

# Working Capital, Cash Generation, and Profitability: The Role of Leverage in Indonesian Consumer Noncyclical Firms

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**Abstract.** This study examines the associations of the cash conversion cycle (CCC), sales growth, operating cash flow, and leverage with profitability, including leverage as a moderator, in Indonesian consumer noncyclical firms. From an initial population of 133 firms, purposive screening yields a balanced panel of 79 listed firms and 395 firm-year observations for 2021–2025. Firm fixed-effects regressions are estimated in a baseline model and a nested CCC–leverage interaction model. In the baseline model, CCC is not statistically associated with return on assets (ROA;  $p = 0.7071$ ), while sales growth ( $p = 0.0177$ ) and operating cash flow scaled by assets ( $p = 0.0010$ ) have positive associations and the debt-to-assets ratio has a negative association ( $p < 0.0001$ ). In the interaction model, the  $CCC \times \text{leverage}$  coefficient is positive but statistically insignificant ( $b = 0.000129$ ;  $p = 0.4337$ ), contrary to the hypothesized negative interaction. The nested-model partial F test agrees with the squared interaction t statistic within rounding precision. Sales growth and operating cash flow are no longer significant when the interaction is included. The findings do not support an independent linear CCC association or leverage moderation in this sample. Conclusions are limited by conventional standard errors, extreme financial ratios, possible accounting-measurement overlap, and omitted calendar-year effects.

**Keywords:** Cash conversion cycle, Sales growth, Operating cash flow, Leverage, Profitability, Panel data.

## 1 Introduction

Consumer noncyclical firms make recurring working capital decisions when purchasing inventories, extending credit to customers, and setting payment schedules for suppliers. Demand for essential goods does not eliminate the need to finance these activities. Earnings may increase alongside the amount of funds tied up in inventories and receivables. Profitability therefore needs to be examined together with the speed of cash circulation and the structure of corporate financing.

The cash conversion cycle (CCC) combines the receivables collection period, inventory holding period, and trade payables payment period. It integrates information from the statement of financial position and operating activities into a measure of time.

Richards and Laughlin [1] developed a cash cycle approach to liquidity analysis based on the relationships among operating accounts. A longer cycle can increase financing needs, while inventories and customer credit can also support sales. The direction of the relationship between CCC and earnings thus requires empirical examination.

Cross-country evidence indicates a predominantly negative relationship between CCC and firm performance. Kiymaz et al. [2] examine firms in developed and emerging economies, while Johan et al. [3] investigate the BRICS context. The meta-analysis by Jaworski and Czerwonka [4], covering 43 studies, identifies a dominant negative relationship whose strength varies with economic and institutional conditions. This literature supports a negative hypothesis while indicating that firm conditions can limit the uniform application of previous findings.

In Indonesia, Hendrani and Rasyid [5] find that cash flow is significant in explaining financial performance, whereas CCC, sales growth, liquidity, and leverage are not significant. Prasetya and Setyawan [6] report significant negative associations of CCC and the payables payment period with ROA among consumer noncyclical firms over 2021–2024. These differences are relevant because the estimated CCC relationship may vary across performance measures, periods, samples, and financing conditions.

Sales growth and operating cash flow provide information distinct from CCC. Sales growth captures changes in the scale of business activities, whereas operating cash flow measures the net cash generated by core operations. Expanding sales can improve fixed-cost absorption, but the benefit depends on margins and working capital requirements. Setiawan and Sha [7] find a significant positive association between sales growth and profitability and a significant negative association between leverage and profitability. Hendrani and Rasyid [5] reinforce the relevance of cash flow information, although their findings do not necessarily extend to every sector.

Leverage warrants examination because an identical CCC can have different implications for firms with different liability proportions. Myers and Majluf [8] explain firms' preference for internal financing under information asymmetry. Cash tied up in operating activities may increase external financing requirements. Nevertheless, DAR includes all liabilities, including trade payables, which also enter the CCC calculation. DAR therefore captures more than interest-bearing borrowing, and its interaction with CCC may partly reflect supplier financing of operations.

The 2021–2025 window covers the transition from pandemic disruption to a subsequent period of supply-chain and financing adjustment. Such events could jointly affect inventory accumulation, payment terms, demand, interest exposure, and profitability. Annual indicators cannot distinguish these common shocks from firm-specific changes unless calendar-year variation is explicitly considered. The absence of year effects in the original specifications is therefore pertinent to the interpretation of the reported coefficients [9], [10].

An unresolved gap is whether leverage alters the relation between operating cash tied up in the CCC and asset profitability once sales expansion, operating cash generation, and firm scale are considered together. Existing evidence differs across countries and accounting definitions: a predominantly negative CCC relation in cross-country studies [2]–[4] contrasts with mixed Indonesian results [5], [6]. In addition, total-liability leverage (DAR) is broader than interest-bearing borrowing because it incorporates

operating payables, which can mechanically interact with CCC through the DPO component.

This study examines (i) the associations of CCC, sales growth, operating cash flow, and leverage with ROA and (ii) whether leverage conditions the CCC–ROA association. The analysis combines working-capital and financing measures in a balanced firm-level panel and compares directly nested fixed-effects specifications. The interaction test is interpreted jointly with model fit and conditional-effect definitions.

