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Effect of working capital management on firms profitability evidence from manufacturing companies in eastern, Ethiopia

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Abstract
Working capital management plays an important role in success and failure of firm in business because of its effect on firm's profitability as well as on liquidity. Profitability and working capital relationship is frequently emphasized for deciding on the level of investment in working capital. All manufacturing firms need to understand the association between these two variables to arrive at optimal financial decisions. Though theories exist on the topic, empirical methods are inadequately focused in arriving at conclusions. Use of statistical methods in understanding the relationship is systematic and scientific, which may provide better insight for decision making. This paper is an endeavor to understand the relationship between working capital and profitability in a detailed manner. The results show that longer accounts receivable and inventory holding periods are associated with lower profitability. Thus, managers can create value by reducing their firm's number of days accounts receivable and inventories. Equally, shortening the cash conversion cycle also improves the firm's profitability.

Keywords: working capital, working capital management, firm size, cash conversion cycle and profitability.

Introduction

Background of Study

Working capital management is part of the financing considerations that a finance manager of a corporation needs to determine, besides capital structure and capital budgeting (Ross, Westerfield and Jordan, 2010). [11] In view that each company emphasized on maximizing profitability that can be generated from their business operation, many studies had been conducted on the effect of capital structure and working capital management in determining the profitability, which the results varies based on the study undertaken. In this study, working capital management components are analyzed on their effect towards the firm's profitability.

Meanwhile, in determining the firm's profitability, the finance manager also need to take account the firm's working capital management, which basically means managing the firm's current assets and current liabilities at satisfactory level (Dong and Su, 2010; Gill, Biger and Mathur, 2010)[3,5]. Generally, in a balance sheet, current assets consist of raw materials, work in progress, finished goods or inventories, account receivables, cash and bank balances which are short term in nature that are used for production and sales; which are able to be converted to cash within the year. On the other hand, current liabilities refer to obligations that need to be paid within the year or not beyond the business operating cycle, whichever is earlier (Ross, Westerfield and Jaffe, 2010). [11] Generally, current liabilities comprise of accounts payable, accrued wages, taxes and other expenses payable and short-term debt. Hence, it is vital in managing the working capital efficiently as it is able to increase the firm's profitability and shareholder value (Smith, 1980; Deloof, 2003, Dong and Su, 2010) [2, 3, 14]. Furthermore, the benefits of having an efficient working capital management are the firms able to meet its short term obligations and maintain adequate liquidity position in order to continue the operation of the firms (Eljelly, 2004) [10]. In view that working capital management decision is important factor as it determines the firm values maximization and shareholders wealth; many researches had conducted various studies to examine on the relationship between working capital management and firm's performance over the last decades. However, the findings are inconsistent for different studies carried out by numerous

Researchers and are performed separately. Furthermore, there is also lack of study being conducted on the effect of working capital management on the profitability of firms in Ethiopia.

In this study, efficiency of working capital management (WCM) is represented by cash conversion cycle (CCC), together with WCM components such as number of days Accounts Receivable (ARD), number of days Inventories (INV) and number of days Accounts Payable (AP) are analyzed on their effect towards firm's profitability, measured by return on asset (ROA). Control variables such as current ratio (CR), firm size (SIZE), sales growth (GROWTH) and debt (DEBT) ratio are also being examined in order to determine their effect towards the profitability of the firm.

In view that one of the financial considerations in business is WCM, there are various empirical research being conducted by researchers on the effects of WCM on profitability of firms (Shin and Soenen, 1998; Deloof, 2003; Lazaridis and Tryfonidis, 2006) [13, 9, 19]. However, in Malaysia, the WCM topic has not been extensively being research as compared to other corporate finance studies such as capital structure and capital budgeting, due to WCM is perceived as investment and financing in short time interval (Zariyawati, Taufiq, Annuar and Sazali, 2010). [16] This is also due to short-term financial management has been regarded as less significant and often being overlooked by researchers, which give more emphasis to other parts of corporate finance and investment despite WCM takes up substantial share of time of the finance managers (Nasruddin, 2006). [7]

