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A STUDY ON LIQUIDITY OF LISTED PLASTIC ENTERPRISES IN VIETNAM

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ABSTRACT : The Article studies factors affecting the liquidity of Vietnamese-listed plastic enterprises. With study figures from 23 listed plastic enterprises in the period of 2012 - 2020, the findings unveiled that no statistical evidence proves the relationship between business size (SIZE) and Cash Conversion Cycle (CCC).The main results revealed that the number of Inventory Conversion Period Days (IP) and Days of Accounts Receivable/Payable Conversion (RP) have a positive impact on the Cash Conversion Cycle (CCC) with 1% of statistical significance. Return on Assets (ROA), Debt Accessibility (DA), and Fixed Asset Investment (TANG)harm the Cash Conversion Cycle (CCC) with 10%, 5%, and 1% of statistical significance, respectively. Improving working capital management performance and effective use of financial leverage shall facilitateensuring the liquidity of Vietnamese-listed plastic enterprises.

Keywords: Working capital management, liquidity, listed plastic enterprises.

I. INTRODUCTION

The enterprise's liquidity is defined as the enterprise's financial capacity to satisfy the demand on debt payment to concerned individuals and organizations having a loan or borrowing relation with the enterprise. It is identified that this issue is a critical step in making intelligent financial decisions. Assessment of corporate liquidity is a measure that is applied to assess such an organization's creditworthiness and financial capacity. An enterprise with good liquidity is financially proven to make payments for due debts. The enterprise's low liquidity indicates unstable and risky economic issues, resulting in future high insolvency. Accordingly, it may impair the enterprise's prestige and result in bankruptcy (Billah et al., 2015). Therefore, during corporate finance management, liquidity analysis helps the enterprise foresee potential or threats when its debts are paid to adjust cash flow, methods of sales financing, and credit sales. In addition, analysis of corporate liquidity also helps the investors, suppliers, and banks to recognize the solvency of due debts to make sound decisions on investment and service supply to minimize the risks (Oliveira and Fortunato (2006); Subramanyam & Wild, 2009)

The plastic industry is known as a young industry with robust development, significantly facilitating the further development of Vietnam. From 2012 to 2020, the plastic industry recorded a high growth rate, obtaining 14.2% on average, characterized by small sectors and dependence on final product industries such as foods, construction, electronic equipment, and automobiles. Hence, liquidity management, the balance of current assets and current liabilities at the proper level, is an important condition to improve business performance, ensuring the enterprise's financial balance.

II. LITERATURE REVIEW

During operation, the enterprise must always satisfy payment obligations to the suppliers, customers, and banks. That is why the player is always available to capitalize on their current assets to make payments for due debts. If the enterprise cannot pay for unpaid debts in a short time may cause bad debts, increasing bankruptcy risks (Lin et al., 2014). Even a bankruptcy may be found in a non-high profitable enterprise without a proper liquidity governance policy (Blach et al., 2014). A survivor must timely and fully identify risks, including liquidity risks, in case of cash flow shortage (Luburic et al., 2015). Therefore, analysis of liquidity, factors affecting the liquidity, and liquidity risk assessment are regular and necessary tasks to be fulfilled by each enterprise.

Corporate liquidity analysis shall show the administrators, investors, suppliers, and creditors a sign of completeness of the liquidity ratio. For this purpose, liquidity measurement must satisfy the following requirements: First, measurement value should reflect the accurate information about the capacity that may be satisfied in cash when a financial obligation is paid or fulfilled. Second, asset capitalization must be quick and easy with proper conversion costs. Currently, viewpoints on corporate liquidity focus on the following aspects:

Firstly, corporate liquidity measurement is based on the relationship between the current assets and current liabilities. This liquidity measurement manner is relatively widespread and concerned creditors and investors. In the studies launched by Truong Ba Thanh and Tran Dinh Khoi Nguyen, 2007; Subramanyam and Will, 2009; Robinson et al., 2009; Gitman and Zutter, 2010, etc., Current Ratio (CR); Quick Ratio (QR); Cash Ratio (CaR) is used to reflect the corporate liquidity. Among these, CR reflects a VND of the current liability secured by how many current assets VND.

