IJRAR.ORG E-ISSN: 2348-1269, P-ISSN: 2349-5138

INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS (IJRAR) | IJRAR.ORG

An International Open Access, Peer-reviewed, Refereed Journal

# The Moderating Influence of Firm Size on the Relationship between Working Capital Management Practices and Financial Performance: Evidence from the Indian Textile Industry

**[1]Mr Amitbrata Nag**

[1]Research Scholar, Department of Commerce, Kazi Nazrul University, Asansol, India

***Abstract :***

Purpose: The study investigates the moderating effect of firm scale on the association between Working Capital Management (WCM) and firms' financial performance within the Indian textile sector. It aims to determine whether the scale of a firm enhances or weakens the effect of working capital efficiency, assessed by the Cash Conversion Cycle (CCC), on profitability, represented by the Return on Capital Employed (ROCE).

Methodology: Panel data were sourced from five leading Indian textile firms over the period 2014–2020. To ensure robust estimation, classical regression assumptions were tested and addressed. After resolving multicollinearity through variable mean-centring, Generalized Least Squares (GLS) regression with an autoregressive [AR(1)] covariance structure was employed to correct for heteroscedasticity and autocorrelation. Data were obtained from the company's financial statements and the Capitaline Plus database.

Findings: The results indicate that neither CCC nor the scale of a business is significantly impactful on profitability individually. However, the interaction term (CCC × Firm Size) was positive and marginally substantial ($p < 0.10$), confirming that firm size moderates the association between WCM and financial performance. Larger firms demonstrated greater ability to translate the effectiveness of working capital in generating profitability, most likely a result of economies of scale and superior access to capital.

Practical Implications: The findings highlight the necessity of aligning working capital policies with firm size to maximise financial performance. Productive WCM strategies can enhance profitability when supported by sufficient scale and operational flexibility.

Originality: This study adds to existing literature by empirically confirming the moderating role of firm size in the WCM-profitability nexus using a GLS-AR(1) approach, offering new evidence from India's textile industry.

***Keywords: Working Capital Management (WCM), Firm Size, Cash Conversion Cycle (CCC), Return on Capital Employed (ROCE), GLS-AR(1), Moderating Effect, Indian Textile Industry***

## I. INTRODUCTION

Efficient Working Capital Management (WCM) is important for maintaining liquidity, profitability, and overall financial stability in any business organization. WCM ensures that firms effectively balance their current assets and current liabilities to sustain smooth business operations and maximize returns. Among the various indicators of WCM, the Cash Conversion Cycle (CCC) is a key indicator that represents the time it takes a firm to convert investments in inventory and various resources into cash flows generated from sales. A shorter CCC generally indicates better liquidity management and operational efficiency, which in turn enhances the firm's profitability. However, the effectiveness of working capital policies may vary among business firms of diverse sizes. Larger firms often benefited from economies of scale, better bargaining power, and access to outside funding. On the other hand, smaller enterprises could struggle with financial challenges and higher risks in managing their short-term assets and liabilities. This implies that firm size may moderate the intensity and course of the link between working capital efficiency and financial performance. Understanding of this moderating influence is vital for identifying whether firm scale amplifies or weakens the profitability effect of working capital decisions.

The present study, therefore, examines the moderating effect of firm size on the association between Working Capital Management and firms' financial performance. The study concentrates on the Indian textile sector-one of the most dynamic and capital-intensive industries-where efficient working capital utilization is crucial due to fluctuating demand patterns, inventory requirements, and credit cycles. Using data from five leading textile companies listed on the Indian stock market for the period 2014-2020, the research evaluates how firm size influences the link between CCC and profitability, measured by the Return on Capital Employed (ROCE). By analysing the moderating role of firm size, the study aims to provide empirical evidence for the existing financial literature and offer managerial insights for enhancing capital efficiency strategies tailored to different firm sizes. This investigation not only deepens understanding of WCM's profitability implications but also highlights the significance of firm-specific characteristics in shaping financial performance.

This study examines how firm size influences the connection between Working Capital Management (WCM) and profitability, thereby addressing a previously overlooked gap in the literature.

## II. LITERATURE REVIEWS

*Mutunga and Owino (2017)* examined the effect of micro-level factors concerning the financial performance of manufacturing firms in Kenya, with a particular emphasis on the moderating role of firm scale. The study was motivated by the stagnant contribution of Kenya's manufacturing industry to the national economy, which has remained at approximately 10% of total output despite being a central pillar in the government's Vision 2030 development agenda. The research employed a descriptive design and utilized data collected from 180 manufacturing firms, achieving a 95% response rate through a self-administered questionnaire. The analysis used descriptive statistics, correlation, and regression models to examine the relationships among operational practices, production capacity, management practices (collectively referred to as micro factors), and firms' financial performance. Grounded in Agency Theory, Wealth Maximisation Theory, and Resource-Based Theory, the study discovered a favourable, statistically significant linkage between micro factors and firm financial performance.

*Muigai and Muriithi (2017)* examined the moderating role of firm size on the association between capital structure and financial distress using Altman's Z-score. Capital structure was evaluated through total long-term and total short-term debt, while firm size was expressed as the natural logarithm of total assets. Employing a Fixed Effects panel model supported by the Hausman test and Feasible Generalized Least Squares (FGLS) estimation, the study concluded that firm size significantly moderated the impact of debt on financial distress. Although debt generally increased financial distress, larger firms experienced a reversed, positive impact due to stronger asset bases and greater access to long-term financing. The findings highlight that large firms manage leverage more efficiently, while excessive short-term debt harms performance. This study supports the moderating role of firm size, aligning with current research on its influence within the Working Capital Management–profitability relationship.

