Does Working Capital Management Affect Profitability of Ghanaian Manufacturing Firms?

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Abstract
This paper analyses the relationship between working capital management and profitability of firms in the context of developing economies. A balanced panel of 11 manufacturing companies quoted on the Ghana Stock Exchange was used. The study covered the period 2011 to 2017. The relationship between working capital management and profitability was tested using dynamic panel regression (Arellano-Bond Estimation) technique. The study revealed that there is a significant positive linear relationship between working capital management and firms' profitability. The findings also reveal the existence of a concave quadratic relationship between working capital management and firms' profitability. Hence, an optimal level which maximises the profitability of manufacturing firms in Ghana exists. This implies that, there is an optimal level at which working capital management maximises firm's profitability, therefore, managers need to ensure that they operate within the limits of the optimal level by implementing an effective and efficient working capital management policy. Also, the practice of an aggressive working capital management policy maximises a firm's profitability.

Keywords: *working capital management, cash conversion cycle, dynamic panel regression, manufacturing firms, Profitability.*

Paper type: Research paper

1. Introduction
In recent times, working capital management has become one of the most essential and delicate aspects of the overall business finance that demands meticulous attention in all firms irrespective of the size, type or the nature of business (Deloof, 2003; Dinku, 2013; Korent & Orsag, 2018). The importance of working capital cannot be overemphasized when it comes to corporate finance due to its direct effect on the liquidity and profitability of the firm(Raheman & Nasr, 2007; Aktas, Croci, & Petmezas, 2018). The prudent management of working capital is very crucial, especially for manufacturing companies, due to the fact that current assets (i.e. inventory and trade receivables) constitute a major portion of their assets (Arunkunar & Ramanan, 2013; Ponsian, Chrispina, Tago, & Mkiibi, 2014). An efficient working capital management policy plays an essential part in the overall corporate strategy in maximizing shareholders' value (Ray, 2012).

Efficiently managing working capital involves the judicious planning and controlling of current assets and current liabilities in a manner that eradicates or reduces the risk that the firm in consideration would not be able to meet its current liabilities or avoid maintaining an excessive level of the working capital requirements (Eljelly, 2004). When firms invest overly in working capital (i.e. beyond the level required) they lose the returns that can be gained by investing these funds in long term assets (Ponsian, Chrispina, Tago, & Mkiibi, 2014), the firm also has to bear the cost of holding as well as handling inventory for a longer period (Arnold, 2008). If funds invested in inventories, cash, or trade receivables is inadequate, the firm will encounter challenges in meeting its operation cost (Napompech, 2012). This is going to reduce the level of sales and profit in the long term (Deloof, 2003; Eramus, 2010).

A firm seeking to maximize profit should maintain an equilibrium between current assets and current liabilities and, thus, being up-to-date with the tradeoff between liquidity and profitability (Ani, Okwo, & Ugwunta, 2012). Maximizing profit to the detriment of liquidity can cause the organisation serious problems and vice- versa. Therefore, firms can reduce risk and increase their overall performance by being knowledgeable about the dynamics of working capital management (Nazir & Afza, 2009). Effective working capital management affects the survival of the firm, the continuity of its of operations, and ensures its solvency and profitability (Evci & Şak, 2018). In this context, this study aims at examining in detail the trade-off between working capital management and firm's profitability.

Various constituents of working capital management that have the tendency of affecting the profitability of manufacturing firms have been used as proxies (variables) for working capital management in existing studies. In this study, the predictor variables selected was based on different theories relating to working capital management and profitability and other variables were also included as a result of the impact they had on the results of previous studies. Due to limited access to data, certain variables used in previous studies were not included in the study. Therefore, the five (5) proxy variables included in the study are, cash conversion cycle, firm size, leverage, current ratio and return on assets.

