

THE INTER-LINKAGES OF WORKING CAPITAL AND PROFITABILITY IN PAKISTAN (2001-2010)

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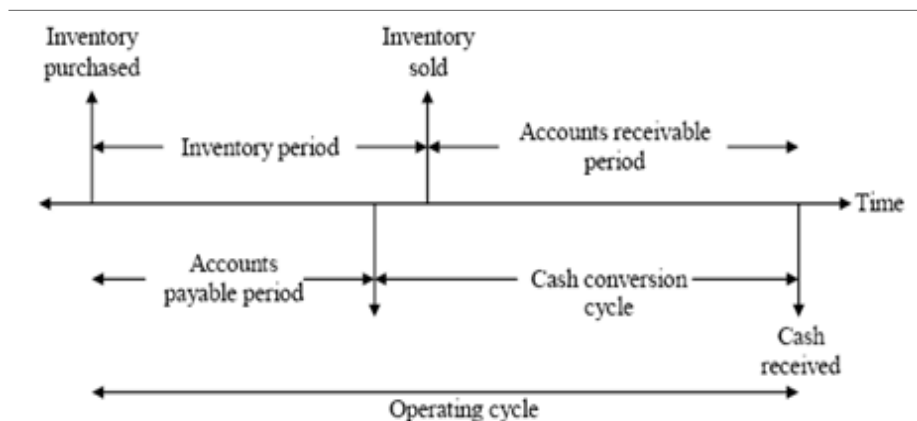
ABSTRACT

The purpose of this study is to establish a relationship between working capital and profitability over a period of 2001-2010 for 25 Pakistani manufacturing companies listed on Karachi stock exchange. To check the stationary of the data Augmented Dickey Fuller (ADF) test is used and Johansen's co-integration test is used for long term relationship. Linear regression model with ordinary least square (OLS) is used to find the coefficients of working capital variables. The result shows that quick ratio (QR), days inventory outstanding (DIO), debt equity ratio (DER) and return on equity (ROE) have a positive association and remaining variables including current ratio (CR), and days sale outstanding (DSO) have a negative association with return on assets (ROA). In the case of return on equity (ROE), current ratio (CR), days inventory outstanding (DIO) and return on assets (ROA) indicates a positive relationship whereas, days sale outstanding (DSO), debt equity ratio (DER) and quick ratio (QR) indicates negative relationship. Based on the finding of the study it is recommended to increase the value of shareholders by reducing the day's sale outstanding that can result in increase in profits of the sectors under study.

Keywords: Working capital, Current Ratio, Quick Ratio, Days Inventory Outstanding, Days Sale Outstanding, Ordinary Least Square.

INTRODUCTION

Working capital means short-term funding needs of a firm. It is the investment needed for a firm to running day-to-day operations. It is the result of the time interval between the costs for the purchase of raw materials and the collection for the sales of finished products (see diagram). This includes maintaining optimum balance of working capital components – receivables, inventory and payables – and using the cash efficiently for day-to-day functions. Optimization of working capital equilibrium means reduce the working capital needs and appreciate maximum possible revenues. Efficient working capital boosts firm's free cash flow, which in turn raises the firm's growth chances and return to shareholders. Even though firms traditionally are focused on long term capital budgeting and capital structure, the recent trend is that many companies across different industries focus on working capital efficiency.



The management of working capital by managing the proportions of the working capital components is important to the financial strength of businesses from all industries. To decrease accounts receivable, a firm may have strict collections policies and limited sales credits to its customers. This would increase cash inflow. However the strict collection policies and lesser sales credits would lead to lost sales thus reducing the profits. Maximizing account payables by having longer credits from the suppliers also has the chance of getting poor quality materials from supplier that would ultimately affect the profitability. Minimizing inventory may lead to lost sales by stock-outs. The working capital management should aim at having balanced optimal proportions of the working capital components to achieve maximum profit and cash flow.

Ramchandaran & Janakiraman (2009) investigated the relation among WCME and EBIT of the paper industry in India during the period of 1997-2006. A Sample consists of 30 companies selected on Bombay Stock Exchange (BSE). The collected data was analyzed with the help of statistical tools like Descriptive Statistics, Correlation and Regression model. The results showed that there was a negative relationship between Cash Conversion Cycle (CCC), Accounts Payable in Days and EBIT. Samiloglu & Demirgunes (2008) analyzed the effect of working capital management on firm profitability. A sample consists of manufacturing companies listed on Istanbul Stock Exchange (ISE) for the period of 1998-2007. The finding showed that account receivables period, inventory period and leverage influence the profitability negatively, while growth influence the profitability positively.