$$\text{Current Ratio (CR)} \quad = \quad \frac{\text{Current assets}}{\text{Current liabilities}}$$

Secondly, the measurement of corporate liquidity is based on cash on hand level. Cash and cash equivalents and highly liquid securities held by the enterprise are referred to assess the enterprise's financial liquidity. The typical studies such as Kim, Mauer, and Sherman (1998), Opler et al. (1999), Dittmar et al. (2003), and Anjum and Malik (2013) measured corporate liquidity by Cash Holding (CH). The more the enterprise holds CH, the higher the liquidity shall be.

$$\text{Cash Holding (CH)} \quad = \quad \frac{\text{Cash + Cash equivalents}}{\text{Total assets - Cash and cash equivalents}}$$

Thirdly, the measurement of corporate liquidity is based on cash income and expenditure from the regular operation. The second line of defense is the capacity to satisfy the enterprise's payment obligations through asset liquidation in case of bankruptcy. More attention should be put on the enterprise's capacity to fulfill its financial obligations: through cash flow from inventory use and receivable accounts in the enterprise's standard operating period (Richards & Laughlin, 1980). CCC criteria are employed to measure the enterprise's liquidity, reflecting the net period of an actual cash payment of raw materials for production till it is paid back in cash from product consumption. CCC is defined as the sum of days of inventories conversion plus days of debt recovery minus delayed debt payment to suppliers (Richards & Laughlin, 1980).

Cash Conversion Cycle (CCC)	=	Inventory Period (IP)	+	Receivables Period (RP)	-	Provider-based Payment Period (PP)

Many Vietnamese and international studies investigate the factors affecting corporate liquidity. Some essential criteria affecting the enterprise's liquidity are described as follows:

- Corporate scale (SIZE)

Total assets or Gross Net Operating Revenue demonstrates SIZE. As big-size enterprises generally have better opportunities to access market and financial resources, their cash flow is generally more potent than that of small and medium-sized enterprises (SMEs) (Petersen & Rajan, 1997; Fazzari & Petersen, 1993; Barclay & Smith, 1996; Opler et al., 1999; Bruinshoofd & Kool, 2004). However, under the perspective of trade-off theory, small-scale enterprises often face higher external financing expenses. Hence, it tends to hold more liquid assets than that big-size enterprise (Marobhe, 2015; Doğan & Kevser, 2020)

- Financial leverage

The Asymmetric Information Theory assumes that an enterprise having high debt use level shall face high liquidity risk exposure and tend to hold highly liquid assets to hedge risks. However, external financial expenses are increased by holding highly liquid assets. Hence, through monitoring channels, an increase in financial leverage will impair the enterprise's solvency (Myers & Rajan, 1998). The studies launched by Opler et al. (1999); Palombini and Nakaramuara (2010); Anjum Abd Malik (2013); Kaya (2014); Christopher Arunga Nyakiamo (2015) specified the existence of a negative relationship between the use of financial leverage and corporate liquidity in terms of cash holding. The studies initiated by Valipour et al. (2012), Marobhe (2015); Doğan and Kevser (2020); Truong Hong Trinh and Pham Thi Thuy Mai (2016) specified that financial leverage has positive impacts on corporate liquidity.

- Inventory management

The standard criterion, reflecting the enterprise's inventory management level, is the number of inventory turnover days, in other words, Inventory Period (IP). Corporate liquidity assessment should consider whether the enterprise's inventory liquidity is high or low. Therefore, the inventory level governance should be well-matched with its business performance. The studies launched by Aymen Telmoudi et al (2010); Krishnankutty and Chakraborty (2011); Usama (2012); Onyango (2012); Nguyen Phuong Ha (2014) unveiled the negative impacts of days of inventory turnover on the current ratio.