*Mazlan and Leng (2018)* conducted a study to explore the moderating role of working capital management (WCM) in the relationship between the key determinants of working capital and firm performance. Two hundred eighty-two publicly listed manufacturing firms in Malaysia were selected as a sample from 2010 - 2014. The research divided WCM into two primary components: working capital requirement and net liquid balance to provide a more detailed understanding of how different aspects of liquidity management influence profitability. The findings expressed that both components significantly moderate the relationship between the critical determinants of working capital and firm performance, suggesting that effective management of short-term assets and liabilities enhances a firm's ability to improve financial outcomes.

*Mahmood et al. (2019)* explored how firm size and leverage moderate the correlation between working capital finance (WCF) and profitability, offering valuable insights into capital structure dynamics. Using the Generalised Method of Moments (GMM) on panel data, the authors found that both moderators—firm size and leverage—significantly influence how WCF affects profitability. Specifically, the relationship between WCF and profitability follows an inverted U-shape for smaller or low-leverage firms, suggesting diminishing returns beyond an optimal level of working capital financing. In contrast, for larger or highly leveraged firms, the relationship is U-shaped, indicating that higher reliance on working capital financing can eventually improve profitability once a threshold is surpassed. The research also identified break-even points that vary by firm characteristics, illustrating how changes in size or leverage shift the efficiency of working capital utilisation. These outcomes emphasize the importance of tailoring financing and liquidity strategies according to firm-specific attributes.

*Dalci et al. (2019)* conducted an extensive empirical examination spanning eight years and involving 285 non-financial firms in Germany. They discovered that firm size moderates the link between the Cash Conversion Cycle (CCC) and firm profitability. The moderated regression results highlighted that the effect of CCC efficiency on profitability, as measured by Return on Assets (ROA), is conditional on firm size. Specifically, smaller firms that extend their CCC experience tend to experience a reduction in profitability. Conversely, larger enterprises appear capable of sustaining a longer CCC without detrimental effects on profitability, potentially due to superior operational capabilities and greater financial flexibility. The study concluded that optimal working capital

strategies must be size-dependent, as the profitability consequences of the CCC differ markedly across small, medium, and large businesses.

*Yousaf and Bris (2021)* examined the linkage between Working Capital (WC) and firm performance, using a sample of 326 Czech firms across the manufacturing, automotive, and construction domains. The study included 20 firms certified under the European Foundation for Quality Management (EFQM) Excellence Model to evaluate the effect of quality certification on firm outcomes. Data were collected from the Albertina database, and the analysis used the two-step Generalised Method of Moments (GMM) approach to address endogeneity and firm-specific effects. The study's findings indicated an adverse correlation between working capital levels and firm performance, suggesting that excessive investment in current assets can diminish profitability. Conversely, firms with EFQM quality certifications demonstrated better performance, indicating that adherence to structured quality management frameworks can enhance operational efficiency and financial outcomes.

*Yuliani et al. (2021)* investigated the dynamics between working capital and firm profitability among Indonesian public companies, sought to determine not only the direct impact but also the potential moderating role of the business environment. Employing a Purposive Sampling technique, the study collected 222 firm-year observations from 74 non-financial companies spanning the period from 2014 to 2016. The data were analysed using the Structural Equation Model (SEM) based on the Partial Least Squares (PLS) approach. The empirical outcomes confirmed that the magnitude of working capital had a significant positive influence on enhancing a firm's financial profitability. However, the research ultimately determined that the business environment does not substantially influence the relationship between working capital and profitability.

*Maeenuddin et al. (2021)* found a correlation between Working Capital Management (WCM) and firm profitability, as assessed by Return on Capital Employed (ROCE). The study incorporated a sample of 69 non-financial firms listed on the Pakistan Stock Exchange from 2007 to 2017. The analysis used Partial Least Squares and Structural Equation Modelling (PLS-SEM), marking one of the first attempts to apply this approach to examine the WCM-profitability relationship. The independent variables, like Inventory Turnover (ITO), Debtors Turnover (DTO), and Creditors Turnover (CTO), were used to capture the components of WCM. Results indicated that, in the absence of moderation, overall WCM had a favourable effect on profitability. However, once firm size was added as a moderating variable, it significantly influenced the linkage between DTO-ROCE and CTO-ROCE, but not between ITO-ROCE or CCC-ROCE. These results indicate that larger firms derive greater advantages from proficient handling of receivables and payables than smaller firms do.

*Ahmed et al. (2023)* investigated the capital structure-profitability relationship within the framework of a developing nation, using data from 156 manufacturing firms enumerated on the Tehran Stock Exchange (TSE) throughout the duration 2011–2019, and revealed the significant moderating role of firm size. Using a fixed-effects panel regression, the analysis expressed that capital structure decisions have an adverse impact on profitability, while firm size is positively associated with profitability. In conclusion, the study's robust findings demonstrate that firm size enhances the influence of capital structure choice on a firm's profitability.

