



The Relationship between Operating Cycle Ratios and Market Value Added (MVA): An Empirical Analysis of Listed Companies of India

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(Received: 14/10/2015; Accepted: 29/03/2016)

The association between operating cycle ratios and the market value added has not been explored in an extant literature. Prior studies have more or less focused on measuring the impact of operating cycle ratios on firm profitability, which fails in measuring the impact of these ratios on shareholders' wealth. The basic objective of the paper is to empirically analyze the association between operating cycle ratios and an MVA in the context of "A" group companies listed on the Bombay Stock Exchange. The study is carried out by using the secondary data of 197 companies classified as "A" group companies that are listed on Bombay Stock Exchange. The study covers the period 2010 to 2014. The study is based on the data collected from the CMIE Prowess database for the said period. The study uses multiple regression analysis to analyze the association between operating cycle ratios and market value added with respect to sample companies. The study finds that none of the operating cycle ratios are statistically significantly related to market value added. The results of the study imply that managing operating cycle ratios efficiently need not necessarily result into the augmentation of shareholder wealth.

Keywords: Market Value Added, Turnover Ratio, Normal, Operating Cycle Ratio

JEL Classification: G30, G31

Paper Classification: Research Paper

Introduction

Operating cycle is the time that elapses between purchases of raw material, its conversion into work-in process, work-in process converted into finished good, finished goods converted into receivables and receivables resulting into cash. Operating cycle is essential as it indicates the smoothness with which the business is run. Managers will try to reduce the operating cycle to ensure quick release of funds locked in the cycle. Managers will, thus, try to shorten the operating cycle to magnify the opportunity cost of the locked funds. A huge sum of money is usually locked in the operating cycle and hence it becomes essential to measure up to what extent the operating cycle affects the firm's performance. Traditionally, the firm's performance is usually measured as return on investment (ROI) or Return on Equity (ROE). Previous studies have also analyzed the

relationship between operating cycle ratios and ROI and ROE. In this study, an attempt has been made to further the extant literature by analyzing the relationship between operating cycle ratios and market value added, a value based measure which reflects the shareholders' wealth rather than accounting profitability.

The paper comprises six sections: the first one introduces the proposed research work, the second section describes a literature review; the third section presents research methodology; fourth section highlights results and discussions; fifth section offers findings and implications; and sixth section concludes the paper.

Literature Review

Shin and Soenen (1998) used a large sample of American listed firms to assess the association between a measure of cash conversion cycle and corporate profitability for the period 1975-1994. The study revealed that a time taken to convert cash from inventories was negatively related to measures of profitability. Lyroudi and Lazaridis (2000) identified that cash conversion cycle demonstrated a positive association with ROA and the net profit margin, but was not linearly related with the leverage ratios.

Al-Shubiri (2010) observed that profitability measures were negatively related with working capital investment and financing policy. Nobanee, Abdullatif and Al Hajjar (2010) using a sample of 34771 Japanese firms, found a cash conversion cycle and profit ratios of firms in question were negatively correlated. Gill, Biger and Mathur (2010) tested 88 listed American firms, analyzed the association between management of working capital and firm profitability. They found that cash conversion cycle and profitability measures in terms of operating profit were statistically significantly related. Bolek, Kacprzyk, and Wolski (2012) found that association between cash conversion cycle and EVA was statistically significant. Kieschnik, Laplante and Moussawi (2012) empirically analyzed the relationship between working capital management and shareholder value. They found that additional dollar invested in net operating working capital was worth less than the additional dollar kept as cash by an average firm.