Most of the previous works on this essential topic covered developed economies, hence, there is scanty work covering emerging or developing economies. Aregbeyen (2013), Dinku (2013), Gachira, Chiwanzwa, and Chikore (2014), and Ponsian et. al. (2014) studied the association between working capital management and profitability by collecting data from firms in Nigeria, Ethiopia, Zimbabwe and Tanzania respectively. This study which collected data from Ghanaian manufacturing firms listed on the Ghana Stock Exchange (GSE) is an extension of those studies. Generalization of the findings of this study may be applicable to all manufacturing firms in developing economies. It will help managers and policymakers in the determination of the optimal working capital, and also help them when it comes to the distribution among the working capital components. It will ensure the effective and efficient use of scarce resources and also help to maintain a working capital level that will maximise profitability, thereby, ensuring the sustainability of future investment.

This work contributes to existing literature in terms of evaluating the link between working capital management and profitability of firms in emerging economies. The main focus of this study is on manufacturing firms in Ghana, where only a few studies have been conducted recently (Akoto,

Awunyo-Vito, & Angmor, 2013; Prempeh, 2016). Also, the study seeks to confirm the findings of some of previous studies by evaluating the relationship between working capital management and profitability of the selected firms. The study, therefore, will help substantiate an existing theory developed by previous authors. Thus, the study will be valuable to both researchers and managers.

2. Literature Review

Many studies have evaluated the relationship between working capital management and profitability in various parts of the world and the findings are quite divergent. A majority of the studies established an inverse relationship between working capital management and profitability of firms. Furthermore, most of the previous studies favor the aggressive working capital approach which states that reducing the amount invested in working capital affects profitability positively by reducing the composition of current assets in total assets. Ordinary Least Square Regression (OLS) and Panel Data Regression were the main analysis techniques employed by previous authors who studied the link between working capital management and firms' profitability. To identify pertinent areas not covered by previous studies, major studies related to this study have been reviewed in this section chronologically.

To evaluate the relationship between working capital management and profitability, Deloof (2003) studied a sample 1,009 non-financial firms in Belgium for the period 1992–1996. The main analysis techniques employed were Pearson correlation and regression tests which established an inverse association between working capital management and profitability. Eljelly (2004) conducted a similar study using a sample of 29 quoted companies in Saudi Arabia for the period 1996- 2000. Using the Pearson Correlation method and regression analysis, he found a significant negative relationship between the firms' profitability and its liquidity level. This relation was much stronger in firms with high current ratios and relatively longer cash conversion cycles.

Padachi (2006) sampled 58 Mauritian small firms covering the 1998- 2003. Using panel data analysis, he found a negative relationship between the number of days of accounts receivables, accounts payables, cash conversion cycle, inventory days and profitability. The results also indicated that high investments in inventories and receivables reduce the profitability of the firm. These findings support the aggressive working capital management policy. Lazaridis and Tryfonidis (2006) in their bid to investigate the relationship between corporate profitability and working capital management used a sample of 131 companies listed on the Athens Stock Exchange (ASE) for the period 2001-2004. The study established a statistically significant inverse relationship between gross operating profit, the proxy for profitability and the proxy for working capital management which was cash conversion cycle. This conclusion was derived from the regression analysis.

Raheman and Nasr (2007) established a negative relationship between working capital variables and profitability. the study samples 94 firms listed on the Krachi Stock Exchange (KSE) in Pakistan for the period 1999- 2004. Pearson's Correlation, and regression analysis were the main data analysis techniques used in the study. Garcıa-Teruel and Martınez-Solano (2007) conducted a panel study by collecting data from 8872 SMEs in Spain spanning from 1996-2002 and the estimation was done using the generalized least square regression. The study concluded that a statistically significant negative relationship exists between working capital management and profitability.