Furthermore, based on the researchers' findings, the results are inconsistent for different studies conducted. In addition, despite various studies being undertaken to investigate on the effect of working capital management on the profitability of firms, the results revealed mixed findings and different researchers used different methodology or approach in measuring the working capital management, such as cash conversion cycle (Padachi, 2006), [9] current ratio (Nor Edi Azhar and Noriza, 2010) [10] and net trade cycle (Shin and Soenen, 1998; Erasmus, 2010)[13]. This study attempts to fill up the gap of working capital management studies by focusing specifically in the manufacturing sector from eastern Ethiopia. Based on the problem statement highlighted, the result of this study is to find out answer for the following identified research questions:-

- What is the effect of working capital management components towards the firm's profitability in manufacturing sectors from period of 2010 to 2014?
- How does number of days Accounts Receivable (ARD) affects the profitability of the manufacturing firms in Ethiopia?
- How does number of days Inventories (INV) affects the profitability of the manufacturing firms in Ethiopia?
- How does number of days Accounts Payable (AP) affects the profitability of the manufacturing firms in Ethiopia?
- How does cash conversion cycle (CCC) affects the profitability of the manufacturing firms in Ethiopia

Research Objectives

The research objectives of this study are as follow:-

- To examine the effect of working capital management components on the profitability of manufacturing firms in Ethiopia from period of 2010 to 2014.
- To investigate the effect of number of days Accounts Receivable (ARD) towards the profitability of the manufacturing firms in Ethiopia.
- To investigate the effect of number of days Inventories (INV) towards the profitability of the manufacturing firms in Ethiopia.
- To investigate the effect of number of days Accounts Payable (AP) towards the profitability of the manufacturing firms in Ethiopia.
- To investigate the effect of cash conversion cycle (CCC) towards the profitability of the manufacturing firms in Ethiopia.

Purpose and Significance of the Study

The importance of conducting this study is it allows firm managers to expand their learning curve to reduce the possibility of default, especially in turbulent time; in view that working capital management has influence on the profitability performance of the firms. Furthermore, this study is also of importance for practitioner, policy maker, academician and firm managers with regards to issue associated with the effect of working capital management on profitability of firm, as it enables minimization of firm's cost of finance and further planning being conducted in order to maximize firm's profitability and shareholders' wealth.

Hypotheses

In order to achieve the objective of the study stated above, the following research hypotheses (HP) were developed:

HP 1: - There is negative relationship between Accounts Receivable Days (ARD) and firm's profitability.

HP2:-There is positive relationship between Inventories holding Days (IHD) and firm's profitability.

HP3:- There is negative relationship between Accounts Payable Days (APD) and firm's profitability

HP4:- There is negative relationship between Cash Conversion Cycle (CCC) and firm's profitability

HP5:-There is negative relationship between liquidity and profitability.

HP6:-There is negative relationship between debt ratio and profitability

Research Methodology

The research design for this study is based on secondary data collected from firms under study from year 2010 to 2014. The data used in this study are obtained from a sample of 30 companies with total observations of 150. This research is analyzed using panel data regression, which is a combination of cross-sectional and time-series analysis, in order to determine the effects of WCM towards firms' profitability in the manufacturing sectors in eastern Ethiopia. The analyses of the sample of firms are examined by applying the statistical package of EViews version 7.0. The dependent variable for the study refers to the firm's profitability that is represented by return on assets (ROA), while the independent variables refer to working capital management components that are represented by number of days Accounts Receivable (ARD), number of days Inventories (INV), number of days Accounts Payable (AP) and cash conversion cycle (CCC). Meanwhile, the control variables

for this framework refer to current ratio (CR), firm size (SIZE), sales growth (GROWTH) and debt ratio (DEBT).