- Receivables management

The standard criterion, reflecting the enterprise's accounts receivable management level, are several receivables period (RP) turnovers. During business, a credit grant in the credit purchase form is necessary to accelerate product consumption. However, an enterprise with excessive credit purchasers may need more cash to fulfill their financial obligations on the due date. The studies of Usama (2012), Dekesi and Ozogbuda (2019); Nguyen Phuong Ha (2014) specified that number of receivable turnovers harms corporate liquidity. The studies of Aymen Telmoudi et al. (2010); Krishnankutty and Chakraborty (2011) specified that number of receivable debt turnover positively impact corporate liquidity.

- Profitability

The profitability of an enterprise illustrates its business performance. Return on Assets (ROA) is generally used to study liquidity, as liquidity is based on profitability from the enterprise's available assets. The studies of Ksenija and Marina (2015); Phung Anh Thu and Nguyen Vinh Khuong (2018) unveiled that profitability negatively impacts corporate liquidity. However, the studies launched by Valipour et al. (2012); Marobhe (2015); Truong Hong Trinh and Pham Thi Thuy Mai (2016); Mai Thanh Giang (2017) revealed that profitability has positive impacts on corporate liquidity.

- Fixed asset investment

Fixed assets are used as security during the enterprise's loan procedure. High fixed asset investment is recognized with a negative impact on cash holding as it may reduce demand for cash and increase liabilities. The studies of Guizani (2017), Mathuva (2014), and Rajabi (2016) unveiled that fixed asset investment has negative impacts on corporate liquidity. However, the studies launched by Aamir and Shah (2015); Truong Hong Trinh and Pham Thi Thuy Mai (2016); Mai Thanh Giang (2017); Samarajeewa and Perera (2020) proved that fixed asset investment is not found with any impacts on corporate liquidity.

In addition to the criteria above affecting corporate liquidity, the studies also specified that other criteria, such as growth opportunities, revenue growth, free cash flow, capital expenditure, Gross Domestic Product, inflation rate, other macro factors, etc., have not been presented in this study.

III. RESEARCH DATA AND METHOD

3.1. Data source

The article surveys 23 Vietnamese listed plastic enterprises from 2012 to 2020. The author collects data from financial statements, securities rates from websites of securities companies, surveyors, Hanoi Stock Exchange (HNX), and Hochiminh Stock Exchange (HOSE) such as https://www.stockbiz.vn; https://www.cophieu68.vn; https://www.vndirect.com.vn; https://finance.vietstock.vn.

3.2. Research model

According to the models of the previous scholars, namely Ashari et al. (2010), Banos-Caballero et al. (2010), Mohamad & Elias (2013), Mathuva (2014), Nguyen Phuong Ha (2014), Nguyen Dinh Thien et al. (2014), Marobhe (2015), Nyakiamo (2015), Truong Hong Trinh and Pham Thi Thuy Mai (2016), Doruk & Ergun (2019), the model of factors affecting Vietnamese listed plastic enterprises in Vietnam stock market in the period of 2012 - 2020 is developed as follows:

$CCC = \beta_0 + \beta_1(RP_{it}) + \beta_2(IP_{it}) + \beta_3(DA_{it}) + \beta_4(ROA_{it}) + \beta_5(SIZE_{it}) + \beta_6(TANG_{it}) + \varepsilon$

Where: i denote enterprises, t denotes years, and ε is tolerance.

