Determinants Influencing Liquidity of Listed Steel Firms in Vietnam

Duc Viet Nguyen, Binh Minh Tran, Ngoc Thao Kieu
Advanced Finance 59A, National Economics University, Vietnam

Hong Ngoc Tran
Advanced Accounting 59A, National Economics University, Vietnam

Manh Dung Tran
National Economics University, Vietnam

Abstract
This study is conducted to investigate the impact levels of determinants influencing liquidity of listed steel firms on Vietnam Stock Exchange. Data were collected from audited financial statements of 25 listed food processing firms from 2014 to 2017. This research employs the least squares method (OLS) and tests to determine the influence of factors on the liquidity of listed sample firms. The results indicate that return on assets (ROA), operating period (AGE) and asset structure (AS) have positive impacts on the liquidity. In contrast, the firm size and debt ratio has the opposite effects. Based on the findings, a number of recommendations are proposed to increase the liquidity ratio of listed firms in the future.
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1. Introduction
Liquidity is the availability of resources that can be quickly converted to meet short-term cash requirements. Assets like stocks and bonds are very liquid since they can be converted to cash within days. A firm is also measured by the amount of cash it generates above and beyond its liabilities. Among markets, for individuals or in firms, it cannot be denied that liquidity is really important. If assets are not already available to be turned into cash, businesses and people can find themselves in liquidity issues, even when the sum value of the assets are high. In order to conform to agreed-upon short-term obligations even in situations where the lack of liquidity is present, the firms that are indebted to creditors and banks may be forced to sell its assets that were not wish to be liquidated. While withholding some assets as collateral and lending money to firms, banks hold essential standings in the market.

Firms may be declared bankrupt at the request of creditors when they are unable to pay their debts. This is clearly stated in the corporate law of Vietnam. Therefore businesses are always interested in due debts and prepare resources for payment. It is clear that ensuring liquidity helps firms maintain their operational apparatus to continue investing, developing and bringing more profit in the future.

In recent years, our country's economic structure has been strongly shifted towards industrialization and modernization. The steel industry is one of the foundation industries, producing production materials to meet industries and infrastructures' needs. The steel industry achieved remarkable achievements over many years of constructing and developing. It is gradually meeting more and more demands to manufacture more and more essential products for the economy with a variety of choices for consumers. Many processed products are highly competitive in both domestic and international markets. The process of international integration has had a great impact on steel firms.

Firms in the industry also have contracts, linking goods with great value, which brings great profits for businesses. Besides, it is essential to maintain stable liquidity to bring trust to partners and suppliers. Firms should start from good management of their liquidity to achieve competent business results and gradually become the dominant industry of our country. It is necessary for business managers to come up with suitable solutions for these problems to maintain their liquidity and develop stable firms in the long term. When considering firms' liquidity in the steel industry, the period from 2014 to 2017 witnessed different liquidity ability between steel firms listed on the Vietnam Stock Exchange. This raises a question of which determinants influence listed steel firms' liquidity and need to be answered.

Meanwhile, prior studies on the liquidity of listed firms on the Vietnam Stock Exchange have not been looked into much. An understanding of firms' liquidity can help managers to form a more precise view on how to invest their capital, thus they can limiting risks. Therefore, the implementation of general research on liquidity is necessary at this moment.

2. Literature Review

Opler et al. (1999) studied the factors affecting liquidity in 1,048 US firms during the time between 1971- 1994. They used the OLS regression model to examine defects and the appropriateness of the model. The dependent variable was liquidity ratio, there are 8 independent variables including scale, working capital, leverage, dividend payment, cash flow/asset ratio, capital expenditure ratio/total assets, industry risk, and rate of research and development/revenue. The results showed that scale, working capital, financial leverage, and dividend payment are negatively correlated with liquidity. On the other hand, the ratio of cash flow/assets, industry risks, capital expenditure/total assets ratio, and development research/revenue ratio are positively correlated with liquidity.

Bruinshoofd and Kool (2006) conducted experiments on Dutch firms. They collected data from 453 firms in the period from 1986 to 1997. Models developed and tested in the study included (i) ordinary least squares (OLS); (ii) fixed impact; (iii) random effects. The findings showed that working capital, investment and return on assets are negatively correlated to the liquidity of the firm, while other factors (scale, assets, revenue, total debt, short-term debt, other income, and average interest rates) are positively correlated to liquidity.