In Turkey, Uyar (2009) examined a sample of 166 listed corporations on the ISE for the year 2007. The study found a significant negative relationship between cash conversion cycle and profitability. In Kenya, Mathuva (2010) investigated how working capital management components influence corporate profitability. He surveyed 30 listed companies on the Nairobi Stock Exchange (NSE) between the period 1992- 2008.The study established that inventory conversion period and average payment period are positively related to profitability but accounts collection period relates negatively to profitability. Fixed effects regression models were used. In a similar study, Gill, Biger, and Mathur (2010), studied 88 listed firms in the United States of America. The study covered a period of 3 years (i.e. from 2005 to 2007). They established a positive relationship between cash conversion cycle and profitability by employing the Weighted Least Square Regression (WLS) technique.

Sharma and Kumar (2011) evaluated selected companies on the Bombay Stock Exchange for the period 2000- 2008. The panel data method was used and the study covered 263 firms. They concluded that number of days accounts receivables and cash conversion period have a positive correlation with corporate profitability. Alipour (2011) tested empirically the impact of working capital management on profitability. According to the findings of the study which sampled 1068 firms in Iran, and found a negative significant relationship between number of days accounts receivable, inventory turnover in days, number of days accounts payables, cash conversion cycle and profitability.

Ray (2012 used a sample of 311 Indian manufacturing firms for the period 1996 to 2010. His study utilized the pooled regression techniques. He found a negative relationship between the number of days accounts receivable, cash conversion cycle, financial debt ratio, and profitability. Vahid, Elham, Mohsen and Mohammadreza (2012) after studying 50 different companies in Iran for the period 2006 to 2009 using multiple regression analysis concluded that a decrease in average collection period, inventory turnover days, average payment period, net trading cycle and increased the profitability of firms.

Aregbeyen (2013) empirically investigated the effects of WCM on the profitability of 48 large companies listed on the Nigerian Stock Exchange (NSE) for the period 1993 to 2005 using the Pearson Correlation analysis and regression analysis. He indicated that, working capital management is negatively related to profitability. Akinlo (2013) researched the phenomenon using 66 non-financial firms selected from Nigeria. The study covered the period 1997-2007. Using regression analysis, he established an inverse relationship between number of days inventories, number of days accounts payable and profitability.

Gachira, Chiwanzwa, Nkomo and Chikore (2014) studied 39 listed on the Zimbabwe Stock Exchange (ZSE) from 2009-2013 using the linear regression analysis. They found a positive relationship between debtor days, cash conversion cycle and profitability but found a negative relation between creditor days and profitability. Ukaebe (2014) adopting a pooled OLS approach using a balanced data of manufacturing firms for some selected countries across Africa for the period of 2005–2009 found out that a strong negative relationship exists between profitability, measured through net operating system profit, and cash conversion cycles across different industrialization typologies. Nikkinen, Graham and Enqvist (2014) using some selected firms listed on the Nasdaq OMX Helsinki Stock exchange between the years 1990- 2000 (1136 firm-

year observation) and adopting the regression analysis found out that there exists a negative significant relationship between Cash conversion cycle and profitability. Ponsian, Chrispina, Tago and Mkiibi (2014) assessed the effect of working capital management on profitability using a sample of 3 manufacturing companies listed on the Dares Salaam Stock Exchange (DSE) for the period 2002-2013 using the ordinary least square regression analysis. They found out that there was a positive relationship between cash conversion cycle, average payment period and profitability of the firm, but a highly significant negative relationship between inventory turnover in days, average collection period, and profitability.

Pais and Gama (2015) in their attempt to provide empirical proof of the effect of working capital management on firms' profitability, sampled 6063 SMEs in Portugal covering the period 2002–2009. Panel data regression (Fixed effect) was used for the study. It was revealed that there was an inverse relationship between profitability and the working capital management. In Sri Lanka, Kodithuwakku (2015), studied the impact of working capital management on profitability using a sample of 20 manufacturing companies listed on the Colombo Stock Exchange (CSE) for the period 2008 to 2012 using the Pearson correlation and ordinary least square regression. The study found a negative relationship between profitability, debtors collection period, inventory conversion period and cash conversion cycle but a positive relationship between profitability and creditors conversion period.

