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## **Determinants of working capital requirement and policies of banks in Ghana**

**Samuel Kwaku Agyei<sup>a</sup>, Isaac Marfo Oduro<sup>b</sup>  
and Abraham Ansong<sup>c</sup>**

<sup>a</sup>Department of Accounting and Finance, School of Business, University of Cape Coast, Cape Coast – Ghana. Email: [twocies2003@yahoo.co.uk](mailto:twocies2003@yahoo.co.uk)

<sup>b</sup>Internal Audit Department, College of Technology Education, University of Education, Winneba. Email: [oduro\\_marfo@yahoo.co.uk](mailto:oduro_marfo@yahoo.co.uk)

<sup>c</sup>Department of Management Studies, School of Business, University of Cape Coast, Cape Coast – Ghana. Email: [ansongabraham@yahoo.com](mailto:ansongabraham@yahoo.com)

### **Abstract**

Efficient management of working capital guarantees not only the future cash flow of a firm but also its profitability. This study attempts to find out the determinants of working capital requirements and working capital management policies in the Ghanaian Banking Industry. The study used bank level data (1999-2008) from the Bank of Ghana. Using panel methodology within the random or fixed effects framework, the study concluded that while Cash Conversion Cycle, Size and Age of a bank have significantly positive impact on bank working capital requirement, leverage, cash position and deposit herfindahl index have a significantly negative effect on bank working capital requirement. Profitability, cash position, growth size and deposit herfindahl index are found to be the key determinants of working capital policies of banks in Ghana. Consequently, the study finds support for the pecking order and agency theories even though no support was found for the lifecycle theory. Thus to ensure efficient working capital management, banks in Ghana would be better off pursuing growth strategies geared towards obtaining greater proportion of the banking market and issue more short term debt instruments.

### **1. Introduction**

Long term investment and financing decisions give rise to future cash flows which, when discounted by an appropriate cost of capital, determines the market value of a company. However, such long term decisions will only result to the expected benefits for firms only if attention is paid to short term decisions regarding current assets

and current liabilities (Watson and Head, 2009). Working Capital refers to a firm's short-term assets and its short-term liabilities. Managing a firm's working capital is a day-to-day activity that ensures that a firm has sufficient resources to continue its operations and avoid costly interruptions (Ross *et al.*, 1998). As noted by Pandey (2004), working capital management which is concerned with the management of short term assets and liabilities of a firm is another important finance function, in addition to the management of long-term asset, capital structure decision and dividend decisions.

The effective management of working capital is very important because it affects the profitability and liquidity of the firm (Taleb *et al.*, 2010). The main objectives of working capital management are to increase profitability of a company and to ensure that it has sufficient liquidity to meet short term obligation as they fall due and so continue in business (Watson and Head, 2009). Since liquid assets give the lowest return there is often a tradeoff between profitability and liquidity. Effective working capital management therefore requires the maintenance of an optimal balance between each of the working capital components to ensure both profitability and liquidity. This is very essential in the overall corporate strategy in creating shareholder value. Firms therefore try to maintain an optimum working capital requirement that maximizes its value (Deloof, 2003; Howorth and Westhead, 2003; and Afza and Nazir, 2007).

Theoretically the concept of working capital management may be simple and straightforward for financial managers. In practice however, working capital management has become one of the most important issues in organizations, where many financial managers are finding it difficult to identify the important drivers of working capital and the optimum level of working capital (Lamberson, 1995). The lack of understanding about the impact of working capital requirements on profitability, the lack of clarity about its determinants, and the lack of management's ability to plan and control its components may lead to insolvency and bankruptcy (Gill, 2011). Smith (1973) argues that a large number of business failures may come from the inability of financial managers to plan and control current assets and current liabilities of their respective firms. Corporate risk management and performance can be improved if finance managers understand the role and drivers of working capital and are able to establish an optimal level of working capital components.

Notwithstanding the importance of identifying the drivers of working capital requirement and policy, the majority of the empirical studies that explore working capital management, aim to understand its relationship with the company's profitability and not a comprehension of its key drivers. In the banking sector in particular, studies that seek to explore factor that influence working capital requirement and policy are very limited if not unavailable. The absence of data and

the difficulty of segregating the various components of working capital within the context of financial institutions might have contributed to such a dearth. The purpose of this study therefore is to find the drivers of working capital in the banking sector in Ghana.

