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Cash Flow Optimality and Investment Returns: Investors Expectations in Listed Manufacturing Firms in Nigeria

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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ABSTRACT

This study investigated the effect of cash flow optimality on investment returns in selected listed Manufacturing companies in Nigeria. The population consisted of listed 66 manufacturing companies on the Nigerian Stock Exchange. 25 of these manufacturing companies were purposively selected for a period of 10 years (2010-2019). The study employed data obtained from the published financial statement of the selected manufacturing companies. Panel data analysis was employed while diagnostic tests were carried out and an application of the Hausman test provided the criteria for choosing between Random Effect Models and Fixed Effect Models. Jarque-Bera Normality, Breusch, and Pagan Lagrangian multiplier tests were conducted to confirm the Hausman test results in order to decide between Random Effects and Pooled OLS. The study found that cash flow optimality had a positive statistically significant on return on assets, $AdjR^2$ = 0.099; $Wad\text{-}chi^2_{(4, 245)}$ = 22.22; *P-value* = 0.000). Furthermore, the study revealed that cash flow optimality exhibited a positive statistical effect on Tobin's Q, ($AdjR^2$ = 0.130; $F_{(4, 245)}$ = 2.884; *P-value* = 0.025). Thus, the study recommended that since the essence of investment is the expected returns, managers of manufacturing companies should ensure that all strategic decisions are channeled towards this direction, and ensure efficient resources management and cash flow optimal management towards meeting investor returns expectations.

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Keywords: Cash flow; cash ratio; current assets; investment returns; return on assets.

1. INTRODUCTION

Globally, investors are interested in wealth maximization and higher investment returns and at the same time expect stable financial improvement and underlying economic performance in terms of profitability, stability, the potential for growth and robust returns. The extent of investment returns, prospects are major determining in assessing the overall efficiency, competence and optimal utilization of the company's resources. The case of investors' higher investment returns expected in the form of higher returns on assets and market financial performance are problematic and multifaceted for managers to easily meet [1]. Managers of manufacturing companies in Nigeria are faced with myriad challenges of economic instability, regional insecurity and harsh economic policies which often have destabilizing effects on sustainable economic performance. This phenomenon is not only peculiar to Nigeria, they are also prevalent in other developing economies which are faced with terrorist activities and political upheavals [2,3]. Many of these manufacturing companies struggle to meet manufacturing products which demand huge financial requirement, inadequate capital requirements and lack of cash flow challenge and liquidity management, and these issues significantly have adverse effects on the performance and expected returns of the manufacturing companies.

Prior studies have made attempts to explain the effects of cash flows on meeting investment returns and performance of manufacturing companies [4,5,6,7,8]. According to these studies, adequate and pragmatic optimality of cash flows, efficient and optimal assets utilization and managerial competence of leaders who are entrusted with these financial concerns have been evidenced in reducing these challenges [3]. Mixed results have been documented, [9] conducted an investigation on the implications of a firm's working capital management practice on its profitability and dividend payout ratio. The study found a negative significant relationship between cash conversion, debt collection period and performance in terms of profitability. Similarly, from the Pakistan economy, [10] conducted an investigation on the impact of working capital management on the financial performance of fifty (50) listed non-financial companies in Pakistan. The investigation of these scholars revealed a significant positive effect of cash flow on investment returns and financial performance which is consistent with the study of [7].

The objective of this study is to expand the frontiers of the existing studies by investigating the effects of cash flows on meeting expected returns on investments. The expectation of every investor is high returns and this is realized through a robust wealth creation drive. Some of the investment measures used to ascertain the level of investment returns in this study is return on assets as a measure of the extent of assets utilization and Tobin's Q as a market measure of financial performance of the manufacturing companies. The rest of the study is considered in this form: Section 2 considered the relevant extant literature on the conceptual, theoretical and empirical perspectives of this research. Section 3 focused on the methodology and measurement of variables and research models which were presented. Section 4 presented the data analysis, results, and discussions of findings while section 5 presented the conclusion and recommendations of the study.