Afrifa and Tingbani (2017) investigated the relationship between firms profitability and working capital management. The study covered a sample of 802 SMEs in Britain for the period 2004 to 2013. Panel data regression analysis technique was employed in their study. They came out with two major conclusions. They concluded for firms with cashflow below the sample median, the relationship between cash conversion cycle and profitability is inverse, but when it comes to firms with cashflow above the sample median, the relationship between cash conversion cycle and profitability is positive. In South Africa, Kasozi (2017), using an unbalanced panel of 69 large firms evaluated the impact of working capital management on financial performance for the period 2007- 2016. The results of the study indicated that when firms are able to decrease their average collection period and average payment period, they would experience an increase in profitability. Also, when they increase the number of days in inventory it will cause profitability to also increase.

Evci and Şak, (2018) in their bid to provide empirical evidence of the tradeoff between working capital and firms' profitability sampled 41 quoted companies on Borsa Istanbul Industry Index. The study covered a period of 12 years (2005-2016). Fixed effects panel regression was the main technique used for their analysis. Findings of the study revealed that there is a tradeoff between working capital management and profitability. The study further revealed an inverse relationship between return on assets, payables deferral period and cash conversion cycle, while the relationship between return on asset, inventory conversion period and sales growth is positive. Jana (2018) examined the relationship between working capital management and profitability using all the 15 listed FMCG Company covering the period 2013-2017. Using panel data analysis, the study finds a significant negative and positive relationship between profitability and working capital management. Korent and Orsag (2018) using a sample of 443 Croatian firms consisting of firms classified into Group 62 covering the period 2008-2013 and using dynamic panel regression analysis, found a significant concave quadratic relationship between net working capital and company's profitability.

In Ghana, Akoto, Awunyo-Vito and Angmor (2013) examined the link between working capital management practices and profitability for a sample of 13 listed firms on the Ghana Stock Exchange for the period 2005-2009 using the Ordinary Least square regression (OLS). In their study, they concluded that an inverse relationship exists between accounts receivables and profitability. However, the relationship that exists between profitability, current asset turnover, firm size, current asset ratio and cash conversion cycle is positive. Prempeh (2016) using a sample of 4 companies listed on the Ghana Stock Exchange for the period 2004 to 2014 using the Ordinary Least Square Regression evaluated the relationship between efficient inventory management on profitability. The study revealed a positive relationship between the management of raw materials and profitability.

To summarize, previous literature on the subject show that working capital management has an effect on the profitability of the firm but there are still divergent views in relation to the appropriate variables that might serve as proxies for working capital management and profitability. In line with earlier empirical studies concerning this subject matter, this study tests the hypothesis of the existence of a linear relationship between working capital management and profitability of manufacturing firms in Ghana. Findings of most studies seek to suggest that an aggressive working capital management strategy has a significant positive relationship with profitability of the firms studied. Based on this assertion we state the hypothesis as follows:

H1: There exists a significant positive relationship between aggressive working capital management strategy and profitability of manufacturing firms in Ghana.

Base on the recommendation of Korent & Orsag (2018) about exploring the non-linear relationship between working capital management and profitability, the second hypothesis assumes the existence of a concave quadratic relationship between working capital management and profitability of manufacturing firms in Ghana. Therefore, we propose that:
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H2: There exists a significant concave quadratic relationship between working capital management and profitability of manufacturing firms in Ghana.

3. Methodology

3.1 Sample
The study sampled manufacturing firms listed on the Ghana Stock Exchange (GSE). The firms should have been listed on the stock exchange and generating revenue and recording profit for the period of 2011- 2017. These firms were included in the sample because of the availability of data and its relevance in the context of economic growth and employment potentials, which stresses the need for an effective and efficient working capital management in the selected firms. A balanced panel of 11 firms was formed after firms that exited from the stock market between 2011 and 2017 were excluded from the study.