This paper contributes to literature on working capital management in Ghana and shall serve as a guide to finance managers on the factors to consider in determining working capital requirement. The veracity of various credit policies pursued by banks would be established by this study. This is necessary in view of the fact that the current global financial crisis is traceable to lax credit policies. In addition, the study sought to validate some of the findings of previous studies in other countries by testing the relationship between working capital requirements and other economic and financial variables.

The rest of the paper is organized as follow: section 2 deals with a review of empirical literature on the determinants of working capital; section3 discusses the methodology of the study; section 4 is on discussion of findings and section 5 summarises and concludes the paper.

## **2. Review of Relevant Literature**

### *2.1. Theoretical Considerations*

A review of finance literature does not provide a robust theory on working capital management. However, agency theory (Jensen and Meckling, 1976) espouses that conflict of interest between shareholders and managers could affect the efficacy of investment and liquidity decisions of management and this can have substantial impact on working capital. Organisations with weak monitoring and few discipline instruments on management decisions could provide a platform for managers to invest in projects with negative net present value or fail to invest in projects with positive net present values. Another agency problem source is the presence of free cash flow in excess, defined by Jensen (1986) as the cash flow in excess beyond the required to finance positive net present value projects. According to the author, in a context of substantial free cash flow, it is likely that managers invest in project with negative net present value, increasing the agency problem between managers and shareholders. Some of these projects and activities may be self-gratifying to the managers and may bring them some pecuniary benefits or other personal rewards (Chung, Michael and Kim, 2005). In other cases, managers could be careless about investment decisions, adopting a more flexible working capital policy, with high level of inventories or generous credit policy beyond the operational needs. The tendency of bank managers maintaining generous credit policy deserves empirical investigation in order to prevent another financial crisis. The other relevant theory about capital structure is the Pecking Order Theory from Myers and Majluf (1984).

According to this theory, companies will tend to raise capital inside, consuming financial slack, before increasing financial leverage by borrowing money from outside or issuing new stocks. The financial slack can be viewed as excess liquidity in the form of current assets, securities or current assets options, all above the company's needs to meet current operations (Kim and Srinivasan, 1991). The fear of banks going for external debt as a result of inefficient use of equity can influence their working capital management practices and policies. The pecking order theory predicts that high-growth firms, typically with large financing needs, will end up with high debt ratios because of a manager's reluctance to issue equity. Smith and Watts (1992) and Barclay, Morellec and Smith (2001) suggest precisely the opposite. High-growth firms consistently use less debt in their capital structure. The position of the banking sector in Ghana will be established in this study. Closely related to pecking order theory, the lifecycle theory predicts that firms with the greatest information asymmetry problems (specifically young-growth firms) are precisely those which should be making financing choices according to the pecking order theory. In general, the major difference between mature and young firms is not that mature firms are larger, but they are more mature. Mature firms are older, more stable, higher profit with few growth opportunities and good credit histories. By applying pecking order arguments, growth firms place greater demand on the internally generated funds to fund their investment needs. Consequentially, firms with relatively high growth will tend to issue securities less (Utami and Inanga, 2012).

## *2.2. Empirical Literature*

Working capital management is very important for creating value for shareholders (Shin and Soenen, 1998). Efficient working capital management is crucial for business organizations because it has a significant impact on both profitability and liquidity. Therefore, it is important for financial managers and executives to understand the requirements of working capital (Gill, 2011). Studies on the determinants of working capital in other countries have found many financial and economic variable that drive working capital requirement of firms such as operating cycle, operating cash flow, sale growth, return on assets, firm size, leverage, interest rate and industry.

Lamberson (1995) used economic indicators as independent variables and financial ratios as dependent variables to explore the relationship between changes in working capital position and changes in the level of economic activity of 50 small firms for a period of 1980-1991. The findings show that liquidity increased slightly for the sampled firms during economic expansion with no notable change in liquidity during economic slowdowns.

A study by Filbeck and Krueger (2005) provide insights into the performance

of surveyed firms across key components of working capital management. The study assessed nearly 1,000 firms and used data from a traditional working capital management survey published by CFO Magazine in United States, for a period 1996-2000. The study discovered the existence of significant differences between industries in working capital measures and these measures change across time. According to Filbeck and Krueger (2005), these changes could be related to the macroeconomic factors such as interest rate, innovation rate, and competition.