*Koroma and Bein (2024)* examined the impact of economic policy uncertainty (EPU) on the association between working capital management (WCM) and profitability among manufacturing companies enlisted on the UK Stock Exchange from 2006 to 2021. The study used the Economic Policy Uncertainty Index, derived from newspaper-based coverage frequency, to capture fluctuations in policy uncertainty. The analysis included data from 199 manufacturing firms and employed multiple econometric approaches, comprising Fixed Effects, Random Effects, and the two-stage Generalised Method of Moments (GMM), to manage for firm-specific effects and endogeneity, thereby ensuring robust results. The findings revealed that EPU significantly moderates the relationship between the Cash Conversion Cycle (CCC), a key indicator of working capital efficiency and firm profitability, proxied by Return on Operating Assets and other performance indicators.

Despite extensive research on the association between Working Capital Management (WCM) and profitability, notable gaps remain. Most prior studies (e.g., Mutunga & Owino, 2017; Dalci et al., 2019; Maeenuddin et al., 2021; Koroma & Bein, 2024) were conducted outside India, leaving limited evidence for the Indian textile sector. The moderating role of firm size in the WCM-profitability nexus also remains underexplored. Moreover, earlier studies rarely addressed key regression assumptions or used comprehensive profitability measures, like Return on Capital Employed (ROCE). This study aims to address these gaps by using panel data (2014–2020) and a GLS-AR(1) model to assess how firm size moderates the link between WCM, assessed by the Cash Conversion Cycle (CCC), and profitability..

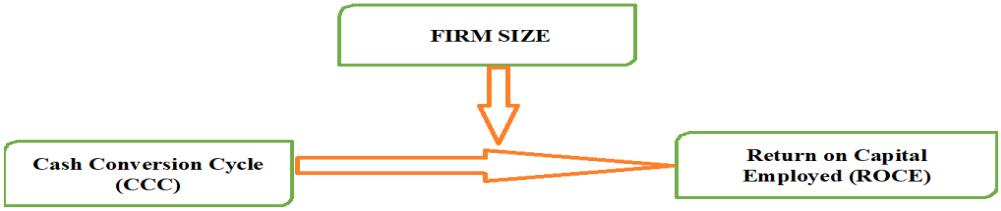
## III. Hypothesis of the Study

**Ho**: There is no moderating influence of firm size on the relationship between the working capital management and the firm's financial performance.

**H1**: There is a moderating influence of firm size on the relationship between the working capital management and the firm's financial performance.

## IV. Conceptual Framework

The conceptual framework illustrates the hypothesised linkage between Working Capital Management (WCM) and firm profitability, and further examines the potential influence of a moderator variable. Specifically, the study aims to test whether Firm Size moderates the core relationship between WCM, assessed by the Cash Conversion Cycle (CCC), and firm profitability, easured by the Return on Capital Employed (ROCE). The framework is designed to determine whether and how the firm's scale alters the effect of working capital efficiency on the firm's overall financial performance.



## V. METHODOLOGY

The objective of the study is to investigate the moderating effect of firm size on the relationship between Working Capital Management and financial performance. For this purpose, the top five significant players in the Indian textile and apparel sectors as of 19 October 2025 have been selected. The associated variables (CCC, ROCE, and Firm Size) of such companies were sourced from financial statements, journals, relevant internet sources, and the Capitaline Plus database for the time span ranging from 2014 to 2020.

**Variables:** This analysis uses a framework in which firm profitability, operationalised as Return on Capital Employed (ROCE), serves as the outcome variable. The key independent variable is Working Capital Management (WCM), which is assessed through the Cash Conversion Cycle (CCC). Additionally, Firm Size, evaluated by the natural logarithm of Total Assets (LTA), is involved in the study as a moderating variable to assess the effect of firm size and its influence on the relationship between the CCC and firm profitability.

| Variable Type | Variable Name | Role in Study | Measurement | Formula |
|---|---|---|---|---|
| Dependent Variable (DV) | ROCE | Firm Profitability | Proxy for firm profitability | ROCE=Earnings Before Interest and Taxes (EBIT) /Total Capital Employed |
| Independent Variable (IV) | CCC | Working Capital Management (WCM) | Measured as the duration of the cash-to-cash cycle. | CCC=Receivable Collection Period+Inventory Conversion Period −Payable Deferral Period |
| Moderating Variable (MV) | Firm Size | Controls/Modifies the relationship between CCC and ROCE. | Measured as the natural logarithm of Total Assets (LTA). | Firm Size=Natural Logarithm of Total Assets (LTA) |

*Summary Table-1*

To investigate the moderating effect of firm size on the association between working capital management and firm profitability, a panel regression model was employed. The dependent variable was Return on Capital Employed (ROCE), while the independent variable was the Cash Conversion Cycle (CCC) as a proxy for working capital efficiency. Firm size was introduced as a moderating variable through an interaction term (CCC × Firm Size).

After detecting multicollinearity between the predictors, all manipulated variables were mean-centred before generating the interaction term. The resulting model is expressed as:

$$ROCEit=\beta0+\beta1(CCC\_Cit) +\beta2(FirmSize\_Cit) +\beta3(CCC\_Size\_Cit) +ui+\varepsilon it$$

Where:

ui = denotes firm-specific random effects,

εit= represents idiosyncratic errors..

