Research Journal of Finance and Accounting
ISSN 2222-1697 (Paper) ISSN 2222-2847 (Online)
Vol.4, No.1, 2013

Empirical Analysis of Working Capital Management and its Impact on the Profitability of Listed Manufacturing Firms in Ghana

Thomas Korankye (Corresponding author)
Institute of Entrepreneurship and Enterprise Development, Kumasi Polytechnic
P. O Box 854, Kumasi, Ghana
Tel: +233200931133. E-mail: Thomas.korankye@kpoly.edu.gh or thomko567@yahoo.co.uk

Rosca Serwaah Adarquah
School of Business, Garden City University College
Kenyasi, Kumasi-Ghana
Tel: +233240103524. E-mail: illymingle@yahoo.com

Abstract

This paper empirically analyses working capital management and its impact on firm profitability. Panel data is obtained from the financial statements of listed manufacturing firms in Ghana from 2004 to 2011 inclusive. In all, six (6) out of seven (7) manufacturing firms quoted on the Ghana Stock Exchange with complete financial data constituted the research sample. This paper uses working capital cycle and gross operating profit margin as proxies for working capital management and profitability respectively. Whiles leverage, interest cover and the ratio of current assets to total assets are used as control variables. The study employs descriptive statistics, Pearson correlation and ordinary least squares regression analyses. The results reveal that working capital cycle significantly affects firm profitability negatively. This means that less profitable listed manufacturing firms in Ghana have longer working capital cycle. From the correlation analysis, the study also finds that inventory turnover period, account receivables collection period and account payables payment period each negatively correlates with profitability. Finally while leverage negatively but significantly relates to profitability, interest cover and the ratio of current to total assets have significantly positive relation with profitability.

Keywords: Working capital, profitability, manufacturing firms, Ghana

1. Introduction

The aim of this paper is to empirically test the relationship between working capital management and the profitability of listed manufacturing firms in Ghana. Working capital basically refers to short-term resources available to a company for financing its day-to-day activities. How profitable or non-profitable a business or a firm can be can partly depend on how it effectively and efficiently manages working capital. Efficient management of working capital is a fundamental part of the overall corporate strategy in creating value for owners. Deloof (2003), Howorth and Westhead (2003), and Afza and Nazir (2009) opine that firms try to keep an optimal level of working capital that maximizes their value. As Smith(1980) admits, working capital management plays an important role in firm's profitability and risk as well as its value. The main components of working capital comprise of current assets and current liabilities. Filbeck and Krueger (2005) stress that keeping an optimal balance among each of the working capital components is the main objective of working capital management. Business success heavily depends on the ability of the financial managers to effectively manage receivables, inventory, and payables. Harris (2005) opines working capital management as a simple and straightforward concept of ensuring the ability of the organization to fund the difference between the short-term assets and short-term liabilities.

In the literature research, on the relationship between working capital management and firm's profitability abound. Deloof (2003) investigated the relationship between working capital management and corporate profitability for a sample of 1,009 large Belgian non-financial firms from 1992 – 1996. He found a negative relationship between gross operating income and number of days receivable, payable and inventories. His studies also established a negative relationship between cash conversion cycle and profitability. In studying working capital management and profitability of listed Pakistani firms on the Karachi Stock Exchange, Raheman and Nasr (2007) determined the existence of a strong negative correlation between the variables of working capital management and profitability. Using a sample of fifty (50) selected listed firms in Nigeria, Falope and Ajilore (2009) conclude that a statistically significant negative correlation exist between net operating profitability and inventory turnover, cash conversion cycle, debtors collection period and account payable days. More recently, Bagchi and Khamrui (2012) have shown that statistically significant inverse association exist between the return on assets of selected FMCG companies in India and each of cash conversion cycle, interest coverage ratio, age of debtors, age of creditors, age of inventory and debt ratio. These findings are not significantly different from those of other researchers such as Ching *et al* (2011), Lazaridis and Tryfonidis (2006), Garcia-Teruel and Martinez-Solano (2007). Despite the findings of these authors, Agyei and Yeboah (2011) show that a positive relationship exists between cash conversion cycle and bank profitability. Gill *et al* (2010) also educe a statistically positive significant relationship between cash conversion cycle and gross operating profit ratio. This implies that longer cash conversion cycle might increase profitability because it leads to higher sales. But Deloof (2003) argues that corporate profitability might also decrease with the cash conversion cycle if the cost of higher investment in working capital is higher and rises faster than the benefits of holding more inventories and granting more trade credit to customers.