The empirical fixed-effects results show no statistically significant baseline CCC association, positive baseline associations of sales growth and operating cash flow, and a negative association of leverage with ROA. The estimated  $CCC \times DAR$  coefficient is positive but not significant and therefore does not support H5. These results are interpreted as associations, subject to conventional standard errors, variation in accounting practices, and exceptionally large firm-year observations.

## **2 Theoretical Background and Hypothesis Development**

### **2.1 Resource Management, Liquidity, and Financing Choices**

The resource-based view links organizational capabilities for managing resources to firm performance [11]. Cash, inventories, receivables, and operating assets are treated here as resources whose use requires coordination. Inventory management and receivables collection can reduce idle funds while maintaining sales continuity. However, financial ratios do not directly measure capabilities that are valuable, rare, difficult to imitate, and difficult to substitute. The theory therefore provides an explanatory perspective on efficiency; CCC is not a direct measure of those capabilities.

Pecking order theory explains financing choices when managers and investors possess different information. Internal funds can reduce the need to issue securities that are subject to information-related financing costs [8]. In working capital management, operating cash can support inventory and receivables requirements, whereas reduced cash availability can increase reliance on external financing. Wirianata and Wijoyo [12] find an association between profitability and capital structure in Indonesia. Their findings highlight the possibility of a bidirectional relationship between leverage and profitability, without directly establishing leverage moderation of the CCC relationship.

Together, these perspectives justify examining operating information and financing information within the same framework. Asset efficiency depends on the commercial benefits of working capital investment and the consequences of its financing, as well as the length of the cash conversion period. Given the observational design, the theories guide hypothesis development and the interpretation of associations. The regression results are not treated as causal identification that rules out all alternative mechanisms.

In this application, resource-based view is used as a broad organizing lens for the coordination of receivables, inventory, supplier terms, and operating cash rather than as an empirical test of firm-specific VRIO capabilities [11]. Pecking order theory distinguishes financing preferences under asymmetric information [8], but the total-liabilities-to-assets ratio does not separate bank loans and bonds from spontaneous trade

credit. Consequently, interpreting a negative DAR coefficient as evidence of interest-cost pressure alone would exceed the identifying information in the accounting measure.

The accounting identities are economically important. Trade payables reduce CCC through DPO and simultaneously enter total liabilities in DAR; similarly, ROA and CFOA use the same average-assets denominator. These features may yield associations that reflect common accounting construction in addition to operating choices. No causal mechanism can be isolated without alternative definitions and temporal separation of explanatory variables.

## 2.2 Cash Conversion Cycle and Profitability

A longer CCC indicates that cash receipts occur later relative to the formation of inventories and receivables, after allowing for payments to suppliers. Funds tied up in these accounts can generate storage costs, impairment risk, and financing requirements. If additional working capital investment fails to produce adequate margins, ROA may decline. Kiyamaz et al. [2], Johan et al. [3], and Prasetya and Setyawan [6] provide evidence relevant to this expected negative relationship.

Conversely, maintaining inventories and offering customer credit can support sales. Kukeli et al. [13] report a nonlinear CCC–profitability relationship, indicating that an increase or decrease in CCC may have different implications at different initial levels. Following the original research design, this study tests a negative linear hypothesis. Nonlinearity is considered an alternative explanation requiring additional testing, rather than a finding established by this study.

The sign of the linear relationship is not predetermined across all operating conditions. Under stable demand, shorter receivables and inventory periods release liquidity; under volatile demand, preserving inventories or granting customer credit can protect sales. Evidence of nonlinearity [13] means that a single linear coefficient can average heterogeneous slopes and may be misleading at extreme CCC values. The present H1 remains a directional prediction, not a statement that every reduction in CCC is beneficial.

**H1: The cash conversion cycle is negatively associated with profitability.**

## 2.3 Sales Growth and Profitability

Sales growth can improve capacity utilization and spread fixed costs over a larger volume of output. When margins and asset efficiency are maintained, additional sales increase earnings relative to assets. This relationship does not necessarily hold when expansion involves substantial discounts, distribution costs, or uncollectible receivables. The positive hypothesis reflects the expectation that the benefits of growth exceed its incremental costs.

Setiawan and Sha [7] identify a significant positive association between sales growth and profitability. Their result provides empirical support, while the insignificant result in Hendrani and Rasyid [5] indicates that the relationship needs to be examined within

the specific sample context. Because SG is calculated relative to the previous year's sales, exceptionally high growth may also reflect a low initial sales base. Interpretation must therefore consider the distribution of SG as well as its mean.

The growth measure scales annual sales changes by the preceding sales level; therefore, unusually high values can arise when the denominator is small, when business combinations expand sales, or when classifications change. Financial-statement verification and outlier-sensitive regressions are necessary before interpreting the average magnitude as typical.

**H2: Sales growth is positively associated with profitability.**

## 2.4 Operating Cash Flow and Profitability

Higher operating cash flow provides funds for core activities and can reduce reliance on external financing. Assets' cash-generating capacity may be associated with earnings through production continuity, supplier payments, and the management of financing requirements. Hendrani and Rasyid [5] find cash flow significant in explaining financial performance. Their evidence supports examining operating cash flow scaled by assets alongside accrual-based earnings measures.

The CFOA–ROA relationship also requires careful interpretation. Both ratios use average assets as a denominator, and operating cash flow is linked to earnings through accrual adjustments and changes in working capital. A positive coefficient may reflect their common operating basis as well as the benefits of internal funding. The statistical significance of CFOA alone does not establish that an exogenous increase in operating cash flow causes an increase in earnings.

