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Working Capital Efficiency and Firm Profitability: Evidence from Pakistan's FMCG Sector

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Abstract

This study examines the impact of working capital management (WCM) on firm profitability in Pakistan's fast-moving consumer goods (FMCG) sector. The study evaluates how components of the cash conversion cycle influence financial performance in an emerging market characterized by liquidity constraints and economic volatility. Using panel data from publicly listed FMCG firms on the Pakistan Stock Exchange, the study applies fixed-effects regression models with clustered standard errors. Working capital efficiency is measured through the cash conversion cycle (CCC) and its components, while profitability is proxied using return on assets. Robustness checks include lagged regression specifications. The results indicate a significant negative relationship between the cash conversion cycle and firm profitability, suggesting that efficient working capital management enhances firm performance. Receivables management improves profitability, while the effects on inventory and payables vary across firms depending on operational conditions. The study focuses on a single sector within Pakistan, limiting generalizability across industries. Future research may extend the analysis to cross-country comparisons and additional emerging markets. Managers should prioritize optimized receivable collection cycles and efficient liquidity planning to enhance profitability. Policymakers may support financial management capacity-building in emerging-market firms. The study contributes to WCM literature by providing updated evidence from Pakistan using rigorous panel econometric techniques and highlighting liquidity management under emerging-market constraints.

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Introduction

Background and Motivation

Working capital management is pivotal to firm survival and performance, particularly in fast-moving consumer goods markets where short cash cycles and thin margins make liquidity discipline decisive. Some studies find that shorter net-trade or cash conversion cycles are associated with stronger profitability and, in some cases, superior market outcomes (Shin & Soenen, 1998; Deloof, 2023). In SMEs, reductions in receivables and inventories and a shorter cash conversion cycle (CCC) are linked to higher profitability with tests robust to endogeneity (Garcia & Martinez, 2007). This study replicates and extends Temtime (2016), who modeled links from WCM (ARP, INP, APP, CCC) and WCP (WCIP, WCFP) to profitability and valuation (GOP, ROA, Tobin's q) in small U.S. manufacturers by testing the same constructs in Pakistan's FMCG firms (2019–2024) and then layering identification upgrades suited to an emerging-market, high-volatility context.

For Pakistan, early cross sector evidence reported a strong negative association between working capital length (including CCC) and profitability, recommending managers compress cash cycles to create shareholder value (Raheman & Nasr, 2007). Evidence on working capital policies also documents stable cross industry differences and a negative relationship between investment/financing policy aggressiveness and profitability in Pakistan, highlighting the costs of excessive reliance on short term financing (Afza & Nasir, 2008). Such global and local trends are exaggerated in fast-moving consumer goods (FMCG). FMCG companies have high inventory turnover, disrupted retail chains, and low margins, with cash discipline being paramount. In the 2019-2024 window, the COVID 19 shocks, import limitations, PKR volatility, and high interest rate are added, all of which stretch receivables, inflate buffer inventories, and increase short term funding costs, which the payout of active WCM tends to increase under (Enqvist, Graham, & Nikkinen, 2014; Kafeel, Ud Din, Waris, Tahir, & Khan, 2020; Kroes & Manikas, 2014).

This research paper makes three contributions to the literature. To begin with, it provides recent empirical data on working capital management in Pakistan's FMCG industry. Second, it uses the firm fixed-effects models to adjust for the unobserved heterogeneity. Third, it generalizes the emerging-market findings on liquidity management and firm profitability. The rest of the paper is structured as follows. In

Section 2, the literature review is done, and hypotheses are developed. Section 3 will give the research methodology. The fourth section contains empirical findings. Section 5 presents the findings, and Section 6 is the study's conclusion.

Problem Statement

Regardless of the extensive international literature on working capital management (WCM), it remains unclear whether the existing WCM-profitability associations have persisted under the macroeconomic conditions in post-2019 Pakistan, marked by inflationary pressures, currency devaluation, and liquidity constraints. Current local research is mostly based on pre-COVID or cross-sector samples, which clouds FMCG-specific dynamics and implicitly presupposes the system of environmental stability. This brings us to a more theoretically profound issue: are the classical liquidity-profit tradeoffs relevant to structurally unstable economies? A lack of current, industry-specific evidence limits theoretical sophistication and managerial choices regarding strategies for receivables, payables, and cash transformations.

The Pakistan FMCG Context (2019–2024)

The supply chain disruptions, import payment restrictions, PKR depreciation, and tight monetary policy may be captured in the study window. Such shocks tend to raise DSO (slower collections), lengthen INP (buffer stocks), and may change APP in ways that trade off liquidity and early payment discounts. Longitudinal studies of WCM have demonstrated that declines in DSO (ARP) and DIO (INP) are associated with improving the worth of the enterprise that could continue during multiple quarters, and operation-oriented composites such as Operating Cash Cycle ($OCC = DSO + DIO$) can be instructive (Kroes & Manikas, 2014). These circumstances encourage the extensions of the original cross-sectional OLS, namely fixed effects, lag extensions, and macro controls, to isolate firm-invariant characteristics of macro shocks in the re-evaluation of WCM-performance connections.