Isshaq and Bokpin (2009) studied determinants influencing liquidity of listed firms form the period from 1991 to 2007 in the context of Ghana. Determinants including firm size and capital dynamic, investment rate and return on assets for liquidity. They used a panel model, in which a delayed reliable variable is included as an explanatory variable. Independent variables included in the model include scale, return on assets and working capital and investment rate. The results showed that scale, profit on assets and working capital and investment rates are positively association with liquidity of listed firms.

Chen and Mahajan (2010) studied firms from 45 countries in the 1994 to 2005 period with aims to assess the liquidity of firm sample. The results showed that macroeconomic variables such as GDP growth, inflation, real short-term interest rates, budget deficits, credit, private credit, and tax rates directly affect the cash balance of the firm, this means they also affect the firm's short-term liquidity. The study has expanded into macro factors to establish the role of the state and offer measures to stabilize the macroeconomic and improve short-term liquidity for firms.

Gill and Mathur (2011) used sample of 164 firms from 2008 to 2010 on Canada Stock Exchange. They used the ANOVA test to examine Pearson's correlation, multicollinearity, model suitability to find out factors influencing the liquidity of the firms. The results showed that the variables including scale, net working capital, short-term debt, investment rate, and industry factors are positively correlated to the firm's liquidity. Variables that have a negative correlation to liquidity are debt, net working capital, and investment rate.

Thus, it can be observed that many studies have been conducted around the world on factors affecting liquidity, mainly short-term liquidity both inside and outside the firms. Researchers use data in different contexts with diverse methods. Most of the studies on these factors stem from within firms, this especially applies to researchers Chen and Mahajan (2010)'s suggestions of the factors macroeconomic variables such as GDP growth, inflation, real short-term interest rates, budget deficit, credit, private credit, and tax rates. These factors also affect firms' short-term liquidity.

In the context of Vietnam, there are some studies on factors influencing the liquidity of different firms in different industries with different periods. Nguyen et al. (2014) used secondary data from financial statements of listed firms on Vietnam Stock Exchange for the period from 2014 to 2017. Forward stepwise was employed. In addition, multicollinearity test was applied to examine the correlation degree between variables. Models were developed and tested in the study to find which best fits the data and the selected variables. The dependent variable is liquidity and is represented by short-term liquidity; the independent variables are the ratio of P/B, P/E, ROA, debt ratio, net transfer rate, working capital ratio. The results showed that the ratio of net working capital and P/B ratio had the strongest impact on the liquidity of listed firms. The above determinants were also positively correlated with liquidity ability besides the P/E ratio and net cash flow rate. Meanwhile, debt ratio and rate of return on total assets are negatively correlated to liquidity. Phu & Nguyen (2014) investigated the financial distress including liquidity difficulties of Vietnamese listed firms and concluded that distressed firms have highly leveraged capital structures with low liquidity and low profitability.

Thai and Tran (2018) studied determinants affecting liquidity rates of Vietnamese commercial banks by using data collected from 24 Vietnamese commercial banks in the 10-year period (2006-2015). The results showed that the bank scale (SIZE), credit risk (LLP), equity ratio on total capital (CAP), the loan-to-asset ratio (TLA) and the growth rate of gross domestic product (GDP) were factors that possess negative and statistically significant correlation to the liquidity ratio. Only the variable of return on equity (ROE) has a positive association with the liquidity ratio of commercial banks.

In short, prior studies on liquidity in the domestic, as well as international context, have demonstrated that liquidity is influenced by different determinants and there are differences between groups of firms in different industries, from different research periods and locations. Methods employed by empirical studies are mainly correlation analysis and multivariate linear regression analysis with data collected, combined with appropriate tests. Financial statements were the main sources to calculate the financial ratios that appear in the research model of previous empirical studies. Following previous empirical studies, this study also focuses on steel firms as

respondents but with larger sample size, a more current period to research and especially determinants included in the model are more comprehensive.