CFOA and ROA should be interpreted as contemporaneous outcomes of related operating processes, not independent measures of the same causal channel. Negative CFOA may occur even alongside positive accrual profits when inventory or receivables expand; alternatively, temporarily positive cash flow can reflect the release of working capital. The hypothesis addresses association after model adjustment, rather than the causal effect of cash-flow growth.

**H3: Operating cash flow is positively associated with profitability.**

## 2.5 Leverage and Profitability

A higher liability proportion may be associated with lower profitability when firms face substantial financing costs or repayment pressure. Setiawan and Sha [7] report a significant negative leverage–profitability association. However, DAR in this study is defined as total liabilities divided by total assets. An increase in DAR does not necessarily imply an increase in interest-bearing borrowing because operating liabilities are also included in the numerator.

A negative association can also arise when low earnings reduce accumulated equity and thereby increase the liability proportion. The findings of Wirianata and Wijoyo [12] on profitability and capital structure indicate that the direction of the relationship cannot be established from a contemporaneous regression alone. The following hypothesis

tests the sign expected in the original design while recognizing that endogeneity has not been fully addressed.

Separate ratios of short-term and long-term interest-bearing debt to assets are conceptually preferable for isolating borrowing-cost explanations. Their absence means the tested DAR ratio encompasses operating as well as financial obligations. Firms with DAR above one may have negative equity and materially different risk profiles; pooling them with solvent firms requires explicit sensitivity analysis.

**H4: Leverage is negatively associated with profitability.**

## 2.6 Leverage as a Moderator

High leverage is expected to increase financing pressure when cash remains tied up in inventories and receivables for an extended period. Firms must sustain operations while meeting obligations, potentially making additional CCC days more detrimental to profitability at higher leverage levels. This expectation develops an internal and external financing mechanism and is distinct from the direct DAR association.

Recent literature treats financing conditions as part of the working capital–performance relationship. Silva and Silva [14] examine financial constraints in the relationship between working capital management and profitability. Financial constraints differ from DAR; their work supports a conditional specification but does not determine the sign of the CCC–DAR interaction in Indonesia. The negative H5 prediction is maintained as an ex ante test rather than revised to match the observed coefficient.

If the cost or availability of external finance rises with leverage, extra cash days may be more costly at higher DAR; this implies a negative interaction. Conversely, if longer supplier terms are an important source of operating finance, the measured combination of CCC and DAR can change mechanically without higher borrowing costs. These explanations are competing hypotheses about economic mechanisms rather than interchangeable interpretations of the same coefficient. A positive coefficient would contradict H5 and would not support reversing the hypothesis after inspecting results.

**H5: Leverage strengthens the negative association between the cash conversion cycle and profitability, as indicated by a negative interaction coefficient.**

Figure 1 illustrates the direct associations (H1–H4) and the proposed leverage interaction (H5). Firm size is included as a control variable. The paths express testable hypotheses rather than causal effects.

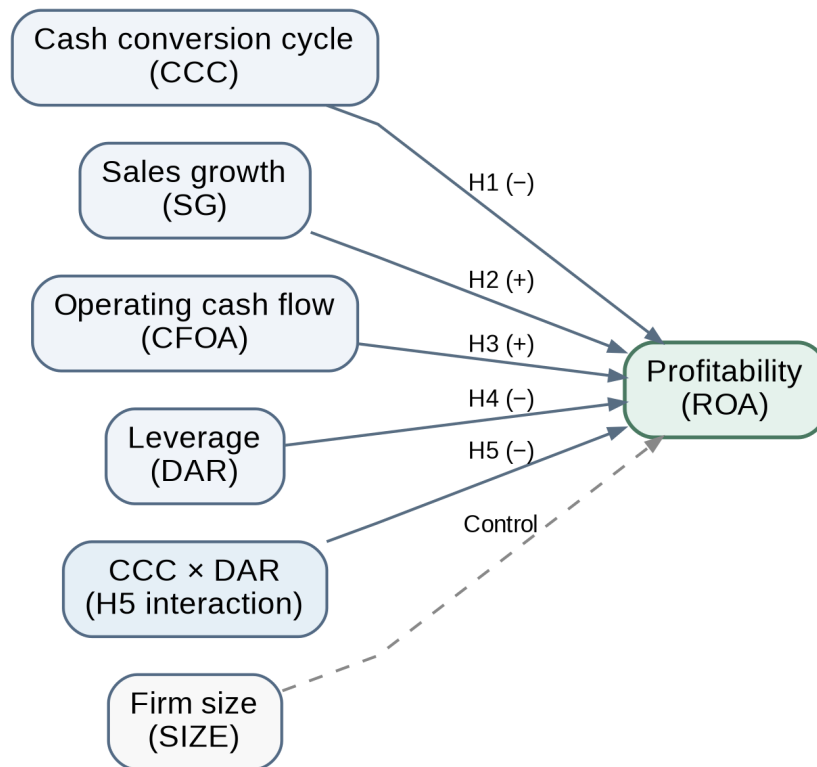


Fig. 1. Conceptual model showing hypothesized relationships; SIZE is included as a control variable.

### 3 Research Methods

#### 3.1 Research Design, Data Sources, and Sample

The study uses a quantitative panel design for consumer noncyclical firms listed on the Indonesia Stock Exchange (IDX) over 2021–2025. Secondary data are obtained from audited annual financial statements and annual reports available through the IDX and firms' official websites. Information for 2020 supplies opening balance-sheet amounts and the sales base for calculating 2021 growth. The unit of analysis is the firm-year.