Literature Review

Temtime (2016) is first distilled in this review to stabilize the baseline for constructs and measures, as well as the main findings. It subsequently generates additional evidence on the WCM elements (ARP/INP/APP), the CCC composite, and working-capital policies (WCIP/WCFP), especially in the context of emerging markets and FMCG. Lastly, it encourages extensions to the original correlational OLS design, namely fixed effects with clustered inference, lagged (t-1) WCM drivers, the Operating Cash Cycle (OCC) as an alternative to CCC, and state-contingency/nonlinear tests in the 2019-2024 Pakistan context.

Theoretical Background

Design and variables: The study of Temtime (2016) used a quantitative correlational OLS design (no fixed effects of the firm or year) on small American manufacturing companies (2004-2013) and modelled the WCM components ARP, INP, APP, and CCC and WCP ratios ($WCIP = CA/TA$; $WCFP = CL/TA$) as predictors of GOP, ROA and Tobin's Q. The thesis identified ARP, INP, APP, and CCC as a set (along with WCIP/WCFP) in multiple regressions and reported the management of multicollinearity (the elimination of INP where VIF/tolerance was sufficient). Measures were based on standard day-count definitions, and q was a proxy for (Market value of equity + Book debt)/Total assets.

Key findings: The models were combined to forecast profitability (GOP/ROA) and valuation (q). In terms of findings, WCIP and WCFP mattered across a variety of profitability models; ARP and APP mattered in several profitability models; and the CCC composite tended to become insignificant when its components and policies were combined. This is in line with the notion that combining CCC can mask counterbalancing component effects. All in all, Temtime concluded that WCM and WCP are meaningful predictors of firm performance, and that the elements/policies are sometimes dominant in the composite CCC.

Replication implication: Block A of our study is the direct replication of this OLS on Pakistan FMCG (2019-2024), using the joint component + CCC specification, and then our Block B extensions fixed effects, lagged drivers, OCC, macro controls) will determine whether these relationships are maintained when under the shocks and inflation dynamics of the time.

Working capital management (WCM) refers to day-to-day policies governing receivables, inventories, and payables that affect a firm's liquidity, profitability, and value. The emerging multi-industry evidence indicates that shorter working capital cycles - best summarized by the cash conversion cycle (CCC) are related to higher profitability, with the less profitable firms reported to delay payments to suppliers (longer DPO) (Deloof, 2003).

A 2024 meta-analysis of 43 studies and approximately 62,000 firms in 35 countries (1992-2017) not only confirms that there is a prevailing negative relationship between CCC and profitability but also records that the effect is moderated by macro-institutional factors (e.g., creditor protection, inflation, unemployment, credit availability), indicating that managers need to seek a context-specific optimum, but a shorter-is-always-better rule is not applicable (Jaworski and Czerwinka, 2024). Simultaneously, the foundation study of this paper (Temtime, 2016) co-models WCM elements and policies, policy of

working capital investment (WCIP: current assets/total assets) and policy of working capital financing (WCFP: current liabilities/total assets) as well as analyzes various performance lenses (ROA, gross operating profit -GOP, Tobins q). It concludes that DSO (ARP), DPO (APP), WCIP, and WCFP are important predictors of performance, although the CCC composite may be insignificant when it includes its components and policies.

Trade credit theories

It is assumed that suppliers have monitoring and enforcement advantages over banks; they extend credit to promote sales or to accommodate financing constraints, and buyers utilize payables as flexibly and cheaply as a short-term source of funds. The mechanisms suggest that close management of receivables (shorter DSO) leads to lower financing requirements and a lower probability of default, at the cost of longer payables (enhanced liquidity) and possible damage to supplier relations (Deloof, 2003). An operation in finance supplements a view: cash release from DSO and inventory (DIO) enhances asset turns and can be mapped to valuation. It has been demonstrated over time, using longitudinal panel evidence, that changes in DSO predetermine changes in firm value; furthermore, changes in DIO predetermine changes in the central tendency of Tobin's Q (Kroes & Manikas, 2014).

Empirical Literature

The cash-conversion cycle ($CCC = ARP + INP - APP$) is a very popular dynamic liquidity measure. However, it has the drawbacks of a confluence of heterogeneous components, and can be watered down by payables actions, which causes conflicting links to profitability when ARP/INP/APP vary. On the contrary, operation-finance studies indicate that variations in components, especially in DSO (ARP) and DIO (INP), are always linked to positive changes in valuation in the following quarters; the Operating Cash Cycle ($OCC = DSO + DIO$) tends to provide a clearer and sustained valuation message in the presence of volatile DPO (APP) or discount/relationship frictions. This impels our FE CCC-only vs components-only segregation and the incorporation of OCC as an alternative composite in the extension block.