2. EXTANT LITERATURE

2.1 Investment Returns

The concept of investment returns have been considered from the perspective of earnings quality, financial performance, stock growth, market share price, return on assets, return on equity and many more [11]. Shareholders wealth maximization model in pursuance of the main corporate objective might be expressed as a motivator for the financial objective of the public corporation, such as wealth maximization as well as profit maximization at the same time. The commonly used financial objectives are to maximize shareholders' wealth, profitability, and growth in earnings per share. From the perspective of growth in earnings per share, a growth in earnings per share would mean more profit to pay out in dividend per share, or there will be more retained profits to reinvest with the intention of increasing earnings per share even more in the future [12,13]. This study had considered investment returns from the perspective of return on assets (ROA) and financial performance as measured by Tobin's Q. Consequently, the study measures investment returns using return on assets and Tobin's Q as a surrogate to financial performance.

2.1.1 Return on assets

Return on assets shows the relative profitability of the business. The ratio is similar to return on capital employed except that total assets are used in the denomination instead of capital employed. The ratio of return on assets compares the profit for the period with the total assets employed by the company in generating the profit during the same period. That is, it measures the amount of return earned on every one naira invested in assets by the companies. The study of [14] stated that return on assets (ROA) is a measure of the effective and efficient utilization of the company's assets to generate revenue [15,12].

2.1.2 Tobin's Q

Tobin's Q as a proxy for financial performance is a theory first postulated by James Tobin in 1969 used in traditional economic theory [14]. It specifies the percentage of the firm's financial performance as reflected in the market value to the replacement cost of the firm value. In other words, financial performance could be referred to as the degree to which a company's overall objectives including financial goals have been achieved [16]. It could also include the ability to measure the results of a company's policies and set operations in monetary terms. Financial performance, ideally, measures the general financial and economic health condition of a company over a given period of time, and could as well be used to compare similar companies within and across the same industry or sector. [16] Further argues that profitability is the most common measure of the company's financial performance.

2.1.3 Cash flow optimality

Evidently, the manufacturing company's problems of higher financial performance have a strong root on the inability to optimize cash flows. Cash flow optimality is a high level of competence and efficient in managing cash and cash management [17]. The case of poor cash management leads to illiquid and shortage of sufficient cash in meeting daily liquidity requirements. In addressing these anomalies in a manufacturing setting predominant issues in developing countries, adequate cash flow optimality is expected. This study considered three explanatory variables as proxies to measure cash flow optimality: cash ratio, cash conversion cycle, and current ratio.

2.1.4 Cash ratio

The concept of cash ratio is the most liquidity asset in the financial statements of the manufacturing companies [3]. Basically, it aimed at providing means of showing when creditors and debtors are paid approximately within the same time in a period of one year. Essentially, a cash ratio lower than 1 does sometimes indicate that a company is at risk of having financial difficulty. However, a low cash ratio may also be an indicator of a specific strategy of a company to have a low cash reserve.

2.1.5 Cash conversion cycle

Cash Conversion Cycle refers to the extent of time in days between manufacturers' payment for trade payables and collections from trade receivables [17]. Ideally, trade receivables are affected by the credit collection policies and rate of recurrence of the conversion of receivables into cash. Where there is a policy within the organization to grant customers a more liberal period, profitability may increase but at the expense of liquid assets.

2.1.6 Current ratio

In this study, cash ratio is a cash flow explanatory variable that measures manufacturers' short term solvency. It indicates the availability of current assets for every current liability. In general terms, it compares assets that will become liquid in approximately twelve months with liabilities that will be due for payment in the same period. It shows the extent to which claims of short-term creditors are covered by assets that will be converted into cash soon. The higher the ratio, the greater the margin of safety for short term creditors. A normal industry average for current ratio is 2:1. However, it depends on the industry concerned and the type of activities undertaken by the company, and such may not be the case in most situations. In the manufacturing sector, companies are very sensitive to a shortage of cash.

2.2 Theoretical Underpinning

The underpinning theory of investment profitability theory suggests that every investor is a concern with investment returns as a reflection of the financial performance of the establishments. Profitability theory developed by Clark in 1847 laid emphasis on economic analysis of profit and its clear future impact on

the going concern of companies [18]. According to Clark's theory of profitability, the underlying assumptions of investments are returns and nation economies hang on ability of investments to yield returns and this motivates economic investments. Apparently, without profit intentions, meaningful investment will suffer setbacks. Clark further postulated that absence of profitability in investments, nations are likely to witness abnormality market conditions, static state economies, and unpredictable factors of production concerns [19]. The theory highlighted that economies driven by profits will not suffer changeless as there will always be a time lag. It is this frictional delay that the investor takes advantage of and make transactional profits before equilibrium returns and consumes expected profits.