This study is necessitated by the fact that though studies on working capital management and profitability abound, specific studies focusing on manufacturing companies in Ghana are largely unavailable. These manufacturing companies in Ghana are however very vital in job creation and gross domestic product growth in the Ghanaian economy. Thus a study such as this contributes significantly and adds value to the existing literature on working capital management and firm profitability.

The rest of the paper encapsulates the methodology, results and discussion, and conclusion.

2. Methodology

This section provides information with respect to the sampling and data collection methods, descriptive analysis, correlation analysis as well the regression model used for the study.

2.1 Sampling and data collection techniques

The paper focuses on listed manufacturing firms on the Ghana Stock Exchange (GSE). This follows firm classification done by the GSE. In all, the GSE classifies seven (7) companies listed on its bourse as manufacturing in nature. These manufacturing firms are Aluworks, Cocoa Processing Company, PZ Cussons, Unilever, Golden Web, Super Paper Products (now known as African Champion Industries) and Pioneer Kitchenware. Only manufacturing firms with complete financial data covering the research timeframe are selected to constitute the sample. As such the sample size comprise of six (6) out of seven firms representing approximately 86% of the research population. The data for the study originate from the financial statements of the listed manufacturing firms

for an eight year period between 2004 and 2011 inclusive. These financial statements are obtained from the Ghana Stock Exchange Fact Book and Annual Reports Ghana.

2.2 Descriptive Analysis

This study uses descriptive statistics to assess the nature of working capital management practices of the listed manufacturing firms. To achieve this purpose the mean, standard deviation, minimum, median and maximum values of inventory turnover period (INTP), account receivables collection period (ARCP), account payables payment period (APPP), gross operating profit margin (GOPM), current assets to total assets (CATA), interest cover (INCO) and leverage (LEV) respectively are computed and analyzed. The measurements of GOPM, WCCY, CATA, INCO and LEV are specified in sub-section 2.4. But the computations of INTP, ARCP and APPP are as follows:

INTP = (inventory*365)/cost of sales

ARCP = (account receivable * 365)/turnover

APPP = (accounts payable x 365)/cost of sales

2.3 Correlation Analysis

The study uses correlation as a statistical measure to express the strength of the relationship between GOPM on one hand and each of INTP, ARCP, APPP, CATA, INCO and LEV. Following the parametric nature of the data, the Pearson Correlation coefficient (r) is much more appropriate. As Berk and Carey (2004) explain, r is computed mathematically as:

$$r = \frac{\sum_{i=1}^{n}(u_i - \acute{u})(y_i - \acute{y})}{\sqrt{\sum_{i=1}^{n}(u_i - \acute{u})^2} \times \sqrt{\sum_{i=1}^{n}(y_i - \acute{y})^2}} \qquad (1)$$

Where u and y are variables which relationship are to be established. Correlation expresses the strength of the relationship on a scale of -1 to +1. A positive correlation is a sign of strong positive relationship whiles a negative correlation indicates an inverse association between one variable and another variable. A correlation of zero could imply a nonlinear relationship, where it is neither positive nor negative.

2.4 Model Specification

To help improve the efficiency of the economic estimates, as a result of increased degrees of freedom and reduced collinearity, panel data is used for the study. The general form of the panel regression equation could be stated as:

$$Y_{i,t}\,\alpha + \beta X_{i,t} + e_{i,t} \qquad (2)$$

In equation (2), subscripts i and t respectively represents the cross-sectional and time series dimension of the data, while α and β also connotes constant and regression coefficients respectively. As $Y_{i,t}$ indicates the dependent variable, $X_{i,t}$ represent the set of exogenous variables of firm i, time t and e measures the error term. The primary method of estimation is ordinary least squares.

