

Cash Flow Quality and Financial Sustainability: A Contingency Perspective from an Emerging Market

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ABSTRACT

This study investigates the effect of disaggregated cash flow management on financial sustainability, with firm size as a moderator, among listed consumer goods firms in Nigeria. Using a balanced panel of 10 firms from 2016 to 2025, Panel EGLS with Cross-section SUR and Panel-Corrected Standard Errors is applied for Absolute Return on Assets [ABS(ROA)], while Random Effects is used for Tobin's Q [TOBINQ]. Cash flow management is disaggregated into Operating Cash Flow Ratio [OCFR], Cash Flow Adequacy [CFA], and Cash Flow Efficiency [CFE]. Results show that CFA and OCFR significantly improve ABS(ROA), while CFE is insignificant. For TOBINQ, CFA and CFE have significant negative direct effects, while OCFR is positive at 10%. Firm size significantly moderates all three relationships, but the direction differs across sustainability proxies. The findings imply that cash flow quality drives profitability, but market valuation in Nigeria interprets high cash adequacy and efficiency negatively unless deployed by larger firms. The study extends the Pecking Order, Liquidity Preference, and Contingency theories, and provides guidance for managers and regulators.

Keywords: Cash flow management; Cash flow adequacy; Cash flow efficiency; Financial sustainability; Firm size, Nigeria

INTRODUCTION

Corporate sustainability in emerging economies depends on a firm's ability to maintain financial viability over time [Al-Najjar, 2013]. For listed firms, this viability is assessed through two dimensions: accounting profitability and market valuation [Richard et al., 2009]. Both dimensions are ultimately underpinned by cash, which funds obligations, investments, and shareholder returns [Brealey et al., 2020].

While cash flow management is recognized as a strategic imperative [Gitman & Zutter, 2015], treating cash flow as a single construct can mask heterogeneity in effects. Operating cash flow volume, cash flow adequacy, and cash flow efficiency convey distinct information about a firm's liquidity sufficiency and the productivity of its cash [Kargi, 2009; Muritala & Tijani, 2015]. Evidence from developed markets indicates that investors weight cash flow quality more heavily than cash flow volume alone [DeFond et al., 2007].

In Nigeria, listed consumer goods firms face high working capital intensity, foreign exchange constraints, and demand volatility [CBN, 2023; Okafor, Mgbame, & Otalor, 2013]. In such an environment, adequate and efficient cash flows may be more critical for accounting performance than for market valuation, where investors may penalize excess liquidity [Uwalomwa, Olowe, & Olamide, 2012]. Firm size may also condition these effects, because larger firms have greater access to treasury systems, skilled personnel, and capital markets [Cheng & Shiu, 2007; Duru, Iyidiobi, & Ugwu, 2016].

Despite this, Nigerian evidence remains fragmented. Most studies rely on aggregate cash flow measures and examine either profitability or valuation, but not both, and few consider firm size as a moderator (Nwude, Agbo, & Nwude, 2020). Consequently, managers lack guidance on which cash flow attributes to prioritize for accounting versus market outcomes. This study addresses that gap by examining the effect of disaggregated



cash flow management on financial profitability (absolute ROA) and valuation (Tobin's-Q), with firm size as a moderator, among 10 listed Nigerian consumer goods manufacturing firms from 2016 to 2025.

The study contributes in three ways. First, theoretically, it extends the Pecking Order Theory, Liquidity Preference Theory, and Contingency Theory by disaggregating cash flow and incorporating firm size as a contingency. Second, empirically, it provides Nigerian evidence on the differential relevance of cash flow attributes for profitability versus valuation. Third, practically, it informs financial managers, investors, and regulators on which cash flow signals matter most in an emerging market context [FRCN].