Chiou *et al.* (2006) collected quarterly data from Taiwan Stock Exchange by using 19,180 firms, for a period 1996-2004. Although, the study revealed that debt ratio and operating cash flow can affect management of working capital, it did not find any consistent empirical results on the relation of the working capital management to business indicator, industry effect, company growth, firm performance, and firm size.

Sathyamoorthi and Wally-Dima (2008) used retail domestic companies listed on Botswana Stock Exchange from 2004 to 2006. The study reveals that companies adopt a conservative approach in the management of their working capital which suggests that it is not static overtime, but varies with the changes in the state of the economy. Companies tend to adopt a conservative approach in the times of high volatility and tend to adopt an aggressive approach in times of low volatility.

Nazir and Afza (2008) using 204 manufacturing firms from 16 industrial groups listed on Karachi Stock Exchange (KSE) for a period of 1998-2006 found the factors that determine working capital requirements. The study used working capital requirement as a dependent variable and operating cycle of firm, level of economic activity, leverage, growth of firm, operating cash flows, firm size, industry, return on assets and Tobin's  $q$  as independent variables. The study using regression analysis on panel data demonstrated that operating cycle, leverage, return on assets and Tobin's  $q$  significantly influence the working capital requirements.

Nazir and Afza (2009) used 132 manufacturing firms from 14 industrial groups listed on Karachi Stock Exchange (KSE) between period of 2004-2007. The study used working capital requirement (WCR) as the dependent variable. Operating cycle of the firm, level of economic activity, leverage, growth of the firm, operating cash flows, firm size, industry, return on assets, and Tobin's  $q$  were used as the determining factors of working capital requirements. Regression analysis on the panel data revealed positive relationships between i) operating cash flow and WCR, ii) Tobin's  $q$  and WCR, iii) return on assets and WCR, and iv) leverage and WCR. No statistically significant relationships between i) size of the firm and WCR and ii) sales growth and WCR was found. The study also indicates that the level of economic activity does not have any significant effect on WCR practices of firms in Pakistan.

Taleb *et al.* (2010) tested the relation between working capital requirement on one hand and operating cycle of firm, level of economic activity, leverage, growth of firm, operating cash flows, firm size, return on assets, and Tobin's *q* on the other. Using regression analysis, the study found statistically significant relationship between working capital requirements and operating cash flows. They also found statistically significant relationships between all independent variables and working capital requirements at every year and all period years of the study.

A study by Gill, (2011) examined the factors the influence working capital requirement of Canadian manufacturing and service firms. The study used a sample of 166 Canadian firms listed on the Toronto stock exchange and applied co-relational and non-experimental research design. The results indicate that overall, working capital requirement is positively correlated with operating cycle, return on assets, Tobin's *q* and industry but negatively correlated with firm size.

Akinlo (2012) investigated the determinants of working capital requirements of 66 firms in Nigeria using panel data for the period 1997-2007. The results suggest that sale growth, firm's operating cycle, economic activity, size and permanent working capital are firm specific characteristics that positively drive working capital policy. Leverage, however, is inversely related to working capital requirements. The import of the study was that traditional valuation methods used to quantify the efficiency of corporate working capital policy may be suspect as increased investments in operating working capital may be necessitated by increased business uncertainties.

### **3. Methodology**

The paper examines the determinants of working capital requirement and policies of Banks in Ghana (1999-2008). In all, 28 financial statements of banks were included in the study even though some the banks had folded up as at 2008. Data were derived from the published annual reports of the banks that are kept with the supervision department of Bank of Ghana.

The paper is divided into two: determinants of working requirement and determinants of bank working capital policies. Working Capital Requirements were included as a dependent variable, as used by Shulman and Cox (1985) and Nazir and Afza (2009), as a measure of working capital management (cash and equivalents + marketable securities + accounts receivables) – (Customer deposits + accounts payables + other payables). Working capital requirements are deflated by total assets to control the size effect. The independent variables include: Cash Conversion Cycle, Cash Flows, Growth, Return on Equity, Leverage, Size, Age and firm level Herfindahl Index. On the other hand, Cash Conversion Cycle, Debtors Collection Period and Creditors Payment Period were used as dependent variables for working

capital management policies. In each case, apart from cash conversion cycle, the other controlling variables were maintained.