Table 1: Results of factors affecting corporate liquidity

Items	Unit	2012	2013	2014	2015	2016	2017	2018	2019	2020	The average growth rate in the period 2012 - 2020
CCC	Day	80.8	83.1	89.4	84.3	85.7	81.2	87.1	74.2	52.4	-5.3%
RP	Day	53.2	55.6	60.3	60.7	69.0	73.1	82.8	83.6	80.0	5.2%
IP	Day	74.7	73.4	78.4	73.8	78.0	76.9	80.3	88.9	84.3	1.5%
DA	%	40.4	42.4	41.9	37.9	40.4	42.1	42.8	44.2	42.3	0.6%
SIZE	Ln(TS)	8.59	8.61	8.64	8.66	8.71	8.77	8.83	8.87	8.89	0.4%
TANG	%	27.1	25.7	24.0	22.6	22.2	23.9	21.9	22.2	23.0	-2.0%
ROA	%	8.6	7.6	6.1	7.0	7.6	6.8	5.6	4.9	7.0	-2.7%

Source: Synthesis by the author.

Through theory study and experimental studies in Table 1, the variables that affect Vietnamese listed plastic enterprises' liquidity from 2012 to 2020 are expected to work out concretely:

Table 2: How to calculate variables and expectations for dependent variables

Variable	Measurement	Symbol	Calculation	Expectation
Dependent variable	Cash Conversion Cycle	CCC	CCC = RP + IP - PP	
Independent variable	Number of days of Accounts Receivable/Payable Conversion	RP	(Receivables/Gross revenue) * 365	-
	Number of Inventory Period days	IP	(Inventories/Gross revenue) * 365	-
	Debt to asset ratio	DA	Liability/total assets	-
	Profitability	ROA	Profit after tax/ Average asset	+
	Corporate scale	SIZE	Natural logarithm of Total Assets	-
	Fixed asset investment	TANG	Tangible fixed assets/Total assets	-

Source: Synthesis by the author.

3.3. Research method

In order to investigate the factors affecting the liquidity of Vietnamese-listed plastic enterprises, Firstly, the author verifies the data stationarity, analyzes the descriptive statistics to generalize the research samples, and analyzes the relation between variables to consider the appropriateness of research variables when it is put into regression models. Next, Hausman verification is used to select the analysis model, including Pooled OLS, FEM, and REM. Finally, the Feasible Generalized Least Squares (FGLS) model is applied to recover the heteroscedasticity and autocorrelation.

3.3.1. Descriptive statistics of variables

Table 3: Descriptive statistics of surveyed variables

	n	mean	sd	median	min	max	skew	kurtosis
CCC	207	79.89	86.66	89.36	-450.3	195.24	-2.79	12.43
RP	207	68.81	40.36	62.72	7.19	214.86	1.33	2.19
IP	207	78.74	35.39	73.4	15.51	191.38	0.71	0.28
ROA	207	0.07	0.06	0.06	-0.14	0.28	0.85	1.57
DA	207	0.42	0.23	0.43	0.05	0.94	0.05	-1.18
SIZE	207	8.73	0.59	8.8	7.61	9.94	-0.02	-0.97
TANG	207	0.24	0.13	0.2	0.01	0.8	0.97	1.24

Source: The author's calculation results from statistics software R

The average cash conversion cycle (CCC) of listed plastic enterprises is approximately 80 days (equivalent to 2.7 months). Return on Assets (ROA) demonstrates the listed plastic enterprises' business performance with an average value of 7%. The number of average collection days to measure the AR management performance is characterized by a mean of 68.8 days. The number of average inventory days to measure the inventory management performance is characterized by a mean of 78.7 days. The average debt-to-asset ratio is 42%. The average ratio of tangible fixed asset investment is 24%.

3.3.2. Verification of data series' stationarity

Table 4: Test results of variables' stationarity

Variable name	CCC	RP	IP	ROA	DA	SIZE	TANG
Dickey-Fuller	-4.16	-4.33	-4.37	-4.65	-4.21	-4.44	-4.42
P - Value	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Conclusions	Stationary	Stationary	Stationary	Stationary	Stationary	Stationary	Stationary

Source: Analysis results from statistical software R

The verification results of the data series' stationarity for expressions demonstrated that all variables are found with stationarity and statistical significance. Therefore, the variables used in the model were suitable for further analysis.