## VI. EMPIRICAL RESULTS & DISCUSSIONS

The descriptive statistics (Table 1) reveal that the sampled textile firms exhibit moderate profitability, with a mean Return on Capital Employed (ROCE) of 11.31% (SD = 4.87). The firms, on average, utilise a lengthy Cash Conversion Cycle (CCC) of 150.46 days (SD = 77.67), indicating an average cash conversion period of approximately five months, with substantial diversity in working capital efficiency across the sample. Firm size, measured logarithmically, is relatively consistent across the sample, with a mean of 8.78 (SD=0.76). The variability observed in both the CCC and its interaction term (CCC_Size) underscores significant differences in working capital management techniques and their potential influence on firms' financial performance, necessitating the subsequent regression analysis.

**Table 1- Descriptive Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| Return on Capital Employed | 11.3143 | 4.87353 | 35 |
| Cash Conversion Cycle | 150.46 | 77.666 | 35 |
| Firm Size | 8.7833 | .75838 | 35 |
| CCC_Size | 1305.428571 | 660.2142382 | 35 |

The Pearson correlation analysis among the study variables (Table 2) revealed that Return on Capital Employed (ROCE) exhibited a very weak and a linear association that is statistically insignificant with the primary independent variable, the Cash Conversion Cycle (CCC) (r = 0.051, p = 0.770), alongside the moderator, Firm Size (r = -0.168, p = 0.335), and the interaction term (CCC_Size; r = 0.055, p = 0.756). Among the explanatory variables, a weak adverse correlation was found between CCC and Firm Size (r = -0.281, p = 0.103), suggesting a minor tendency for larger firms to have shorter cash cycles. The correlation matrix initially indicated no serious multicollinearity, as none of the coefficients exceeded 0.80. However, to confirm this finding, the Variance Inflation Factor (VIF) and Tolerance statistics were examined as one of the classical regression assumptions before estimating the regression using SPSS software.

**Table 2- Correlations**

| | | ROCE | CCC (Cash Conversion Cycle) | Firm Size | CCC_Size |
|---|---|---|---|---|---|
| ROCE | Pearson Correlation | 1 | .051 | -.168 | .055 |
| | Sig. (2-tailed) | | .770 | .335 | .756 |
| | N | 35 | 35 | 35 | 35 |
| CCC (Cash Conversion Cycle) | Pearson Correlation | .051 | 1 | -.281 | .991** |
| | Sig. (2-tailed) | .770 | | .103 | .000 |
| | N | 35 | 35 | 35 | 35 |
| Firm Size | Pearson Correlation | -.168 | -.281 | 1 | -.164 |
| | Sig. (2-tailed) | .335 | .103 | | .346 |
| | N | 35 | 35 | 35 | 35 |
| CCC_Size | Pearson Correlation | .055 | .991** | -.164 | 1 |
| | Sig. (2-tailed) | .756 | .000 | .346 | |
| | N | 35 | 35 | 35 | 35 |

**. Correlation is significant at the 0.01 level (2-tailed). N = 35 observations.

Multicollinearity primarily occurs among the predictor variables, specifically between the Cash Conversion Cycle (CCC) and the interaction term (CCC_Size). The Variance Inflation Factor (VIF) and Tolerance statistics were analysed using the coefficients (Table 3). The results showed that the Cash Conversion Cycle (VIF = 351.816, Tolerance = 0.003) and the interaction term (CCC × Size) (CCC_Size; VIF = 333.076, Tolerance = 0.003) exhibited extremely high VIF values and very low tolerance levels, far exceeding the commonly accepted thresholds of VIF < 10 and Tolerance > 0.10. Conversely, Firm Size recorded an acceptable VIF of 6.199 and Tolerance of 0.161, indicating no serious collinearity issue for this variable.

**Table 3- Coefficients**

| Model | | Unstandardised Coefficients | | Standardised Coefficients | t | Sig. | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | 73.698 | 22.989 | | 3.206 | .003 | | |
| | Cash Conversion Cycle | -.484 | .189 | -7.719 | -2.559 | .016 | .003 | 351.816 |
| | Firm Size | -7.063 | 2.573 | -1.099 | -2.745 | .010 | .161 | 6.199 |
| | CCC_Size | .056 | .022 | 7.527 | 2.565 | .015 | .003 | 333.076 |

a. Dependent Variable: Return on Capital Employed

Further confirmation came from the Collinearity Diagnostics (Table 4), where the fourth dimension reported a very small Eigenvalue (0.000) and a high Condition Index (136.189), well above the critical limit of 30. The variance proportions for the Cash Conversion Cycle, Firm Size, and CCC_Size were concentrated in this dimension, suggesting a strong linear relationship across these variables. These findings collectively indicate severe multicollinearity, particularly between the Cash Conversion Cycle and its interaction term (CCC_Size). Such high multicollinearity inflates the standard errors of the regression coefficients, making it difficult to accurately interpret the individual effects of the correlated predictors. This issue arises because the interaction term CCC_Size is mathematically dependent on the original variable CCC, resulting in inflated VIF values.

| Table 4- Collinearity Diagnostics | | | | | | | |
|---|---|---|---|---|---|---|---|
| Model | Dimension | Eigenvalue | Condition Index | Variance Proportions | | | |
| | | | | (Constant) | Cash Conversion Cycle | Firm Size | CCC_Size |
| 1 | 1 | 3.772 | 1.000 | .00 | .00 | .00 | .00 |
| | 2 | .223 | 4.111 | .00 | .00 | .00 | .00 |
| | 3 | .005 | 28.167 | .09 | .02 | .08 | .02 |
| | 4 | .000 | 136.189 | .91 | .98 | .92 | .98 |
| a. Dependent Variable: Return on Capital Employed | | | | | | | |