The specific panel regression equation used for the study is as follows:

$$GOPM_{i,t} = \alpha + \beta_1 WCCY_{i,t} + \beta_2 LEV_{i,t} + \beta_3 INCO_{i,t} + \beta_4 CATA_{i,t} + e_{i,t} \quad (3)$$

Where:

GOPM = Gross operating profit margin computed as the excess of turnover over cost of sales divided by total assets less non-current financial assets.

WCCY = Working capital cycle calculated as (accounts receivable collection period + inventory turnover period – accounts payable payment period)

LEV = Leverage representing the ratio of total debt to total assets

INCO = Interest cover measured as the fraction of earnings before interest and tax to finance cost

CATA = The ratio of current assets to total assets

GOPM which represents the dependent variable is used to measure firm profitability. The exclusion of non-current financial assets from total assets in the computation of GOPM is consistent with prior studies such as that of Bagchi and Khamrui (2012). This is necessary because these non-current financial assets are largely investments in subsidiaries and so including them in the total assets will understate the GOPM. Although previous studies such as Deloof (2003); Lazaridis and Tryfonidis (2006), Bagchi and Khamrui (2012) additionally used COP, INP, and PAP as proxies for working capital management variables, this study uses WCCY solely to proxy working capital management of the listed manufacturing firms in Ghana. This is justifiable by the fact that WCCY comprehensively embodies ARCP, INTP and APPP (ICAG, 2011). INCO, LEV and CATA serve as the control variables.

3. Results and Discussion

3.1 Descriptive statistics

The descriptive summary statistics are shown in table 1. Throughout the eight year period, the mean gross operating profit margin was 17%, with the minimum and maximum been -8% and 53% respectively. The deviation from the average profitability was 17%. Whiles the average period it took the firms to collect account receivables was two months 18 days, the average payables payment period was five months 3 days. This means that the credit period enjoyed by the manufacturing firms on average exceeds the credit period they grant to their customers by almost two months 15 days. Although this long APPP represents a source of free finance, it may also give a signal that the manufacturing firms are unable to pay more quickly owing to liquidity constraints (ICAG, 2011). Characteristically of manufacturing firms compared with service firms, the mean turnover period for inventory was four and half months. In all, the average time for which the manufacturing firms needed external short-term working capital financing (WCCY) was 59 days. As the WCCY increases the working capital requirement also increases thereby putting more pressure on the manufacturing firms to source for short-term external finance. Again 59% of the manufacturing firms' activities are financed by debt. This indicates that listed manufacturing firms in Ghana are highly leveraged. The mean INCO connotes that EBIT is able to meet financial charges on debt about 11 times. This reflects a minimal interest debt exposure. Moreover, the average proportion of current assets to total assets stood at 42%. This is a reflection of the size of short-term resources available for the manufacturing firms to meet their short-term financing needs.

3.2 Correlation analysis

The results of the Pearson correlation is shown in table 2 below. The table 2 shows that WCCY, APPP, ARCP and INTP are negatively correlated with GOPM. Clearly, as each of working capital cycle, account payables payment period, account receivables collection period and inventory turnover period increases (decreases), profitability of the listed manufacturing firms in Ghana decreases (increases). As Deloof (2003) elicits, a possible explanation for the negative correlation between APPP and GOPM could be that less profitable firms take longer period to pay their account payables. This shows that delaying payment to suppliers could be expensive in terms of factors such as lost cash discounts and supplier goodwill. Whiles LEV also correlates negatively with GOPM, CATA and INCO correlates positively with GOPM. None of the variables have nonlinear relationship with profitability.