Purposive sampling was applied sequentially to 133 consumer noncyclical companies in the initial IDX population. First, 47 companies conducting their initial public offerings after 2020 were excluded to establish eligibility for the 2021–2025 observation window and the required 2020 base data. Among the remaining 86 companies, seven were excluded because their financial information was incomplete for constructing the study variables. The final balanced panel contains 79 firms, each observed for

five years, resulting in 395 firm-year observations ( $79 \times 5$ ). Table 1 presents the complete selection arithmetic.

Table 1. Sample selection and firm-year observations

| Component                                              | Number / study information         |
|--------------------------------------------------------|------------------------------------|
| Initial population: IDX consumer noncyclical companies | 133 firms                          |
| Less: firms with IPO after 2020                        | (47 firms)                         |
| Subtotal: firms meeting the IPO-date criterion         | 86 firms                           |
| Less: firms with incomplete financial data             | (7 firms)                          |
| Final sample of companies                              | 79 firms                           |
| Observation period                                     | 2021–2025                          |
| Observations per company                               | 5 years                            |
| Final firm-year observations                           | 395 (79 firms $\times$ 5 years)    |
| Base financial year for 2021 computations              | 2020                               |
| Sampling approach                                      | Purposive sampling; balanced panel |

Financial statements for 2020 provide opening balances for 2021 and the sales base for the first annual growth rate. Financial ratios use monetary amounts consistently within each firm-year. SIZE, defined as the logarithm of year-end total assets, is sensitive to reporting currency and monetary scale. All monetary figures are expressed in consistent Indonesian Rupiah (IDR) units prior to taking the natural logarithm of year-end total assets (SIZE) to ensure cross-firm comparability across the panel.

Restricting the sample to firms eligible for all five observation years excludes newer listings and companies with incomplete information. This may introduce selection and survivorship biases, while the consumer noncyclical sector also encompasses heterogeneous business models. Accordingly, the findings describe the balanced analytical sample, not every company in the IDX sector over the study period.

### 3.2 Variables and Accounting Definitions

Table 2. Variables, definitions, and analytical units

| Code | Operational definition                                                          | Unit  |
|------|---------------------------------------------------------------------------------|-------|
| ROA  | Net income after tax / average total assets                                     | ratio |
| CCC  | Days sales outstanding + days inventory outstanding – days payables outstanding | days  |
| DSO  | Average trade receivables / net sales $\times$ 365                              | days  |
| DIO  | Average inventory / cost of goods sold $\times$ 365                             | days  |
| DPO  | Average trade payables / cost of goods sold $\times$ 365                        | days  |

| Code | Operational definition                                         | Unit  |
|------|----------------------------------------------------------------|-------|
| SG   | $(\text{Sales}(t) - \text{Sales}(t-1)) / \text{Sales}(t-1)$    | ratio |
| CFOA | Net cash flow from operating activities / average total assets | ratio |
| DAR  | Total liabilities / year-end total assets                      | ratio |
| SIZE | Natural log of year-end assets (recorded monetary unit)        | log   |
| INT  | $(\text{CCC} - 83.27267) \times (\text{DAR} - 0.508492)$       | days  |

Average balance-sheet amounts refer to the arithmetic mean of the opening and closing annual balances. The CCC follows the operating-duration identity developed by Richards and Laughlin [1]. Where sales on credit and annual credit purchases are not disclosed separately, net or total sales and cost of goods sold (COGS) are used as proxies in DSO and DPO. These are approximations, not estimates of actual credit sales or purchases. Changes in inventory, production mix, taxes, and credit terms can produce systematic measurement error. Alternative proxies would be needed to evaluate sensitivity to these assumptions.

The ratios have different asset conventions for defensible accounting reasons: ROA and CFOA scale flows by average assets, whereas the source DAR records obligations relative to year-end assets. This does not make the variables identical or directly comparable. For sensitivity analysis, DAR can be reconstructed using average assets, and interest-bearing debt can be measured separately from trade payables. Any alternative definition would require re-extraction from the original statements.

The sample means used to construct the interaction are  $\text{CCC} = 83.27267$  days and  $\text{DAR} = 0.508492$ . The product term  $\text{INT} = (\text{CCC} - 83.27267) \times (\text{DAR} - 0.508492)$  uses mean centering. Centering establishes economically interpretable reference values for the two direct coefficients without eliminating all multicollinearity, accounting overlap, or endogeneity. The EViews variable  $\text{CCC\_X\_DAR}$  is referred to as INT throughout the article; its construction needs to be retained unchanged when reproducing the models.

