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Working Capital Management and Performance of Listed Manufacturing Companies in Nigeria

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ABSTRACT:

The cash conversion cycle theory was applied to examine how working capital management impact on financial performance of Nigerian listed manufacturing firms from 2010-2022. Secondary series were gathered from the annual reports of 25 manufacturing firms. At the 5% level, the panel unit root, Kao and Pedroni cointegration; and Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS) were tested. The Panel unit root test shows that all variables were integrated at order one. The Kao and Pedroni cointegration verified the existence of long-run form. The average collection period, cash conversion cycle, and average payment period are all negative and insignificant.The inventory turnover ratio is positive and insignificant; and only the Dynamic Ordinary Least Squaresshow that firm size is positive and significant. In conclusion,publicly traded manufacturing firms employ conservative working capital management techniques. Thus, publicly traded manufacturing firms should avoid carrying excessive inventories, but instead make adequate forecasts and plans for seasonal variations, as well as employ a more liberal credit term to encourage more sales such as the use of quantity and prompt discount payment system.

KEYWORDS:

Cash Conversion Cycle, Panel FMOLS, DOLS, Annual Reports, Performance.

Introduction

The business expectation survey report of Central Bank of Nigeria (CBN) in early January 2020 highlighted the availability of capital as the second most significant problem hindering the growth of any business in Nigeria (Ibrahim & Isiaka, 2021). This challenge was not too apparent until the financial crisis of 2007/2008, which gave rise touneasiness in obtaining credit at lower interest rates (Tsuruta, 2019). Dullien (2010) identifies recent realities as the cessation of credit and capital, a longer time to settle customer accounts, and payment to suppliers. This has become completely obnoxious to suppliers because it leads to bad debts. Moreso, it has a negative corollary effect and deprives the supplier of cash supremacy. As a result, working capital management has become quite critical in every business life. (JP Morgan, 2019).

According to Tran et al. (2017), working capital management (WKM) is a managerial strategy used by firms to optimize current assets and liabilities as well as the connectivity between the modules. Working capital optimization promotes and sustains a firm's financial performance (Aktas et al., 2015). This makes it an organizational lifebloodsince it has the power to make or break a company's profitability (Wolf, 2015; Niresh, 2012). Hence, firms are constantly striving to strike a balance between liquidity and profitability.

Manufacturing firms desire proper WKM because most of their assets are current (Horne &Wachowitz, 2000), and this has a direct impact on their profitability and liquidity needs (Rahemam& Nasr, 2007). WKM optimization assists in avoiding the effectof little cash that affects a firm’s survival (Padachi, 2006), as well as reducing risk and promoting firm effectiveness (Tingbani, 2015). According to Makori and Jagongo (2003), to achieve firms’ objectives, WKM should prioritize liquidity satisfaction, profitability, and shareholder wealth creation.).MakoriandJagongo, (2003),Ogundipe, Idowu, and Ogundipe (2012), show that for continuous operationalincrease in added value, firmsmust maintain an optimal time lag between the purchase of raw materials and the collection of cash for goods sold.

According to Kabethi (2013), FP is a monetary metric of a firm's operations and strategies. It is a metric of a firm's financial health, industrial competitiveness, and profitability(Machiuka, 2010). For proper evaluation of firms FP helps to measure how well the organization's resources have been used wisely. As previously stated, there is always a tradeoff between liquidity requirements and firm profitability. The greater the liquidity, the lower the level of profitability. As a result, an optimal level of WKM is required to strike a balance between the two.

Various points of view have been expressed regarding the relationship between working capital management (WKM) and Firms’ financial performance (FP). For example, Anton and Anca (2021); Olayemi (2021); Chang (2018); and Yusoff, Kamilah, Ong, and Shafie (2018) believe that WKM has a negative impact on firm FP. This assertion is not supported by others who believe that a very positive and significant relationship exists (Olaoye&Okunade, 2020; Moussa, 2018; and Orumwense&Mwakipsile, 2017). This research bridges the gap by reconciling the two opposing viewpoints. Another gap filled is the use of a larger number of observations, 250 in total; along with the Kao and Pedroni cointegration, DOLS, and FMOLS long-run methods in data analysis.