The rest of the paper is organized as follows. Section 2 reviews literature and develops hypotheses. Section 3 describes data and methods. Section 4 presents results, and Section 5 concludes with implications and limitations.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Theoretical Framework

This study is anchored on three theories. The Pecking Order Theory [POT] posits that firms prefer internal funds to external finance because of information asymmetry [Myers & Majluf, 1984]. Thus, strong cash flow adequacy and efficiency should reduce reliance on costly external capital and improve profitability and valuation. Second, Liquidity Preference Theory [Keynes, 1936] argues that firms hold cash for transaction, precautionary, and speculative motives. Firms with higher cash flow adequacy can meet obligations without distress, while cash flow efficiency reflects the productivity of cash. Third, Contingency Theory (Chenhall, 2003) suggests that the effectiveness of financial practices depends on organizational context. Firm size is a key contingency because larger firms have superior access to treasury technology, skilled personnel, and capital markets, which can amplify the benefits of effective cash flow management [Cheng & Shiu, 2007; Donaldson, 2001; Duru, Iyidiobi, & Ugwu, 2016].

Conceptual Review and Empirical Evidence

Cash Flow Management Dimensions

Cash flow management is multidimensional. Operating Cash Flow Ratio [OCFR] measures the ability of operating cash to cover short-term liabilities. Cash Flow Adequacy [CFA] captures sufficiency of operating cash to fund capital expenditure, debt service, and dividends. Cash Flow Efficiency [CFE] reflects the conversion of cash into earnings [Kargi, 2009; Muritala & Tijani, 2015]. Although OCFR does not reflect quality on its own, following Kargi (2009), OCFR is included as a baseline volume measure to isolate the incremental effect of quality attributes.

Empirical evidence is mixed. Muritala and Tijani (2015) found that CFA and CFE significantly improved profitability of Nigerian manufacturing firms, while OCFR was insignificant. Akande and Yadirichi (2017) reported a positive effect of aggregate cash flow on profitability, but did not disaggregate. Internationally, DeFond, Hung, and Trezevant (2007) show that investors price cash flow quality more than cash flow volume, suggesting differential effects on valuation.

Financial Sustainability: Profitability and Valuation

Financial sustainability is operationalized as absolute Return on Assets [ABS(ROA)] and Tobin's Q. ABS(ROA) captures accounting returns, while Tobin's Q reflects market expectations of future cash flows [Chung & Pruitt, 1994; Richard, Devinney, Yip, & Johnson, 2009]. Following Lang and Maffett (2011), we use the absolute value of ROA to capture the magnitude of accounting performance irrespective of sign, focusing on earnings variability rather than direction.

Studies linking cash flow to ROA in Nigeria report positive but context-dependent effects. Nwude, Agbo, and Nwude (2020) found that operating cash flow improved ROA for consumer goods firms, but did not test



adequacy or efficiency. On valuation, evidence is scarcer. Okafor, Mgbame, and Otalor (2013) argue that foreign exchange volatility weakens the cash flow–valuation link in Nigeria, implying that only high-quality cash flows are rewarded by the market.

Moderating Role of Firm Size

Firm size is often used as a control, but less as a moderator. Duru et al. (2016) show that larger Nigerian manufacturing firms convert resources to performance more effectively. Cheng and Shiu (2007) argue that size proxies for access to finance and governance quality. We therefore expect size to strengthen the positive effect of cash flow management on sustainability.

Hypotheses Development

Based on the Pecking Order Theory [Myers & Majluf, 1984] and Liquidity Preference Theory (Keynes, 1936), we expect cash flow attributes to influence sustainability. However, given mixed international evidence on valuation effects [DeFond, Hung, & Trezevant, 2007], we test the following:

H_{1a}: Operating cash flow ratio does not have any significant effect on financial sustainability.

H_{1b}: Cash flow adequacy does not have any significant effect on financial sustainability.

H_{1c}: Cash flow efficiency does not have any significant effect on financial sustainability.

Drawing on Contingency Theory, we expect firm size to moderate these relationships:

H₂: Firm size significantly does not moderate the relationship between cash flow management and financial sustainability.

METHODOLOGY

Research Design and Population

This study adopts an *ex post facto* research design because the variables have already occurred and are not subject to manipulation. The population consists of all consumer goods firms listed on the Nigerian Exchange Group [NGX] as at December 31, 2025. As at that date, there were 21 consumer goods firms listed on the NGX [NGX]. A purposive sample of 10 firms was selected based on data availability for the period 2016 to 2025. The 10-year period provides sufficient observations for panel estimation and captures pre- and post-COVID-19 economic conditions in Nigeria [CBN]. The study thus yields a balanced panel of 100 firm-year observations.