### 3.3 Panel Specification and Estimation

The baseline specification estimates direct contemporaneous associations using firm fixed effects:

$$\text{ROA}_{it} = \alpha + \mu_i + \beta_1 \text{CCC}_{it} + \beta_2 \text{SG}_{it} + \beta_3 \text{CFOA}_{it} + \beta_4 \text{DAR}_{it} + \beta_5 \text{SIZE}_{it} + \epsilon_{it}(1)$$

The moderation specification adds one explanatory term, INT, while maintaining the direct effects and firm intercepts:

$$\text{ROA}_{it} = \alpha + \mu_i + \gamma_1 \text{CCC}_{it} + \gamma_2 \text{SG}_{it} + \gamma_3 \text{CFOA}_{it} + \gamma_4 \text{DAR}_{it} + \gamma_5 \text{SIZE}_{it} + \gamma_6 \text{INT}_{it} + \epsilon_{it}(2)$$

The subscript  $i$  identifies companies and  $t$  identifies years;  $\mu_i$  represents company-specific, time-invariant effects and  $\epsilon_{it}$  is the firm-year error. Company effects are estimated through the within transformation or equivalent company indicators. The empirical EViews estimates use cross-section (firm) fixed effects, without calendar-year fixed effects or a cluster-robust covariance estimator. The associated p-values are

therefore conventional panel least-squares inference, not firm-cluster-robust significance tests [9], [10], [15].

In the moderation specification,  $\gamma_1$  is the CCC slope evaluated at mean DAR and  $\gamma_4$  is the DAR slope evaluated at mean CCC; neither is a universal marginal effect. The constant is tied to the omitted reference firm and the specified values of the covariates. For SIZE, a 1% rise in assets corresponds approximately to a 0.01-unit rise in log assets, not a one-unit change in assets.

In Model 2, the conditional CCC slope at leverage level  $d$  is  $\gamma_1 + \gamma_6(d - 0.508492)$ . Statistical significance of the conditional slope, as distinct from the interaction coefficient, requires  $\text{Var}(\gamma_1)$ ,  $\text{Var}(\gamma_6)$ , and  $\text{Cov}(\gamma_1, \gamma_6)$  from the same estimated covariance matrix:

$$\text{SE}[\text{slope}(d)] = \sqrt{\text{Var}(\gamma_1) + \delta^2 \text{Var}(\gamma_6) + 2\delta \text{Cov}(\gamma_1, \gamma_6)}(3)$$

Because the estimated interaction coefficient is statistically indistinguishable from zero, H5 is evaluated directly through the interaction test and nested partial F test rather than simple-slope confidence bands [16].

### 3.4 Estimation Strategy and Sensitivity Considerations

Chow tests compare pooled intercepts with firm fixed effects, and Hausman tests compare the fixed- and random-effects specifications subject to their assumptions. With 395 firm-year observations, 79 company effects and five explanatory slopes, Model 1 has 311 residual degrees of freedom; Model 2 has 310 residual degrees of freedom after adding INT. The empirical EViews Chow tests have matching denominator degrees of freedom (78, 311) and (78, 310), respectively [9].

The same 395 firm-years and firm fixed effects are reported in both models. Adding INT lowers the residual sum of squares from 1.077010 to 1.074879. The resulting nested-model partial F statistic is approximately 0.61459 ( $p \approx 0.4337$ ), which agrees, to reported rounding, with the squared conventional t statistic of the interaction ( $0.783927^2 \approx 0.61454$ ). Accordingly, the Model 2 estimation supports a coherent finding of no statistically significant interaction at the 5% level.

The two firm fixed-effects models are interpreted using the reported conventional standard errors. Model selection does not itself correct for within-company error dependence, groupwise heteroskedasticity, or common annual shocks. Firm-clustered covariance estimation and year fixed effects are priority robustness extensions, but they are not claimed as completed analyses here [9], [10], [15], [17].

Extremely low CCC values, very high SG, and DAR above one warrant checks against the originating statements. Useful sensitivity specifications include separate DSO, DIO and DPO regressors, interest-bearing debt rather than total liabilities, non-linear CCC, outlier treatments defined before estimation, and checks by sub-industry. No estimates from these alternative designs are included in the empirical EViews output; the implications are discussed as limitations rather than empirical results [18].

## 4 Results

### 4.1 Descriptive Patterns and Extreme Values

Table 3. Descriptive statistics (395 firm-years; ratio variables in decimal units)

| Variable | Mean      | Median    | Min       | Max      | SD       |
|----------|-----------|-----------|-----------|----------|----------|
| ROA      | 0.043634  | 0.048428  | -0.581333 | 0.423761 | 0.116199 |
| CCC      | 83.2727   | 61.6760   | -1470.142 | 763.6457 | 133.5131 |
| SG       | 0.166895  | 0.067635  | -0.886697 | 14.63960 | 0.894646 |
| CFOA     | 0.076930  | 0.076559  | -0.487947 | 0.543645 | 0.113716 |
| DAR      | 0.508492  | 0.460360  | 0.065197  | 2.731376 | 0.334724 |
| SIZE     | 28.79289  | 28.79856  | 24.56828  | 33.01543 | 1.718569 |
| INT      | -10.43085 | -1.079279 | -447.2689 | 73.79038 | 40.27415 |

The average ROA is 4.36%, but individual observations range from -58.13% to 42.38%. The median CCC is 61.68 days, well below the mean of 83.27 days, and a negative CCC may occur if trade payables financing exceeds the aggregate collection and inventory periods. The minimum of -1,470.14 days is unusually large in magnitude, however, and could also reflect very small COGS, classification errors, or abnormal trading conditions. It cannot safely be ascribed to supplier-financing strategy before checking the constituent DSO, DIO, DPO values against the statements.