However, studies of factors influencing liquidity have not previously focused on specific industries. Meanwhile, each industry has own characteristics. Moreover, the time scope is not long, variables putting into the model are not really comprehensive; the impact of international economic integration is not as profound as it is today. Therefore, this research focuses on steel firms listed on Vietnam Stock Exchange with a larger scope, longer duration time and especially having determinants relating to the steel industry.

3. Research Methodology

3.1. Model Design

This study's objective is to investigate the impact levels of determinants such as return, firm size, firm's operating time, debt ratio, GDP growth and inflation to on the liquidity of listed steel firms on Vietnam Stock Exchange. In order to test their impacts on the liquidity of steel firms listed on the stock market, we design a regression model based on the quantification of determinants included in the model. Short-term liquidity variables are proxied (surrogated) for the liquidity.

Based on the hypothetical basis and the regression is designed as below:

$$CR_i = \alpha_0 + \alpha_1*SIZE_i + \alpha_2*AGE_i + \alpha_3*AS_i + \alpha_4*ROA_i + \alpha_5*ROS_i + \alpha_6*ROE_i + \alpha_7*I_i + \alpha_8*GDP_i + \alpha_9*DR_i + E_i \quad (1)$$

$$QR_i = \beta_0 + \beta_1*SIZE_i + \beta_2*AGE_i + \beta_3*AS_i + \beta_4*ROA_i + \beta_5*ROS_i + \beta_6*ROE_i + \beta_7*I_i + \beta_8*GDP_i + \beta_9*DR_i + U_i \quad (2)$$

$$CAR_i = \mu_0 + \mu_1*SIZE_i + \mu_2*AGE_i + \mu_3*AS_i + \mu_4*ROA_i + \mu_5*ROS_i + \mu_6*ROE_i + \mu_7*I_i + \mu_8*GDP_i + \mu_9*DR_i + V_i \quad (3)$$

In which:

CR: Current ratio; QR: Quick ratio; CAR: Cash ratio

ROA: Return on assets; ROE: Return on equity; ROS: Return on sales; SIZE: Firm size; AGE: Business duration; AS: Asset structure; GDP: GDP growth; I: Inflation; DR: Debt ratio

E_i, U_i, V_i: Random errors

3.2. Data Collection

In this study, the data source gathered is mainly a secondary data, collected from audited financial statements (including balance sheet or financial position statements; income statement or comprehensive income statement; cash flow statement; and notes to the financial statements) of the listed steel firms on Vietnam Stock Exchange including Hanoi Stock Exchange (HNX) and Ho Chi Minh City Stock Exchange (HSX) for a period of 4 years from 2014 to 2017. Moreover, some management statements, websites of cophieu68.vn finance.vietstock.com, stockbiz.com, hnx.com, cafef.vn and others are also collected for having enough information for running regression models.

As a result 25 listed steel firms on the stock market, corresponding to 100 observations. Then we put in worksheets of Microsoft Excel and then data were transfered Eview for processing and analyzing the data.

Table 1: Descriptive Statistics of Listed Steel Firms

Variables	Mean	Median	Max	Min	Std. Dev.	Probability
CR	1.191776	1.083171	3.489622	0.044446	0.626406	0.000019
QR	0.581997	0.503155	2.186579	0.031367	0.399691	0
CAR	0.165600	0.059035	1.099549	0.000855	0.236234	0
ROA	-0.00542	0.029796	0.217071	-1.67618	0.235785	0
ROE	0.125131	0.114662	3.109668	-3.02031	0.555773	0
ROS	-0.49914	0.018707	0.862616	-22.7083	3.005374	0
DR	0.720395	0.661887	4.924427	0.195762	0.537618	0
SIZE	6.197163	6.272695	7.664282	2.060698	0.887144	0
AGE	13.84	12.00	23.00	10.00	3.212098	0.000226
AS	0.592041	0.628873	0.956812	0.034997	0.225959	0.006378
I	3.025	3.38	4.71	0.63	1.496334	0.004265
GDP	6.4215	6.445	6.812	5.984	0.338786	0.001951

Table 1 presents values based on software of Eviews, we get the following values: minimum value (Minimum); highest value (Maximum); Average values (Mean) and standard deviations (Std. Deviation) of 25 steel firms are listed on the Vietnam Stock Exchange in 4 years from 2014 to 2017. As stated in theoretical framework, we calculate Quick ratio (QR); Current ratio (CR) along with nine determinants influencing the liquidity of steel firms.