Literature Review

The Richards and Laughlin (1980) cash conversion cycle (CCOC) approachis simply the time lag between purchase of raw materials and accepting of cash for goods sold. It provides a clear picture of a company’s strengths and weaknesses in their working capital management. COCC affirms that a shorterapproach promotes business financial performance and that is a very important benefit of working capital management (Gitman, 1974). For manufacturing firms whose main stock-in-trade is

current assets, it acts as their critical lifeblood wire(Mab & Makoni, 2019; Altaf & Shah, 2017; Shadrack et. al., 2015; Zalaghi&Godini, 2019).

The following studies were examined empirically to bring to light the relationship between the cash conversion cycle and financial performance of firms. Ibrahim and Isiaka (2021) examine the impact of WKM on the FP of 10 publicly traded non-financial firms from 2014-2018. Using the Pooled Ordinary Least Squares (POLS), fixed and random effects methods, the study ascertains that WKM significantly explains a firm's FP. Nguyen and Nguyen (2018) investigate the relationship between WKM and FP of listed firms in Vietnam. According to the estimations, the firm'sWKM and FP are positively related. In a separate study in Ghana Amponsah-Kwatiah and Asiamah (2020) believe that WKM and manufacturing firms' profitability are positivelyconnected. This assertion was previously confirmed in a study conducted in the United Kingdom by Goncalves, Gaio, and Robles (2018) for unlisted firms from 2006 to 2014. Later, Lyngstadaas (2020) confirms in the United States that higher levels of FP are a function of effective WKM among manufacturing firms. This was supported by Orumwense and Mwakipsile (2017) in a Nigerian study that working capital management and managerial performance of manufacturing firms are significantly related. Moussa (2018) assessed 68 Egyptian industrial companies between 2000 and 2010 and confirmed that WKM is positively related to FP. The study went further to assert that stock markets in developing countries are yet to achieve optimal WKM efficiency. Olaoye and Okunade (2020) examine the impact of WKM on the financial performance of ten publicly traded manufacturing firms in Nigeria from 2008 to 2017 and found that WKM has a significant influence on the financial performance of the selected firms.

Contrarily,Olulu-Briggs and Wobo (2022) conducted a Nigerian study on telecommunication firms and found that the ratio of cash to current liabilities is negative and insignificant; indicating that telecommunication firms in Nigeria are unable to meet up with their short-term liabilities and this affects their long term financial performance. Wang, Minhas, and Ahsan (2020) in Pakistan, found a negative relationship among listed non-financial firms using POLS and GMM methods. Tsuruta (2018) studied over 100,000 SMEs in Japan and discovered that in the short term, WKM has a negative effect on FP, but a positive relationship in the long run. Altaf and Shah (2018) provide evidence of an inverted U-shape link between WKM and firm FP for 437 nonfinancial Indian firms using the GMM technique. Similarly, Botocand Anton (2017) discovered in their analysis of Eastern, South-Eastern, and Eastern Europe data that an inverted U-shape link exist between WKM level and FP between 2006 and 2015. Laghari and Chengang (2019) also presented evidence of a U-shaped relationship between working capital and financial performance among Chinese listed companies using the GMM approach. A U-shaped interaction means that a decrease in working capital management up to a limit is ensued by an increase in financial performance beyond that point. Thus, there exist an optimum level of WKM equivalent to an optimum level of FP.Anton and Anca (2021) discovered that WKM was positive at the optimal level but became negative after the optimal level in relation to firms' FP using the POLS, fixed effects, and panel-corrected standard errors model for 719 listed Polish firms from 2007-2016.From the healthcare sector,Olayemi (2021) used POLS to secure data from2012-2019 and found that the average collection period (ACOP) significantly promotes FP, whereas firm size hinders the growth of firm performance.Yusoff, Kamilah, Ong, and Shafie (2018) investigate how WKM affects the performance of 100 Malaysian manufacturing firms. The study demonstrates that inventory conversion period (ICPD), ACOP, and cash conversion cycle (CCOC) are negatively and significantly correlated with FP.