Average annual SG is 16.69% versus a median of 6.76%; the maximum SG of 14.63960 represents approximately 1,463.96% growth, potentially due to a low prior-year revenue denominator. DAR peaks at 2.731376, implying liabilities more than 273% of assets under the reported definitions. Such firms may have severely negative equity, and the substantive and numerical influence of those observations must be verified. CCC and SG kurtosis values of 54.10 and 184.67 suggest substantial tail mass. Non-normal raw predictors alone do not prove non-normal residuals, but the extreme data reinforce the case for influence diagnostics and robust uncertainty estimates.

### 4.2 Estimator Selection and Reported Diagnostics

Table 4. Panel estimator selection for Model 1 and Model 2

| Test             | Model 1            | Model 2            | Interpretation                   |
|------------------|--------------------|--------------------|----------------------------------|
| Chow F           | 6.248368 (78, 311) | 6.237235 (78, 310) | p < 0.0001 in both models        |
| Chow $\chi^2$    | 372.399120         | 372.745821         | Reject pooled company intercepts |
| Hausman $\chi^2$ | 97.718627 (df = 5) | 97.922255 (df = 6) | p < 0.0001 in both models        |
| Selected model   | Firm fixed effects | Firm fixed effects | Cross-section fixed effects      |

The Chow tests reject pooled company intercepts for Model 1 and Model 2. The empirical Hausman tests also reject the tested random-effects alternatives; firm fixed effects are therefore used in both reported regressions. Model selection does not, however, establish robust standard errors or control macroeconomic shocks common to companies.

Table 5. Reported model diagnostics (not panel-robust inference)

| Diagnostic                          | Model 1     | Model 2     |
|-------------------------------------|-------------|-------------|
| Centered VIF, range                 | 1.127–1.737 | 1.130–2.424 |
| Minimum predictor p in Glejser test | 0.4509      | 0.0843      |
| Residual Jarque–Bera p              | 0.062999    | 0.112699    |
| Durbin–Watson statistic             | 1.940296    | 1.940672    |

The reported centered VIF ranges are below common warning thresholds, but this does not preclude mechanical overlap between accounting ratios. Neither individual Glejser p-values nor Durbin–Watson statistics establish the absence of all panel heteroskedasticity and serial dependence. The Jarque–Bera tests reported for model residuals do not imply normality of the raw CCC and SG distributions. Panel-specific residual dependence tests and clustered covariance estimates remain outstanding.

#### 4.3 Baseline Firm Fixed-Effects Estimates

Table 6. Model 1: baseline firm fixed-effects estimates (conventional SE)

| Regressor | Coefficient $\beta$ | SE        | p-value  |
|-----------|---------------------|-----------|----------|
| CCC       | −0.0000125          | 0.0000332 | 0.7071   |
| SG        | 0.011212            | 0.004700  | 0.0177   |
| CFOA      | 0.058763            | 0.017723  | 0.0010   |
| DAR       | −0.127540           | 0.018772  | < 0.0001 |
| SIZE      | 0.026863            | 0.006637  | 0.0001   |
| Intercept | −0.670334           | 0.190814  | 0.0005   |

In Model 1, CCC has a small negative coefficient ( $b = -0.0000125$ ;  $p = 0.7071$ ), providing no statistical support for H1. SG ( $b = 0.011212$ ;  $p = 0.0177$ ) and CFOA ( $b = 0.058763$ ;  $p = 0.0010$ ) are positively associated with ROA, supporting H2 and H3 under conventional standard errors. The DAR coefficient is negative ( $b = -0.127540$ ;  $p < 0.0001$ ), consistent with H4. SIZE is positive ( $b = 0.026863$ ;  $p = 0.0001$ ).

In magnitude, a 0.10 increase in SG corresponds to a 0.112 percentage-point difference in ROA; the same change in CFOA corresponds to a 0.588 percentage-point difference in ROA; and a 0.10 change in DAR corresponds to a 1.275-percentage-point lower ROA, conditional on covariates. Since SIZE is logged, a 1% increase in year-end assets is associated with approximately 0.0269 percentage points higher ROA at the point estimate, without implying causality.

#### 4.4 Moderation Model: Direct Effects and Interaction

Table 7. Model 2: firm fixed-effects estimates with CCC  $\times$  DAR (conventional SE)

| Regressor              | Coefficient $\gamma$ | SE        | t-statistic | p-value  |
|------------------------|----------------------|-----------|-------------|----------|
| CCC                    | -0.0000150           | 0.0000636 | -0.236734   | 0.8130   |
| SG                     | 0.010060             | 0.007138  | 1.409302    | 0.1597   |
| CFOA                   | 0.009818             | 0.048208  | 0.203662    | 0.8388   |
| DAR                    | -0.155487            | 0.029644  | -5.245065   | < 0.0001 |
| SIZE                   | 0.035500             | 0.017607  | 2.016269    | 0.0446   |
| INT (CCC $\times$ DAR) | 0.000129             | 0.000164  | 0.783927    | 0.4337   |
| Intercept              | -0.899289            | 0.510615  | -1.761187   | 0.0792   |

Note: INT is the mean-centered CCC  $\times$  DAR term. Coefficients are shown with precision sufficient to read the very small CCC slopes; the full EViews t statistics and p-values govern inference. All standard errors are conventional panel least-squares standard errors; the specification includes firm, but not year, fixed effects.

Model 2 estimates a positive but statistically insignificant interaction ( $\gamma_6 = 0.000129$ ;  $t = 0.783927$ ;  $p = 0.4337$ ), in the opposite direction to H5. SG and CFOA are not individually significant in Model 2 ( $p = 0.1597$  and  $0.8388$ , respectively), unlike the baseline estimates. DAR remains negative and significant ( $\gamma_4 = -0.155487$ ;  $p < 0.0001$ ). The direct CCC coefficient in the moderation model is a conditional slope at the mean DAR, not an unconditional effect.