In undertaking the study, first the descriptive statistics of the variables used for the study were ascertained, then the presence of multicollinearity was tested by using pairwise correlation and the Hausman (1978) specification test was used to choose between the fixed or random effects regression models. The nature of the data allows for the use of panel data methodology for the analysis. Panel data methodology has the advantage of not only allowing researchers to undertake cross-sectional observations over several time periods, but also control for individual heterogeneity due to hidden factors, which, if neglected in time-series or cross-section estimations leads to biased results (Baltagi, 1995). The general form of the panel data model can be specified as:

$$y_{it} = a + \beta'X_{it} + u_{it} \quad (1)$$

where the subscript  $i$  denotes the cross-sectional dimension and  $t$  represents the time-series dimension.  $Y_{it}$  represents the dependent variables in the model, which are working capital requirement, Debtors' Collection Period, Creditors' Payment Period and Cash Conversion Cycle.  $X$  contains the set of explanatory variables in the estimation model.  $a$  is the constant and  $\beta$  represents the coefficients.  $u_{it} = \mu_i + \lambda_i + v_{it}$  where  $\mu_i$  is an unobserved individual specific effect,  $\lambda_i$  is an unobserved time specific effect and  $v_{it}$  is a zero mean random disturbance with a variance of  $\sigma^2$ . The error components of variance follow a two way analysis of variance (ANOVA). If  $\mu$  and  $\lambda_i$  denote fixed parameters to be estimated, this model is known as the fixed effects. In this case the  $X_{it}$ 's are assumed independent of the  $v_{it}$ 's for all  $i$  and  $t$ . On the other hand if  $\mu_i$  and  $\lambda_i$  are random variables with zero means and constant variances and, this model is known as the random effects model.

The random effects model also adds  $\mu_i \sim \text{i.i.d. } N(0, \sigma_\mu^2)$  and  $\nu_{it} \sim \text{i.i.d. } N(0, \sigma_\nu^2)$ , showing that the two error components are independent from each other (Baltagi, 2008 and Hsiao, 2003).

Specifically, the model for this study follows the one used by Nazir and Afza (2009, p. 32 and 33) - with some modifications due to data availability and the special nature of the banking industry - to explain working capital requirements and the determining factors. This takes the following form:

$$\begin{aligned} WCR\_TA_{it} = & \alpha + \beta_1 OC_{it} + \beta_2 OCF\_TA_{it} + \beta_3 EA_t + \beta_4 GROW_{it} + \beta_5 ROA_{it} + \beta_6 Q_{it} \\ & + \beta_7 LEV_{it} + \beta_8 LNSize_{it} + \beta_9 IndDum_{it} + \epsilon_{it} \end{aligned} \quad (2)$$

The above model was modified slightly due to data availability, the special nature of the banking industry and to allow for the testing of determinants of working capital policies of banks. This resulted in four main models:



$$WCR_{it} = \alpha + \beta_1 CCC_{it} + \beta_2 ROE_{it} + \beta_3 CTA_{it} + \beta_4 TDA_{it} + \beta_5 ROA_{it} + \beta_6 GRO_{it} + \beta_7 SIZE_{it} + \beta_8 AGE_{it} + \beta_9 HHI_{it} + \varepsilon_{it} \quad (3)$$

$$DCP_{it} = \alpha + \beta_1 ROE_{it} + \beta_2 CTA_{it} + \beta_3 TDA_{it} + \beta_4 ROA_{it} + \beta_5 GRO_{it} + \beta_6 SIZE_{it} + \beta_7 AGE_{it} + \beta_9 HHI_{it} + \varepsilon_{it} \quad (4)$$

$$CPP_{it} = \alpha + \beta_1 ROE_{it} + \beta_2 CTA_{it} + \beta_3 TDA_{it} + \beta_4 ROA_{it} + \beta_5 GRO_{it} + \beta_6 SIZE_{it} + \beta_7 AGE_{it} + \beta_9 HHI_{it} + \varepsilon_{it} \quad (5)$$

$$CCC_{it} = \alpha + \beta_1 ROE_{it} + \beta_2 CTA_{it} + \beta_3 TDA_{it} + \beta_4 ROA_{it} + \beta_5 GRO_{it} + \beta_6 SIZE_{it} + \beta_7 AGE_{it} + \beta_9 HHI_{it} + \varepsilon_{it} \quad (6)$$

where the variables are defined in appendix 1.