Methodology

This study obtained data from the annual reports of the sampled QMFs in Nigeria from 2010-2022. The convenient sampling techniques were utilized in the selection of 25 of the 71 quoted manufacturing firms based on data availability (NGX, 2023). Working Capital Management was proxied by average collection period, cash conversion cycle, average payment period, inventory turnover ratio in days, and firm size (as a control variable), as seen in Olaoye&Okunade (2020), Madugba& Ogbonnaya (2016), Akinleye & Adeboye (2019), Olayemi (2021), and Ibrahim & Isiaka (2021). Financial Performance was proxied by return on assets, as seen in Dalci (2020). The descriptive statistics, unit root, Pedroni and Kao co-integration, Dynamic Ordinary Least Squares (DOLS), and Fully Modified Ordinary Least Squares (FMOLS)are used in the study's analysis.

The model is as stated below:

$ROA = f(ACOP, CCOC, APP, ITUD, FZ)$ 1

$ROA_{it} = \alpha_0 + \alpha_1 ACOP_{it} + \alpha_2 CCOC_{it} + \alpha_3 APP_{it} + \alpha_4 ITUD_{it} + \alpha_5 FZ_{it} + \mu_{it}$ 2

On apriori, α_1 and $\alpha_4 < 0$; α_2, α_3, and $\alpha_5 > 0$

Note, α_1, α_2, α_3, α_4, and α_5 = Constant parameters, α_0 = Intercept, it = different firm I in year t, μ_{it} = Error term.

Table 1: Concept Acronyms, Meaning and Description

Acronyms	Full Meaning	Description
ROA	Return on assets	Earnings after tax/Total assets
ACOP	Average collection period	Receivables /Credit sales x 365
CCOC	Cash conversion cycle	ACOP + ITUD - APP
APP	Average payment period	Average creditors/Cost of sales x 365
ITUD	Inventory turnover	Inventory/Cost of sales x 365
FZ	Firm size	Natural logarithm of firm size

Results and Discussion

Table 2: Descriptive Test Result

	ROA	ACOP	CCOC	APP	ITUD	FZ
Mean	0.224965	69.62348	75.86936	34.02075	40.26662	5.854770
Std. Dev.	0.099008	23.48669	28.96693	8.808943	12.67352	0.902660
Skewness	0.485722	1.322533	0.386937	1.080522	-0.190321	3.798316
Kurtosis	3.125816	5.324664	2.982123	5.989058	2.761036	21.34568
Jarque-Bera	9.995127	129.1712	6.241667	141.7143	2.104092	4107.008
Probability	0.006754	0.000000	0.044120	0.000000	0.349223	0.000000

Source: E-views10 output

Table 2 shows the average yearly ROA, ACOP, CCOC, APP, ITUD, and FZ as0.224965, 69.62348, 75.86936, 34.02075, 40.26662 and 5.854770 respectively. The level of variability for ROA, ACOP, CCOC, APP, ITUD, and FZ are 0.099008%, 23.48669%, 28.96693%, 8.808943%, 12.67352%, and 0.902660% respectively. ROA, ACOP, CCOC, APP, and FZ are positively skewed, whereas ITUD is negatively skewed. ROA, ACOP, CCOC, APP, and FZ are leptokurtic given their value to be greater than 3; but ITUD is mesokurtic as its value is approximately 3. The J-Bera p-vashows that ROA, ACOP, CCOC, APP, and FZ are not distributed normally but ITUD is normally distributed.

Table 3: Levin, Lin & Chu Stationarity Test

Variables	Levin, Lin & Chu Test Statistics	P-value	Order of Integration
ROA	-3.50823	0.0002	I (1)
ACOP	-4.66023	0.0000	I (1)
CCOC	-5.09831	0.0000	I (1)
APP	-46.1273	0.0000	I (1)
ITUD	-172.637	0.0000	I (1)
FZ	-17.3498	0.0000	I (1)

Source: E-views10 output

Table 3 shows that at the 95% confidence interval, all the variables are integrated at order one I (1). Thus, the test for long-run association amongst the variables (Pedroni, 1999; Kao, 1999).