To address the multicollinearity identified between the Cash Conversion Cycle and its interaction term, all independent variables were mean-centred before generating the interaction term. This doesn't change the interpretation of relationships—it just reduces multicollinearity. After centring, the VIF values fell below 5, and the Tolerance values exceeded 0.10, confirming that multicollinearity was no longer a concern. Centring means subtracting each variable's mean from its values:

$$CCCc=CCC-\text{Mean (CCC)}$$
$$Sizec=FirmSize-\text{Mean (FirmSize)}$$

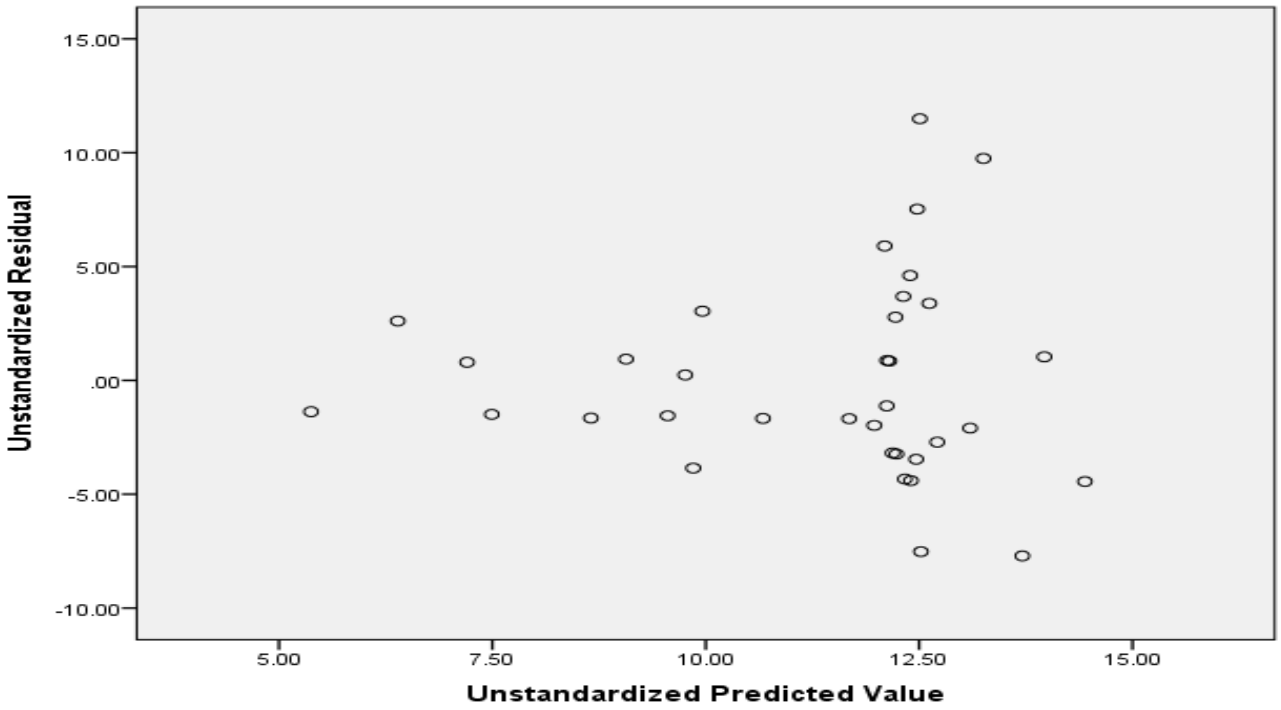
Then, create the interaction term from the centred variables:
Interaction Variable= CCC_Size_C=CCCc×Sizec

| Table 5- Coefficients | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Model | | Unstandardised Coefficients | | Standardised Coefficients | t | Sig. | Collinearity Statistics | |
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | 12.208 | .845 | | 14.449 | .000 | | |
| | CCC_C | .004 | .011 | .056 | .334 | .740 | .908 | 1.102 |
| | Firm Size_C | 1.319 | 1.416 | .205 | .932 | .359 | .531 | 1.885 |
| | CCC_Size_C | .056 | .022 | .549 | 2.585 | .015 | .571 | 1.751 |
| a. Dependent Variable: ROCE | | | | | | | | |

After mean-centring the predictor variable to address multicollinearity, the regression analysis was re-estimated. The Variance Inflation Factor (VIF) values in Table 5 for all predictors—Cash Conversion Cycle (CCC_C = 1.102), Firm Size (Firm Size_C = 1.885), and the interaction term (CCC_Size_C = 1.751) were significantly lower than the critical threshold of 10, whereas their associated Tolerance values were greater than 0.10. This confirms that multicollinearity is no longer present.

| **Variables** | **Tolerance (Before)** | **VIF (Before)** | **Tolerance (After)** | **VIF (After)** | **Interpretation** |
|---|---|---|---|---|---|
| Cash Conversion Cycle (CCC) | 0.003 | 351.816 | 0.908 | 1.102 | Severe multicollinearity was reduced to an acceptable level |
| Firm Size | 0.161 | 6.199 | 0.531 | 1.885 | Within an acceptable limit, both before and after |
| Interaction Term (CCC_Size) | 0.003 | 333.076 | 0.571 | 1.751 | Severe multicollinearity was eliminated after centring |
| **Condition Index (Max)** | **136.189** | — | **2.484** | — | Multicollinearity fully resolved |

Heteroscedasticity was assessed using both graphical (scatterplot) and statistical methods (Glejser test).




