096	0.000	0.082	0.000	0.096	0.000
CTO	-0.076	0.150	-0.132	0.033	-0.085	0.108
DER×ROA	-1.260	0.001	-0.916	0.020	-1.192	0.001
ITO×ROA	-0.428	0.000	-0.422	0.000	-0.434	0.000
CTO×ROA	1.043	0.015	1.440	0.005	1.116	0.009
R-squared	0.610	-	0.736	-	0.562	-

Model selection was conducted using the Chow test to compare CEM and FEM, and the Hausman test to compare FEM and REM.

Table 7. Chow Test and Hausman Test Results

Test	Statistic	d.f.	Probability	Decision
Chow (Cross-section Chi-square)	397.477	24	0.0228	FEM > CEM
Hausman (Cross-section random)	61.358	6	0.4082	REM > FEM

The Chow test produced a probability of 0.0228 (< 0.05), rejecting the null hypothesis and indicating that the Fixed Effect Model is more appropriate than the Common Effect Model. However, the subsequent Hausman test produced a probability of 0.4082 (> 0.05), failing to reject the null hypothesis and indicating that the Random Effect Model is more appropriate than the Fixed Effect Model. Accordingly, the Random Effect Model (REM), estimated using Generalized Least Squares (GLS), was selected as the final model for this study, which according to Gujarati (in Purwanti & Kurnia, 2024) already satisfies the Best Linear Unbiased Estimator (BLUE) property, resolving concerns regarding heteroskedasticity, multicollinearity, and autocorrelation.

b) Final Regression Model (Random Effect Model)

Table 8. Random Effect Model Regression Results

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	1.002	0.476	2.106	0.038
DER	-0.389	0.101	-3.841	0.000
ITO	0.096	0.012	7.742	0.000
CTO	-0.085	0.052	-1.623	0.108
DER × Profitability	-1.192	0.343	-3.475	0.001
ITO × Profitability	-0.434	0.080	-5.421	0.000
CTO × Profitability	1.116	0.416	2.684	0.009

R-squared = 0.562; Adjusted R-squared = 0.534; Wald chi2(6) = 19.97; Prob > chi2 = 0.0000. The resulting regression equation is:

$$CR = 1.002 - 0.389DER + 0.096ITO - 0.085CTO - 1.192(DER \times ROA) - 0.434(ITO \times ROA) + 1.116(CTO \times ROA)$$

The constant of 1.002 indicates the expected liquidity level when leverage, inventory turnover, cash turnover, and their interaction terms with profitability are zero. The DER coefficient of -0.389 indicates that a one-unit increase in leverage decreases liquidity by 0.389 units, holding other variables constant. The ITO coefficient of 0.096 indicates that a one-unit increase in inventory turnover increases liquidity by 0.096 units. The CTO coefficient of -0.085 is not statistically significant. The interaction coefficients indicate that profitability strengthens the negative effect of leverage on liquidity (-1.192), weakens the positive effect of inventory turnover on liquidity (-0.434), and strengthens the effect of cash turnover on liquidity (1.116).

c) Coefficient of Determination, F-Test, and t-Test

The R-squared value of 0.562 indicates that leverage, inventory turnover ratio, cash turnover ratio, and their interaction with profitability jointly explain 56.2% of the variation in liquidity, while the remaining 43.8% is explained by factors outside the model. The F-statistic (Wald $\chi^2 = 19.97$; Prob = 0.0000 < 0.05) indicates that the independent variables and their interaction terms jointly and significantly affect liquidity. The partial t-test (z-test) results show that: (1) leverage has a negative and significant effect on liquidity (coefficient = -0.389; $p = 0.000$); (2) the inventory turnover ratio has a positive and significant effect on liquidity (coefficient = 0.096; $p = 0.000$); (3) the cash turnover ratio has no significant effect on liquidity (coefficient = -0.085; $p = 0.108$); (4) profitability significantly moderates the effect of leverage on liquidity (coefficient = -1.192; $p = 0.001$); (5) profitability significantly moderates the effect of the inventory turnover ratio on liquidity (coefficient = -0.434; $p = 0.000$); and (6) profitability significantly moderates the effect of the cash turnover ratio on liquidity (coefficient = 1.116; $p = 0.009$).

d) The Effect of Leverage on Liquidity

Leverage, proxied by DER, has a negative and significant effect on liquidity (coefficient = -0.389; $p = 0.000 < 0.05$), so H1 is accepted. This finding is consistent with Fatahillah et al. (2024), Nasution et al. (2023), and Prasetya et al. (2022), who found that higher leverage burdens firms with greater interest and debt obligations, reducing the cash available to sustain current assets. As debt proportion increases, firms allocate more financial resources to meet obligations to creditors, thereby reducing their capacity to pay short-term debt. This underscores the importance of maintaining a balanced capital structure, since excessive reliance on debt, despite serving as a source of expansion funding, may increase financial risk and reduce liquidity.