2.3 Empirical Review

Al-Nimer and Warrad [20] examined whether liquidity through quick ratio has any significant impact on the profitability of Jordanian banks through return on asset (ROA). The study used 2005-2011 financial reports of 15 Jordan banks listed at Amman Stock Exchange (ASE). The study revealed that there was a positive significant impact of the independent variable quick ratio on the dependent variable of return on asset (ROA). That means that return on assets (ROA) in Jordan banks was significantly influenced by the rate of liquidity.

Kadioglu et al. [21] conducted an investigation to examine the effects of cash flow on the profitability of listed companies in Borsa Istanbul. The study obtained data from selected sampled listed companies on the Borsa Istanbul Stock Exchange. The study employed a panel data consisting of 2,175 observations for a period of 7 years (2009-2015), measuring profitability using Tobin's Q. In conclusion, the study found that cash flow had a negative significant effect on firm performance (Tobin's Q) in its profitability drive. The study also found that greater cash flow is in the managers' led to lower performance and inversely resulting in less Tobin's Q. The result also showed that leverage and regular annual dividend payment had a positive effect on performance.

Bararuallol and Aba [1] examined the tendency of prioritizing management of listed companies on Indonesia Stock Exchange to allocate free cash flow. The study employed a survey research design using a structured questionnaire administered to 23 companies selected from Indonesia Stock Exchange. The questionnaire was based on economic situations of Stability, better, worse, and uncertainty. It also considered economic situations faced with allocating free cash flow of payment of cash dividend, buy back stock, and make acquisitions, purchase of financial assets and distribution of cash to other areas of investment such as mutual funds. The study found that due to a worsening economic situation, the listed companies prefer to purchase shares and investments in other business fields, and then followed by the purchase of financial assets and acquisitions and payment of cash dividends in the final choice.

Ogundipe et al. [22] conducted a study, examining the association between cash holding and firm characteristics. The study sampled 54 Nigerian firms listed on the Nigerian Stock Exchange for a period of 15 years (from 1995-2010) by applying co-relational research design. The results show that cash flow, net working capital, leverage, profitability, and investment in capital expenditure, significantly affect the corporate cash holdings in Nigeria. The study, therefore, contributes to the literature on the factors that determine corporate cash holdings. The findings may be useful for financial managers, investors, and financial management consultants [23].

Inyiama et al. [23] conducted an investigation on the effect of optimal cash level on return on investment of some selected brewery companies in Nigeria. The study employed expos facto research design using secondary data sourced from the annual report and financial statement of the selected brewery companies of Nigerian Breweries Plc, Guinness Nigeria Plc, and International Breweries Plc for a period of eleven years (2005-2015). The objectives are to ascertain the effect of cash holdings on ROI. The hypothesis was formulated and analyzed, using simple regression analysis. The study found that corporate optimal cash level depreciates return on investment. The implication is that brewery firms' management should hold only cash that is necessary at every point in time. Therefore, the study recommends that firms should strike at balancing their cash and cash levels so as to maintain profitability and remain relevant amidst stern competition in the industry.

3. METHODOLOGY

This study investigated the effect of cash flow optimality on investments return in listed Manufacturing companies in Nigeria. The

population consisted of 66 manufacturing companies which are listed on the Nigerian Stock Exchange and 25 of these manufacturing companies were purposively selected for a period of 10 years (2010-2019). The study employed data obtained from the published financial statement of the selected manufacturing companies. Panel data analysis was employed, while diagnostic tests were carried out, as an application of the Hausman test provided the criteria for choosing between Random Effect Models and Fixed Effect Models. Jarque-Bera Normality, Breusch, and Pagan Lagrangian multiplier tests were conducted to confirm the Hausman test results in order to decide between Random Effects and Pooled OLS.