Reheman & Nasr (2007) evaluated Working Capital Management and Profitability Case of Pakistani Firms. A sample consists of 94 Pakistani firms listed on Karachi Stock Exchange for the duration of 1999 – 2004. The outcome showed that there were strong negative associated between working capital variables and profitability. Uyar (2009) investigated the Relationship of Cash Conversion Cycle with Firm Size and Profitability for merchandizing and manufacturing firms listed at Istanbul Stock Exchange for a period of 2007. The analysis showed that there was a significant negative relationship between the Cash Conversion Cycle (CCC), firm size and profitability. Vijayakumar and Venkatachalam (1996) investigated Responsiveness of Working Capital Management. The period of study covers from 1985-86 to 1993-94. The result showed that Leverage Ratio (LR), Working Turnover Ratio (WTR), Inventory Turnover Ratio (ITR), and Return to Risk (RTR) had shown Positive link with Profitability Ratio and Current Ratio (CR), Cash Turn Ratio (CTR) and Working Capital to Total Asset Ratio (WC/TA) had shown Negative link with Profitability Ratio. Sen & Oruc (2009) established the relationship between efficiency level of firms being traded in ISE (Istanbul Stock Exchange) in working capital management and their return on total assets. According to the conclusion there were inverse associated between working capital variables and return on total assets.

Raheman *et al.*, (2010) examined the impact of working capital management on firm's performance in Pakistan. A sample size of 204 manufacturing firms listed on Karachi Stock Exchange and panel data was used for analysis for the period of 1998 - 2007. The outcome indicated that the cash conversion cycle, net trade cycle and inventory turnover in days affect the performance of the firms. Padachi (2006) considered the trends in working capital management and its impact on firms' performance. A sample of 58 small manufacturing firms operating in five major industry groups which are both registered and organized as proprietary/private companies and panel data was used for analysis for the period of 1998–2003. The conclusion showed that high investment in inventories and receivables were related with lower profitability. Gill *et al.*, (2010) determined the relationship between working capital management and profitability. A sample consists of 88 American firms listed on New York Stock Exchange for a period of 2005 to 2007. The statistically found that there was a significant correlated between cash conversion cycle and profitability. Mohamad & Saad (2010) considered working capital: the effects of market valuation and profitability. A sample consists of 172 companies listed on Bursa Malaysia and secondary data was used for analysis for the period of 2003-2007. The results showed that there were inverse associated between working capital variables and profitability.

Objectives

The present study visualize with the following objective.

- To establish a relationship between Working Capital and Profitability.

MATERIAL AND METHODS

The data for this study has been collected from the website of State Bank of Pakistan (SBP) and related websites of the companies under review. The study covers period from 2001-2010. For this study four major public sectors namely cement sector, fuel and energy sector, chemical sector and textile sector have been purposively selected, on the basis of availability of financial data for the period under study. A sample of 25 listed companies from four sectors has been taken on the basis of capitalization. To check the stationary of the data Augmented Dickey Fuller test is used and Johansen’s co-integration test is used to find the long term relationship. The following Linear Regression model is used for analysis with OLS techniques.

$$ROA_t = a + b_1CR_t + b_2DSO_t + b_3DIO_t + b_4QR + b_5DEO + b_6ROE_t + \varepsilon$$

Table 1. Variables Description

WCM COMPONENTS AND PROFITABILITY RATIOS DEFINITIONS	
Components	Equation
Current Ratio (CR)	Current Assets/Current Liabilities
Debt Equity Ratio (DER)	Total Debt/Total Equity
Days Sales Outstanding (DSO)	(360 × Receivables)/Sales
Days Inventory Outstanding (DIO)	(360 × Average Inventories)/Cost of sales
Quick Ratio (QR)	(Current Assets-Inventories)/Current Liabilities
Return on assets (ROA)	(Net profit after tax/Total assets) × 100
Return on equity (ROE)	(Net profit after tax/equity) × 100

Hypothesis

- I. H₀: There is no association between working capital and profitability.
- II. H₁: There is an association between working capital and profitability.