The variables are then analyzed to determine if there is any significant relationship between the dependent and independent variables through Pearson Correlation matrix with the purpose of identification of multicollinearity. In this study, panel data regression analysis has been adopted due to it assumptions that firms are heterogeneous, fewer multicollinearity problems between variables and higher degree of freedom, which resulted in higher efficiency of the estimator (Wooldridge, J.M. (2003) [15] Balanced panel data has been used in this study in view of the characteristic of data used, which involves both cross sections and time series. Fixed effects method is selected as compared to the random effects estimation in view that based on Hausman test result, as reflected by the Chi-Square statistic revealed mostly significant at 0.01 levels in all the models. In all the regression models, the standard errors are computed by applying White's correction for heteroscedasticity, as adopted in the study by Deloof (2003) [2] and Padachi (2006). [9]Four panel data regression models developed in order to test on the hypotheses developed on the effect of WCM components towards firm's profitability measured by ROA. In this study, the regression models are derived based on model developed by Sharma and Kumar (2011). [12] The model is further supported by researchers which have analyzed the effect of individual WCM components separately towards the profitability of firms, such as Deloof (2003) [9], Padachi (2006), Falope and Ajilore (2009), Gill, Biger and Mathur (2010), Akinlo(2012). [9, 5, 1] Thus, there are four panel data regression models formed for this study to test on the hypotheses developed.

Model 1: The effect of ARD on profitability of firms

$$ROA_{i,t}= \beta_0 + \beta_1 ARD_{i,t} + \beta_2 CR_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 GROWTH_{i,t} + \beta_5 DR_{i,t} + \eta_i + \lambda_t + \varepsilon_{i,t}$$

Model 2: The effect of INV on profitability of firms

$$ROA_{i,t}= \beta_0 + \beta_1 INV_{i,t} + \beta_2 CR_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 GROWTH_{i,t} + \beta_5 DR_{i,t} + \eta_i + \lambda_t + \varepsilon_{i,t}$$

Model 3: The effect of AP on profitability of firms

$$ROA_{i,t}= \beta_0 + \beta_1 AP_{i,t} + \beta_2 CR_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 GROWTH_{i,t} + \beta_5 DR_{i,t} + \eta_i + \lambda_t + \varepsilon_{i,t}$$

Model 4: The effect of CCC on profitability of firms

$$ROA_{i,t}= \beta_0 + \beta_1 CCC_{i,t} + \beta_2 CR_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 GROWTH_{i,t} + \beta_5 DR_{i,t} + \eta_i + \lambda_t + \varepsilon_{i,t}$$

Where profitability of the firms refer to ROA, while *i* stands for the i^{th} firm, *t* stands for year *t,* and the variables are defined as follows:-

$ROA_{i,t}$: Return on asset of firm *i* at time *t*

$ARD_{i,t}$: Number of days Accounts Receivable of firm *i* at time *t*

$INV_{i,t}$: Number of days Inventories of firm *i* at time *t*

$AP_{i,t}$: Number of days Accounts Payable of firm *i* at time *t*

$CCC_{i,t}$: Cash Conversion Cycle of firm *i* at time *t*

$CR_{i,t}$: Current Ratio of firm *i* at time *t*

$SIZE_{i,t}$: Firm Size of firm *i* at time *t*

$GROWTH_{i,t}$: Sales Growth of firm *i* at time *t*

$DR^{i,t}$: Debt ratio of firm *i* at time *t*

β_0: Intercept coefficient

η_i: Individual firm effect assumed constant for firm *i* over *t*

λ_t: Time specific effect assumed constant for given *t* over *i*

$\varepsilon_{i,t}$: Time varying disturbance term serially uncorrelated with mean zero and variance 1. Random error term for firm *i* at time *t*

Research Results and Analysis

The summary of the key descriptive statistics for the dependent and independent variables are summarized in Table 1. below, which presents descriptive statistics for 30 manufacturing firms for a period of five years from 2010 to 2014, which has a total of 150 firm-year observations