Table 1. Measurement of variables

Variables	Abbrev.	Measurement	Source
Dependent Variables (Investment Returns)			
Return on Assets	ROA	Net Profit before Interest and Tax / Total Assets	[24]
Tobin's Q	TQ	$TQ_{it} = \frac{(\mathrm{BVA_{it}} + \mathrm{MVE_{it}} - \mathrm{BVE_{it}})}{\mathrm{BVA_{it}}}$	[25]
Independent Variables *(Cash flow Optimality)*			
Cash Ratio	CR	Cash and cash equivalent / Current liabilities	[26]
Cash Conversion Cycle	CCC	ACP +ITID – APP = Average Collection period + Inventory Turnover in Days – Average Payment Period	[27]
Quick Ratio	QR	Current assets-closing inventory / Current liabilities	[27]
Current Ratio	CUR	Current assets / Current liabilities	[7]

Author' Compilation (2020)

3.1 Model Specification

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \varepsilon_{it}$$

Where,

Y = Investment Returns = Dependent variable
X = independent variable: Cash flow Optimality

3.2 Models Specification

$$ROE_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 CCC_{it} + \beta_3 QR_{it} + \beta_4 CUR_{it} + \varepsilon_{it} \quad \text{Model 1}$$

$$TQ_{it} = \beta_0+ \beta_1 CR_{it} + \beta_2 CCC_{it} + \beta_3 QR_{it} + \beta_4 CUR_{it} + \varepsilon_{it} \quad \text{Model 2}$$

ROE: Return on Equity
TQ = Tobin's Q
CR = Cash Ratio
CCC = Cash Conversion Cycle
QR =Quick Ratio
CUR = Current Ratio
β_0 = regression intercept which is constant
ε is the error term of the model
i = cross-sectional variable
t = time series variable

4. RESULTS AND DISCUSSION

This section of the study discussed and presented the regression results based on pooled (OLS), random effect, and fixed-effect models. This section started with the estimation of the ordinary least square (OLS). This is because it serves as the link between the traditional approaches to econometrics. Although, it has a limitation of the presence of not being able to account for unobserved heterogeneity and may produce biased and unreliable estimates. The solution to this problem has been to estimate the static model-fixed and random effect models that take care of firm-specific effects and accounts for unobserved heterogeneity. For the static model, to use the random effect model, the Breusch-Pagan Langragian multiplier for random effect is conducted. However, it is important to note that the static model has its weakness. In other words, since the study also explored the impact of cash flow optimality on the performance of the listed manufacturing companies in Nigeria between 2009 and 2018 using the pooled (OLS), random effect, and fixed-effect models; the interpretation of each of the models would depend on the result of the Hausman test.

4.1 Effect of Cash Flow Optimality on Return on Asset of the Selected Listed Manufacturing Companies in Nigeria

$$ROA_{it} = \beta_0 + \beta 1CR_{it} + \beta 2CCC_{it} + \beta 3QR_{it} + \beta 4CUR_{it} + \varepsilon_{it} \quad \text{Model 1}$$

$$ROA_{it} = 11.470 + 4.219CR_{it} - 1.936CCC_{it} - 4.243QR_{it} + 5.817CUR_{it} + \varepsilon_{it} \quad \text{Model 1}$$

This sub-section presents the regression result on the impact of Cash flow Optimality on performance in terms of Return on Asset (ROA) of the listed manufacturing companies in Nigeria between 2009 and 2018 using the pooled (OLS), random effect and fixed-effect models. Columns 2 to 4 depict the coefficients, t-statistic and probability values of the variables considered in the model for pooled regression, random effects and fixed effects models. As observed in the lower part of Table 2, the LM test [176.74 (*P-value* = 0.000)] with Hausman test [3.01 (*P-value* = 0.557)] shows that the pooled OLS model is not appropriate for this particular relationship, rather random effect model is appropriate to explain the changes caused by the independent variables in this study. This choice of the random effect model implies that the panel effect exists. Hence random effect is preferred and interpreted.

The coefficients of cash ratio and current ratio are positively signed and are in tandem with the expectorations (β_1 = 4.219; β_4 = 5.817) > 0. But, contrary to the expectation, coefficients of cash conversion cycle and quick ratio are negatively signed and not in consonant with the expectation (β_2 = - 1.936; β_3 = -4.243) < 0. This result implies that a unit change in cash ratio and the current ratio will lead to an increase of 4.219 and 5.817 in return on assets respectively. Also, a unit change in cash conversion cycle and the quick ratio will lead to a decrease of 1.936 and 4.243 in return on assets in that order. As observed in column 3, the Wald-statistics value = 22.22; (*P-value* = 0.000) showed that the explanatory variables are jointly statistically significant in explaining the variances that occur in the dependent variable, Return on Asset (ROA). The R^2 - 0.123 indicates that the explanatory variables explain about 12.3% changes that occur in Return on Asset (ROA).