3.3. Data Processing

After data collection, data screening and putting in the worksheets are conducted. Then, data are transferred in Eviews 8 for processing and running the regression model. In this period, we used regression analysis together with testing methods of overcoming the defects of the models for concluding hypotheses designed with the case studies of listed steel firms on Vietnam Stock Exchange.

The research sample includes 25 steel firms listed on the stock market for the period from 2014 to 2017, so we use the least squares model (OLS). We choose methods to test the model's defects, whether it is a statistically significant test of the model through an evaluation of the Prob (F-statistic) statistical value, using variance inflation factors (VIF) to verify multicollinearity. We use Breusch – Pagan-Godfrey test for autocorrelation and Durbin-Watson verification to validate variance change.

4. Research Results

Current ratio (CR), Quick ratio (QR) and Cash ratio (CAR) influenced by independent variables are shown in Table 2, below:

Table 2: Factors Influencing Liquidity Ratios of Steel Firms

Model		ROA	ROS	ROE	AS	DR	SIZE	AGE	GDP	I
CR	B_i	**0.6123**	-0.002	-0.076	**1.638**	**-0.3325**	**-0.1464**	0.0061	0.0906	0.004
	Prob	**0.0247**	0.9371	0.403	**0.000**	**0.0069**	**0.0219**	0.6671	0.5668	0.9044
	B_0					0.702896				
QR	B_i	0.1675	0.0106	-0.024	**1.015**	**-0.1681**	**-0.1394**	**0.0218**	0.0608	0.018
	Prob	0.3905	0.4919	0.722	**0.000**	**0.0565**	**0.0028**	**0.0341**	0.5944	0.481
	B_0					0.227014				
CAR	B_i	0.0826	0.0059	0.007	**0.319**	**-0.1308**	**-0.1054**	**0.0223**	0.0295	0.017
	Prob	0.5235	0.5665	0.876	**0.001**	**0.0261**	**0.0007**	**0.0014**	0.6980	0.3071
	B_0					0.175543				

(i) Current Ratio Model

Table 2 shows that Prob (p-value) of four determinants is smaller than the significant level of 5% and 10%, that are: Return on assets (ROA) with Prob =0.0247, Debt ratio (DR) with Prob =0.0069; Asset structure (AS) with Prob =0.000 and Size with Prob = 0.0219. This means that the above variables have a significant impact on the current ratio (CR) at the significance level of 5% or that ROA, AS, DR and SIZE affect CR. Thereby, we can build a sample equation of determinants influencing current ratio (CR) as below:

CR = 0.702896+ 0.6123 * ROA + 1.638 * AS – 0.3325 * DR – 0.1464 * SIZE + e

Through the above model, we can see that ROA has a positive impact on CR, and agrees with the study of Isshaq and Bokpin (2009) in Ghana. This is explained because when the ROA increases, it proves that the firm has good financial performance, thereby being able to ensure its ability to pay its debts. Meanwhile, ROE has the opposite effect to CR. Moreover, debt ratio (DR) has the negative effect of CR. In addition, this has the same results with study of Gill and Mathur (2011). This is completely understandable because when the debt ratio increases, firms will be forced to pay large debts, the risk of losing their liquidity is high. Therefore, when DR increases, CR will decrease. Furthermore, we can see that variable influencing CR is the variable of AS with the same directional effect on CR. Asset structure plays a very important role in the development of a business. With maintaining a reasonable and stable asset structure, firms will be advantageous in production and business as well as expanding the scale. Moreover, we employ the asset structure with the coefficient of current assets and total assets. Therefore, when AS increases, CR rises as well, meaning that the ability of firms to pay current liabilities is larger.