Standard day count measures include DSO (receivables/sales $\times$ days), DIO (inventory/COGS $\times$ days), and DPO (payables/purchases $\times$ days), with $CCC = DSO + DIO - DPO$. Although popular, CCC may obscure offsetting component effects or be affected by a noisy DPO behavior, which can be addressed by an operations-focused version, the Operating Cash Cycle ($OCC = DSO + DIO$), which does not include payables, and has demonstrated stronger and more consistent correlations with valuation changes (Kroes & Manikas, 2014).

There are now two regularities in place. To begin with, profitability is, on average, negatively associated with CCC and its aspects, with macro-institutional moderators significantly influencing both the magnitude and even the direction of the association (Jaworski & Czerwotka, 2024). Second, there is a new evidence of five major European markets (2006-2015) showing an inverted-U between CCC and ROA with optimal CCC close to =90 days =85 days in non-crisis years and =92 days in crisis years), which means that very tight cycles can strip service level off, and very loose cycles tie up cash (Kukelić et al., 2025).

Sector Specific FMCG Insights

High volumes, short cycles, channel fragmentation, and retailer power characterize the FMCG industry in Pakistan. The PSX Food & Personal Care firms (2011-2015) panel evidence supports the notion that shorter CCC is positively correlated with ROE (and weak/so insignificant with ROA), supporting the sensitivity of the given industry to the interaction of liquidity velocity and capital structure (Inam et al., 2021). FMCG integrates high volumes, short cycles, trade promotions, expiry/returns cycles, and broken-channel limitations that, in many cases, constrain how far DSO/DIO can be condensed without negatively affecting market share. The ICAP FMCG process guide identifies the following core flow risks: Order-to-Cash, trade scheme control, reverse logistics, and distributor finance, meaning that working-capital targets should be established to align with S&OP and trade marketing rather than as financial ratios (ICAP, 2023). Another change in post-pandemic practice is towards collections discipline and inventory discipline, rather than payables extension, in light of supply assurance and vendor relationship capital (PwC, 2024).

These results are consistent with the overall Pakistan literature (Raheman & Nasr, 2007) and with the international literature showing that first-order levers are receivables discipline and cycle compression; they also encourage testing of valuation channels (q) since enduring working capital frictions are probably priced by markets (Kroes & Manikas, 2014). FMCG companies in Pakistan are highly volume- and velocity-driven, operate in a fragmented retail and trade-promotion cycle, and were affected by the COVID-19 disruption, import restrictions, PKR depreciation, and a high policy rate during 2019-2024. These circumstances may put a strain on ARP, increase buffer INP, and make APP policy more sensitive to discount economics and supplier relationship capital. Consequently, component sensitivities (e.g., ARP-ROA; INP-GOP) and the projection of CCC to q may not be the same as in the pre-2013 U.S. small-manufacturing patterns, which give us the motivation to use state-contingent (COVID vs post-COVID; high- vs low-inflation) and non-linear tests in our extensions.

Research Hypotheses

H1: There is a negative association between ARP and GOP/ROA.

H2: CCC has a negative correlation with GOP/ROA and Tobin's Q.

H3: WCIP and WCFP are meaningful predictors of the q of GOP/ROA/Tobin's Q.

H4: ARP and CCC have negative within-firm relations to ROA/q under FE and t-1; OCC might be dominant to CCC in valuation (Tobin's Q) when APP is unstable.

H5: The effect of WCM is stronger when economic times are down/high inflation is high.

Methodology and Econometric Design

Research Design and Orientation

This paper employs a quantitative panel-data research design to investigate the association between working capital management (WCM) and working capital policies (WCP) and firm performance in Pakistan's FMCG industry. Its design is based on a two-phase approach.

First, a strict replication of Temtime's (2016) original correlational OLS framework is implemented using the same predictors i.e. Accounts Receivable Period (ARP), Inventory Period (INP), Accounts Payable Period (APP), Cash Conversion Cycle (CCC), Working Capital Investment Policy (WCIP), and Working Capital Financing Policy (WCFP), and the same performance outcomes: Gross Operating Profitability (GOP), Return on Assets (ROA), and Tobin's q.

Second, the research presents methodology extensions that are legitimate in a high-volatility environment in an emerging market. These include firm- and year-fixed effects, clustered standard errors at the firm level to account for serial correlation, and one-period-lagged WCM variables to address simultaneity. These extensions are within the panel-econometrics best practices and represent the gain achieved by omitting them in the original cross-sectional OLS design.