## 4. Discussion of Empirical Results

### 4.1. Descriptive Statistics and Correlation Analysis

The nature of the variables during the period under study is shown in Table 1. On average, banks in Ghana can cover only 44% of the current liabilities from their current assets. This means that about 56% of bank current liabilities should be paid for from other sources. The large size of bank deposits which represents a greater proportion of bank capital and the capital adequacy requirement of banks (10%) could be explanatory factors. But this goes to confirm earlier findings that most banks in Ghana rely heavily on debt financing; as also shown by the high proportion of debt capital (87.9%) (Marfo-Yiadom and Agyei, 2011). The average cash conversion cycle (-6,524.6 days), debtors collection period (1,195.87 days) and creditors payment period (7,690.43 days) also confirm the aforementioned fact that most banks finance their operations from current liabilities. Equity holders over the period of study enjoyed a return of 23% even though bank growth averaged at 60%. The proportion of total assets held in cash was about 25% while the log of total assets and age were 7.96 and 1.08 respectively. The average firm level herfindahl index was 64.81.

**Table 1:** Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Minimum	Maximum
WCR	190	-0.43982	0.17719	-0.91357	0.16014
CCC	187	-6524.60	3906.48	-26102.6	-1557.03
DCP	189	1195.88	616.020	6.64622	4891.48
CCP	188	7690.44	4167.13	2004.02	29254.49
ROE	190	0.23325	0.35296	-1.51805	2.08799



CTA	190	0.24849	0.11017	0.05882	0.59981
TDA	190	0.87903	0.10560	0.30511	1.71268
GRO	160	0.59927	0.92610	-0.31517	8.15322
SIZE	190	7.96000	0.61856	5.94646	9.21754
HHI	190	64.81364	120.7421	0.00196	552.1884

Correlation analysis is shown in Appendix 3. The levels of pairwise correlation among the variables suggest a minimal presence of multicollinearity.

#### *4.2. Determinants of Bank Working Capital Requirement*

The study is tailored towards finding out what factors account for the size of working capital kept by banks in Ghana and also the factors that influence bank working capital policies. The results of the first part of the study are shown in Table 3. The random effects model was preferred to the fixed effects model based on the results of the Hausman (1978) test, so only the random effects model is reported. The results show that in Ghana the major factors that account for the size of working capital include but not limited to cash conversion cycle, cash level, the capital structure, size, age and the proportion of market share controlled by a bank.

Cash has a significantly negative relationship with bank working capital. Banks that have large amount of cash and cash equivalent keep lower amount of working capital. The main asset of banks is cash so as banks are able to keep high levels of cash their need for other forms of working capital reduced and they are better able to meet the needs of depositors. Banks that have a greater proportion of their capital in the form of debt keep lower levels of working capital. This result is in line with the pecking order theory which suggests that debt use has the potential of influencing management to be efficient in the utilization of available resources which include working capital. The results therefore sits well with other similar ones like Chiou, Cheng and Wu (2006), Nazir and Afza (2008) and Palombini and Nakamura (2012). The relationship between size of working capital and bank market share is also negative and significant pointing out that banks controlling a greater proportion of the banking market are efficient in the utilization of working capital and therefore keep minimal working capital. Bigger banks which mostly have been in existence for a very long time need more working capital than smaller banks as it is reflected in a significantly positive relationship between bank size and age on one hand and working capital requirement on the other. Together the two results seem to suggest that aging banks still pursue growth strategies hence the need for more working capital. On the contrary this could also be a signal of some inefficiency in the utilization of available working capital due to diseconomies of scale.

**Table 3:** Model 3 – Determinants of Bank Working Capital Requirement

Variable	Random Effects Model			Fixed Effects Model		
	Coef.	z-stat	Prob.	Coef.	t-stat	Prob.
CCC	5.93E-06	1.68	0.093	0.00000439	1.14	0.256
ROE	0.01752	0.54	0.589	0.0169942	0.49	0.623
CTA	-0.2903	-2.67	0.008	-0.326742	-2.28	0.024
TDA	-0.4458	-3.67	0.000	-0.4310767	-3.42	0.001
GRO	0.00688	0.59	0.556	0.0038415	0.3	0.762
SIZE	0.12403	4.35	0.000	0.1129548	2.86	0.005
AGE	0.14371	4.47	0.000	0.1466799	4.34	0.000
HHI	-0.0007	-5.72	0.000	-0.0006966	-4.71	0.000
CONSTANT	-1.0627	-4.51	0.000	-0.9875422	-3.14	0.002
R-sq		0.4976			0.4963	
Prob>Chi2		0.0000			0.0000	
Wald Chi2 (7)		147.6				
Hausman Test (Chi2(7) Prob.		2.27 0.9435				