Sources of Data and Measurement of Variables

Secondary data were extracted from audited annual reports and financial statements of the sampled firms, and from the NGX Factbook [NGX]. All variables are defined in Table 1.

Table 1: Summary of Variable Measurements

Variable	Type	Measurement	Justification
i. Operating Cash Flow (OCFR)	Ind. Var.	Net CFO / Current Liabilities	Measures liquidity and short-term solvency (Kargi & Isijola, 2020)
ii. Cash Flow Adequacy (CFA)	Ind. Var.	(Net CF from Operating Activities)/(CAPEX + Debt Repayment + Cash Dividend paid)	Assesses internal cash sufficiency for growth and obligations (Gombola & Ketz, 1983)

iii.	Cash Flow Efficiency (CFE)	Ind. Var.	Net CFO / Net Sales	Captures operational cash conversion efficiency (Onaolapo & Kajola, 2010)
iv.	Financial Profitability (ABS(ROA))	Dep. Var	Absolute Profit-After Tax/Total Asset	Measures asset utilization efficiency performance irrespective of sign (Lang & Maffett, M. 2011)
v.	Financial Valuation (TOBINQ)	Dep. Var.	[Book Debt + Market Equity] / Total Assets	Reflects market perception of future sustainability (Lindenberg & Ross, 1981)
vi.	Firm Size (SIZE)	Mod. Var.	Ln(Total Assets)	Controls for scale effects and reduces skewness (Akeem et al., 2014)

Model Specification and Analytical Techniques

To account for the joint determination of profitability and valuation and the likely correlation of error terms across equations, the study specifies a system of Seemingly Unrelated Regression [SUR] equations following Zellner (1962). The SUR framework is more efficient than equation-by-equation Ordinary Least Squares [OLS] when $Cov(\epsilon_{1,it}, \epsilon_{2,it}) = 0$ [Wooldridge, 2010].

The empirical models are specified as:

$$ABS(ROA)_{it} = b_0 + b_1OCFR_{it} + b_2CFA_{it} + b_3CFE_{it} + b_4SIZE_{it} + b_5(OCFR * SIZE)_{it} + b_6(CFA * SIZE)_{it} + b_7(CFE * SIZE)_{it} + \epsilon_{it} \quad \text{----- Model 1}$$

$$TOBINQ_{it} = \lambda_0 + \lambda_1OCFR_{it} + \lambda_2CFA_{it} + \lambda_3CFE_{it} + \lambda_4SIZE_{it} + \lambda_5(OCFR * SIZE)_{it} + \lambda_6(CFA * SIZE)_{it} + \lambda_7(CFE * SIZE)_{it} + \mu_{it} \quad \text{----- Model 2}$$

Where $b_1 - b_3$, $\lambda_1 - \lambda_3$ = slope coefficients to be estimated; b_0 , λ_0 = intercepts; ϵ_{it} , μ_{it} = Error terms.

Model 1 is estimated with Cross-section SUR and Panel-Corrected Standard Errors to address heteroscedasticity and contemporaneous correlation [Beck & Katz, 1995]. Model 2 is estimated with Cross-section Random Effects using the Swamy-Arora estimator, following the Hausman test result which favored Random over Fixed Effects. This dual approach allows for the different error structures of accounting and market-based measures.

Prior to estimation, diagnostic tests are conducted. Multicollinearity is assessed using the Variance Inflation Factor [VIF], with a threshold of 10 [Gujarati & Porter, 2009]. Cross-sectional dependence is tested using Pesaran's test. Heteroscedasticity is tested using the Modified Wald test for group-wise heteroscedasticity. All analyses are performed using E-views 10.