Thuvarakan (2013) analyzing the UK manufacturing industry, found that working capital components and profitability were not statistically significantly related. Alavinasab and Davoudi (2013) reported that cash conversion cycle and ROA were negatively related. The same held true in respect of the association between cash conversion cycle and ROE. Abdul and Mohamed (2007) analyzed the association between management of working capital and profitability in the case of Pakistani firms. The researchers reported that the components of working capital management and profitability measures were negatively related. Pouraghajan and Emamgholipourarchi (2012) taking a sample of listed companies traded on a Tehran Stock exchange, carried out a study to examine the influence of working capital management on ROA, return on invested capital and on Tobin's Q. The study reported that working capital and profitability measures were statistically significantly related. On the contrary, they reported that management of working capital management and market value of companies as measured in terms of Tobin's Q were not significantly correlated. Baharlooyinezhad, Nemati and Shooshtarian (2015) analyzed the relationship between management of working capital and shareholder wealth in the context of 67 companies that were listed on the Tehran Stock exchange. Using methods of person correlation coefficient and regression, they reported that there exists a statistically significant relationship between management of working capital and shareholder wealth.

Nejad, Bandarian and Ghatebi (2015) found that inventory holding period was statistically significant in explaining variation in profitability. Moreover, it demonstrated a negative

correlation with financial performance. Collection period and accounts payable deferral period were also found to have a negative correlation with financial performance. In the Indian context, Ghosh and Maji (2003) investigated the association between management of working capital and firm profitability in with reference to Indian cement Industry and reported that there was a little impact of the former on the latter. Chakraborty (2008) attempted to assess whether the working capital management had any impact on and firms' profitability with reference to pharmaceutical companies of India. He came across to two contradictory findings. One was stating that working capital management was affecting profitability whereas, the other was disproving it. Chatterjee (2012) carried out a study of 100 Indian companies listed on the Bombay stock Exchange for two year period i.e. 2010 and 2011. He found that there existed a negative association between cash conversion cycle and profitability ratios. He also reported that liquidity and profitability of the Indian companies were negatively correlated.

Arunkumar and Radha (2013) taking a sample of 1198 manufacturing firm, for a five year period, found that average collection period and profit were positively related Inventory turnover and creditors' turnover measured in terms of days allowed were positively related to profit. Panigrahi (2014) conducted a conceptual analysis of management of working capital in respect of FMCG companies in India. His study revealed that companies that were carrying negative working capital in their accounts, maximized shareholder value by offering higher dividend and capital appreciation to their shareholders. Panigrahi (2013) reported that the cash conversion cycle demonstrated a positive relationship with ROA and return on equity.

Ramachandran and Gopinathan (2012) assessed the association between management of working capital and firm profitability in the case of Indian sugar industry. They reported that working capital turnover ratio and the debtors' turnover ratio were negatively correlated with return on investments. On the contrary, inventory turnover ratio was reported to have positive correlation with return on investment. Creditors' turnover ratio indicated a statistically insignificant positive correlation with return on investment.

Research Gap

The review of literature section highlights that majority of the studies have focused on measuring the influence of management of working capital on firm profitability. Studies examining the association between management of working capital and shareholder wealth are not conducted at large scale. This paper aims at filling that gap by examining the relationship between operating cycle and shareholder wealth, measured in terms of market value added. This research will thus try to fill in that vacuum to establish relationship between operating efficiency and economic efficiency.

Contribution of the Study

The chief contribution of this research paper is to empirically analyze an association between the operating cycle ratios and the market value added and to offer new insights as to how managing the operating cycle effectively leads to enhancement in the market value added. It will thus help managers in linking the production efficiency with economic efficiency that is usually measured in terms of the excess return generated by the company for its shareholders over and above the cost of capital. It will also help in identifying the most significant operating cycle component that drives market value added which in turn will help managers in managing operating cycle more effectively.

Research Methodology

Type of study

An analytical and descriptive research design is used for the study

Sample and period of the study

The study comprises a sample of 197 companies rated as "A" group on the Bombay Stock Exchange. The reference period of the study ranges from 2010 to 2014.

Method of data collection

The secondary data required for the research were culled from the CMIE Prowess database for the said period. Values of operating cycle ratios of sample companies were culled from the CMIE Prowess database.