### 4.3. Determinants of Bank Working Management Capital Policies

#### a) Debtors' Collection Period

The study also reveals that whiles profitability, growth and bank size have a significantly positive relationship with length of credit given to debtors, cash level and bank market size show otherwise (Table 4A). Profitable banks are able to relax their credit terms for customers just like banks that are growing and larger banks. This could be as a result of economies of scale and partly as a result of a major growth strategy to get more customers. Expectedly banks that have more cash are able to relax their credit terms for their customers because they may be in a relatively stable financial condition as compared to banks that have lower levels of cash. Surprisingly, the results seem to suggest that banks that control larger proportion of market deposits ask their debtors to pay earlier than others. Probably, the size of deposits that they control puts pressure on them to have enough cash to cover withdrawals.

**Table 4A:** Model 4 – Determinants of Debtors' Collection Period

Variable	Random Effects Model			Fixed Effects Model		
	Coef.	z-stat	Prob.	Coef.	t-stat	Prob.
ROE	383.069	3.40	0.001	494.006	4.72	0.000
CTA	-594.88	-1.60	0.110	-736.187	-1.69	0.093
TDA	368.861	0.87	0.385	317.7113	0.83	0.409
GRO	89.4489	2.19	0.028	73.7783	1.91	0.058
SIZE	769.642	8.65	0.000	357.4332	3.08	0.002
AGE	55.5258	0.49	0.621	149.1818	1.45	0.150
HHI	-2.3068	-5.66	0.000	-1.30172	-3.02	0.003
CONSTANT	-5223.6	-6.89	0.000	-2013.2	-2.15	0.033
R-sq		0.5241			0.4643	
Prob>Chi2		0.0000			0.0000	
Wald Chi2 (7)		167.38				
Hausman Test Chi2 (7) Prob.		182.48 0.0000				

*b) Creditors Payment Period*

Banks that are large or control a bigger portion of the market are better able to negotiate for longer credit terms than smaller banks (Table 4B). This could be explained by larger banks ability to provide collateral and market power induced by their size. In other words, bank size and market share have a significantly positive relationship with length of credit enjoyed by banks in Ghana.

*c) Cash Conversion Cycle*

The level of cash held by banks, bank size and market share are the only important factors that influence the cash conversion cycle of banks in Ghana (Table 4C). All these factors have significantly negative relationship with bank CCC. The results seem to show that banks that have high cash level reduce their cash conversion cycle. This is contrary to our expectation. But it reinforces the fact that bank reliance on cash for operation as is not curtailed by the level of cash that they hold. The larger the size of banks, the lower the CCC suggesting an efficient use of working capital by larger banks as against smaller banks. Similar results were also found for banks that controlled greater proportion of total deposits in the Ghanaian banking market.

**Table 4B:** Model 5 – Determinants of Creditors' Payment Period

Variable	Random Effects Model			Fixed Effects Model		
	Coef.	z-stat	Prob.	Coef.	t-stat	Prob.
ROE	-268.22	-0.35	0.725	-78.90864	-0.10	0.920
CTA	4197.18	1.42	0.155	4777.606	1.47	0.144
TDA	2498.05	0.88	0.376	2122.67	0.74	0.459
GRO	202.969	0.72	0.470	244.6609	0.85	0.397
SIZE	3557.49	4.75	0.000	2985.234	3.45	0.001
AGE	-113.44	-0.15	0.880	-8.269802	-0.01	0.991
HHI	7.80546	2.63	0.009	9.570055	2.97	0.004
CONSTANT	-24799	-4.04	0.000	-20277.57	-2.91	0.004
R-sq		0.4038			0.3828	
Prob>Chi2		0.0000			0.0000	
Wald Chi2 (7)		96.22				
Hausman Test Chi2 (7) Prob.		4.4  0.7328				