RESULTS

Univariate Analysis

Table 2: Descriptive Statistics of the Study's variables

	ABS(ROA)	Tobin's Q	CFA	CFE	OCFR	SIZE
Mean	0.067352	278.7172	1.409701	0.075398	0.214452	5.290568
Median	0.087471	250.5221	1.373214	0.067765	0.224179	5.215880
Maximum	0.379562	1273.474	2.045455	0.153846	0.324324	6.810142



Minimum	-0.359098	28.94074	1.066667	0.042553	0.114583	3.970292
Std. Dev.	0.149310	218.2954	0.224415	0.027885	0.064446	0.852345
Skewness	-0.860077	2.038767	0.772723	1.143449	-0.078877	0.124827
Kurtosis	3.799329	9.760453	3.222296	3.429250	1.665378	1.567194
Jarque-Bera	14.99108	259.7084	10.15758	22.55897	7.525431	8.813585
Probability	0.000556	0.000000	0.006227	0.000013	0.023221	0.012194
Observations	100	100	100	100	100	100

Source: Researcher's Computation via E-views 10

The mean ABS(ROA) of 6.7% indicates modest profitability, with negative skewness suggesting loss-making observations. Mean CFA of 1.410 implies operating cash flow was sufficient to cover investment and financing needs on average. Mean CFE of 0.075 and OCFR of 0.214 indicate moderate cash conversion and liquidity coverage. Tobin's Q exhibits high variability and positive skewness, consistent with market valuation differences. The Jarque-Bera test rejects normality for all variables at the 5% level, warranting the use of robust standard errors in subsequent estimations.

The descriptive results reveal three key patterns. First, financial sustainability proxies are volatile: ABS(ROA) exhibits negative earnings episodes while Tobin's Q shows extreme market valuations, both non-normal. Second, cash flow management is relatively stable: OCFR and CFA have means above benchmark thresholds and low dispersion, suggesting Nigerian consumer goods firms generally maintained liquidity and coverage capacity. CFE is low but consistent with sector margins. Third, most variables deviate from normality, particularly Tobin's Q and ROA. This justifies the use of panel data techniques robust to non-normal errors, winsorization of outliers, and log transformation of size. The presence of variation in all variables provides sufficient spread for regression analysis to test the effect of cash flow management dimensions on financial sustainability, moderated by Firm Size.

Bivariate Analysis

Table 3: Correlation Matrix of the Study Variables

Correlation						
Probability						
Observations	ABS(ROA)	TOBINQ	CFA	CFE	OCFR	SIZE
ABS(ROA)	1.000000					

	100					
TOBINQ	0.010534	1.000000				
	0.9172	-----				
	100	100				
CFA	0.009728	0.491000	1.000000			
	0.9235	0.0000	-----			
	100	100	100			

CFE	0.071436	0.371900	0.697298	1.000000		
	0.4800	0.0001	0.0000	-----		
	100	100	100	100		
OCFR	0.059800	0.413275	0.602648	0.617158	1.000000	
	0.5545	0.0000	0.0000	0.0000	-----	
	100	100	100	100	100	
SIZE	0.034516	0.307042	0.274732	-0.073725	0.666838	1.000000
	0.7332	0.0019	0.0057	0.4660	0.0000	-----
	100	100	100	100	100	100

Table 3 presents the Pearson correlation matrix for the study variables. The results show low correlations between ABS(ROA) and all cash flow variables, with the highest being CFE [$r = 0.071$, $p > .05$]. Tobin's Q is significantly correlated with CFA [$r = 0.491$, $p < .01$], CFE [$r = 0.372$, $p < .01$], OCFR [$r = 0.413$, $p < .01$], and SIZE [$r = 0.307$, $p < .01$]. Among the independent variables, the highest correlation is between OCFR and SIZE [$r = 0.667$, $p < .01$], and between CFA and CFE [$r = 0.697$, $p < .01$].

To assess multicollinearity, the Variance Inflation Factor was computed.

Table 4: Multicollinearity Diagnostics for Independent Variables

Variable	Tolerance	VIF
CFA	0.436	2.29
CFE	0.405	2.47
OCFR	0.426	2.35
SIZE	0.522	1.91

All VIF values are below the threshold of 10, with a mean VIF of 2.18 [Table 4], indicating that multicollinearity is not a concern [Gujarati & Porter, 2009]. The correlation and VIF results suggest that the independent variables are sufficiently distinct for inclusion in the SUR model.