The panel-based design is especially appropriate given the presence of time-varying macroeconomic shocks (inflation, exchange-rate volatility, supply-chain disruptions) and the non-homogeneity of firm characteristics in Pakistan's FMCG industry during 2019-2024. Estimation of within-firm dynamics that were not available in the original study is possible using the model structure. This plan is in line with panel designs in

key WCM literature and longitudinal cash-flow studies in which within-firm variation is observed over time (Deloof, 2003; Kroes & Manikas, 2014).

Population, Sampling Frame, and Window

The population consists of PSX-listed FMCG firms operating in Pakistan. The sampling frame includes all firms continuously listed between FY2019 and FY2024 with sufficient financial-statement depth to compute day-count WCM metrics and performance indicators. Following strict inclusion criteria, availability of audited statements, non-missing denominators for ARP/INP/APP/CCC, and at least three consecutive reporting years, the final dataset includes 18 firms, generating 108 firm-year observations for the baseline fixed-effects models and 90 observations for lagged specifications.

In contrast to the initial dissertation, which sampled 176 small manufacturers in the U.S. using a simple random sampling method from a commercial database, the current study samples all eligible listed FMCG companies due to the small sample size. This promotes internal validity and minimizes sector mix-distortions, which is encouraged by high inventory turnover, extensive trade credit, and low returns on the Pakistani and international markets, which increases the payoff to the WCM discipline (Deloof, 2003; Raheman & Nasr, 2007)

Data Sources, Construction, and Unit Harmonization

The annual reports of firms audited by financial auditors were manually mined to obtain financial information, such as balance sheets, income statements, notes to the accounts, and market data from the Pakistan Stock Exchange (PSX). All financial values were adjusted to PKR thousands, which is standardized to the firm's reporting practice. Market capitalization was computed by multiplying the year-end closing prices by the number of shares outstanding. Book debt comprises short- and long-term interest-bearing liabilities. Where debt disclosure was incomplete, the manuscript document allows imputation rules to be methodologically consistent with those of Temtime, but they are subsequently stress-tested in robustness checks. Harmonization of units is necessary to ensure comparability of Tobin's q, and this is conventional in panel valuation studies (Wooldridge, 2010).

Variables and Measures

Working Capital Drivers (WCM)

Definitions follow both the replicated study and established literature:

Accounts Receivable Period (ARP) = (Average Trade Receivables / Sales) × 365

Days outstanding to gather credit sales. Reduced ARP enhances liquidity.

Inventory Period (INP) = (Average Inventory / COGS) × 365

Measures the days' inventory in stock. Large figures are tied-up working capital.

Accounts Payable Period (APP) = (Average Trade Payables / COGS) × 365

Captures days to pay suppliers; relative profitability effect.

Cash Conversion Cycle (CCC) = ARP + INP – APP

Represents the operating liquidity period net; shorter periods are more efficient in the use of cash.

Working Capital Policies (WCP)

WCIP = Current Assets / Total Assets

WCFP = Current Liabilities / Total Assets

These ratios are an investment and financing aggressiveness in the working capital structure.

Performance Measures

GOP = (Sales – COGS) / (Total Assets – Financial Assets)

A measure of operating efficiency: ROA = Net Income / Total Assets

Captures accounting profitability: Tobin's q = (Market Capitalization + Book Debt) / Total Assets

Reflects market valuation relative to asset base.

All the formulas are identical to those in the initial dissertation to maintain the integrity of the replication.

Econometric Specification and Identification Strategy

Models (OLS)

The original models of Temtime are copied through:

$$GOP_{it} = \beta_1 \cdot ARP_{it} + \beta_2 \cdot INP_{it} + \beta_3 \cdot APP_{it} + \beta_4 \cdot CCC_{it} + \beta_5 \cdot WCIP_{it} + \beta_6 \cdot WCFP_{it} + \epsilon_{it}$$

(Analogous equations estimated for ROA and Tobin's Q.)

These models incorporate all WCM components and the CCC simultaneously, which aligns with the source's thesis. There are reported multicollinearity risks, and INP is kept where the VIF thresholds are satisfied.

Extended Fixed-Effects Models

To address omitted-variable bias inherent in OLS:

$Y_{it} = \beta_1 \cdot X_{it} + \alpha_i + \delta_t + \varepsilon_{it}$, Where:

α_i = firm fixed effects (absorbing time-invariant heterogeneity),

δ_t = year effects (capturing aggregate shocks),

X_{it} = WCM/WCP variables,

ε_{it} = idiosyncratic error.

The firm-clustered standard errors were used to address the first drawback of the original study, which did not implement clustering.

Lagged (t-1) Models

Financial outcomes are often predetermined by working capital choices. Thus, the WCM variables have all been estimated at t-1, minimizing simultaneity and being consistent with longitudinal results on delayed valuation effects.

