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The Relationship between Working Capital Management and the Financial Performance of Plastic Companies in Vietnam

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***Abstract*—** *This study aimed to examine the relationship between working capital management and the financial performance of plastic companies in Vietnam. Various data from a sample of 28 plastic firms during the period 2014 to 2019 were collected. Econometric regression analysis was conducted on the data to determine the magnitude of relationships between working capital components and the financial performance of these companies. The research results show that the random effects model explains the relationship between the independent variables and the financial performance of the company better. The researcher found that there is a positive relationship between the inventory conversion period, the current assets ratio and the return on assets ratio and the negative relationship between the receivables conversion period and return on assets ratio.*

***Keywords*—** *Working capital, financial performance, plastic firms.*

I. INTRODUCTION

Plastics are used as materials to produce many kinds of items that contribute significantly to social life as well as serve the development of many other economic sectors and fields such as electricity, electronics, telecommunications and transportation… Plastic industry is increasingly playing an important role in the life and production of countries, including Vietnam. A significant number of studies have been conducted on working capital management and financial performance internationally and in Vietnam. However, few studies could be found on this relationship in the plastic firms in Vietnam. The purpose of this study is therefore to investigate the relationship between working capital management and the financial performance of plastic companies in Vietnam. The result of this research may help financial managers in plastic filed to manage short-term assets and liabilities properly with the aim of enhancing their company's performance.

II. THEORETICAL BASIS

Working capital management is defined as the management of short-term assets and short-term liabilities and the financing of these assets (Gill, Biger & Mathur, 2010:2). In practice, working capital management has become one of the most vital issues for companies and many financial managers find it hard to identify the basic working capital components and suitable levels of working capital (Nazir & Afza, 2009:19). Erasmus (2010:1) suggests that it is essential that management ensure that the working capital investment is sufficient and fully utilised, since investing more in unused working capital could result in the erosion of value

Financial performance measurement generally focuses on types of financial ratios obtained from the financial statements of companies, and includes profitability ratios, liquidity ratios, activity ratios and debt ratios (Ismaila, 2011:6). This study uses profitability to measure financial performance; specifically, return on assets (ROA), return on equity (ROE) and gross operating profit (GOP). Parrino, Kidwell and Bates (2012:97) argue that profitability ratios are some of the most important ratios used by shareholders, creditors and managers to analyse a company's performance. The higher the profitability ratios, the better the performance of the company will be. ROA is defined as the ratio of net profit after tax divided by the total assets (Agha & Mphil, 2014:375). ROA measures a company's effectiveness in using its assets to generate profit.

Several international studies have been conducted on the relationship between working capital management and the financial performance of companies (Deloof, 2003; Banos Caballer, Garcia-Teruel & Martinez-Solano, 2011), Lazaridis and Tryfonidis (2006). Deloof (2003:575) conducted a study on the relationship between working capital management and profitability in a sample of 1637 large non-financial companies for the period of 1992–1996 in Belgium. The study found a significant but negative relationship between GOP and the number of days in inventories, number of days in accounts receivable and number of days in accounts payable. Similarly, Banos-Caballer *et al*. (2011:521) investigated the link between working capital and profitability in small and medium enterprises (SMEs) in Spain. Their main finding was that working capital and profitability exhibit a concave relationship, in which companies maintain an optimal working capital level that balances the costs and benefits while maximising their profitability. Lazaridis and Tryfonnidis (2006) in the study of the relationship between working capital management and profitability of companies listed on the Athenian stock market also found a significant relationship between profitability, measured by gross profit from business operations and cash conversion cycle and its components

(receivables, payables and inventories). In addition, the study of Eljelly (2004) has found a negative relationship between the profitability of businesses and their liquidity, as measured by short-term payment ratios. Mathuva (2011) in the study of working capital management of listed companies in Kenia also pointed out the influence of working capital management activities on the profitability of enterprises and came to the conclusion: i) There is a negative relationship between the enterprise's cash collection period and profitability, ii) There is a positive relationship between the inventory conversion period and profitability iii) There is a positive relationship between the average payment period and profitability of firms.