**Table 4C:** Model 6 – Determinants of Cash Conversion Cycle

Variable	Random Effects Model			Fixed Effects Model		
	Coef.	z-stat	Prob.	Coef.	t-stat	Prob.
ROE	708.858	0.97	0.330	574.2746	0.77	0.444
CTA	-5096	-1.8	0.072	-5514.005	-1.77	0.079
TDA	-2094.2	-0.78	0.438	-1802.755	-0.66	0.512
GRO	-124.77	-0.46	0.642	-169.9311	-0.62	0.539
SIZE	-3024.9	-4.2	0.000	-2630.682	-3.17	0.002
AGE	217.523	0.3	0.762	154.2839	0.21	0.834
HHI	-9.5752	-3.36	0.001	-10.85296	-3.51	0.001
CONSTANT	21406.9	3.62	0.000	18280.34	2.73	0.007
R-sq		0.376			0.3624	
Prob>Chi2		0.000			0.0000	
Wald Chi2 (7)		91.8				
Hausman. Test Chi2 (7) Prob.		2.9  0.8939				

## 5. Conclusion

This study is a modest attempt to find out the main factors that determine the working capital requirement on one hand and working capital management policies of banks in Ghana on the other. Secondary data for the study was taken from Bank of Ghana for 28 banks. Using panel methodology within the random or fixed effects framework (where necessary) the study concludes that while Cash Conversion Cycle, Size and Age of a bank have significantly positive impact on bank working capital requirement, leverage, cash position and deposit Herfindahl index have a significantly negative effect on bank working capital requirement. On working capital policies of banks, among the key factors that determine working capital management policies of banks in Ghana include profitability, cash position, growth size and deposit Herfindahl index. Consequently the study finds support for the pecking order and agency theories even though no support was found for the lifecycle theory.

The results essentially imply that, to ensure efficient working capital management, banks in Ghana should pursue growth strategies geared towards obtaining greater proportion of the banking market and issue more short term debt instruments.

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## Appendixes

### Appendix 1: Definition of variables (proxies)

VARIABLE	DEFINITION
WCR	Working Capital Requirement (Dependent Variable) = Ratio Net Working Capital to Net Total Assets for Bank $i$ in time $t$
CCC	Cash Conversion Cycle = The difference between Debtors Collection Period and Creditors Payment Period for Bank $i$ in time $t$
CPP	Creditors' Payment Period = The ratio of bank short –term debt to interest expense x 365 for Bank $i$ in time $t$
DCP	Debtors Collection Period = The ratio of Bank current asset to Interest Income x 365 for Bank $i$ in time $t$
ROE	Profitability = Ratio of Earnings before Interest and Taxes to Equity Fund for Bank $i$ in time $t$
CTA	Cash Position = Ratio of Cash and cash equivalent to Net Total Assets for Bank $i$ in time $t$
$TDA$	Leverage = the ratio of Total Debt to Total Net Assets for Bank $i$ in time $t$
GRO	Bank Growth = Year on Year change in Interest Income for Bank $i$ in time $t$
SIZE	Bank Size = The log of Net Total Assets for bank for Bank $i$ in time $t$
$AGE$	Bank Age = the log of bank age for Bank $i$ in time $t$
HHI	Firm -level Deposit Herfindahl Index = the ratio of bank deposit to total market deposits x 10,000 for Bank $i$ in time $t$
$\varepsilon$	The error term