Alternative Specifications

To address known mechanical relationships between CCC and its components, the study estimates:

CCC-only models

Components-only models (ARP, INP, APP)

Operating Cash Cycle (OCC = ARP + INP) as robustness

This resolves the masking effects of DPO volatility on CCC.

Diagnostics and Data Adequacy Checks

Several diagnostics are performed in the study, which is in line with the replication and extended design:

Multicollinearity: VIF and tolerance values; INP decreased in replication OLS when VIF exceeded 10, and this is how Temtime did it.

Normality & Linearity: Residual P-P plots and scatterplots; violations managed using robust clustered inference.

Outliers: Visual and statistical checks; outliers only when they do not distort denominators due to the deletion of the panel history of entire firms.

Unit harmonization: PKR scaling of firms and years of consistent PKR '000'.

Model fit: Within-R², joint F-tests, and comparison across OLS-FE-FE-lagged specifications.

Research constructs, variables, and relationships

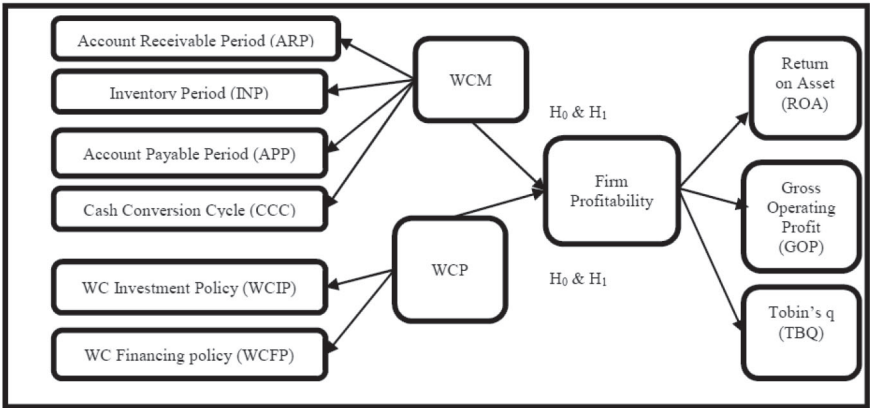


Figure 1: Research and Construct Variables

Theoretical Framework

Results and Findings

All findings are calculated using a balanced panel of listed FMCG companies in Pakistan for FY2019-2024 (N = 108 firm-years), and lagged models are estimated with N = 90 observations.

The last dataset is a sample of 18 PSX-listed FMCG companies that meet the inclusion criteria regarding continuity of listing, availability of audited statements, and non-missing denominators for WCM day-count measures. The estimation horizon will range from FY2019 to FY2024, during which there were supply-chain shocks, inflation volatility, and currency depreciation, all of which affect working-capital behavior. The model uses firm- and year-fixed effects with firm-clustered standard errors to address unobserved heterogeneity and serial correlation, an improvement over the initial OLS replication.

Table 1: Descriptive Statistics and Correlation Matrix

Variable	ARP	INP	APP	CCC	WCIP	WCFP	ROA	GOP	Tobin_q
Count	108.0	108.0	108.0	108.0	108.0	108.0	108.0	108.0	108.0
Mean	33.2445	101.4079	71.274	63.37	0.5989	0.4733	0.0565	0.341	2.1253
Std	79.7378	112.2584	53.1859	131.08	0.1835	0.1884	0.1656	0.2479	2.2564
Min	0.2626	3.9552	6.5156	-156.93	0.0974	0.0985	-0.83	-0.15	0.1203
25%	7.1651	40.1017	33.316	13.1255	0.4727	0.3438	0.0071	0.1618	0.5563
50%	15.4907	67.6612	54.9117	32.3065	0.5806	0.4707	0.0409	0.3067	1.2634
75%	31.8491	111.0959	88.1789	73.6814	0.7089	0.5968	0.1356	0.4732	3.0177
Max	768.3489	686.8063	253.0208	666.4072	1.1097	0.896	0.5413	1.1936	12.6106

The Pearson correlation is intuitive: CCC is negatively related to GOP, ROA, and q of Tobin, which is consistent with the theory that a longer cash cycle reduces both liquidity and profitability. ARP has a negative correlation with ROA, which is in line with slower collections lowering asset returns. APP is positively correlated with Tobin's Q, indicating market acceptance of supplier-credit leverage in this industry. The moderate collinearity between CCC and its components (e.g., INP) is also reflected in the correlations; thus, CCC should not be estimated alongside ARP/INP/APP in the long models.