Table 8. Model fit for the two nested firm fixed-effects models

| Statistic                               | Model 1  | Model 2  |
|-----------------------------------------|----------|----------|
| R <sup>2</sup> (including firm effects) | 0.797549 | 0.797950 |
| Adjusted R <sup>2</sup>                 | 0.743519 | 0.743200 |
| Residual sum of squares                 | 1.077010 | 1.074879 |
| Overall F (including firm effects)      | 14.76114 | 14.57465 |
| Overall model F p-value                 | < 0.0001 | < 0.0001 |
| Observations                            | 395      | 395      |

The nested regressions explain similar overall variation. R<sup>2</sup> rises only from 0.797549 to 0.797950 when INT is added, and adjusted R<sup>2</sup> falls from 0.743519 to 0.743200. This pattern accords with the statistically insignificant increment from INT. Both R<sup>2</sup> and the reported overall model F statistics incorporate company intercepts; they do not, by themselves, measure the incremental explanatory contribution of the working-capital variables.

The conventional nested OLS test of the single added interaction yields  $F(1, 310) = [(1.077010 - 1.074879)/1]/(1.074879/310) \approx 0.61459$  ( $p \approx 0.4337$ ). This matches  $0.783927^2 \approx 0.61454$  within rounding precision. The reported interaction inference and

SSR values are therefore mathematically compatible. This check does not establish that the conventional standard errors are robust to panel disturbances.

Table 9. Assessment of hypotheses H1–H5

| Hypothesis          | Expected | Assessment from EViews results                           |
|---------------------|----------|----------------------------------------------------------|
| H1: CCC → ROA       | Negative | Not supported; Model 1 $p = 0.7071$                      |
| H2: SG → ROA        | Positive | Model 1 supported ( $p = 0.0177$ ); Model 2 $p = 0.1597$ |
| H3: CFOA → ROA      | Positive | Model 1 supported ( $p = 0.0010$ ); Model 2 $p = 0.8388$ |
| H4: DAR → ROA       | Negative | Supported in both models ( $p < 0.0001$ )                |
| H5: CCC × DAR → ROA | Negative | Not supported; $b = +0.000129$ , $p = 0.4337$            |

## 5 Discussion

### 5.1 Cash Conversion Duration: Contrasting Mechanisms

The insignificant baseline CCC coefficient indicates that a single linear slope does not provide precise evidence of a negative relationship in this sample. This finding is consistent with the insignificant CCC result of Hendrani and Rasyid [5], but differs from the negative pattern in Kiymaz et al. [2] and the local evidence in Prasetya and Setyawan [6]. The difference does not establish that working capital management is unimportant. Component-specific relationships may offset one another when receivables, inventories, and payables are combined into CCC.

For example, longer inventory holding can increase costs while reducing stockout risk, and a longer supplier payment period can reduce immediate cash needs. The summary data do not identify which component dominates within each firm. Separate DSO, DIO, and DPO regressions would help distinguish these mechanisms. Demiraj et al. [19] and Wanzala and Obokoh [20] examine working capital and performance in different industries and countries; their work informs component-level research design without establishing a uniform relationship across sectors.

A nonlinear relationship is another plausible explanation, as discussed by Kukeli et al. [13]. An insignificant linear coefficient can result when positive relationships in one part of the distribution offset negative relationships elsewhere. This study does not estimate a CCC squared term or a working capital threshold. It therefore does not identify an optimal CCC level.

The absence of a significant baseline linear CCC association does not prove that operating working capital is irrelevant. DSO, DIO and DPO can affect ROA through different mechanisms that offset in an aggregate duration measure. The result is consistent with the null evidence in Hendrani and Rasyid [5] but differs from the negative associations reported by Prasetya and Setyawan [6] and from international evidence [2], [4].

The minimum CCC of −1,470.14 days is exceptionally extreme. It may arise from unusually extended payable periods, very low annual COGS, reporting-unit

inconsistencies, or account misclassification, and no specific explanation can be assigned without tracing the underlying DSO, DIO, and DPO accounts to the corresponding issuer-year. This observation, the 1,463.96% maximum sales growth, and DAR above one motivate source-level checking and sensitivity analysis.

## **5.2 Sales Expansion, Cash Flows, and Shared Accounting Denominators**

Model 1 associates sales growth positively with ROA ( $p = 0.0177$ ), in line with Setiawan and Sha [7]; nevertheless, this association is not statistically significant in Model 2 ( $p = 0.1597$ ). The result is specification-dependent, and the outlying maximum SG of 1,463.96% further motivates caution. The findings do not establish that higher sales growth independently causes a rise in profitability.

The positive CFOA–ROA association also changes across specifications: conventional significance in Model 1 ( $p = 0.0010$ ) does not persist in Model 2 ( $p = 0.8388$ ). CFOA and ROA share an average-assets denominator and both reflect related operating processes; the numerical association cannot be assumed to identify the causal value of liquidity. This instability requires particular care when deriving policy recommendations from the baseline results.

Managers can use growth and operating cash flow as complementary indicators. High growth accompanied by low CFOA calls for examination of receivables, inventories, supplier payments, and margins. Conversely, strong operating cash flow in a particular year can arise from a nonrecurring reduction in working capital. Performance assessment therefore requires analysis of cash flow sources and sales sustainability alongside annual ratios.