The scatterplot of unstandardised residuals against unstandardised predicted values was examined to evaluate the assumption of homoscedasticity. Ideally, the residuals should be randomly dispersed in a rectangular pattern around the zero line, indicating consistent variability throughout all levels of predicted values. However, the observed plot shows a slight funnel-shaped pattern, with residual dispersion increasing as predicted values rise. Specifically, residuals are relatively concentrated between ±5 at lower predicted values (around 7.50) but become more widely spread, ranging from approximately −7.50 to +10, at higher predicted values (around 12.50). This pattern of widening residuals indicates that the dispersion of the residuals is not stable, indicating mild heteroscedasticity.

**Table 6- Coefficients**

| Model | | Unstandardised Coefficients | | Standardised Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 3.902 | .449 | | 8.700 | .000 |
| | CCC_C | -.006 | .006 | -.182 | -1.111 | .275 |
| | Firm Size_C | .720 | .752 | .205 | .958 | .345 |
| | CCC_Size_C | .031 | .011 | .566 | 2.742 | .010 |
| a. Dependent Variable: ABS_RES | | | | | | |

The Glejser Test was performed to evaluate heteroscedasticity in the regression model by regressing the absolute residuals (ABS_RES) on the independent variables — CCC_C, FirmSize_C, and their interaction term (CCC_Size_C). The results (Table 6) disclose that the coefficients for CCC_C (p = 0.275) and FirmSize_C (p = 0.345) are statistically insignificant, indicating that these variables do not significantly influence the variance of the residuals. However, the interaction term CCC_Size_C is statistically significant (p = 0.010), implying that the residual variance increases slightly with changes in the engagement between working capital management and firm size. Overall, the findings reveal a minor heteroscedasticity issue, primarily driven by the interaction variable.

Both the visual and formal tests indicate statistically significant heteroscedasticity, violating a key assumption of Ordinary Least Squares (OLS) regression. The residual scatterplot visually suggests non-constant variance, as the data points exhibit a slight fanning or cone shape, with the residual spread widening at higher predicted ROCE values. This visual finding is formally confirmed by the Glejser Test, which showed that the absolute residuals are significantly predicted by the CCC_Size_C interaction term (Sig. = .010< .05). Since the variance of the errors is not constant, the standard errors derived from the OLS model are biased, leading to potentially unreliable t-statistics and p-values. To obtain robust inferences, subsequent analysis should employ Heteroscedasticity-Consistent Standard Errors (Robust Standard Errors) or consider an appropriate data transformation.

After applying the Generalised Least Squares (GLS) procedure with an autoregressive [AR(1)] covariance structure, the Glejser Test was performed to verify whether the heteroscedasticity observed in the OLS model persisted. The absolute values of the GLS residuals were regressed on the independent variables-Cash Conversion Cycle (CCC_C), Firm Size (FirmSize_C), and their

interaction (CCC_Size_C). The results show (Table 7) that coefficients of all variables are statistically insignificant (CCC_C: p = 0.454; FirmSize_C: p = 0.718; CCC_Size_C: p = 0.139), indicating that the predictors no longer have any relation to the residual variance. This confirms that the GLS model effectively corrected the heteroscedasticity problem. Thus, the assertion of homoscedasticity is validated, and the model's standard errors and significance tests are reliable for inference.

**Table 7- Coefficients**

| Model | | Unstandardised Coefficients | | Standardised Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 3.894 | .705 | | 5.524 | .000 |
| | CCC_C | -.007 | .009 | -.136 | -.759 | .454 |
| | Firm Size_C | .431 | 1.181 | .085 | .365 | .718 |
| | CCC_Size_C | .027 | .018 | .342 | 1.518 | .139 |
| a. Dependent Variable: ABS_RES | | | | | | |

The Model Summary (Table 8) of the Glejser regression, performed after applying the GLS (AR(1)) correction, indicates that the independent variables—Cash Conversion Cycle (CCC_C), Firm Size (FirmSize_C), and their interaction (CCC_Size_C)—explain only 10.2% of the variation in the absolute residuals ($R^2 = 0.102$; Adjusted $R^2 = 0.015$). This limited explanatory power indicates that the residuals are randomly distributed and not systematically affected by the predictor variables. Consequently, the principle of homoscedasticity is maintained. The previously detected heteroscedasticity has been successfully corrected through the GLS procedure, as confirmed by both the insignificant coefficients ($p > 0.05$) and the low $R^2$ value in the Glejser test model.

**Table 8- Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .320[a] | .102 | .015 | 3.80785 |
| a. Predictors: (Constant), CCC_Size_C, CCC_C, Firm Size_C | | | | |
| b. Dependent Variable: ABS_RES | | | | |

The assessment of the normality of residuals was conducted using both the Kolmogorov–Smirnov and Shapiro–Wilk tests. The results (Table 9) show that for the standardised residuals, the Kolmogorov–Smirnov test produced a statistic of 0.144 with a p-value of 0.063, while the Shapiro–Wilk test yielded a statistic of 0.952 with a p-value of 0.134. In both tests, the p-values exceed the conventional threshold of 0.05. Therefore, the residuals are considered to be normally distributed. This confirms that the regression model satisfies the assumption of normality, and the statistical tests of significance (t-test and F-test) based on this model are valid and reliable.