e) The Effect of Inventory Turnover Ratio on Liquidity

The inventory turnover ratio has a positive and significant effect on liquidity (coefficient = 0.096; $p = 0.000 < 0.05$), so H2 is accepted, consistent with Hidayatullah et al. (2021), Lukna et al. (2024), and Baldacci et al. (2022). Faster inventory turnover accelerates the conversion of stock into sales and subsequently into cash, reflecting efficient working-capital management. Firms with a higher inventory turnover tend to maintain better liquidity, because rapid inventory sales accelerate cash inflows, whereas slow-moving stock traps funds in inventory and reduces the ability to meet current obligations.

f) The Effect of Cash Turnover Ratio on Liquidity

The cash turnover ratio has a coefficient of -0.085 with $p = 0.108 (> 0.05)$, indicating no significant effect on liquidity; thus H3 is rejected. This finding is consistent with Firdaus and Rivandi (2023) and Meidyawan and Prasetyo (2022), who likewise found no significant effect of cash turnover on liquidity. A high cash turnover does not necessarily indicate strong liquidity, since cash generated from operations is often immediately reused to finance production costs, marketing, salaries, and other operating expenses, reducing the cash available to meet short-term obligations. Conversely, low cash turnover may leave more cash available for debt repayment. Liquidity is also influenced by other current-asset components such as receivables and inventory, not solely by cash, which may explain why cash turnover alone does not significantly determine the Current Ratio in this sector.

g) Profitability as a Moderator of the Leverage–Liquidity Relationship

The interaction between leverage and profitability has a coefficient of -1.192 with $p = 0.001 (< 0.05)$, indicating that profitability significantly moderates the effect of leverage on liquidity, strengthening its negative direction; H4 is accepted. This suggests that highly profitable firms tend to be more aggressive in utilizing debt to finance expansion, since strong earnings provide the confidence and capacity to take on further obligations. Consequently, as profitability rises, the additional obligations arising from greater debt utilization exert a stronger

negative effect on the firm's ability to meet short-term obligations. Rather than mitigating the negative impact of leverage, profitability in this context amplifies it, implying that even profitable firms must manage their debt utilization prudently to avoid future liquidity deterioration.

h) Profitability as a Moderator of the Inventory Turnover–Liquidity Relationship

The interaction between inventory turnover ratio and profitability has a coefficient of -0.434 with $p = 0.000$ (< 0.05), indicating that profitability significantly moderates the effect of the inventory turnover ratio on liquidity, weakening its positive direction; H5 is accepted. Firms with high profitability tend to have larger and more reliable internal funding sources, allowing them to meet operational needs and short-term obligations without relying heavily on the speed of inventory turnover. Consequently, the contribution of inventory turnover toward liquidity becomes relatively smaller for firms that already generate strong profits, since profit itself functions as an alternative internal funding source that reduces dependence on inventory efficiency to sustain liquidity.

i) Profitability as a Moderator of the Cash Turnover–Liquidity Relationship

The interaction between cash turnover ratio and profitability has a coefficient of 1.116 with $p = 0.009$ (< 0.05), indicating that profitability significantly moderates the effect of the cash turnover ratio on liquidity, strengthening its positive direction; H6 is accepted. Profitable firms typically possess more effective financial-management systems, enabling more efficient use of cash in operational activities while maintaining an appropriate balance between operational cash use and the availability of funds for short-term obligations. As profitability increases, the effectiveness of cash utilization contributes more strongly to improved liquidity, indicating that profitability enhances the benefit of efficient cash management for a firm's liquidity condition.

CONCLUSION

Based on the analysis of 100 firm-year observations from 25 transportation and logistics companies listed on the Indonesia Stock Exchange during 2022–2025, the following conclusions are drawn: (1) leverage has a negative and significant effect on liquidity a higher leverage level corresponds to lower liquidity; (2) the inventory turnover ratio has a positive and significant effect on liquidity a higher inventory turnover corresponds to higher liquidity; (3) the cash turnover ratio has no significant effect on liquidity, regardless of its level; (4) profitability significantly moderates the effect of leverage on liquidity by strengthening its negative direction; (5) profitability significantly moderates the effect of the inventory turnover ratio on liquidity by weakening its positive direction; and (6) profitability significantly moderates the effect of the cash turnover ratio on liquidity by strengthening its effect.

This study is limited to transportation and logistics companies listed on the IDX during 2022–2025, uses purposive sampling based on predetermined criteria, examines only leverage, inventory turnover ratio, and cash turnover ratio with profitability as a moderating variable, and draws on a still-limited body of literature examining profitability as a moderator of these relationships in this sector. Future research is encouraged to extend the analysis to other sectors and longer observation periods, incorporate additional variables such as receivables turnover, firm size, sales growth, or operating cash flow, and consider alternative moderating variables or activity ratios more suited to the characteristics of the transportation and logistics industry.

Theoretically, this study contributes to the understanding of the determinants of liquidity and the moderating role of profitability. Practically, the findings offer guidance for corporate management in balancing debt, inventory, and cash policies to preserve liquidity; for investors, in evaluating leverage, profitability, and liquidity conditions prior to investment decisions; and for creditors, in assessing a firm's capacity to meet short-term obligations before extending financing.

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