Taken together, the differing SG and CFOA  $p$ -values indicate that the direct-effect estimates are sensitive to adding the interaction term, even though the interaction itself is insignificant. Shared accounting constructions, extreme values, and untested dependence in the panel limit explanations of why these estimates shift; the empirical output alone does not identify the responsible mechanism.

## **5.3 Leverage, Supplier Credit, and the Interaction Test**

The negative baseline DAR coefficient indicates that a higher liability proportion is associated with lower ROA. This finding is consistent with Setiawan and Sha [7], but it does not identify interest expense as the only explanation. Total liabilities can increase through operating obligations, while low ROA can reduce equity and increase DAR. Measures of interest-bearing debt, interest expense, and interest coverage would help distinguish financing-cost explanations from changes in balance-sheet composition.

Mechanical relationships among the accounting measures also matter. Trade payables enter both the liabilities numerator of DAR and the DPO term subtracted from CCC. The interaction may therefore reflect liability composition as well as borrowing risk. DAR and ROA both draw on asset information, and CFOA and ROA share an average-assets denominator. Alternative leverage measures based on interest-bearing

borrowing and alternative earnings measures would strengthen assessment of whether the estimated pattern persists beyond accounting-ratio relationships.

Model 2 directly tests whether DAR conditions the CCC–ROA association. The estimated interaction coefficient is positive ( $b = 0.000129$ ), opposite to the theory-derived negative H5 expectation, and it is not statistically significant ( $t = 0.783927$ ;  $p = 0.4337$ ). The evidence therefore does not support leverage strengthening the negative CCC–ROA association. A nonsignificant interaction is not evidence that the true conditional effect is exactly zero.

Mean centering makes the Model 2 CCC coefficient the slope evaluated at average DAR and makes the DAR coefficient the slope evaluated at average CCC. Neither conditional interpretation requires a significant interaction. Given the statistically insignificant interaction coefficient, specific simple-slope significance claims across DAR percentiles are not warranted.

#### 5.4 External Validity, Endogeneity, and Implications

Firm fixed effects address unchanging heterogeneity but not changes in macroeconomic exposure, market power, credit access, inventory prices, or reverse links from ROA to DAR. The short 2021–2025 window and the restriction to survivors heighten the relevance of these risks. Year effects would absorb economy-wide changes common to sampled firms, while industry-by-year effects or industry-specific descriptive checks may reveal diverging adjustment to shocks. A formal dynamic specification can be considered [18], but must be justified by diagnostics and the modest time dimension.

The practical implications remain conditional. SG and CFOA are positively associated with ROA in Model 1, but their significance does not persist after adding INT. Managers should consider working-capital components alongside earnings quality, operating cash generation and liability composition rather than infer a universal CCC target or a verified leverage-moderation mechanism. Year effects, clustered errors, outlier checks and alternative financing measures are recommended robustness tests.

## 6 Conclusion

Using 79 IDX consumer noncyclical firms observed over 2021–2025 (395 firm-years), this study estimates firm fixed-effects models of profitability. Model 1 identifies no significant linear CCC–ROA association, positive SG and CFOA associations, and a negative DAR association under conventional standard errors. These results describe contemporaneous within-company associations and do not support causal interpretation.

In Model 2, the mean-centered CCC  $\times$  DAR interaction is positive but statistically insignificant ( $b = 0.000129$ ;  $p = 0.4337$ ), contrary to the hypothesized negative moderation. The interaction  $t$  statistic and its implied nested partial  $F$  statistic are mutually consistent, confirming that the moderation effect is not statistically significant. H5 is not supported. SG and CFOA, significant in Model 1, are not statistically significant in Model 2.

The five-year balanced panel, conventional rather than firm-clustered uncertainty estimates, omitted year effects, extreme observations, and accounting-measurement overlap constrain inference. Although aggregate sample-selection counts are documented, firm-level exclusion decisions and monetary-unit harmonization should remain reproducible from the underlying research records. Future robustness analysis should address these issues and examine CCC components, interest-bearing debt, and outlier sensitivity before stronger recommendations are drawn.

## **DECLARATIONS**

### **Author Contributions**

Amin Wijoyo: writing—original draft preparation and writing—review and editing; Ferry Adang: methodology; Amiruddin: writing—review and editing; Syarifuddin Ras-yid: writing—review and editing. All authors have read and approved the final version of the manuscript.

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### **Conflict of Interest**

The authors declare that there are no conflicts of interest regarding the publication of this article.

### **Data Availability Statement**

The source annual financial statements and reports are publicly accessible from the Indonesia Stock Exchange (<https://www.idx.co.id/>) and from the listed companies. The data that support the findings of this study are available from the corresponding author upon reasonable request.

### **Artificial Intelligence (AI) Disclosure**

During the preparation of this manuscript, the authors used ChatGPT (OpenAI) for language editing, document formatting, and editorial drafting. The authors subsequently checked the factual content, validated the statistical results, and approved the final version, and take full responsibility for the final manuscript. The tool was not used to generate firm-level observations or to fabricate regression estimates.

### **Research Ethics**

Ethical review and approval were not required for this study because it uses publicly accessible secondary corporate information and does not involve human participants or identifiable personal records.

### **Informed Consent Statement**

Not applicable.

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