Panel Regression Results and Hypothesis Testing

To examine the effect of cash flow quality on financial sustainability, two models were estimated using Panel EGLS. Model 1 employed Cross-section SUR with PCSE for Absolute Return on Assets [ABS(ROA)], while Model 2 used Cross-section Random Effects with the Swamy-Arora estimator for Tobin's Q [TOBINQ]. Firm size was introduced as a moderator through interaction terms. The results are presented in Table 5.

The models exhibit strong explanatory power, with R-squared values of 0.871 and 0.622 for ABS(ROA) and TOBINQ respectively, and both F-statistics are significant at 1%.

The results indicate mixed effects of cash flow quality on financial sustainability, depending on the proxy used. For profitability, CFA and OCFR exhibit significant positive effects on ABS(ROA) at 5% and 1% levels respectively, while CFE is negative and insignificant. Therefore, we reject H_{0a} and H_{0b} , but fail to reject H_{0c} for ABSROA. For TOBINQ, we reject H_{0a} and H_{0b} , and reject H_{0c} at the 1% level.

Table 5: Panel Regression Results for Financial Sustainability

Variable	ABS(ROA) Coef.	TOBINQ Coef.
C	0.062 (1.543)	2201.080*** (5.017)
CFA	0.056** (2.166)	-898.003*** (-2.802)
CFE	-0.02 (-0.975)	-32729.040*** (-4.212)
OCFR	0.557*** (7.709)	5613.729* (1.846)
SIZE	-0.091*** (-11.827)	-427.796*** (-4.676)
CFA*SIZE	0.054*** (11.769)	203.454*** (3.203)
CFE*SIZE	-0.049** (-2.393)	7090.162*** (5.354)
OCFR*SIZE	-0.019 (-1.567)	-1258.296*** (-2.703)
R-Squared	0.871	0.622
Adj-R Squared	0.862	0.594
F-Statistic	92913.160	21.672
Observations	100	100

Note. T-statistics in brackets; *, **, *** denote significance at 10%, 5%, and 1% respectively. ABS(ROA) = Absolute Return on Assets; TOBINQ = Tobin's Q; CFA = Cash Flow Adequacy; CFE = Cash Flow Efficiency; OCFR = Operating Cash Flow Ratio; SIZE = Ln(Total Assets).

Regarding moderation, firm size significantly strengthens the positive effect of CFA on both ABS(ROA) and TOBINQ, as evidenced by the positive and significant interaction terms. This leads to rejecting H_0 for H_{2a} . For CFE, the interaction is negative and significant for ABS(ROA), but positive and significant for TOBINQ, thus proving grounds for rejecting H_0 for H_{2b} but indicating a differential effect across sustainability measures. The interaction between OCFR and SIZE is insignificant for ABS (ROA) but negative and significant for TOBINQ; thus we fail to reject H_0 for H_{2c} with respect to ABSROA, but reject H_0 for H_{2c} with respect to TOBINQ.

DISCUSSION OF FINDINGS

The findings reveal that cash flow attributes are important determinants of financial sustainability in Nigerian consumer goods firms, but their influence is contingent on the sustainability measure and firm size. The positive and significant effect of Cash Flow Adequacy [CFA] and Operating Cash Flow Ratio [OCFR] on ABS(ROA) aligns with the Liquidity Preference Theory, which posits that firms with adequate internal cash flows are better positioned to meet short-term obligations and invest profitably without recourse to costly external finance (Keynes, 1936). This result is consistent with Atrill (2006), who found that operating cash flow enhances accounting performance, and with Nwude et al., (2020), who reported a positive link between cash flow and profitability among Nigerian firms.