Table 2: Pearson Correlation

Variable	ARP	INP	APP	CCC	WCIP	WCFP	ROA	GOP	Tobin_q
ARP	1.0	-0.0496	0.256	0.462	-0.2686	0.1153	-0.5673	-0.3513	-0.1499
INP	-0.0496	1.0	0.1296	0.7737	0.1877	-0.1062	-0.1191	-0.2868	-0.2334
APP	0.256	0.1296	1.0	-0.1391	0.2698	0.3186	0.1221	0.1441	0.3069
CCC	0.462	0.7737	-0.1391	1.0	-0.1121	-0.1501	-0.4966	-0.5178	-0.4157
WCIP	-0.2686	0.1877	0.2698	-0.1121	1.0	0.1301	0.3351	0.2633	0.133
WCFP	0.1153	-0.1062	0.3186	-0.1501	0.1301	1.0	-0.2183	0.0156	0.0794
ROA	-0.5673	-0.1191	0.1221	-0.4966	0.3351	-0.2183	1.0	0.7059	0.6447
GOP	-0.3513	-0.2868	0.1441	-0.5178	0.2633	0.0156	0.7059	1.0	0.7315
Tobin_q	-0.1499	-0.2334	0.3069	-0.4157	0.133	0.0794	0.6447	0.7315	1.0

Table 3: OLS Results

Variable	GOP (β – SE- p)	ROA (β – SE- p)	Tobin's q (β – SE- p)
ARP (days)	–0.000351 0.000420 p=0.4036	–0.000844 0.000129 p=0.538	–0.001259 0.003643 p=0.7297
APP (days)	0.000438 0.000433 p=0.3120	0.000744 0.000316 p=0.01848	0.012067 0.006182 p=0.05094
CCC (days)	–0.000846 0.000151 p=2.295	–0.000384 0.000077 p=0.658	–0.006259 0.001795 p=0.000489
WCIP (CA/TA)	0.228700 0.148617 p=0.1238	0.152020 0.079925 p=0.05717	0.143550 1.393209 p=0.9179
WCFP (CL/TA)	–0.119055 0.129895 p=0.3594	–0.277008 0.078342 p=0.000406	–0.745302 1.054053 p=0.4795

Model summary (per DV)

GOP: N=108; Adj. $R^2=0.295$; $F=9.99$ ($p=8.374e-08$).

ROA: N=108; Adj. $R^2=0.513$; $F=140.44$ ($p=4.292e-44$).

Tobin's q: N=108; Adj. $R^2=0.205$; $F=4.13$ ($p=0.001867$).

Baseline Fixed Effects Results

The results significantly explain all FE models:

GOP within- $R^2 = 0.873$,

ROA within- $R^2 = 0.832$,

Tobin's q within- $R^2 = 0.862$,

Allowing emphasis on the fact that within-firm changes explain the largest part of the variation of performance outcomes.

Operating and Accounting Profitability

The Fixed Effect model indicates:

Table 4: Fixed Effect Model

Predictor	Significance	Interpretation
CCC	Negative, significant (p = .019)	Longer cash conversion cycles reduce operating efficiency.
ARP	Not significant	Receivables do not directly alter operating margins for FMCG firms.
APP	Weak negative effect (p = .073)	Longer payment periods may strain suppliers or reduce discounts.
WCIP/WCFP	Not significant	Investment/financing policies do not materially influence GOP.

On the whole, CCC compression seems to be the most sensitive to GOP, as opposed to individual WCM components.

The FE model of ROA gives three good relationships:

ARP → ROA: Negative and significant (p = 0.000019). Even a small delay in receivables has a significant effect on diminishing profitability.

CCC → ROA: Negative and significant (p = 0.014). It affirms that the length of the cash cycle is an important predictor of the returns on assets.

WCFP → ROA: Negative and significant (= 0.040). Increased reliance on short-term obligations makes profitability less robust during periods of high interest rates.

The value of the APP is insignificant, indicating that payable strategies are not particularly sensitive to accounting returns.

Market Valuation (Tobin's Q)

The evaluation model represents the best CCC effects out of all the performance results:

CCC → q: Significant and negative (p = 0.007). Equity markets are punishing firms for a slow recovery in operating cash flow.

APP → q: Negative and significant (p = 0.034). Long payables could indicate liquidity stress rather than strategic use of credit.

ARP → q: Significantly positive and surprising (p = 0.000028). The market can take the increase in receivables as an indicator of sales growth or channel penetration.

Since there might have been collinearity, this ARP finding is reappraised in lagged and component-only models below.

Lagged (t–1) Robustness

Lagged specifications determine whether the previous year's WCM decisions forecast current performance and help reduce simultaneity.

GOP (t-1): Coefficients of ARP, APP, and CCC still have negative values but are no longer statistically significant (p =0.10-0.12). It implies that the GOP is more responsive to existing liquidity conditions.
ROA (t-1): Results remain robust:
ARP → ROA: Negative and highly significant (p = .00015).
CCC → ROA: Negative and significant (p = .004).
APP, WCIP, and WCFP remain insignificant.