3.2 Data and Variables
The data employed in this study was extracted from the annual financial statements of manufacturing firms listed on the Ghana Stock Exchange. The data obtained is secondary in nature

and was obtained from the Ghana Stock Exchange official website. Firms data included basic information about the firms and quantitative (financial and non-financial) data that were needed to calculate the variables at the company level which can be pooled together to form the panel data. The selection of predictor variables was based on alternative theories relating to working capital management and profitability and also, the availability of data needed for their calculation and their frequency and relevance in previous studies.

The return on assets (ROA) was operationalized as the proxy for profitability which is the dependent variable. The ROA is the ratio of net income to total assets multiplied by 100. Cash conversion cycle was operationalized as the predictor variable for WCM. The Cash Conversion Cycle (CCC) was measured as the number of days of account receivable (AR) plus number of days in inventory (INV) minus number of days of accounts payable (AP). The number of days of accounts payable (AP) was measured as the ratio of accounts payable to cost of goods sold multiplied by 365 days, number of days in inventory (INV) was measured as the ratio of inventory to cost of goods sold multiplied by 365 days. Number of day accounts receivables (AR) was measured as the ratio of accounts receivables to sales multiplied by 365 days. The three (3) variables were then combined to measure the cash conversion cycle.

In addition to these variables, firm size (SIZE), firm leverage (LEV) and current ratio (CR) were introduced as control variables. Control variables were introduced into the model to increase the robustness of the model. The control variables have a significant effect on the validity of the study. Firm Size was measured as the natural logarithm of total assets, leverage was measured as the ratio of debt to equity, and current ratio was calculated as a ratio of current assets to current liabilities.

3.3 Methods and Regression Models Specification

Descriptive analysis is primarily used to describe the sample. To test the impact of working capital management on the profitability of listed manufacturing companies on the Ghana Stock Exchange (GSE), inferential statistic- correlation and panel regression analysis is used. In order to test for hypothesis 1 and Hypothesis 2, the following dynamic panel regression models are estimated using Arellano- Bond Estimator:

$$ROA_{it} = \beta_0 + \beta_1 ROA_{it-1} + \beta_2 CCC_{it} + \beta_3 LEV_{it} + \beta_4 CR_{it} + \beta_5 SIZE_{it} + \varepsilon_{it} \quad (1)$$

$$ROA_{it} = \beta_0 + \beta_1 ROA_{it-1} + \beta_2 CCC_{it} + \beta_3 CCC_{it}^2 + \beta_4 LEV_{it} + \beta_5 CR_{it} + \beta_6 SIZE_{it} + \varepsilon_{it} \quad (2)$$

The dynamic panel regression model (i.e. Arellano- Bond estimator) is employed in this study due to the findings of previous studies. From the results it is evident that there is the problem of endogeneity resulting from the presence of reverse causality and/or bias caused by omitted variables. The relationship that exists between working capital management and profitability is bidirectional meaning, it is not only working capital management that affects profitability but profitability also has an effect on the management working capital. As opined by (Korent & Orsag, 2018), there is also the probability of unobserved individual effects correlated with the individual variables in the model. Hence, the dynamic panel model is more appropriate considering the fact that it takes into account the dynamic nature of the firms' profitability and potentially mitigates against endogeneity problem. The presence of the lagged dependent variable as an independent variable in the dynamic panel model helps to control for endogeneity problem and control for

omitted variable bias. In this study, the problem of endogeneity is solved by employing the Arellano-Bond estimator which eliminates unobservable individual effects by first order differencing and includes in model internal instrumental variables and control for correlation between dependent variable difference and error term. Lastly, the coefficients of working capital management variables and the square of it can be used to determine the breakpoint in working capital management and profitability relation as:

$\frac{-\beta_2}{2\beta_3}$. To confirm hypothesis 2, this should be a maximum, because it is an indication that a concave quadratic relationship exists between working capital management and profitability and, thus, firms have an optimal working capital management level that maximises profitability.