**Table 9- Tests of Normality**

| | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | Statistic | df | Sig. | Statistic | df | Sig. |
| Standardised Residual | .144 | 35 | .063 | .952 | 35 | .134 |
| a. Lilliefors Significance Correction | | | | | | |

The Durbin–Watson test (Table 10) assesses the existence of autocorrelation in the residuals of the regression model; a value that is near 2 indicates no autocorrelation, values below 1.5 suggest positive autocorrelation, and values above 2.5 indicate negative autocorrelation. The Durbin–Watson statistic value (1.352) indicated mild positive autocorrelation among the residuals.

**Table 10- Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|---|---|---|---|---|---|
| 1 | .448[a] | .200 | .123 | 4.564 | 1.352 |
| a. Predictors: (Constant), CCC_Size_C, CCC_C, Firm Size_C | | | | | |
| b. Dependent Variable: ROCE | | | | | |

To revalidate the above finding, a Runs Test was conducted, which reported a non-significant result (p = 1.000), suggesting that the residuals were randomly distributed. The Runs Test was applied to examine the independence of residuals in the regression model, which is essential for confirming the absence of autocorrelation. In this test, the unstandardised residuals were used as the test variable, with a custom cutpoint of 0. The obtained results show (Table 11) a Z-value of 0.000 with an Asymp. Sig. (2-tailed) value of 1.000, which is more than the 0.05 significance level. This confirms that there is no autocorrelation in the model and that the assumption of independent residuals is satisfied.

***Table 11- Runs Test for Autocorrelation of Residuals***

| Test Variable | Test Value (a) | Total Cases | Number of Runs | Z | Asymp. Sig. (2-tailed) |
|---|---|---|---|---|---|
| Unstandardised Residual | 0E–7 | 35 | 18 | 0.000 | **1.000** |

User-specified test value (Cut point = 0)

Since the Durbin–Watson test is specifically designed to detect first-order autocorrelation in time-dependent or panel data, It was regarded as more acceptable for the present study. Thus, it was concluded that a mild autocorrelation exists in the model, which was subsequently addressed by applying robust estimation techniques to obtain reliable, unbiased coefficient estimates.

| Predictors | Unstandardised Coefficient (B) | Std. Error | t-value | Sig. (p) | Interpretation |
|---|---|---|---|---|---|
| Constant | 11.794 | 1.271 | 9.277 | 0.000 | Mean ROCE when predictors are centred. |
| Cash Conversion Cycle (CCC_C) | 0.011 | 0.013 | 0.817 | 0.419 | Insignificant positive impact of WCM on profitability |
| Firm Size (FirmSize_C) | 1.494 | 2.021 | 0.739 | 0.465 | Insignificant positive impact of firm size on profitability |
| CCC × Firm Size (CCC_Size_C) | 0.049 | 0.028 | 1.775 | 0.084 | Marginally significant moderating effect (p < 0.10) |

The Durbin–Watson statistic (DW = 1.352) indicated mild positive autocorrelation in the initial regression model. To address this, the model was re-estimated using a Generalised Least Squares (GLS) approach through the Linear Mixed Model (LMM) procedure in SPSS, specifying an autoregressive [AR(1)] covariance structure for repeated firm-year observations. The autoregressive parameter (ρ = 0.476) indicated moderate serial correlation, which the model appropriately adjusted for. The GLS estimation improved model efficiency and reliability, as indicated by lower AIC and BIC values than those of the OLS model. The results expressed that neither the Cash Conversion Cycle (β = 0.011, p = 0.419) nor Firm Size (β = 1.494, p = 0.465) exerted a significant influence on firm profitability (ROCE). However, their interaction term (CCC_Size_C; β = 0.049, p = 0.084) was marginally substantial, indicating that the size of the firm has a positive influence on the association between working capital management and financial performance. This approach modelled the temporal correlation of residuals within each firm, thereby improving the efficiency and reliability of coefficient estimates.

| Model Diagnostics | Value | Interpretation |
|---|---|---|
| AR(1) ρ (Rho) | 0.476 | Moderate positive autocorrelation modelled and corrected |
| Residual Variance | 22.07 | Within-firm variation in ROCE after correction |
| AIC | 211.628 | Lower value indicates better model fit |
| BIC | 215.930 | Lower than OLS, confirming improved model efficiency |

*Summary Table-4*

*Dependent Variable: ROCE (Return on Capital Employed)*
*Estimation Method: REML (Restricted Maximum Likelihood), Covariance Type: AR(1)*
*Number of Firms: 5 | Period: 2014–2020 (Balanced Panel)*

The autoregressive parameter (ρ = 0.476) indicated moderate serial dependence, which the GLS model successfully accounted for. The improved model fit indices (AIC = 211.628, BIC = 215.930) suggest that the GLS model provided more efficient estimation than the standard OLS regression.
Therefore, after accounting for autocorrelation through the GLS-AR(1) model, the results confirm the moderating role of firm size in enhancing the connection between working capital efficiency and firm profitability in the Indian textile sector.

## VII. CONCLUSION AND SUGGESTIONS

The present study investigated the moderating effect of firm size on the relationship between working capital management (WCM) and the financial operation of selected textile firms in India from 2014 to 2020. Using panel data analysis and controlling for classical regression assumptions, the study employed a Generalised Least Squares (GLS) model with an autoregressive [AR(1)] covariance structure to facilitate accurate and impartial parameter estimation.