Table 4: Pedroni Residual and Kao Cointegration Test

Pedroni Residual Cointegration Test
Series: ROA ACOP APP CCOC ITUD FZ

Alternative hypothesis: common AR coefs. (within-dimension)					(between-dimension)		
	Statistic	Prob.	Weighted Statistic	Prob.		Statistic	Prob.
Panel v-Statistic	-0.958741	0.8312	-1.120519	0.8688	Group rho-Statistic	2.446000	0.9928
Panel rho-Statistic	0.623068	0.7334	1.514613	0.9351	Group PP-Statistic	**-3.811488**	**0.0001**
Panel PP-Statistic	**-6.245819**	**0.0000**	**-2.763593**	**0.0029**	Group ADF-Statistic	**-4.258399**	**0.0000**
Panel ADF-Statistic	**-6.261427**	**0.0000**	**-2.553192**	**0.0053**			

Kao Cointegration Test

	t-Statistic	Prob.
ADF	**3.246851**	**0.0006**

Source: E-views10 output

The outcome of the Pedroni test shows that out of 11 statistics, 6 are significant at the 5% level. Similarly, the Kao test confirms a significant relationship amongst the variables. Thus, our findings from Pedroni and Kao tests confirm the presence of long-run relationship among the variables.The study proceeds to determine the nature of the relationship in the long run using FMOLS and DOLS.

Long-runTest

Table 5: FMOLS Test Result

Dependent Variable: ROA
Method: Panel Fully Modified Least Squares (FMOLS)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ACOP	-0.001327	0.002821	-0.470276	0.6391
APP	-0.003655	0.003293	-1.109888	0.2695
CCOC	-0.000899	0.002720	-0.330674	0.7415

FZ	0.024986	0.033439	0.747217	0.4567
ITUD	0.002737	0.013286	0.206032	0.8372
R-squared	0.546452	Mean dependent var		0.238574
Adjusted R-squared	0.502006	S.D. dependent var		0.104765
S.E. of regression	0.078957	Sum squared resid		0.667057
Long-run variance	0.011896			

Source: E-views10 output

Table 5 shows that ACOP, APP and CCOC are negative (-0.001327, -0.003655, and -0.000899) and insignificant (0.6391, 0.2695 and 0.7415) respectively to ROA. A unit increase in ACOP, APP and CCOC will cause ROA to decrease by 0.001327, 0.003655, and 0.000899 unitsrespectively. However, FZ and ITUD are positive (0.024986 and 0.002737) but insignificant (0.4567 and 0.8372) to ROA. This means that 1% growth in FZ and ITUD will lead to about 0.024986% and 0.002737% rise in ROA respectively. The adjusted R-square of 0.502006 shows that the model is of good fit. Thus, the variables were able to explain changes in ROA to about 50.2%.

Table 6: DOLS Test Result

Dependent Variable: ROA
Method: Panel Dynamic Least Squares (DOLS)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ACOP	-0.000216	0.003437	-0.062931	0.9506
APP	-0.001486	0.005421	-0.274180	0.7873
CCOC	-0.000949	0.003065	-0.309756	0.7605
FZ	0.043622	0.012705	3.433581	0.0032
ITUD	0.004135	0.006619	0.624691	0.5405
R-squared	0.787145	Mean dependent var		0.235276
Adjusted R-squared	0.561768	S.D. dependent var		0.109759
S.E. of regression	0.072660	Sum squared resid		0.089750
Long-run variance	0.002427			

Source: E-views10 output

Table 6 shows that ACOP, APP and CCOC are negative (-0.000216, -0.001486, and -0.000949) and insignificant (0.9506, 0.7873 and 0.7605) respectively to ROA. A unit increase in ACOP, APP and CCOC will cause ROA to decrease by 0.000216, 0.001486, and 0.000949 unit respectively. However, FZ and ITUD are positive (0.043622 and 0.004135) with p-value of 0.0032 and 0.5405 respectively. This means that only FZ is significant. This means that 1% growth in FZ and ITUD will lead to about 0.043622% and 0.004135% rise in ROA respectively. The adjusted R-square of 0.561768 shows that the model is of good fit. Thus, the variables were able to explain changes in ROA to about 56.2%.