Variables used and their definition

Raw Material Turnover. Raw Material turnover ratio = Raw Material Consumption/ Average Raw Material Inventory

Work-in –Progress Turnover Ratio. Work-in Progress Turnover Ratio = Cost of Production / Average Work-in progress inventory

Finished Good Turnover Ratio. Finished Good Turnover Ratio = Cost of Sales/ Average Finished Goods Inventory

Debtor's Turnover. Debtors' Turnover= Credit Sales/ Average Debtors

Creditors' Turnover. Creditors' Turnover = Credit Purchases/ Average Creditors

Market Value Added. Market value added describes the wealth created by the company for its shareholders in terms of excess of the market capitalization of equity over its value recorded in the balance sheet. Following this, in this paper, the MVA has been calculated as below.

Market Value Added = Market Capitalization- Shareholders' funds

Statistical Tools Used

The multiple regression model was applied to analyze the relationship between operating cycle ratios and market value added of the sample companies. Following Templeton (2011), the data were normalized using a two-step approach. First, they were ranked and in the second step they were normalized as per the defined methodology of Templeton (2011). In order to remove the serial autocorrelation among the observation all independent variable were transformed into lagged variables. Lag of dependent variable was also taken and was included as an independent variable while running the multiple regressions. Statistical analysis was performed in SPSS software. F-test, t-test have been used to analyze the statistical relevance and validity of the overall regression model and that of individual explanatory variables.

Statement of the research problem

The study aims at analyzing the relationship between operating cycle ratios and market value added. As the operating cycle reflects the time consumed to convert the asset into cash, it is quite



essential to analyze the impact of operating cycle ratios on shareholders’ wealth. To measure, the shareholder’s wealth, the market value added has been used. It measures the excess of the market capitalization of equity over the value recorded on the balance sheet. It, thus, captures the price the market is willing to offer over its book value. The paper thus aims at examining the association between operating cycle ratios and market value added to develop new insights into linking operating efficiency with economic efficiency.

Research Hypothesis

Following null hypothesis was tested to examine the relationship between operating cycle ratios and market value added.

H1: There does not seem to be a significant association between operating cycle ratios and market value added of Indian listed companies.

Regression Model

$$\text{Model 1: } MVA_{it} = LAGRMTURN_{it} + LAGWIPTURN_{it} + LAGFGTURN_{it} + LAGDTURN_{it} + LAGCTURN_{it} + LAGMVA_{it}$$

- where MVA_{it} represents normal market value added of i th firm in t time period
- $LAGRMTURN_{it}$, indicates lagged raw material turnover of i th firm in t time period
- $LAGWIPTURN_{it}$, indicates lagged work-in-progress turnover of i th firm in t time period
- $LAGFGTURN_{it}$, indicates lagged finished goods turnover of i th firm in t time period
- $LAGDTURN_{it}$, indicates lagged debtors’ turnover of i th firm in t time period
- $LAGCTURN_{it}$, indicates lagged creditors’ turnover of i th firm in t time period
- $LAGMVA_{it}$ indicates lagged MVA i th firm in t time period

Results and Discussions

Descriptive Statistics

Table 1 represents the results of descriptive statistics for the regression model. The mean values of raw material turnover, WIP turnover, finished goods turnover, debtors’ turnover, and creditor’s turnover were found to be 50.6, 385.7, 285.6, 29.8, and 38.7 respectively. The average market value added of sample firms was reported to be Rs. 238921.3 million with a SD of Rs. 314235.56 million, respectively.

Table 1: Descriptive Statistics for the Relationship between MVA and Operating Cycle Ratios

	Mean	Std. Deviation	N
MVA	245446.610	315869.08182	469
LAGRMTURN	50.5974	51.44082	469
LAGWIPTURN	385.6913	3700.75807	469
LAGFGTURN	285.6327	3083.13606	469
LAGDTURN	29.7545	20.71011	469
LGCTURN	13.6696	22.86899	469
LAGMVA	238921.273	314235.56436	469

Results of Correlation Coefficients

The values of correlation coefficients are shown in Table 2. The correlation between raw material turnover and market value added was found to be 0.021, between WIP turnover and market value added 0.073, between finished good turnover and market value added 0.102, between debtors' turnover and market value added 0.005, between creditors' turnover and market value added, -0.063. The correlation between finished goods turnover and market value added was significant. In case of other independent variables and market value added, the correlation was not statistically significant.