The results revealed that the Cash Conversion Cycle (CCC), a measure of working capital efficiency, demonstrates an insignificant positive association with the firm's profitability, as measured by Return on Capital Employed (ROCE). This suggests that better working capital efficiency does not automatically translate into increased profitability for the sampled textile firms, possibly due to long cash conversion cycles and the industry's inventory-intensive nature. Similarly, firm size, measured as the natural logarithm of total assets, exhibited an insignificant direct relationship with profitability, suggesting that scale alone does not guarantee better financial outcomes. However, the interaction term between CCC and firm size was shown to be positive and marginally significant, confirming that firm size moderates the correlation between working capital management and profitability. This result implies that larger companies are better equipped to leverage efficient working capital practices, likely due to their stronger bargaining power, improved access to finance, and operational economies of scale.

The diagnostic tests validated the robustness of the estimated model. After addressing multicollinearity through mean-centring, the model satisfied all classical regression assumptions. Heteroscedasticity and autocorrelation were successfully corrected using the GLS (AR(1)) approach, as confirmed by improved model fit indicators (AIC and BIC) and homoscedastic residual patterns. Overall, the findings highlight that firm size plays a meaningful role in strengthening the connection between working capital efficiency and firm performance in the Indian textile sector, thereby supporting the moderating hypothesis.

From a managerial perspective, the findings highlight that efficient working capital management can significantly contribute to profitability, particularly for larger firms that possess sufficient resources and operational flexibility to optimise their short-term assets and liabilities. Conversely, smaller firms may encounter limitations that hinder their capacity to convert working capital efficiency into financial profits.

Although the study effectively accomplished its intended objectives, certain limitations furnish important recommendations for future exploration. Firstly, further investigations might enlarge the sample size and scope by including a greater number of firms from different industries or regions to enhance the overall applicability of the outcomes. Secondly, Researchers may also include additional moderating or mediating variables, such as leverage, liquidity, or operational efficiency, to better explain how working capital management affects profitability. Thirdly, Future studies may consider various alternative measures of profitability, such as Return on Assets (ROA), Return on Equity (ROE), or Tobin's Q, to offer a broader evaluation of firm performance. Fourthly, Future research could conduct a comparative analysis by classifying firms into small, medium, and large categories to examine whether the moderating effect of firm size varies across different firm scales. Lastly, Future endeavors may also make use of sophisticated econometric methods, like dynamic panel models (e.g., Generalised Method of Moments—GMM) or nonlinear regression methods, to capture lagged and asymmetric impacts of working capital management on profitability.

## VIII. REFERENCE

1. Mutunga, D., & Owino, E. (2017). Moderating Role of Firm size on the relationship between Micro Factors and Financial Performance of Manufacturing Firms in Kenya. Journal of Finance and Accounting, 1(2), 14–27. http://erepo.usiu.ac.ke/handle/11732/4257

2. Muigai, R. G., & Muriithi, J. G. (2017). The moderating effect of firm size on the relationship between capital structure and financial distress of Non-Financial companies listed in Kenya. Journal of Finance and Accounting, 5(4), 151–158. https://doi.org/10.11648/j.jfa.20170504.15

3. Mazlan, A. R., & Leng, C. Y. (2018). The Moderating Effect of Working Capital Management on the Relationship between Working Capital Determinants and Firm Performance. Indian-Pacific Journal of Accounting and Finance, 2(1), 38–48. https://doi.org/10.52962/ipjaf.2018.2.1.39

4. Mahmood, F., Han, D., Ali, N., Mubeen, R., & Shahzad, U. (2019). Moderating Effects of Firm Size and Leverage on the Working Capital Finance–Profitability Relationship: Evidence from China. Sustainability, 11(7), 2029. https://doi.org/10.3390/su11072029

5. Dalci, I., Tanova, C., Ozyapici, H., & Bein, M. A. (2019). The Moderating Impact of Firm Size on the Relationship between Working Capital Management and Profitability. Prague Economic Papers, 28(3), 296–312. https://doi.org/10.18267/j.pep.681

6. Yousaf, M., & Bris, P. (2021). Effects of working capital management on firm performance: Evidence from the EFQM certified firms. Cogent Economics & Finance, 9(1). https://doi.org/10.1080/23322039.2021.1958504

7. Yuliani, Y., Karim, S., Umrie, R. H., Bakar, S. W., & Robiyanto, R. (2021). Moderating effect of business environment Accounting & Management to working capital and profitability in Indonesia. Contaduría Y Administración, 66(2), 1–21. https://doi.org/10.22201/fca.24488410e.2021.2480

8. Maeenuddin, Lenny Yusrini Shaari Abd. Hamid, Ahmad Imran Khan, Ghayasuddin, Yusrini, L., Hamid, S. Abd., Khan, A. I., & Ghayasuddin. (2021). Working Capital Management and Firm's Financial Performance (ROCE). Turkish Online Journal of Qualitative Inquiry (TOJQI), 12(9), 1848–1862. https://www.tojqi.net/index.php/journal/article/view/5977

9. Ahmed, A. M., Sharif, N. A., Ali, M. N., & Hágen, I. (2023). Effect of Firm Size on the Association between Capital Structure and Profitability. Sustainability, 15(14), 11196. https://doi.org/10.3390/su151411196

10. Koroma, S., & Bein, M. (2024). The Moderating Effect of Economic Policy Uncertainty on the Relationship between Working Capital Management and Profitability: Evidence from UK Non-Financial Firms. SAGE Open, 14(2). https://doi.org/10.1177/21582440241242552