3.3.3. Analysis of correlation coefficient between variables

In order to evaluate the relationship between variables, a correlation coefficient matrix among study variables is developed.

Table 5: Correlation coefficient between study variables

	CCC	RP	IP	ROA	DA	SIZE	TANG
CCC	1						
RP	0.33	1					
IP	0.38	0.18	1				
ROA	-0.15	-0.24	-0.07	1			
DA	-0.13	0.15	-0.29	-0.41	1		
SIZE	-0.20	0.34	-0.09	-0,002	0.31	1	
TANG	-0.13	-0.18	-0.41	-0.05	0.21	-0.09	1

Source: The author's calculation results from statistics software R

IV. MAIN FINDINGS AND DISCUSSION

4.1. Main findings

Table 6: Results of estimating a linear regression model

Model	Dependent variable: CCC			
	OLS	FEM	REM	FGLS
IP	0.697*** (0.169)	0.276 (0.167)	0.279* (0.161)	0.525*** 0.097
RP	0.808*** (0.144)	0.374*** (0.143)	0.473*** (0.137)	0.466*** 0.100
ROA	-85.845 (101.168)	-251.3*** (91.153)	-229.4*** (88.198)	-73.37* 37.936
DA	-21.176 (28.081)	-160.01*** (44.038)	-112.34*** (37.613)	-55.06*** 21.057
SIZE	-41.18*** (10.047)	-37.473* (20.115)	-39.60** (15.863)	-15.551 22.811
TANG	26.439 (43.497)	-204.392*** (55.822)	-154.142*** (50.975)	-70.77** 29.573
Constant	337.332*** (86.549)		469.897*** (135.727)	
Observations	207	207	207	207
R2	0.297	0.275	0.248	
Multiple R-squared	0.276	0.161	0.225	0.724
F test (p-value)	F=14.73 0.000			
Hausman test (p-value)		chisq=21.81 0.0013		
Breusch-Godfrey/Wooldridge Test (p-value)		chisq=71.66 7.19E-12		
Studentized Breusch-Pagan Test (p-value)		BP=17.42 0.008		
Notes:		*p<0.1;	**p<0.05;	***p<0.01

Source: Analysis results from statistical software R

Regression was applied to Pooled OLS, FEM, and REM models. Then, F Test and Hausman Test were initiated to select the model, specifying that FEM model is selected to analyze. In order to test defects of the FEM model, the Breusch-Pagan test and the Breusch-Godfrey/Wooldridge test were carried out; the main findings unveiled that heteroscedasticity and autocorrelation exist in the FEM model. In order to recover the heteroscedasticity and autocorrelation, the Feasible Generalized Least Squares (FGLS) model is applied.

Results of estimating the FGLS model for factors affecting the liquidity of the listed plastic enterprises in the period of 2012 - 2020 specified that:

Inventory Period positively impacts the Cash Conversion Cycle (CCC) of the listed plastic enterprises in 2012 - 2020 with 1% of statistical significance. From 2012 to 2020, the number of average IP days tended to climb up 1.53%; an increase in the number of IP days shall increase the capitalization period. Hence, the enterprise's liquidity is impaired. The regression results unveiled that when the number of IP days increases to 1 day, CCC climbs to 0.525 days.

Receivables Period they positively impacted the Cash Conversion Cycle (CCC) of the listed plastic enterprises in 2012 - 2020 with 1% statistical significance. From 2012 to 2020, the number of average receivable turnover days tended to climb up 5.23%, an increase in the number of RP days, i.e., more credit is granted to the customer, shall increase the capitalization period. Hence, the enterprise's liquidity is impaired. The regression results unveiled that when the number of IP days increases to 1 day, CCC climbs to 0.466 days. The main findings were well matched with the judgments of Aymen Telmoudi et al (2010); Krishnankutty and Chakraborty (2011); Nguyen Dinh Thien et al. (2014).