Table 2: Correlations

		MVA	Lagmturn	Lagmturn	Lagmturn	Lagmturn	Lagmturn	Lagmturn
Pearson Correlation	MVA	1.000	.021	.073	.102	.005	-.063	.598
	LAGRMTURN	.021	1.000	.058	.029	.310	.215	.038
	LAGWIPTURN	.073	.058	1.000	.776	.121	.078	.094
	LAGFGTURN	.102	.029	.776	1.000	-.050	.079	.118
	LAGDTURN	.005	.310	.121	-.050	1.000	.271	.030
	LGCTURN	-.063	.215	.078	.079	.271	1.000	-.030
	LAGMVA	.598	.038	.094	.118	.030	-.030	1.000
Sig. (1-tailed)	LAGRMTURN		.323	.058	.014	.455	.087	.000
	LAGWIPTURN	.323		.105	.268	.000	.000	.205
	LAGFGTURN	.058	.105		.000	.004	.046	.021
	LAGDTURN	.014	.268	.000		.142	.043	.005
	LGCTURN	.455	.000	.004	.142		.000	.260
	LAGMVA	.087	.000	.046	.043	.000		.258
	LAGRMTURN	.000	.205	.021	.005	.260	.258	
N	LAGWIPTURN	469	469	469	469	469	469	469
	LAGFGTURN	469	469	469	469	469	469	469
	LAGDTURN	469	469	469	469	469	469	469
	LGCTURN	469	469	469	469	469	469	469
	LAGMVA	469	469	469	469	469	469	469
	LAGRMTURN	469	469	469	469	469	469	469
	LAGWIPTURN	469	469	469	469	469	469	469

The findings of the study are contradictory to that of Panigrahi (2013) and Arunkumar and Radha (2013). On the contrary the results are consistent with Chakraborty (2008), Ghosh and Maji (2003). The primary difference between the results of those studies and the one in question is their measurement of company performance. In the studies cited above, primarily company performance in terms of profit ratios, whereas, in our study, market value added has been used. The primary reason for using market value added is that they measure economic performance of the companies rather than accounting performance, which grossly misses out the opportunity cost involved in making financial decisions.

Model Summary

Table 3 shows a model summary of the multiple regression model. As shown in the table, the multiple correlation coefficient is 0.601. The R squared is 0.361. It implies that 36.1% variation in market value added is explained by a set of independent variables jointly. The result of the D-W test also confirms that there does not exist problem of autocorrelation as the value of D-W lies in an acceptable range of 1.5 to 2.5.

Table 3: Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.601a	.361	.353	254108.02984	2.283
a. Predictors: (Constant), LAGRMTURN, LAGWIPTURN, LAGFGTURN, LAGDTURN, LAGCTURN, LAGMVA					
b. Dependent Variable: MVA					

Tests of statistical significance of the regression model

In order to test the overall statistical relevance of the multiple regression model, F- test was used. The outcomes of the ANOVA test are reported in Table 4. The results show that the model used is statistically significant (F= 43.524, $p < 0.05$).

Table 4: ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16862142003885.900	6	2810357000647.650	43.524	.000b
	Residual	29831751561907.600	462	64570890826.640		
	Total	46693893565793.600	468			
a. Dependent Variable: MVA						
b. Predictors: (Constant), LAGRMTURN, LAGWIPTURN, LAGFGTURN, LAGDTURN, LAGCTURN, LAGMVA						

Tests of significance of individual independent variables

a. Dependent Variable: MVA

In order to examine the whether individual independent variable is statistically significant in explaining the variation in dependent variable, t test was applied. To apply the test, following hypothesis was tested

$H_0 : \beta_i = 0$ i.e. beta coefficient of individual explanatory variable is not significantly different

Table 5 : Coefficients^a

Model		Unstandard Coefficients		Standardized Coefficients	t	Sig.
		B	Std.Error	Beta		
1	(Constant)	107772.668	23475.213		4.591	.000
	LAGRMTURN	49.896	242.958	.008	.205	.837
	LAGWIPTURN	-1.671	5.206	-.020	-.321	.748
	LAGFGTURN	5.218	6.256	.051	.834	.405
	LAGDTURN	56.678	634.396	.004	.089	.929
	LAGCTURN	-697.820	542.784	-.051	-1.286	.199
	LAGMVA	.595	.038	.592	15.765	.000

a. Dependent Variable : MVA

from zero. Where β_i stands for beta coefficients of all explanatory variables. Table 5 presents the results of t-test.