RESULTS AND DISCUSSION

The Augmented Dickey Fuller Test Results

Table 2. Results of Augmented Dickey Fuller test (Intercept)

Variables	T-Statistic	Critical value 1%	Critical value 5%	Critical value 10%	Results
CR	-5.968038[0]	-3.4582	-2.8732	-2.5729	I(0)
QR	-5.910344[0]	-3.4582	-2.8732	-2.5729	I(0)
DSO	-16.55718[0]	-3.4583	-2.8733	-2.5730	I(1)
DIO	-3.710994[1]	-3.4583	-2.8732	-2.5730	I(0)
DER	-11.15811[0]	-3.4582	-2.8732	-2.5729	I(0)
ROA	-6.342660[0]	-3.4582	-2.8732	-2.5729	I(0)
ROE	-7.647670[1]	-3.4583	-2.8733	-2.5730	I(0)

Note: [] indicate the lag value

Augmented Dickey Fuller test with intercept has been applied to test the stationary status of the data. Current Ratio (CR), Quick Ratio (QR), Debt Equity Ratio (DER) and Return on Assets (ROA) are stationary at level with zero lag value because t-statistic value is greater than critical values at 1%, 5% and 10% significant level, respectively, therefore we can reject H₀. It means that Current Ratio (CR), Quick Ratio (QR), Debt Equity Ratio (DER) and Return on Assets (ROA) don’t have a unit root problem and the Current Ratio (CR), Quick Ratio (QR), Debt Equity Ratio (DER) and Return on

Assets (ROA) are a stationary series at 1%, 5% and 10% significant level. Day's Sale Outstanding (DSO) was found stationary at first difference with zero lag value. Days Inventory Outstanding (DIO) and Return on Equity (ROE) are stationary at level with one lag value so we can reject null hypothesis H_0 and accept alternative hypothesis H_1 .

Table 3. Results of Augmented Dickey Fuller test (Trend and Intercept)

Variables	T-Statistic	Critical value 1%	Critical value 5%	Critical value 10%	Results
CR	-6.050359[0]	-3.9981	-3.4291	-3.1377	I(0)
QR	-6.114672[0]	-3.9981	-3.4291	-3.1377	I(0)
DSO	-16.52443[0]	-3.9983	-3.4292	-3.1378	I(1)
DIO	-12.40471[1]	-3.9984	-3.4292	-3.1378	I(1)
DER	-11.13540[0]	-3.9981	-3.4291	-3.1377	I(0)
ROA	-6.599248[0]	-3.9981	-3.4291	-3.1377	I(0)
ROE	-7.635757[1]	-3.9983	-3.4292	-3.1378	I(0)

Note: [] indicate the lag value

Augmented Dickey Fuller test with trend and intercept has been applied to test the stationary status of the data. Current Ratio (CR), Quick Ratio (QR), Debt Equity Ratio (DER) and Return on Assets (ROA) are stationary at level with zero lag value because t-statistic value is greater than critical values at 1%, 5% and 10% significant level, respectively, therefore we can reject H_0 . It means that Current Ratio (CR), Quick Ratio (QR), Debt Equity Ratio (DER) and Return on Assets (ROA) don't have a unit root problem and the Current Ratio (CR), Quick Ratio (QR), Debt Equity Ratio (DER) and Return on Assets (ROA) are a stationary series at 1%, 5% and 10% significant level. Day's Sale Outstanding (DSO) was found stationary at first difference with zero lag value. Days Inventory Outstanding (DIO) is stationary at first difference with one lag value. Return on equity (ROE) is stationary at level with one lag value, so we can accept alternative hypothesis H_1 and reject null hypothesis H_0 .

Table 4. Johansen's Co-integration Test Results

Variables	Eigen value	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
CR	0.259633	276.4580	124.24	133.57	None **
DER	0.223417	202.8086	94.15	103.18	At most 1 **
DIO	0.183942	140.8598	68.52	76.07	At most 2 **
DSO	0.171215	91.05880	47.21	54.46	At most 3 **
QR	0.083151	45.04901	29.68	35.65	At most 4 **
ROE	0.061895	23.77994	15.41	20.04	At most 5 **
ROA	0.032624	8.126148	3.76	6.65	At most 6 **

*(**) denotes rejection of the hypothesis at 5 % (1%) significance level L.R. test indicates 7 co integrating equation(s) at 5% significance level

Johansen's co-integration test will explain the long term relationship between dependent and independent variables. The result of Johansen's co-integration test shows that Current Ratio (CR), Debt Equity Ratio (DER), Days Inventory Outstanding (DIO), Day's Sale Outstanding (DSO), Quick Ratio (QR), Return on equity (ROE) and Return on Assets (ROA) have co-integration between them because likelihood ratio is greater than critical values at 5% and 1% significance level. So we can reject null hypothesis (H_0) that can explain there is no co-integration between dependent and independent variables and accept alternative hypothesis (H_1) that can explain there is a co-integration between dependent and independent variables.