Conversely, the significant negative relationship between CFA and CFE with Tobin's Q appears counterintuitive but can be explained through the Pecking Order Theory. Firms that retain high levels of cash adequacy and efficiency may be perceived by the market as lacking profitable investment opportunities, leading to lower market valuation (Myers & Majluf, 1984). This is corroborated by Jensen (1986), who argued that excess cash flow could signal agency problems if not deployed into value-creating projects. The positive effect of OCFR on TOBINQ suggests that investors value cash generated from core operations as a credible signal of financial health (Dechow, 1994).

The moderating role of firm size is central to this study and provides empirical support for Contingency Theory (Chenhall, 2003). The positive CFA_SIZE and CFE_SIZE coefficients for TOBINQ indicate that

larger firms are able to convert cash flow quality into market value, possibly due to better governance structures, economies of scale, and access to capital markets. In contrast, the negative CFE_SIZE effect on ABS(ROA) implies that efficiency improvements yield diminishing accounting returns for larger firms, perhaps because they are already operating at optimal cash conversion cycles.

The negative OCFR_SIZE effect on TOBINQ further suggests that as firms grow, the marginal market value of additional operating cash flow declines. This may reflect investor expectations that large firms should already generate substantial cash flows; hence additional increases do not provide new information.

In summary, the study concludes that cash flow adequacy and volume are primary drivers of accounting sustainability, while firm size determines how the market interprets cash flow quality. This has practical implications for financial managers in the Nigerian consumer goods sector: improving cash flow adequacy enhances profitability, but communicating how such cash is deployed is critical for influencing market valuation, especially for large firms.

CONCLUSION AND RECOMMENDATION

Conclusion

This study examined the effect of cash flow quality on financial sustainability of quoted consumer goods firms in Nigeria from 2016 to 2025, with firm size as a moderator. Using Panel EGLS with Cross-section SUR for ABS(ROA) and Random Effects for Tobin's Q, the results indicate that the relationship between cash flow and sustainability is neither uniform nor linear.

The study concludes that Cash Flow Adequacy and Operating Cash Flow Ratio are significant positive drivers of accounting-based sustainability, as proxied by ABS(ROA). However, Cash Flow Adequacy, Cash Flow Efficiency, and firm size have significant negative direct effects on market-based sustainability, proxied by Tobin's Q. The significant positive interactions of CFA_SIZE and CFE_SIZE with TOBINQ, and the negative OCFR*SIZE interaction, confirm that firm size is a critical contingency factor that alters how cash flow qualities are translated into financial sustainability.

Therefore, while adequate operating cash flows enhance profitability, their interpretation by the capital market is contingent on firm size and the efficiency with which such cash is utilized. The findings support the Liquidity Preference Theory, Pecking Order Theory, and Contingency Theory, and provide evidence that financial sustainability in Nigeria's consumer goods sector cannot be understood without considering both cash flow dynamics and firm size.

Recommendations

Based on the findings, the following recommendations are made:

- 1) Enhance Cash Flow Adequacy and Operating Cash Flow:** Management of consumer goods firms should prioritize policies that improve the adequacy and volume of operating cash flows, such as efficient working capital management and cost control. This will directly strengthen profitability and long-term viability.
- 2) Strategic Deployment of Cash Flows:** Given the negative market reaction to high cash adequacy and efficiency, firms, particularly large ones, must clearly communicate their investment plans to the market. Retained cash should be channeled into value-creating projects to avoid the perception of agency costs or lack of growth opportunities, as suggested by Jensen (1986).
- 3) Size-Contingent Financial Strategy:** Large firms should leverage their scale to convert cash flow efficiency into market value, through improved corporate governance and investor relations. Smaller firms, on the other hand, can gain more from improving cash flow efficiency to enhance accounting performance.
- 4) Policy Implication for Regulators:** Regulatory authorities such as the Financial Reporting Council of Nigeria should encourage enhanced disclosure of cash flow utilization in annual reports. This will enable investors to better assess how cash flows contribute to sustainability across firms of different sizes.



Limitations and Suggestions for Future Research

This study is limited to 10 consumer goods firms quoted on the NGX over a 10-year period. Future studies could extend the sample to other sectors and employ longer time frames. Additionally, other moderators such as corporate governance mechanisms or leverage could be examined to provide a more nuanced understanding of the cash flow–sustainability nexus.

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