Based on the regression result in column 3 of Table 2, the significance of the Wald-Chi2 (22.22; *P-value* = 0.000) failed to support the null hypothesis of no significant effect of Cash flow optimality on return on assets of the listed manufacturing companies in Nigeria. Hence, this study concludes that cash flow optimality has a significant effect on the return on assets of the listed manufacturing companies in Nigeria. In summary, as can be observed in Table 2, the results also provided robust evidence against the study hypotheses. The $AdjR^2$ = 0.099; (*P-value* = 0.000) indicated that the model is well-fit implying that the explanatory variables account for variations in the return on assets (ROA). Consequently, the study do not accept the null hypothesis but accepts the alternative that cash flow optimality positively and significantly affected on return on equity of the listed manufacturing companies in Nigeria. Consequently, the study do not accept the null hypothesis but accept the alternative hypothesis that cash flow optimality had a positive significant effect on return on assets (ROA) of the listed manufacturing companies in Nigeria.

Table 2. Regression result of cash flow optimality and return on asset

Variables	Pooled model	Random effect model	Fixed effect model
Cash Ratio (CR)	8.084***	4.219	3.286
	(2.693)	(1.478)	(1.100)
	[0.008]	[0.139]	[0.273]
Cash Conversion Cycle (CCC)	-2.580***	-1.936***	-1.828***
	(-4.591)	(-3.659)	(-3.292)
	[0.000]	[0.000]	[0.001
Quick Ratio (QR)	4.832	-4.243	-5.308
	(1.010)	(-1.066)	(-1.305)
	[0.314]	[0.286]	[0.194]
Current Ratio (CUR)	-0.433	5.817*	6.691**
	(-0.115)	(1.829)	(2.053)
	[0.909]	[0.067]	[0.042]
Constant	12.469***	11.470***	11.178***
	(4.659)	(3.037)	(4.760)
	[0.000]	[0.002]	[0.000]
Observations	250	250	250
R^2	0.224	0.123	0.127
Adj. R^2	0.203	0.099	0.007
F-Statistic	10.48		4.769
Prob. F-Statistic	[0.000]		[0.001]
Wald-chi^2		22.22	
Prob. Wald-chi^2		[0.000]	
LM Test		176.74 [0.0000]	
Hausman		3.01 [0.5565]	

*Source: Author's Computation (2019), underlying data from annual reports of firms listed on Nigerian Stock Exchange (NSE). Note: The dependent variable is Return on Asset (ROA). T-statistics in parentheses and Probability values in square bracket; *** p<0.01, ** p<0.05, * p<0.1*

4.1.1 Discussion of findings

Inferences from the results show that the coefficient of cash conversion cycle (CCC) appears to be negative *(coef*. = - 1.936; *P-value* = 0.000) and the negative coefficient is statistically significant at 1% level implying that cash conversion cycle (CCC) has inverse relationship with return on asset (ROA) of the selected firms. This is in tandem with the result of [20,28,29]. These studies found a negative significant relationship between cash conversion and ROA. However, it is contrary to the findings, some studies found inverse effects [11,23,30]. Alternatively, the result of this present study suggests that a unit increase in the cash conversion cycle (CCC) causes the return on asset (ROA) of the selected firms in Nigeria to fall by 1.936 units. Also, the coefficient of the current ratio (CUR) is positively and significantly related to return on asset (ROA), (*coef*. = 5.817; *P-value* = 0.067) at 5% level of significance. This implies that the current ratio (CUR) had a positive relationship with Return on Asset of the selected firms. This alternatively means that Return on Asset (ROA) of the selected firms reduces by 3.407 units given a unit increase in current ratio (CUR).

The implication of the results revealed that there is a positive relationship but insignificant relationship between cash ratio (CR) and firm's performance in terms of Return on Asset (ROA), (*coef*. = 4.219; *P-value* = 0.139). Also, quick ratio (QR) does not show a significant relationship with Return on Asset (ROA) as can be observed in the negative but statistically insignificant coefficient (*coef.* = -4.243; *P-value* = 0.286). As a result, the Cash Ratio (CR) and Quick Ratio (QR) do not have an impact on performance in terms of Return on Asset (ROA) of the selected firms in during the period of this study.