**Appendix 2: List of Banks In Ghana included in the Study**

BANK	TYPE OF BANK	ADDRESS
1. BANK OF GHANA	CENTRAL	<a href="http://www.bog.gov.gh">www.bog.gov.gh</a>
2. BARCLAYS BANK GH LTD	UNIVERSAL AND OFFSHORE	<a href="http://www.barclays.com/forwardafrica">www.barclays.com/forwardafrica</a>
3. ACCESS BANK	UNIVERSAL	233 21-784143
4. AGRIC. DEV'T BANK	UNIVERSAL	<a href="http://www.adbghana.com">www.adbghana.com</a>
5. AMALGAMATED BANK	UNIVERSAL	<a href="http://www.amalbank.com.gh">www.amalbank.com.gh</a>
6. BANK OF BARODA	UNIVERSAL	<a href="http://www.bankofbaroda.com">www.bankofbaroda.com</a>
7. SAHEL BANK (BSIC)	UNIVERSAL	<a href="mailto:bsicgh@africaonline.com.gh">bsicgh@africaonline.com.gh</a>
8. CAL BANK	UNIVERSAL	<a href="http://www.calbank.net">www.calbank.net</a>
9. ECOBANK GHANA LTD	UNIVERSAL	<a href="http://www.ecobank.com">www.ecobank.com</a>
10. FIDELITY BANK LTD	UNIVERSAL	<a href="http://www.fidelitybank.com.gh">www.fidelitybank.com.gh</a>
11. FIRST ATLANTIC MERCHANT BANK	UNIVERSAL	<a href="http://www.firstatlanticbank.com.gh">www.firstatlanticbank.com.gh</a>
12. GHANA COMM. BANK	UNIVERSAL	<a href="http://www.gcb.com.gh">www.gcb.com.gh</a>
13. GUARANTY TRUST BANK	UNIVERSAL	<a href="http://www.gtbghana.com">www.gtbghana.com</a>
14. HFC BANK (GH) LTD	UNIVERSAL	<a href="http://www.hfcbankgh.com">www.hfcbankgh.com</a>
15. INTERCONTINENTAL BANK (GH) LTD	UNIVERSAL	<a href="http://www.intercontinentalbankghana.com">www.intercontinentalbankghana.com</a>
16. INTERNATIONAL COMMERCIAL BANK LTD	UNIVERSAL	<a href="http://www.icbankingroup.com">www.icbankingroup.com</a>
17. MERCHANT BANK (GH)	UNIVERSAL	<a href="http://www.merchantbank.com.gh">www.merchantbank.com.gh</a>
18. NATIONAL IN'T BANK	UNIVERSAL	<a href="http://www.nib-ghana.com">www.nib-ghana.com</a>
19. PRUDENTIAL BANK	UNIVERSAL	<a href="http://www.prudentialbank-ghana.com">www.prudentialbank-ghana.com</a>
20. SG-SSB LTD	UNIVERSAL	<a href="http://www.ssb.com.gh">www.ssb.com.gh</a>
21. STANBIC BANK	UNIVERSAL	<a href="http://www.stanbic.com.gh">www.stanbic.com.gh</a>
22. STANDARD CHARTERED BANK (GH) LTD	UNIVERSAL	<a href="http://www.standchartered.com">www.standchartered.com</a>
23. THE TRUST BANK LTD	UNIVERSAL	<a href="http://www.trustbank.com.gh">www.trustbank.com.gh</a>
24. UNIBANK (GH) LTD	UNIVERSAL	<a href="http://www.unibankghana.com">www.unibankghana.com</a>
25. UNITED BANK FOR AFRICA (GH) LTD	UNIVERSAL	<a href="http://www.ubaghana.com">www.ubaghana.com</a>
26. UT BANK LTD	UNIVERSAL	<a href="http://www.utbankghana.com">www.utbankghana.com</a>
27. ZENITH BANK (GH) LTD	UNIVERSAL	<a href="http://www.zenithbank.com.gh">www.zenithbank.com.gh</a>
28. BANK OF BARODA	UNIVERSAL	

**Appendix 3: Correlation Analysis**

	<b>WCR</b>	<b>CCC</b>	<b>DCP</b>	<b>CPP</b>	<b>ROE</b>	<b>CTA</b>	<b>TDA</b>	<b>GRO</b>	<b>SIZE</b>	<b>AGE</b>	<b>HHI</b>
WCR	1.00										
CCC	-0.0510	1.00									
DCP	0.536	-0.360	1.00								
CPP	0.104	-0.990	0.485	1.00							
ROE	0.079	-0.010	0.190	0.038	1.00						
CTA	-0.423	0.057	-0.338	-0.094	-0.070	1.00					
TDA	-0.272	0.094	0.159	-0.061	0.198	-0.036	1.00				
GRO	-0.123	0.138	0.023	-0.124	-0.082	0.049	0.070	1.00			
SIZE	0.337	-0.407	0.564	0.464	0.338	-0.461	0.259	-0.197	1.00		
AGE	0.352	-0.199	0.233	0.219	0.352	-0.352	0.101	-0.335	0.643	1.00	
HHI	-0.046	-0.343	-0.000	0.323	0.340	-0.188	0.104	-0.142	0.459	0.635	1.00