III. METHODOLOGY

3.1. Variables for this Study

In accordance with the research objectives, the dependent and independent variables used in this study and their measurement were adopted from existing literature in order to produce or construct a worthwhile comparison with previous empirical studies. The variables used in the study are described in the Table 1 below:

TABLE 1: Variables and their measurements

Type of variables	Name of variable	Abbreviation	Measurement
Dependent	Return on Asset	ROA	Net profit/total asset
Independent	Receivables Conversion Period	RCP	Account receivable ÷ Net Sales*365
Independent	Inventory conversion period	ICP	Inventory ÷ cost of sales*365
Independent	Average payment period	APP	Account payable ÷ cost of sales*365
Control	Current assets ratio	CAR	Current assets÷ current liabilities
Control	Size	Size	Natural logarithm of Total assets
Control	Gross domestic Product	GDP	GDP = (GDPt – GDPt-1)/GDPt-1

3.2. Panel Data Model

Model specification

Based on the models of previous studies Deloof (2003), Lazaridis and Tryfonidis (2006), the author used a model of the impact of working capital management on business performance of listed plastic companies on Vietnam's stock market in the period of 2016-2019 is as follows:

ROAit = β0 + β1 ICPit + β2 RCPit + β3 APPit + β4 SIZEit + β5 CARit + β6 GDPit + εit

Where:

ROAit: Return on assets measured by EBIT÷ Total Assets

β0: Beta coefficient

ICPit: Inventory conversion period

RCPit: Average collection period

APPit: Average payment period

CARit: Current assets ratio

SIZEit: measured by natural logaritham of Total assets

GDPit: Gross domestic product growth rate of country

εit = Error term

3.3. Data Collection and Data Analysis

In this research, financial statements of 28 plastic companies listed on Vietnam's stock market (HOSE and HNX) were collected to calculate the working capital indicators and financial performance. Data on Vietnam's GDP growth rate is taken from the World Bank website.

To analyze the relationship between working capital management and financial performance, the author used Stata 15 software to run regression models to measure the influence of working capital management on the financial performance of companies. Because this study used a panel data model, the researcher chose to use fixed effects model (FEM) or random effects model (REM). Therefore, the Hausman test (1978) is used to select the appropriate method.

IV. DATA ANALYSIS AND RESULTS

4.1 Descriptive Data Analysis

Table 2 shows descriptive data in the model on the relationship between working capital and the financial performance of 28 plastic companies listed on Vietnam's stock market in the 2016-2019 period. The data is collected by year, so the total observations are 168 observations.

TABLE 2: Summary of descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	168	0.049909	0.147229	-1.693255	0.267104
ICP	168	82.69578	49.95898	19.80318	197.9735
RCP	168	101.0387	80.39879	33.16283	357.4989
APP	168	180.8059	124.3849	26.45741	500.7852
CAR	168	2.282638	2.599638	0.2700462	17.29825
SIZE	168	26.82882	1.194313	24.40852	29.41734
GDP	168	6.629833	0.404750	5.984	7.076

(Data Source: Stata output)

ROA: The dependent variable that shows the financial performance of listed plastic enterprises has an average value of 4.99%, and the standard deviation is relatively high with the maximum value of 26.71% while the minimum value is only -169.32%.

ICP: The independent variable represents the Inventory conversion period and measures inventory management efficiency with an average of 82 days. Minimum number of inventory conversion period is 19.8 days when the maximum value is 197.97 days. And the standard deviation is 49.95 days.

RCP: The independent variable represents the average number of receivables conversion period is 101.03 days. The minimum value of 33.16 days while the maximum value is 357.49 days and the standard deviation is 80.39 days.

APP: The independent variable shows the Average payment period with average value of 180.8 days. This number is relatively high compared to the average value of RCP and ICP. The maximum value of APP is 500.78 days and the smallest value is 26.45 days with very high standard deviation of 124.38 days.

CAR: The variable shows that most listed plastic companies have good liquidity. The maximum value of the variable is 17.29 while the smallest value is only 0.27 and the standard deviation is 2.59.

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SIZE: Enterprise size variable has average value of 26.82 and maximum value of 29.41 and minimum value of 24.40. Standard deviation is 1.19.
GDP: The economic growth variable has an average value of 6.62%, this variable has an amplitude ranging from 5.98% to 7.07% and the standard deviation of the variable is 0.4%.

4.2. Correlation Results

TABLE 3: Correlation matrix between variables

	ROA	ICP	RCP	APP	CAR	SIZE	GDP	VIF
ROA	1.0000							
ICP	0.0666	1.0000						1.68
RCP	-0.0317	0.6936	1.0000					3.21
APP	-0.0180	0.5934	0.5970	1.0000				2.46
CAR	0.1590	0.1618	0.1482	0.1488	1.0000			1.15
SIZE	0.0049	-0.0956	-0.0952	-0.0899	-0.4872	1.0000		1.22
GDP	-0.1032	-0.1368	-0.1481	-0.1498	-0.0520	0.1516	1.0000	1.10

(Data Source: Stata output)

Based on the correlation coefficient matrix table, we see that the variables ICP, CAR, SIZE have a positive relationship with ROA, variables RCP, APP, GDP have a negative relationship with ROA. In the correlation coefficient matrix table we can see that the variables ICP, RCP, APP have a high correlation coefficient, but the variance inflation factor is still <10 so these variables can be accepted for regression model.