The regression results in the FGLS model specified that criteria such as Return on Assets (ROA), Debt Accessibility (DA), and Fixed Asset Investment (TANG) hurt the Cash Conversion Cycle (CCC) with 10%, 1%, and 5% of statistical significance, respectively. It meant that an increase in ROA, DA, and TANG should impact the reducing Cash Conversion Cycle, i.e., an increase in corporate liquidity. From 2012 to 2020, ROA tended to reduce by 2.67% on average, demonstrating reduced profitability; the TANG criterion tended to reduce by 2.04% on average, specifying that reduced investment into fixed assets affects to increase in the number of CCC, reducing the corporate liquidity. However, DA-based use of financial leverage climbing up to 0.57% was characterized by the impact of an increasing number of CCC days, reducing the corporate liquidity.

No statistical evidence was available to prove that enterprise size (SIZE) hurts the number of CCC days and corporate liquidity in the study sample.

Therefore, the criteria Multiple R- squared of 0.724 in the FGLS model unveiled that the independent variables explain 72.4% of dependent variable changes. IP and RP were found with positive impacts on the number of CCC days with 1% of statistical significance. ROA, DA, and TANG were found with negative impacts on the number of CCC days with 10%, 5%, and 1% of statistical significance, respectively.

4.2. Governance recommendations

From the main findings, some governance implications for the business administrator are suggested as follows:

Firstly, various measurement methods of corporate liquidity are available; each of them showcases a particular analysis perspective with specific advantages and negatives. Therefore, to evaluate the enterprise's liquidity, the business administrator is recommended to combine the measurement methods as the basis of appropriate financial decisions to enhance their liquidity in each business condition successfully. The enterprise's liquidity should be assured by balancing current assets and current liabilities, between CCC of inventories, and receivables against debt payables, ensuring a good balance between cash inflow and cash outflow to ensure liquidity and effectively use the enterprise's non-current assets.

Secondly, regression analysis results from the FGLS model unveiled that number of Inventory Period days (IP) and the number of days of Accounts Receivable/Payable (RP) Conversion have positive impacts on the number of Cash Conversion Cycle (CCC), i.e., negative impacts on the enterprise's liquidity. In order to successfully improve the enterprise's liquidity, sound working capital management must be upheld, especially inventory and receivable management.

Thirdly, effective use of financial leverage facilitates the enterprise's profit increase, and decrease in the number of Cash Conversion Cycle (CCC) days, increasing the enterprise's liquidity. However, excessive use of financial leverage will increase financial risk and imbalance. Therefore, an innovative financial structure should be well developed from time to time to maximize profit and guarantee the enterprise's liquidity.

Fourthly, enhancing capital and asset use performance shall increase Return on Assets (ROA), affecting the enterprise's liquidity guarantee. A significant contribution to business performance and profitability improvement is made by fixed asset investment and effective use of non-current and current assets in production. This is a favorable condition for the enterprise to secure the due debts, ensuring the enterprise's liquidity.

V. CONCLUSIONS

According to the figures from the financial statements of 23 Vietnamese listed plastic enterprises in the period of 2012 - 2020, this study specifies that the number of Inventory Period (IP) days, number of Accounts Receivable/Payable (RP) Conversion days have positive impacts on Cash Conversion Cycle (CCC) with 1% of statistical significance. Return on Assets (ROA), Debt Accessibility (DA), and Fixed Asset Investment (TANG) hurt the Cash Conversion Cycle (CCC) with 10%, 5%, and 1% of statistical significance, respectively. However, with the above study specimen, no statistical evidence illustrates the relation between the enterprise size (SIZE) and Cash Conversion Cycle (CCC). Although specific findings are obtained, the study is still restricted regarding data collection from the enterprise's financial statements. Therefore, other observation variables such as enterprise age, corporate manager's characteristics, cost of capital, risks, and macro variables such as economic growth, inflation, etc., are not considered, studied, and suggested as an implication for further studies.

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