Regression Analysis

Table 5. Empirical results of Return on Assets (ROA)

$$ROA_t = a + b_1CR_t + b_2DSO_t + b_3DIO_t + b_4QR + b_5DEO + b_6ROE_t + \varepsilon$$

Predictor	Coefficient	Standard Deviation	T	P
Constant	-32.900	4.590	-7.17	0.000
CR	-6.264	2.681	-2.34	0.020
QR	11.120	2.261	4.92	0.000
DSO	-4.8561	0.8722	-5.57	0.000
DIO	7.9716	0.9790	8.14	0.000
DER	0.0004659	0.0004524	1.03	0.304
ROE	0.016931	0.004633	3.65	0.000

$$F = 28.33 \quad P = 0.000 \quad R-Sq = 41.2\%$$

Regression Analysis shows predictors and their relationship. Predictor means variables used in study. Coefficient shows the impact of independent variables on dependent variable which is -6.26 of Current Ratio (CR), 11.12 of Quick Ratio (QR), - 4.86 of Days Sale Outstanding (DSO), 7.97 of Days Inventory Outstanding (DIO), 0.000466 of Debt Equity Ratio (DER) and 0.0169 of Return on Equity (ROE) on Return on Assets (ROA). This means that if there is 1% increase in Current Ratio (CR) then Return on Assets (ROA) will decrease with 6.26%, if there is 1% increase in Quick Ratio (QR) then Return on Assets (ROA) will increase with 11.12%, if there is 1% increase in Days Sale Outstanding (DSO) then Return on Assets (ROA) will decrease with 4.86%, if there is 1% increase in Days Inventory Outstanding (DIO) then Return on Assets (ROA) will increase with 7.97%, if there is 1 unit increase in Debt Equity Ratio (DER) then Return on Assets (ROA) will increase with 0.000466 units, if there is 1 unit increase in Return on Equity (ROE) then Return on Assets (ROA) will increase with 0.0169 units. T gives the t-statistics used in significance tests for the null hypotheses which is -2.34 for Current Ratio (CR), 4.92 for Quick Ratio (QR), -5.57 for Days Sale Outstanding (DSO), 8.14 for Days Inventory Outstanding (DIO), 1.03 for Debt Equity Ratio (DER) and 3.65 for Return on Equity (ROE), these values show that the variables are less and more efficient respectively. Finally, the column 'P' lists the P-values associated with the t-statistics given in the 'T' column. P values show the significance level of the variable which is for 0.020 for Current Ratio (CR), 0.000 for Quick Ratio (QR), 0.000 for Days Sale Outstanding (DSO), 0.000 for Days Inventory Outstanding (DIO), 0.304 for Debt Equity Ratio (DER) and 0.000 for Return on Equity (ROE) showing that all these variables are highly significant except Debt Equity Ratio (DER). The "F value" and "Prob(F)" test the overall significance of the regression model. F value is 28.3 means that all independent variables in the model significantly affect dependent variable. Coefficient of determination (R-Sq) demonstrates the capability of independent variable to explain dependent variable. The R-Sq shows that Current Ratio (CR), Quick Ratio (QR), Days Sale Outstanding (DSO), Days Inventory Outstanding (DIO), Debt Equity Ratio (DER) and Return on Equity (ROE) explain dependent variable by 41.2%, while 58.8% is explained by error term. The value of Durbin-Watson statistic is 0.83 means that there is a positive autocorrelation in the sample.

CONCLUSION

This study investigated the inter-linkages of working capital and profitability in Pakistan. Ordinary least square (OLS) analysis reveals that both positive and negative association between selected independent and dependent variables. Out of six independent variables, four variables namely, quick ratio (QR), days inventory outstanding (DIO), debt equity ratio (DER) and return on equity (ROE) positive association and remaining variables including current ratio (CR), and days sale outstanding (DSO) show a negative association with return on assets (ROA). Followed the case of return on equity (ROE), current ratio (CR), days inventory outstanding (DIO) and return on assets (ROA) indicates a

positive relationship whereas, days sale outstanding (DSO), debt equity ratio (DER) and quick ratio (QR) indicates negative relationship.

On the basis of t-statistic, it is clear that among independent variables, current ratio (CR), quick ratio (QR), days sale outstanding (DSO), days inventory outstanding (DIO) and return on equity (ROE) are significantly associated with return on assets (ROA), whereas only one independent variables debt equity ratio (DER) is insignificantly associated with return on assets (ROA). In the case of return on equity (ROE), debt equity ratio (DER) and return on assets (ROA) are significant associated with return on equity (ROE), whereas all other independent variables are insignificantly associated with return on equity (ROE). From the values of R^2 , it is also evident that the independent variables explain 41.2% and 30.3% variations in return on assets (ROA) and return on equity (ROE) respectively. Based on the finding of the study it is recommended that companies should maintain optimum current assets for their daily business processing as well as for meeting their short term maturities, otherwise profitability would reduce.

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