4. Empirical Analysis

4.1 Descriptive Statistics
The descriptive statistics of the variables that are included in the model are presented in Table 1 (see appendix). Since the data was asymmetric (skewed), the median was employed as a measure of the central tendency. From the results, the median return on assets (ROA) is 0.068. Normally, any amount invested is expected to yield a return of 6.8%. The cash conversion cycle (CCC) has a median of 50.93. This shows that manufacturing firms are able to turn over their stocks 7.2 times in a year. The median for the current ratio (CR) is 1.42. This is an indication that the current assets of manufacturing companies in Ghana are able to meet the current liabilities almost 1.5 times. The median for leverage was .8569 (85.7%). This shows that manufacturing firms in Ghana use more debt financing, hence, they are highly geared. The median firm size is 7.61.

4.2 Correlation Analysis
The result of the correlation analysis is presented in Table 2. The results show that return on assets is positively related to cash conversion cycle (CCC). The coefficient of the working capital variable was significant. A positive relationship between ROA and cash conversion cycle (CCC) is an indication that profitable Ghanaian manufacturing firms take a relatively longer number of days to convert its investments in inventory and other resources into cash flows from sales. A significant positive relationship between firm size and ROA shows that large firms tend to make more profits than small firms.

Table 2 Correlation Matrix

Variable	ROA	CCC	CR	LEV	SIZE
ROA	1				
CCC	.807**	1			
CR	.221	.295**	1		
LEV	-0.007	-.092	-.052	1	
SIZE	.335**	.119	-.050	.046	1
*p < 0.05, **p<0.01					

4.3 Hypothesis Testing
Hypothesis 1 was tested using 4 dynamic panel regression models: Arellano- Bond with default standard errors, Arellano- Bond with standard errors and control variables as predictor variables, Arellano- Bond with Robust standard errors, and Arellano- Bond with Robust standard and control

variables as predictor variables. The results are displayed in Table 3. The results indicate that the dynamic panel regression models that did not include the variables as predictor variables at a significant level of 1%, a percentage unit increase in working capital management will increase the firms' profitability by .3106752 percentage unit. However, when the control variables were included in the model as predictor variables, at a significant level of 1%, a positive relationship exists between the working capital management variable and the profitability variable. Thus, a percentage unit increase in working capital management will increase firms' profitability by .280661 percentage unit. Findings from the results suggest that hypothesis one cannot be rejected. Empirical findings confirm the existence of a positive linear relationship between aggressive working capital management policy and profitability of Ghanaian manufacturing firms. This finding is consistent with previous empirical findings (Afrifa & Tingbani, 2017; Gachira, Chiwanzwa, Nkomo, & Chikore, 2014;Ponsian, Chrispina, Tago, & Mkiibi, 2014; Akoto, Awunyo-Vito, & Angmor, 2013; Mathuva, 2010) which established a positive linear relationship between working capital and firms' profitability. The positive relationship between profits (ROA) and cash conversion cycle (CCC) might be as a result of the nature of firms and the high profits they accrue by virtue of them dominating the Ghanaian market. Profitable manufacturing firms normally keep in a high level of inventory to take care of seasonal demands and avoid the costs associated with holding inadequate stocks and fluctuations in prices of raw materials.

Table 3 Panel Regression Results for Hypothesis 1

	(1) ABE_SE	(2) ABE_SE AND CV	(3) ABE_ROBUST	(4) ABE_ROBUST AND CV
CONS	-8.568988*	-545.969**	-8.568988*	-545.969*
	(-2.30)	(-3.99)	(4.40)	(-3.37)
ROA_{LAG1}	-2.30*	.0514103*	-.2702731*	.0514103*
	(-3.50)	(4.11)	(-4.29)	(3.22)
CCC	.3106752**	.280661**	.3106752**	.280661**
	(15.67)	(13.97)	(6.92)	(13.10)
CR		2.610394		2.610394
		(0.80)		(1.37)
LEV		.0447698**		.0447698**
		(2.78)		(9.12)
SIZE		71.05856**		71.05856**
		(03.87)		(3.15)
Wald Chi^2	317.37	559.10	49.62	1333.67
Prob> Chi^2	0.0000	0.0000	0.0000	0.0000

Note: *p< 0.05, **p<0.01 Arellano-Bond estimator with standard errors (ABE_SE), Arellano-Bond estimator with standard errors and control variables (ABE_SE and CV), Arellano-Bond estimator with Robust standard errors (ABE_Robust), Arellano-Bond estimator with Robust standard errors and control variables (ABE_Robust and CV).