The raw material turn over ratios was found to be statistically insignificant in explaining variation in market value added ($t = 0.205, p > 0.05$). The WIP turnover was statistically insignificant ($t = -0.321, p > 0.05$). The finished good turnover was also found not to be statistically significant ($t = 0.834, p > 0.05$). Debtors' turnover and creditors' turnover were also statistically not related to market value added ($t = 0.89, p > 0.305$; $t = -1.286, p > 0.05$). The lagged MVA was found to be statistically significant ($t = 15.765, p < 0.05$).

Test of Collinearity

To examine to correlation among the independent variables themselves, the collinearity diagnostic was performed. The results of the same are presented in Table 6.

Table 6 : Collinearity Diagnostics^a

Model	Dimension	Eigen value	Condition Index	Variance Proportions						
				(Constant)	LA-GRM-TURN	LAG-WIP-TURN	LAGFG-TURN	LAG-DTURN	LAGC-TURN	LAG-MVA
1	1	3.373	1.000	.02	.03	.00	.00	.02	.03	.03
	2	1.710	1.404	.00	.00	.10	.10	.00	.00	.00
	3	.722	2.161	.01	.01	.00	.00	.00	.43	.43
	4	.491	2.620	.01	.23	.01	.00	.03	.51	.35
	5	.327	3.213	.08	.69	.05	.04	.22	.01	.06
	6	.234	3.797	.28	.04	.49	.53	.03	.01	.11
	7	.143	4.860	.61	.00	.34	.33	.69	.02	.02

a. Dependent Variable: MVA

Condition index of all independent variables was found to be less than 10. As a thumb rule, if the value of condition index is less than 15, there does not seem to be a problem of multicollinearity among the independent variables. Hence, it is quite obvious that there does not exist a problem of multicollinearity in the regression model used.

Findings and Implications

The results of the study highlight that none of the operating cycle ratios demonstrates a significant association with market value added. This is quite consistent with Pouraghajan and Emamgholipourarchi (2012) who also reported that management of working capital and market value of companies were not significantly related. The results are contradicting to Baharlooyinezhad, Nemati and Shoostarian (2015) who reported a statistically significant relationship between management of working capital and shareholder wealth. The results are not consistent with Bolek, Kacprzyk and Wolski (2012) who also reported that the cash conversion cycle and EVA were significantly related. The results thus imply that managing operating cycle efficiently needs not necessarily results into the augmentation of market value added.

Conclusion

The present study offers an insight into the relationship between operating cycle ratios and market value added. Earlier studies have primarily focused on measuring the association between working capital ratios and profitability. This research work uses market value added as a measure of shareholders' wealth. It investigates the relationship between operating cycle ratios and market value added. The study has revealed that none of the operating cycle ratios is significantly related to the market value added. The results thus refute the notion that operating efficiency is significantly affecting economic efficiency.

Limitations of the Study

The research was confined to "A" group companies only that were traded on the Bombay stock exchange. In this study, only one measure of shareholders' wealth, i.e. market value added was used; although, there are numerous measures of shareholder wealth that can be used to arrive at more robust results.

Scope for Further Research

The future studies could be made more broad-based by encompassing all listed companies. Moreover, instead of using only one measure of shareholders' wealth, it could use a combination of measures of shareholders' wealth like, Economic Value Added, Total Shareholder Return, Shareholder Value Added etc. to arrive at more robust and validating relationship between operating efficiency and economic efficiency.

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