Table 1: Descriptive statistics of sample companies

Variables	N	Mean	Medium	Maximum	Minimum	Std. Dev.
ROA	150	0.179	0.164	0.310	-0.054	0.072
ARD	150	95.6	92.0	136.0	60.0	10.2
INV	150	47.1	52.0	75.0	27.0	9.2
APD	150	52.9	51.6	68.2	37.1	9.1
CCC	150	91.9	93.0	139.2	53.0	17.3
CR	150	3.6	3.2	7.5	0.4	1.02
DR	150	0.24	0.24	0.44	0.07	0.09
Growth	150	12.8	0.10	1.35	-1.43	0.54
Size	150	11	11.55	14.18	6.57	1.52

Source: E-view output from financial statements of sample companies, 2010-2014

Based on, Table 1. The average profit of the manufacturing firms as indicated by ROA is 17.9% (median16.4. %). The minimum value for ROA is reported as negative 5.4% with maximum value of 31%, whereby the standard deviation of GOP is indicated as 7.2%, which means that ROA value can deviate from mean of both sides by 7.2%.

For WCM components, noted that ARD has reported the highest mean value of 96 days, followed by APD with average of 52 days and IHD recorded an average of 47 days, which resulted in average CCC of 91 days that is around 3 months period. These reflect that manufacturing firms receive payment from sales proceeds on average of 96 days with standard deviation of 10 days, which the minimum collection period from receivables proceeds is 60 days with maximum period of 136 days. Furthermore, firms take an average of 47 days to sell inventory with standard deviation of 9.2 days, which the median for inventory conversion to sales is 50 days. Meanwhile, firms pay their purchases an average of 52 days with standard deviation of 9 days, which the minimum period reported as 37 days and maximum periods 68 days. Reportedly, CCC as a measure of efficiency in working capital management has an average of 91 days with median of 93 days. The average current ratio of manufacturing firms is reported as 3.6, while the mean size of the firms is 11. Meanwhile, the average sales growth and debt ratio are reported as 12.8% and 24% respectively. To check the liquidity of the companies, a traditional measure of liquidity (current ratio) is used. The average current ratio for

manufacturing firms is 3.6. With a standard deviation of 1.02. The highest current ratio for a company in a particular year is 7.5 and in the same way the minimum ratio for a company in a year is 0.4.

Pearson's Correlation Analysis

Pearson's Correlation analysis is also being conducted in order to determine on the relationship between the independent and dependent variables such as the WCM components, and control variables towards the profitability of the firms that is measured by ROA. Furthermore, based on the Pearson's correlation matrix, it also allows detection of any problem of multicollinearity. According, to (Wooldridge, 2003). [15] Multicollinearity can be identified if there is high (not perfect) correlation between two or more independent variables The detailed result of Pearson's correlation matrix for firms under study from year 2010 to 2014 is summarized per Table. 2.

Table 2: Pearson's Correlation Matrix of Manufacturing Sector

VAR	GOP	ARD	INV	AP	CCC	CR	SIZE	SG	DR
GOP	1								
ARD	-0.3592	1							
INV	-0.4422	.137	1						
AP	-0.2396	.063	.063	1					
CCC	-0.257	0.811	0.842	0.26	1				
CR	-0.3362	.310	.560	-.360	.350	1			
SIZE	0.3238	-.145	-.089	-.450	-.120	-.280	1		
SG	-0.3776	-.475	-.035	-.240	-.320	-.150	.520	1	
DR	-0.0428	-.023	-.026	-.760	-.036	-.018	.156	.460	1

Based on Table 2 there are high correlation values observed between CCC and ARD as the correlation is 0.811 and between CCC and INV with high correlation reported as 0.842. Thus, there is a multicollinearity problem in developing regression that includes all the independent and control variables into one liner regression as the correlation is higher than 0.7 (Pallant, 2009) [10]. However, this problem of multicollinearity is being mitigated by not including the variables of CCC, ARD and INV together in a similar regression model since there are highly correlated.