Discussion of Findings

Using DOLS, the average collection period is not a significant aspect of working capital management, although its decrease leads to an increase in ROA of quoted manufacturing firms. This is likened to the ease with which management can collect debt from creditors and tight credit management terms. This is consistent with Tsuruta (2018),Altaf and Shah (2018),and Wang, et al. (2020) that WKM is

negatively related to FP of firms. However, contradictory with Nguyen and Nguyen (2018),Amponsah-Kwatiah and Asiamah (2020),and Lyngstadaas (2020) earlier assertion that WKM is positively related to FP of firms.

The average payment period is negative and insignificant. This means that APP retards the ability of management to utilize firm's resources effectively and efficiently. This can be attributed to the longer period it takes quoted manufacturing firms to pay their suppliers. This finding supports Anton and Anca (2021),Olayemi (2021), Chang (2018), and Yusoff, et al. (2018)report that WKM is negatively related to FP of firms.

Cash conversion cycle of quoted manufacturing firms do not enable management to utilize its resources effectively. A possible narrative is the high level of APP, too conservative trade credit policy, and low inventory turnover (Tsuruta, 2018; Altaf & Shah, 2018; Chang, 2018; and Wang, et al.2020). However, this outcome is not in line with earlier proposition that cash conversion cycle is central to the financial performance of firms (Mab & Makoni, 2019; Altaf & Shah, 2017; Shadrack et. al., 2015; Zalaghi&Godini, 2019).

Inventory turnover ratio is weak but not significant to ROA. This may be due to seasonal variations of most products of the firm, poor policies of inventory management, high production cost, and too much bulk buying (Altaf & Shah, 2017; Olaoye&Okunade, 2020; Moussa, 2018; and Orumwense&Mwakipsile, 2017). Though not in support with Tsuruta (2018), Altaf and Shah (2018), Chang (2018) that WKM is negatively related to FP of firms.

Firm size significantly promotes ROA. This can be attributed to the relative economies of scale of most of the quoted manufacturing firms. This is consistent with Altaf and Shah (2017),Olaoye and Okunade (2020), Moussa (2018), and Orumwense and Mwakipsile (2017) that there exists positive link between WKM and FP of firms. In contrast,Tsuruta (2018), Altaf and Shah (2018), Chang (2018)are of the view that WKM is adverselycorrelatedto thefinancial performance of firms.

Limitations

This study is restricted to the use of accounting information which is historical in nature. Also, the method of inventory valuation may not be appropriate for some firms which can distort the level of their performance.

Conclusions and Recommendations

The cash conversion cycle approach was applied to examine the impact of working capital management on the financial performance of 25 quoted manufacturing firms in Nigeria for the period 2010-2022. The variables used are return on assets, average collection period, cash conversion cycle, average payment period, inventory turnover ratio in days, and firms size as control variable. The unit root, descriptive, Kao and Pedroni cointegration, DOLS and FMOLS methods were exploitedto analyze the data which were secured from the annual reports of quoted manufacturing firms. The study showed support for a conservative working capital management approach of quoted manufacturing firms in Nigeria. This is in harmonywith the studies byTsuruta (2018),Anton and Anca (2021), Olayemi (2021), Chang (2018), and Yusoff, et al. (2018),Altaf and Shah (2018), Chang (2018) and Wang, et al. (2020); which is This can be accreditedto high levels of average payment periods, seasonal variations of most products of the firm, poor policies of inventory management, high production cost, and too much bulk buying, as well as low inventory turnover.The study therefore recommends that quoted manufacturing firms should avoid carrying too much stock of inventories, make adequate forecast and plan for seasonal variations, adopt a more liberal credit term to encourage more sales through the use of quantity and prompt discountspayment.

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