In this study sub-section on the study, in Table 3, Jarque-Bera statistic was used to check whether the residual (error term) of the estimated model when the Return on Asset is regressed on cash flow optimality indicators is normally distributed. Also, Breusch-Pagan / Cook-Weisberg test for heteroskedasticity with the null hypothesis of

Table 3. Diagnostic tests for cash flow optimality and return on asset

Stat.	Breusch-Pagan Heteroskedasticity test	Jarque-Bera normality test
Chi2	2.44	1.38
P-value	[0.1181]	[0. 4999]

Source: Author's Computation, 2019

Constant variance is applied to check whether the model is free from the heteroskedasticity problem. Econometrically, a model is said to possess heteroskedasticity if the variances of error term are not equal over the various values of the independent variables. This simply means that during regression analysis the variance would be found to be non-consistent. From Table 3, all the test statistics and their associated P-values are statistically insignificant. These mean that the residual is normally distributed and has constant variances. Therefore, the models are determined to be fit.

4.2 Effect of Cash Flow Optimality on Tobin's Q of the Listed Manufacturing Companies in Nigeria

$$TQ_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 CCC_{it} + \beta 3QR_{it} + \beta_4 CUR_{it} + \varepsilon_{it}$$

$$TQ_{it} = 2.563 - 0.127CR_{it} - 0.001CCC_{it} - 0.822QR_{it} + 0.307CUR_{it} + \varepsilon$$

Table 4 presents the regression result on the impact of cash flow optimality on performance in terms of Tobin's Q (TQ) of the listed manufacturing companies in Nigeria between 2009 and 2018 using the pooled (OLS), random effect, and fixed-effect models. Columns 2 to 4 depict the coefficients, t-statistic and probability values of the variables considered in the model for pooled regression, random effects and fixed effects models. As observed in the lower part of Table 4, the LM test [221.24 (*P-value* = 0.000)] with Hausman test [52.40 (*P-value* = 0.000)] shows that the pooled OLS and random effect models are not appropriate in establishing this particular relationship, rather random effect model is appropriate to explain the changes caused by the cash ratio (CR), cash conversion cycle (CCC), quick ratio (QR), and current ratio (CUR) in this study. Choosing this approach of fixed effect implies that panel effect exists and the model that suits this is a fixed-effect model. Hence, the fixed-effect is preferred and interpreted. Also, as observed in column 4 of Table 4, the F-statistics value = 2.884; (*p-value* = 0.025) shows that the explanatory variables are jointly statistically significant in explaining the variances that occur in the dependent variable, Tobin's Q (TQ). The R - squared value of 0.081 indicates that the explanatory variables explain about 8.1% changes that occur in Tobin's Q (TQ).

As in the regression result in column 4 of Table 4 indicates, the F-statistic value of 2.884 (*P-value* = 0.025) is not in support of the null hypothesis that says cash flow optimality has no significant effect on Tobin's Q of the listed manufacturing companies in Nigeria. As a result, the study concludes that cash flow optimality had a significant effect on Tobin's Q of the listed manufacturing companies in Nigeria. In summary, as can be observed in Table 4, for models 4, the results also provided robust evidence against the study hypotheses. The $AdjR^2$ = 0.056; *F-Stat.* = 0.288; (*p-value* = 0.025) indicated that the model is well-fit implying that the explanatory variables account for variations in the return on assets (ROA). Consequently, the study does not accept the null hypothesis but accept the alternative hypothesis that cash flow optimality had a positive significant effect on Tobin's Q of the listed manufacturing companies in Nigeria.

According to the results, it is only the coefficient of Quick Ratio (QR) that appears to be statistically significant at a 5% level, though negative (coef. = - 0.822; *P-value* = 0.046). This is suggesting that the Quick Ratio (QR) had an inverse relationship with Tobin's Q (TQ) of the selected firms. In other words it suggests that a unit increase in Quick Ratio (QR) leads to about 0.822 units on the Tobin's Q (TQ) of the selected firms The results are consistent with prior studies of [21,31,12,32,33]. Conversely, the results revealed that the coefficient of Cash Ratio (CR) is negative and statistically insignificant (*coef.* = -0.127; *P-value* = 0.674). The result also demonstrates that Cash Conversion Cycle (CCC) does not show a significant relationship with Tobin's Q (TQ) as can be observed in the negative but statistically insignificant coefficient (*coef.* = -0.001; *P-value* = 0.987). This is in tandem with prior studies [22,1,33]. Furthermore, the coefficient of Current Ratio (CUR) is positively and insignificantly related to