Thus, four panel data regression models have been developed to investigate the individual effect of WCM components (ARD, INV, AP, CCC), which analysis have been conducted separately towards the firms' ROA as dependent variable. The results of the effect of WCM components on profitability are reflected as per Eview output while the summary of the panel data regression analysis is presented under Table 3

Table 3: Panel Data Regression Analysis

Dependent Variable : Return on Asset (ROA)Regression Method : Panel Least Squares(Fixed Effects Estimation)Period : 2010 to 2014				
Model	**1**	**2**	**3**	**4**
C	-5.067**	-7.583 **	-5.074	-8.763
ARD	-0.0005*			
INV		0.000325**		
AP			-0.000213*	
CCC				-0.000045**
CR	-0.041*	-0.032*	-0.013*	-0.021*
DR	-0.025**	-0.015**	-0.035**	-0.022**
GROWTH	0.024*	0.011*	0.022*	0.034*
Size	0.006**	0.003**	0.004**	0.008**
R-squared	0.553	0.553	0.534	0.593
Adjusted R-squared	0.481	0.479	0.452	0.448
F-statistic	21.347**	16.369**	17.862**	14.749**
Hausman Test(Chi-Sq. Statistic)	37.899**	49.011**	63.473**	48.173**

Note: * $p < .05$, ** $p < .01$

Source: Researcher's Estimation, 2015

Based on Model 1 in Table 3, there is a significant negative relationship between ARD and ROA at significance level of 0.05. This result revealed that an increase in the number of days accounts receivable (ARD) by a day has reduced the ROA of the firms by -0.05%, which the result is consistent with the majority of the findings from past literature review conducted that had also revealed a significant negative relationship between profitability and ARD (Deloof, 2003; Lazaridis and Tryfonidis, 2006; Falope and Ajilore, 2009; Gill, Biger and Mathur, 2010; Dong and Su, 2010) [4, 5, 3]. Thus, based on the result obtained in Model 1 above, hypothesis 1 is accepted. Therefore, there is a significant negative relationship between ARD and ROA of firms under manufacturing sector, which is consistent with the results obtained by previous researchers

Based on Model 2 in Table 3 that analyze on the effect of INV towards the firms' ROA, it is revealed that INV has a positive relationship with ROA, This indicates that an increase of the number of days inventories (INV) by a day has increased the ROA of the firms by 0.03%. The result found is consistent with the study conducted by Zcapkun, Hameri and Weiss (2009), [17] which revealed a significant positive relationship between inventory performance and ROA. 2009; Dong and Su, 2010) [14]. However, the result obtained is found to be contrary with previous literature review, which mostly revealed a negative relationship

(Deloof, 2003) [2] Falope and Ajilore. [4] Thus, based on the result obtained in Model 2 above, hypothesis 2 is accepted. Therefore, there is a significant positive relationship between INV and ROA of firms under manufacturing sector, which is consistent with the results obtained by previous researchers

In Model 3 of Table 3, AP reported an insignificant positive relationship with GOP, which implies that GOP has increased by 0.021% by lengthening a day of the accounts payable (AP). Although the result obtained consistent with some of the earlier studies that revealed a negative relation between AP and profitability (Deloof, 2003; Falope and Ajilore, 2009) [2, 4], however, the result contradict with the study conducted by Dong and Su (2010) [4], who had found a significant positive association between AP and profitability, which means that there is a delay in payment by firms with higher profitability.

Thus, based on the result obtained in Model 3 above, hypothesis 3 is accepted. Therefore, there is a significant negative relationship between AP and ROA of firms under manufacturing sector, which is consistent with the results obtained by previous researchers

Based on Model 4 in Table 3, CCC reported a negative relationship with ROA, which indicates that there is a decrease in ROA by 0.00045% by lengthening the cash conversion cycle (CCC). Thus, based on the result obtained in Model 4 above, hypothesis 4 is accepted. Therefore, there is a significant negative relationship between CCC and ROA of firms under manufacturing sector.

Debt ratio and current ration have a significant negative relationship with return on Assets in all the models at 0.01, level of significance. However, sizes of sales and growth have a significant positive relationship with return on Assets in all the models at 0.01, level of significance

Recommendations

Company's managers can create profits or value for their companies and shareholders by handling correctly the cash conversion cycle and keeping each different component of working capital such as accounts receivable, inventory and accounts payable to a possible optimum level.

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