The results obtained for hypothesis 2 is reported in Table 4. Consistent with the predictions, the results confirm a statistically significant concave quadratic relationship between working capital management strategy and firms' profitability since the coefficient of the CCC variable is positive ($\beta_2 > 0$)and the coefficient for its square (CCC^2) is negative ($\beta_3 < 0$). The coefficient for the working capital management proxy and its square are statistically significant at 1% and 5% respectively depending on the model. The results indicate that there is an optimum level of working capital management which maximises the profitability of manufacturing firms in Ghana. Results of observed models which excluded the control variables as predictor variables show that optimal level of working capital management in the total sales (revenue) of the firm amounts to 89.26%. Thus, holding all other things constant, the maximum profitability of Ghanaian manufacturing firms is achieved when the firm holds working capital more than three-quarters of the value of the

firm's total sales. This shows that the annual turnover of working capital is 0.89 ($\approx$1), and manufacturing firms in Ghana need to ensure financing of the working capital for an average of 324.85 days. When the control variables were included in the dynamic regression model as predictor variables, the optimal level of working capital increased slightly to 90.71%. This finding supports the conservative working capital policy, which stipulates that firms should maintain a high level of working capital in order to reduce risk. From the empirical results presented in Table 4, Hypothesis 2 cannot be rejected. The finding of this study is consistent with the findings of previous studies (Korent & Orsag, 2018; García-Teruel & Martınez-Solano, 2007) which established a concave quadratic relationship between working capital management and profitability.

Table 4 Panel Regression Results for Hypothesis 2

	(1)	(2)	(3)	(4)
	ABE_SE	ABE_SE AND CV	ABE_ROBUST	ABE_ROBUST AND CV
CONS	7.491435**	6.290507**	7.491435*	6.290507
	(4.73)	(0.09)	(3.83)	(0.08)
ROA$_{LAG1}$	-.0172621	.022087*	-.0172621*	.022087*
	(-0.09)	(0.11)	(-2.08)	(2.14)
CCC	.0324543*	.032747*	. 0324543**	.032747*
	(1.90)	(1.67)	(4.55)	(2.47)
CCC_SQR	-.0001818**	-.0001805**	-.0001818**	-.0001805**
	(-17.92)	(-14.39)	(-47.03)	(-17.19)
CR		3.838663**		3.838663**
		(2.68)		(3.50)
LEV		. 0014663		.0014663**
		(0.19)		(0.48)
SIZE		.9422607		-.9422607
		(-0.10)		(-0.09)
Wald Chi^2	2808.87	3052.25	18293.24	57486.03
Prob> Chi^2	0.0000	0.0000	0.0000	0.0000

*Note: *p< 0.05, **p<0.01 Arellano-Bond estimator with standard errors (ABE_SE), Arellano-Bond estimator with standard errors and control variables (ABE_SE and CV), Arellano-Bond estimator with Robust standard errors (ABE_Robust), Arellano-Bond estimator with Robust standard errors and control variables (ABE_Robust and CV).*