(ii) Quick Ratio Model

Table 2 shows that Prob (p-value) of four factors is less than the 5% significance level, that are: Asset structure (AS) with Prob = 0.000; Debt ratio (DR) with Prob = 0.0565; SIZE with Prob = 0.0028, AGE with Prob = 0.0341. This means that the above variables are significant for the quick ratio (QR) model at the significance level of 5%, or that AS, SIZE, DR and AGE affect QR. Thereby, we build a model equation of determinants affecting Quick Ratio (QR) as below:

QR = 0.227014 + 1.015 * AS – 0.1681 * DR - 0.1394 * SIZE + 0.0218 * AGE + e

Through the QR model equation, AGE and AS have the same directional effect. On the other hand, SIZE and DR have the negative effect to QR.

(iii) Cash Ratio Model

Table 2 illustrates that the Prob (p-value) of the four factors is less than the 5% significance level, namely: Debt ratio (DR) with Prob = 0.00261; Firm size (SIZE) with Prob = 0.0007; Asset structure (AS) with Prob = 0.001 and AGE with the Prob = 0.0014. This means that the above variables are significant for the CR model

at the 5% significance level, or that DR, AGE, AS and SIZE affect CR. Hence, we build the model equation of the determinants influencing cash ratio (CAR) as below:

CAR = 0.175543 + 0.319 * AS – 0.1308 * DR – 0.1054 * SIZE + 0.0223 * AGE+ e

With the third model equation, AS and AGE have the positive impact on cash ratio while SIZE and DR have negative impact on cash ratio.

Evaluation of the appropriateness of regression model:

+ Prob1 (F-statistic) statistic value = 0.000892 <0.1 shows that the CR regression model is appropriate.

+ Prob2 statistical significance (F-statistic) = 0.00043 <0.1 shows that the QR regression model is appropriate.

+ Prob3 statistical significance (F-statistic) = 0.00051<0.1 shows that the CAR regression model is appropriate.

The coefficient of R^2 is the coefficient of conformity assessment of the model. The value of the coefficient of R^2 indicates how much of the variation in the dependent variable can be explained by the regression model.

OLS regression results:

(i) Current ratio model: R^2 coefficient is 0.588180 meaning that internal factors such as ROA, DR, Debt Ratio, Asset Structure and SIZE explain 58.8180% of the variation of CR, the remaining 41.182% of the variation of CR will be explained by other factors.

(ii) Quick ratio model: R^2 coefficient is 0.468540 meaning that internal factors such as SIZE, AGE, Asset structure (AS) and Debt Ratio (DR) explain 46.8540% variation of QR, the remaining 53.1460% of the variation of QR will be explained by other factors.

(iii) Cash ratio model: R^2 coefficient is 0.324851 which means that the internal factors such as SIZE, AGE, Asset structure (AS) and Debt Ratio (DR) explain 32.4851% of the variation CAR remaining 67.5149% of the variation of CAR will be explained by other factors.

The remaining factors can be internal or external that are not included in the model such as financial leverage, revenue growth, tax policy and market interest rates, the advancement of science and technology, the context of the steel industry and others.

With the results of model testing presented above, we can see that the model has no defect in autocorrelation, no multicollinearity, no heteroskedascity. Therefore, the results obtained from the model are reliable and do not violate the hypotheses of the least squares method for multivariate models.

5. Conclusion

The financial situation of a firm is clearly reflected through its liquidity. If the business has high liquidity, the financial situation will be positive. The liquidity is influenced by many different factors, requiring financial managers to master to clarify the causes and properly implement solutions to improve liquidity.

This study has firstly generalized, synthesized and systematized the theoretical issues of factors affecting liquidity of businesses in general, followed by using accounting information, indicators of financial targets from financial statements of steel firms to build regression models for those firms. This study used the least squares method (OLS) and several testing methods to find out the influencing factors and the degree of influence of those factors. Research results show that ROA, debt ratio, asset structure, SIZE scale, AGE all affect the liquidity, in which, factors of firm size, ROA, asset structure and AGE have positive impacts while debt ratio and SIZE has negative effects on liquidity of steel firms.

Therefore, this research has solved the research objectives, clearly pointed out the influencing factors and the impact of those on the liquidity of producing steel firms. The recommendations proposed in this study are useful and valuable suggestions for business managers in general and financial managers particularly at these firms in implementing the above solutions.

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