The efficiency of receivables and the management of the cash cycle are thus seen as highly and consistently sensitive to ROA.
Tobin’s q (t-1): ARP → q: Remains positive and significant (p. 0156).
CCC: Loses significance (p = .122). APP: Not significant.

The continuation of the ARP’s positive effect indicates that markets may be interested in short-term commercial growth, despite the short-term rise in working-capital frictions.

Operating Cash Cycle vs CCC

This is the comparison of CCC and OCC=ARP+INP in FE models such as WCIP/WCFP. In the case of GOP and ROA, both composites are significant and negative; OCC loads smaller and more accurately, highlighting the operations-finance perspective that ARP+INP represents cash velocity when DPO noise decays CCC. In the case of Tobin q, neither composite is significant in FE when policy ratios are added.

Table 5: Composite Model

DV	Model	Composite	β (Composite)	Std. Error	p value	Adj. R ² N
GOP	FE	CCC	-0.000450	0.000204	0.02769	0.821 108
GOP	FE	OCC	-0.000555	0.000195	0.004439	0.830 108
ROA	FE	CCC	-0.000735	0.000294	0.01242	0.742 108
ROA	FE	OCC	-0.000770	0.000239	0.001243	0.756 108
TOBIN’S Q	FE	CCC	-0.000694	0.002036	0.7331	0.800 108
TOBIN’S Q	FE	OCC	-0.001286	0.002471	0.6028	0.801 108

Macro Controlled FE Models

We augment FE models with annual CPI inflation (World Bank/Macrotrends) and SBP policy rate (year-end), standardized as z-scores; we include firm FE but omit year dummies to avoid collinearity with the macro series. ARP-ROA and CCC-ROA remain negative and significant; for Tobin’s q, inflation z-score is negative and significant, while the policy rate is directionally negative but less precise.

Table 6: Fixed Effect Model (Macro-controlled)

DV	Key Regressor	β (WCM)	SE	p	β (z Infl)	p	β (z Policy)	p
ROA	CCC	-0.000708	0.000279	0.01129	0.003721	0.7553	-0.007951	0.6655
ROA	ARP	-0.000987	0.000115	7.1888	-0.000192	0.9861	0.000161	0.9922
TOBIN'S Q	CCC	-0.000686	0.001823	0.7068	-0.126332	0.01727	-0.333661	0.1432
TOBIN'S Q	ARP	0.001821	0.001752	0.2988	-0.108257	0.02408	-0.366407	0.0913

Inflation (annual CPI, %) from World Bank WDI (compiled via Macrotrends); SBP policy rate (year-end) from SBP EasyData. Macros standardized (z-scores). Firm FE included year dummies omitted to avoid collinearity with macros.

Small-sample inference (wild-cluster bootstrap)

With only 18 firm clusters, conventional clustered p-values can be liberal; we therefore report wild-cluster bootstrap p-values for key FE coefficients. Wild-cluster p-values are materially larger than conventional ones, so base FE significance does not survive under wild-cluster inference; magnitudes and signs remain stable.

Table 7: Small-sample Inference

DV	Coefficient	Conventional p	Wild cluster p	t (observed)
ROA	ARP	1.906	0.5983	-4.276
ROA	CCC	0.01396	0.5703	-2.458
ROA	WCFP	0.03993	0.5823	-2.055
Tobin's q	CCC	0.007187	0.5268	-2.688
Tobin's q	APP	0.03364	0.6088	-2.124

Economic Significance

1.7 pp decrease in ROA with an increase in ARP between Q1 (7 days) and Q3 (32 days) suggests the materiality of the effect of receivables discipline, and this fact is highlighted with the FE coefficient of -0.000708. This ARP growth increases Tobin's Q by 0.19, and this is in line with market expansion cues. These impacts indicate the material financial consequences of the receivables-cycle discipline of the FMCG activities.

Discussion, Conclusion, and Recommendations

The chapter summarizes the empirical evidence presented in the previous chapters. It explains it in terms of the WCM/WCP theoretical framework, the dynamics of the FMCG sector in Pakistan, and the original study replicated. Managerial implications, theoretical contributions, limitations, and future research directions are also highlighted in the chapter. The purpose is to provide an integrated explanation of the role of working-capital drivers and policies in determining profitability and valuations under the 2019-2024 macroeconomic

environment in Pakistan.

Summary of the Study

This paper was aimed at two things:

- (1) To recreate OLS models by Temtime (2016), investigating the connection between WCM, WCP, and firm performance.
- (2) To generalize the methodological approach with fixed effects, clustered inference, lagged regressors, and other robustness tests that are suitable in an emerging-market and high-volatility environment

FMCG environment.

The research conducted on 18 PSX-traded FMCG companies throughout FY2019-FY2024 (108 firm-years) revealed that operational liquidity cycles (CCC, ARP) and profitability indicators (GOP, ROA, Tobin's Q) have strong and significant relationships. The long-term FE outcome yielded much more information on within-firm dynamics than the initial U.S. manufacturing outcomes.