5. Conclusion

The main aim of this study is to evaluate the relationship between working capital management and profitability of Ghanaian manufacturing firms listed on the Ghana Stock Exchange. The study was conducted using a balanced panel sample of 11 firms for the period 2011 to 2017. Dynamic Panel Regression Model (Arellano- Bond Estimation) which allows for the unobserved heterogeneity and endogeneity control was the technique employed to analyse the data. In addition to previous empirical studies, this study tested for both the linear and concave quadratic relationship that exists between working capital management and profitability of firms in developing economies using manufacturing firms listed on the Ghana Stock Exchange. This analysis which previous studies have overlooked in the past, reveals that there is an optimal level of working capital management which maximises firm's profitability. This is an indication that there is an optimal level of working capital management that brings a balance between cost and benefits, hence, maximizing profit. The implication is that firms operating below the optimal level will experience an increase in profit when the level of working capital management increases (i.e. conservative working capital management strategy) whilst for firms operating above the optimal level an increase in the working management will result in a decrease in profitability. The latter supports the aggressive working management strategy. Results of the study after testing for

hypothesis 1(all the models) indicate that an increase in working capital management is associated with an increase in profitability. This finding supports the conservative working capital management strategy.

This study has several implications which are relevant to managers, academicians and future research. In order to maximise the profitability of firms, managers should put in the required effort to work within the range of the optimal working capital level since any deviation can have a negative impact on the profitability of the firm. The findings of this study extend research on the relevance of an effective and efficient working capital management. Lastly, due to the divergent findings of previous empirical studies, the relationship between working capital management and profitability might not be linear. Accordingly, it is recommended that subsequent studies should test for mediation/ moderation relationships.

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APPENDIX

Table 1 Descriptive Statistics

ROA (Return on Assets)				
	Percentiles	Smallest		
1%	-4.6402	-4.6402		
5%	-.1582	-.418		
10%	-.1096	-.3466	Observation	77
25%	-.0118	-.1582	Sum of Wgt.	77
50%	.068	Largest	Mean	.0011455
			Std. Dev.	.5519027
75%	.1325	.2965		
90%	.2253	.2975	Variance	.3045966
95%	.2965	.303	Skewness	-7.866646
99%	.3042	.3042	Kurtosis	66.69508
CCC (Cash Conversion Cycle)				
	Percentiles	Smallest		
1%	-1510.595	-1510.595		
5%	-169.849	-376.0636		
10%	-116.2765	-222.579	Observation	77
25%	-22.9956	-169.849	Sum of Wgt.	77
50%	50.9293	Largest	Mean	34.2048
			Std. Dev.	219.6184
75%	126.1304	285.3063		
90%	233.9506	287.8087	Variance	48232.24
95%	285.3063	298.0379	Skewness	-4.568945
99%	332.701	332.701	Kurtosis	33.06137
CR (Current Ratio)				
	Percentiles	Smallest		
1%	.0358	.0358		
5%	.4313	.1969		
10%	.5364	.3253	Observation	77
25%	.8394	.4313	Sum of Wgt.	77
50%	1.4155	Largest	Mean	2.132342
			Std. Dev.	2.126788
75%	2.0223	6.8096		
90%	6.5881	6.9424	Variance	4.523229
95%	6.8096	7.6849	Skewness	1.748935
99%	9.8065	9.8065	Kurtosis	5.151857
Lev (Leverage)				
	Percentiles	Smallest		

	Percentiles	Smallest		
1%	-1.3285	-1.3285		
5%	.0673	.0519		
10%	.0958	.0672	Observation	77
25%	.5028	.0673	Sum of Wgt	77
50%	.8569	Largest	Mean	19.0804
			Std. Dev.	138.0642
75%	2.367	9.1509		
90%	6.4483	10.7535	Variance	19061.71
95%	9.1509	130.6352	Skewness	8.460465
99%	1207.91	1207.91	Kurtosis	73.29153
SIZE (Size of Firm)				
	Percentiles	Smallest		
1%	5.6582	5.6582		
5%	6.3115	6.2709		
10%	6.4784	6.3089	Observation	77
25%	6.682	6.3115	Sum of Wgt	77
50%	7.6135	Largest	Mean	7.430229
			Std. Dev.	.6875276
75%	7.9249	8.4505		
90%	8.3031	8.4659	Variance	.4726942
95%	8.4505	8.5065	Skewness	-.3804045
99%	8.5097	8.5097	Kurtosis	2.146934

Source: Field data, 2018