Table 4. Regression result of cash flow optimality and Tobin's Q

Variables	Pooled model	Random effect model	Fixed effect model
Cash Ratio (CR)	0.442	-0.012	-0.127
	(1.161)	(-0.040)	(-0.421)
	[0.247]	[0.968]	[0.674]
Cash Conversion Cycle (CCC)	-0.215***	-0.021	-0.001
	(-3.107)	(-0.422)	(-0.017)
	[0.002]	[0.673]	[0.987]
Quick Ratio (QR)	1.580***	-0.637	-0.822**
	(2.627)	(-1.535)	(-2.014)
	[0.010]	[0.125]	[0.046]
Current Ratio (CUR)	-1.385***	0.156	0.307
	(-2.889)	(0.466)	(0.928)
	[0.004]	[0.641]	[0.355]
Constant	3.049***	2.622***	2.563***
	(8.975)	(6.166)	(11.393)
	[0.000]	[0.000]	[0.000]
Observations	250	250	250
R^2	0.153	0.076	0.081
Adj. R^2	0.130	0.051	0.056
F-Statistic	6.556		2.884
Prob. F-Statistic	[0.000]		[0.025]
Wald-chi^2		9.449	
Prob. Wald-chi^2		[0.051]	
LM Test		221.24 [0.0000]	
Hausman		52.40 [0.0000]	

*Source: Author's Computation (2019), underlying data from annual reports of firms listed on Nigerian Stock Exchange (NSE). Note: The dependent variable is Tobin's Q (TQ). T-statistics in parentheses and Probability values in square bracket; *** p<0.01, ** p<0.05, * p<0.1*

Table 5. Diagnostic tests for cash flow optimality and Tobin's Q

Stat.	Breusch-Pagan Heteroskedasticity test	Jarque-Bera normality test
Chi2	1.36	4.38
P-value	[0.2427]	[0. 1105]

Source: Author's Computation, 2019

Tobin's Q (TQ) (coef. = 0.307; P-value = 0.355). This also implies that the Cash Ratio (CR), Cash Conversion Cycle (CCC), and Current Ratio (CUR) do not have significant effect on performance in terms of Tobin's Q (TQ) of the selected firms in Nigeria as established by the result of this study.

In this study, Jarque-Bera statistic was used to check whether the residual (error term) of the estimated model when the Tobin's Q (TQ) is regressed on cash flow optimality indicators is normally distributed. Also, Breusch-Pagan/Cook-Weisberg test for heteroscedasticity with the null hypothesis of constant variance is applied to check whether the model is free from Heteroscedasticity problem. Econometrically, a model is said to possess heteroscedasticity if the variances of error term are not equal over the various values of the independent variables. This simply means that during regression analysis the variance would be found to be non-consistent. As indicated in Table 5 above, all the test statistics and their associated p-values are statistically insignificant. The implication is that the residual is normally distributed and has constant

variances. Therefore, this study concludes that the models are fit.

5. CONCLUSION AND RECOMMENDATIONS

This study investigated the effect of cash flow optimality on investment returns. In carrying out the objective of this investigation, the study employed investment returns as the dependent variable and measured the variables by using two proxies of return on assets and Tobin's Q as a surrogate of financial performance. The independent variable of cash flow was measured with cash ratio, cash conversion cycle and current ratio. The study carried out a panel data analyses and found mixed results of the effects of the individual variables in the models. However, the result based on F-statistically joint findings reveal that cash flow optimality exhibited a positive statistically significant effect on return on assets. The result also revealed that cash flow optimality has a positive statistically significant effect on Tobin's Q.

Conclusively, the study affirms that cash flow optimality had a positive statistically significant effect on investment returns of manufacturing companies in Nigeria. The study recommends that since the essence of investment is the expected returns, the managers of manufacturing companies should ensure that this underlying economic idea is prioritized in all strategic decisions. Competent and adequate cash management is essentially important as well as optimal resources management. While much studies have been undertaken in the area of cash flow optimality, there is a considerable dearth of studies on the effects of cash flow optimality on investment returns. Thus, by addressing this gap, the current study has contributed to the existing but insufficient knowledge through the investigation of the effects of cash flow optimality on return on assets and Tobin's Q as a measure of financial performance from the perspective of market reactions. Further studies can be carried out to further expand the scope of this study by investigating the cash flow optimality of other corporations that are outside the manufacturing line of business.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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