3.3 Regression analysis

The low correlation values (as shown in table 3) between the explanatory variables reflect the absence of multicollinearity. Table 4 presents the regression results of the study. As shown by the F-statistic, the overall regression model is significant at the 99% level. The coefficient of determination indicates that approximately 55% of the variability in gross operating margin can be explained by the exogenous variables. From the regression results, working capital management (WCCY) is statistically significant at the 90% level. The beta coefficient of WCCY shows a negative association between it and GOPM. This reveals that the profitability of listed manufacturing firms in Ghana increases as WCCY decreases. Intuitively, less profitable manufacturing firms keep longer working capital cycle. Clearly such firms have longer inventory turnover period, account payables period and account receivables collection period. This adds to the existing literature by confirming the findings of similar empirical studies such as Bagchi and Khamrui (2012), Raheman and Nasr (2007), Lazaridis and Tryfonidis (2006), Falope and Ajilore (2009), and Deloof (2003). It however contradicts the findings of Gill *et al* (2010) who found a positive relationship between cash conversion cycle and gross operating profit of sampled listed American firms on the New York Stock Exchange from 2005 to 2007. The import of the findings is that effective working capital management is a necessity for improving firm profitability. Firms therefore have to keep closer eyes on the cost of keeping account payable days longer. Leverage is significant at 95% level, but is negatively related to GOPM. Since high leverage adversely influences profitability (see table 3), profitable listed manufacturing firms in Ghana therefore use less debt in financing their activities. This is consistent with the findings of Bagchi and Khamrui (2012) and Raheman and Nasr (2007). Finally, INCO and CATA are all positively significant at 99% level, implying that the ratios of EBIT to financial charges and current assets to total assets are directly proportional to profitability.

4. Conclusion

This paper has empirically analyzed working capital management and its impact on firm profitability. Panel data was obtained from the financial statements of listed manufacturing firms in Ghana for eight (8) years from 2004 to 2011 inclusive. In all, six (6) out of seven (7) manufacturing firms quoted on the Ghana Stock Exchange with complete financial data constituted the research sample. Descriptive statistics, Pearson correlation and regression analyses were used. The findings revealed that working capital cycle (used as proxy for working capital management) is statistically significant but negatively associated with firm profitability. Intuitively, profitable listed manufacturing firms in Ghana maintain shorter working capital cycle. The study also found that inventory turnover period, account receivables collection period and account payables payment period each negatively correlates with profitability. Finally while leverage negatively but significantly relates to profitability, interest cover and the ratio of current to total assets have significantly positive relation with profitability. In essence, this study has shown that effective working capital management is a necessity for improving firm profitability.

References

Afza, T., and Nazir, M. (2009), "Impact of Aggressive Working Capital Management Policy on Firms' Profitability, *The IUP Journal of Applied Finance,* Vol. 15(8), pp.20-30

Agyei, K.S. and Yeboah, B. (2011), "Working Capital Management and Profitability of Banks in Ghana", *British Journal of Economics, Finance and Management Sciences,* Vol. 2(2)

Bagchi, B. and Khamrui, B. (2012), "Relationship between working capital management and profitability: A study of selected FMCG companies in India", *Business and Economics Journal, Vol. 2012: BEJ-60*

Berk, K. N. and Carey, P. M. (2004), *Data Analysis with Microsoft Excel,* Brooks/Cole, Thompson Learning

Ching, H.Y., Novazzi, A., and Gerab, F. (2011), "Relationship between Working Capital Management and Profitability in Brazilian-listed Companies", *Journal of Global Business and Economics,* Vol.(3), pp.74-86.

Deloof, M. (2003), "Does Working Capital Management Affects Profitability of Belgian Firms?", *Journal of Business Finance and Accounting,* Vol. 30(3&4), pp.573-587

Falope, O.L. and Ajilore, O.T. (2009), "Working Capital Management and Corporate Profitability: Evidence from Panel Data Analysis of Selected Quoted Companies n Niegria", *Research Journal of Business Management,* Vol. (3), pp.73-84

Filbeck, G.., and Krueger, T. (2005), "Industry Related Differences in Working Capital Management", *Journal of Business,* Vol. *20* (2), pp.11-18.