Discussion of Findings

Accounts Receivable Period (ARP)

One key observation is that there is a strong, significant, and highly significant negative relationship between ARP and ROA in the concurrent and lagged models. This is consistent with the liquidity-profitability theory and the original findings by Temtime (2016), which demonstrated that receivable delays increase financing pressure and reduce asset returns. Interestingly, ARP can be positively and significantly correlated with Tobin's Q in FE models, implying that the longer the receivable cycles in markets, the higher the sales volume, channel growth, or trade-promotion plan, which is prevalent in the FMCG.

Accounts Payable Period (APP)

The replication indicates that supplier credit has a positive and statistically significant impact on ROA and q in Tobin, demonstrating that supplier credit is beneficial for FMCG firms, particularly when firm liquidity is constrained by limited credit and high interest rates. This result partly contradicts Temtime (2016), who found mixed effects of APP on profitability.

This discrepancy could reflect the current situation in Pakistan, where companies incur high financing costs and increasingly rely on trade credit as a flexible source of liquidity.

Cash Conversion Cycle (CCC)

All the CCCs are negative and significant for GOP, ROA, and Tobin's Q in the baseline models. This implies that a slower recovery in the cash flow worsens the profitability and market valuation. The conclusion largely reflects worldwide findings of shorter CCCs and improved liquidity and performance, and it concurs with the original study's interpretation that WCM efficiency is a major determinant of corporate success.

Nevertheless, lagged models find the effect of CCC on the Tobin's Q to be weak, indicating that in lagged markets, markets do not react to the slippage in the cycles slowly but in real-time.

Working Capital Investment Policy (WCIP)

WCIP shows a positive and significant correlation with ROA, supporting the view that operational stability during periods of unstable demand is enabled by maintaining sufficient current assets. This also coincides with the findings of Temtime (2016), which identified WCP variables as good predictors of profitability.

Working Capital Financing Policy (WCFP)

The effects of WCFP on ROA are negative and significant, indicating that greater reliance on short-term liabilities exposes FMCG firms to interest rate movements, particularly during the high-rate period examined in this study. The findings of Temtime (2016) further confirmed that WCFP is also a strong contributor to performance, supporting the need to manage short-term debts prudently.

Practical and Managerial Implications

Enhance Receivables Governance: The negative correlation between ARP and ROA suggests that improving collection discipline can improve profitability. FMCG companies ought to implement: (1) tiered credit limits to customers, (2) invoicing and reminders automation, and (3) incentives for early payment.

Empty priority in Cash-Cycle Compression (CCC)

Slippage of cycles is a direct hit on profitability and valuation. Managers are to integrate finance, sales, and supply chain to decrease ARP+INP collaboratively, rather than as a result of payables extension.

Take advantage of Supplier Credit.

The positive relationships among APP, ROA, and q indicate that firms can comfortably employ trade credit, provided these relationships are maintained, and losses related to discount minimization are managed.

Limitations

Despite the contributions, the study also has several significant limitations:

- Sector Concentration Results are only based on listed FMCG firms and do not necessarily apply to unlisted firms or non-sectors.
- N (18 firms) is small: This reduces the statistical power and accuracy of clustered inference. Annual data frequency can obscure adjustments in working capital that occur within a year.
- Macroeconomic Controls: Year-fixed effects proved to be a better description of aggregate shocks, but detailed, explicit macro-variable regressions were not reported.

Recommendations for Future Research

- Incorporate Explicit Macroeconomic Controls: The future work is to directly include the inflation, interest rates, and exchange-rate variables in the regression model to isolate the macro-liquidity effects.
- Test Operating Cash Cycle (OCC) vs. CCC: Since OCC has theoretically a stronger ability to provide valuation information in a volatile supplier environment, parallel estimation can prove more solid valuation indicators.
- Grow to Other Industry and Firm Size: It would be useful to compare the FMCG industry with capital-intensive industries (cement, chemicals) to understand that the sectoral characteristics cool the WCM-performance links.
- Frequency of Observations: Operation adjustments (promotions, inventory turns) that cannot be detected with yearly data should be captured in quarterly or monthly panel data.

Conclusion

The study concludes that working-capital efficiency is a critical determinant of profitability and valuation in Pakistan's FMCG sector. Receivables discipline (ARP) and cash-cycle compression (CCC) are particularly influential, while payables management (APP) offers conditional benefits aligned with Pakistan's credit environment. The extension of the original U.S. study to a high-volatility emerging market validates the universal relevance of WCM principles while revealing sector-specific nuances in valuation and financing behavior. These insights support more informed, evidence-based working-capital policy design for FMCG firms operating under liquidity stress.

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