4.3. Regression model specifications and results from a sample of plastic companies in Vietnam

TABLE 4: Regression result on the relationship between working capital and financial performance

Variables	(1)	(2)	(3)	(4)
	Pool OLS	FEM	REM	REM2
ICP	0.000141**	0.000162**	0.000158**	0.000156**
	(6.83e-05)	(8.13e-05)	(7.10e-05)	(7.12e-05)
RCP	-0.000391***	-0.000497***	-0.000459***	-0.000464***
	(0.000140)	(0.000161)	(0.000143)	(0.000155)
APP	6.90e-05	9.86e-05*	8.42e-05	8.62e-05
	(5.52e-05)	(5.45e-05)	(5.28e-05)	(5.57e-05)
CAR	0.0107**	0.00926	0.0103*	0.0105*
	(0.00493)	(0.00854)	(0.00588)	(0.00626)
SIZE	0.0126	0.111***	0.0182	0.0172
	(0.0107)	(0.0390)	(0.0141)	(0.0158)
GDP	-0.0446	-0.0873***	-0.0480*	-0.0307
	(0.0279)	(0.0295)	(0.0259)	(0.0272)
Constant	0.00167	-2.354**	-0.123	-0.217
	(0.324)	(0.964)	(0.388)	(0.443)
Observations	168	168	168	168
R-squared	0.103	0.155		
Number of Name		28	28	28

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
(Data Source: Stata output)

Stata software has been used to analyze data, run regressions and perform tests. The OLS estimation results showed that the coefficient of R^2 = 0.1103, the F statistical value of 3.08 is statistically significant at the 1% level, indicating that the OLS estimate can be an appropriate estimate.

Regarding to panel data, the fixed effects model and the random effects model were used in conjunction with the Hausman test to check whether there is a correlation between the unobserved variables of the companies affecting the explanatory variables or the explanatory variables.

TABLE 5: Diagnostic statistics

	Pool OLS	FEM	REM	REM2 GLS regression with AR(1)
Observations	168	168	168	168
F-stats/Wald chi2	3.08	4.08	19.08	15.22
Prob>F/Prob>Wald Chi 2	0.0069	0.0009	0.0040	0.0333
Hausman (Chi2)		9.09	9.09	9.09
Prob>chi2		0.1056	0.1056	0.1056
R-SQUARED	0.1031			0.1131
Within		0.1545	0.1159	0.0939
Between		0.0014	0.0933	0.0969
Overall		0.0205	0.1004	

(Data Source: Stata output)

The testing results show that the F statistical result F (6,134) = 4.08 with a statistical significance level of 1% shows the difference between the objects (enterprises). In this case the fixed impact model is more suitable than the OLS Pool.

The results of estimating the model according to the random effects method also give Wald value - chi squared is 19.08 (statistical significance level of 5%), showing that the random impact model is more suitable than the Pool OLS.

Hausman test results with chi - square value is 9.09 with P value> 0.05 so the random effects model is more suitable to use than the fixed impact model.

To check the autocorrelation phenomenon in the model, Wooldridge test was used, the F statistical result = 71.79 with a significance level of 1% so the equation exists the autocorrelation phenomenon. This phenomenon will make the estimates obtained by the conventional regression method on the table data unreliable. Therefore, the author has used the GLS (Generalized Least Square) method to overcome the first-order autocorrelation between errors to ensure a reliable estimate. After using the GLS method we have the following results:

The analysis results show that there is a statistically significant positive relationship between ROA and ICP. This is consistent with the theory of conservative working capital management theory and the results of empirical research by Arnold (2008). In view of this theory, firms should minimize risk by increasing short-term assets, then impact financial performance of their companies. In addition, the research results show a statistically significant negative relationship between RCP and ROA. This means that the sooner the company collects their account receivable, the greater the financial efficiency of the business. This result is consistent with many previous studies such as the study of Deloof (2003), and Mathuva (2010). Moreover, the result also shows a statistically significant positive relationship between ROA and Current assets ratio (CAR). This result is similar to the one in Makori and Jagongo (2013). Meanwhile, the coefficient of APP, SIZE and GDP is not statistically significant.

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V. CONCLUSIONS

Working capital management is one of the important financial management activities that contributes to the firms' financial performance. And financial managers also pay attention to this issue. This study was conducted on data collected from 28 plastic companies listed on HOSE and HNX in the period 2014-2019. The study is an empirical evidence of the impact of working capital management on the financial performance of Vietnamese plastic enterprises. The research results show that the conservative working capital management theory is suitable for plastic enterprises. In addition, the shorter receivables conversion period, the higher the rate of return on assets. At the same time, the rate of return on assets is positively related to the liquidity of the firms. Accordingly, managers in the field can improve the financial efficiency of the company by a reasonable working capital policy.

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