Garcia-Teruel, P.J. and Martinez-Solano, P.M. (2007), "Effects of Working Capital Management on SME Profitability", *International Journal of Managerial Finance,* Vol. (3), pp.164-177

ICAG (2011), *Financial Reporting,* 2nd Ed., Black Mask Ltd, Accra-Ghana

Harris, A. (2005), "Working Capital Management: Difficult, but Rewarding", *Financial Executive,* Vol. 21(4), pp.52-53

Howorth, C. and Westhead, P. (2003), "The Focus of Working Capital Management in UK Small Firms", *Management Accounting Research*, Vol. 14(2), pp. 94-111

Lazaridis, I. and Tryfonidis, D. (2006), "Relationship between Working Capital Management and Profitability of Listed Companies in the Athens Stock Exchange", *Journal of Financial Management and Analysis,* Vol. 19 pp. 26-35

Raheman, A. and Nasr, M. (2007), "Working Capital Management and Profitability – Case of Pakistani Firms", *International Review of Business Research Papers,* Vol.3(1), pp279-300

Smith (1980), *Profitability versus Liquidity Tradeoffs in Working Capital Management, in Readings on the Management of Working Capital*, New York, St. Paul: West Publishing Company.

Table 1: Descriptive summary statistics

	Mean	Std dev	Minimum	Median	Maximum
GOPM	0.1703	0.1705	-0.0808	0.0965	0.5295
WCCY	59.3759	151.7504	-197.6850	74.0372	803.3345
ARCP	78.1501	130.8579	0.0000	48.3524	909.8659
APPP	153.4492	118.0419	6.0662	127.9913	580.8580
INTP	134.6750	80.9439	28.2358	116.6291	349.9250
INCO	11.1343	23.9196	-5.4367	0.3705	113.1573
LEV	0.5909	0.3285	0.2655	0.4551	2.0323
CATA	0.4243	0.1948	0.0602	0.4147	0.7909

Table 2: Pearson Correlation Matrix I

	GOPM	*WCCY*	*ARCP*	*APPP*	*INTP*	*INCO*	*LEV*	*CATA*
GOPM	1							
WCCY	-0.1162798	1						
ARCP	-0.1884603	0.611177	1					
APPP	-0.1796604	-0.3544615	0.3418815	1				
INTP	-0.1753244	0.3697838	0.0277329	0.2410849	1			
INCO	0.6199362	-0.1019451	-0.0500166	0.0146549	-0.0888919	1		
LEV	-0.4005508	-0.0222352	0.0450958	0.1396877	0.0891193	-0.2012081	1	
CATA	0.5999209	0.2750495	-0.0044775	-0.317682	0.0596091	0.4445776	-0.2831053	1

Table 3: earson Correlation Matrix II

	GOPM	WCCY	INCO	LEV	CATA
GOPM	1				
WCCY	-0.1162798	1			
INCO	0.6199362	-0.1019451	1		
LEV	-0.4005508	-0.0222352	-0.2012081	1	
CATA	0.5999209	0.2750495	0.4445776	-0.2831053	1

Table 4: Regression results. Profitability: Gross Operating Profit Margin

3

	Coefficient	t Stat	P-value
Constant	0.057408	0.9834	0.3309
WCCY	-0.00023	-1.9422	0.0587
LEV	-0.1083	-2.041	0.0465
INCO	0.0026	3.2278	0.0024
CATA	0.3809	3.65	0.0007

Adjusted R squared	0.556
F	15.714
Prob.(F statistic)	5.33E-08
Observations	48

This academic article was published by The International Institute for Science, Technology and Education (IISTE). The IISTE is a pioneer in the Open Access Publishing service based in the U.S. and Europe. The aim of the institute is Accelerating Global Knowledge Sharing.

More information about the publisher can be found in the IISTE's homepage: http://www.iiste.org

CALL FOR PAPERS

The IISTE is currently hosting more than 30 peer-reviewed academic journals and collaborating with academic institutions around the world. There's no deadline for submission. **Prospective authors of IISTE journals can find the submission instruction on the following page:** http://www.iiste.org/Journals/

The IISTE editorial team promises to the review and publish all the qualified submissions in a **fast** manner. All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Printed version of the journals is also available upon request of readers and authors.

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digtial Library , NewJour, Google Scholar