TRENDS IN WORKING CAPITAL MANAGEMENT AND ITS IMPACT ON FIRMS' PERFORMANCE: AN ANALYSIS OF F&B FIRMS LISTED ON VIETNAM STOCK MARKET

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Abstract: The research investigates the trends in working capital management and its impact on firms' performance: an analysis of F & B firms listed on Vietnam Stock Market 2010 to 2020. With a sample of 42 F&B companies listed on Hanoi Stock Exchange (HNX) and Ho Chi Minh City Stock Exchange(HOSE), the authors choose to follow the research models used by Sharma and Kumar (2011) and use the quantitative method with OLS regression and model testings to process the study. However, contradicting the result observed by Sharma and Kumar (2011) and some other studies in different countries, our research outcome shows the negative and statistically significant impact of WCM on firm performance. Particularly, the cash conversion cycle (CCC), a comprehensive measure of WCM, and its components, namely accounts receivable days, accounts payable days, and inventory days, significantly and negatively affect firm performance measured by return on assets (ROA). Thus, the research opens up new insight into the relationship between WCM and firm performance for business administrators of F&B firms in Vietnam to take it into consideration and improve their business management strategies.

Keywords: Working capital management, firm performance, return on assets, cash conversion cycle, account receivable days, inventory days, account payable days

1. Introduction

Working capital management (WCM) is an essential part of business management (Vartak and Hotchandani, 2019). To all-size companies, WCM plays a vital role in the financial health of firms. Especially when working capital refers to total current assets and current liabilities as the lifeblood of a business to keep its wheels operating smoothly, it is necessary to manage and accurately determine the requirements for companies' working capital.

Managing working capital involves daily financial activities that deal with current assets and current liabilities, namely cash management, accounts receivable management, accounts payable management and inventory management (Chandra, 2011, Clayman et al., 2012, Berk and DeMarzo, 2016). Notably, Pass and Pike (1984) mentioned two critical goals of WCM, which were to satisfy the liquidity and profitability of firms. However, it is challenging for firms to balance out and achieve both goals as they frequently conflict. Typically, liquidity requires confining a certain amount of funds to fulfill short term obligations. At the same time, profitability refers to maximizing shareholder wealth by utilizing equity, debt, and companies' funds for operational use or investment purposes for higher returns. Thus, there is a trade-off between profitability and liquidity since attempts to optimize profitability could pressure liquidity, while a high concentration on liquidity is likely to dilute profitability. Therefore, firms need effective and efficient WCM to accomplish both goals and improve their performance.

In Vietnam, the food and beverage (F&B) industry is one of the leading sectors contributing to national economic growth. The industry is characterized by holding a large amount of inventory and high investment

in receivables and payables. Hence, to survive in the fiercely competitive market economy, F&B companies in Vietnam have searched for optimal solutions for managing working capital to boost productivity and operating performance. However, there is a limited number of comprehensive research on the effect of WCM on firm performance to assist companies' managers in having an overview of this relationship between these variables and creating effective management strategies. Realizing the necessity of the issue, the authors opt to carry out the research on the impact of WCM on the performance of F&B firms listed on the Vietnam stock market.

2. Literature Review

WCM is one of the most crucial parts of financial management (Deloof, 2003). Many studies suggested managing working capital regarding cash management, receivables management, inventory management, and payables management. In this section, the authors review the theoretical framework of each component of WCM and empirical studies to elucidate a general view of managing working capital in businesses and the impact of WCM on firm performance.

2.1. Overview of Working Capital Management

2.1.1. Definition and Purposes of Working Capital Management

WCM refers to the day-to-day financial activities that deal with current assets and current liabilities (Chandra, 2011). WCM necessitates short-term decisions in working capital and financing all aspects of both firms' short-term assets and liabilities. Managing a firm's working capital aims to ensure the firm's ability to continue operating with sufficient cash flow for payments of both maturing short-term debt and impending operational expenses (Azhar and Noriza, 2010). Additionally, effective and efficient WCM could help firms satisfy the two crucial goals, profitability and liquidity (Pass and Pike, 1984).

2.1.2. Components of Working Capital Management

WCM can be divided into four main categories: cash management, accounts receivable management, accounts payable management, and inventory management (Clayman et al., 2012, Brealey et al., 2012, Berk and DeMarzo, 2016).

2.1.2.1. Cash Management

Cash is considered the most critical current asset, representing the essential input necessary for the continuous running of a business (Nyambane and Ouma, 2017). Therefore, managing cash effectively creates a smooth operation for firms. According to Kakeeto et al. (2017), cash management consists of cash planning, managing the cash flows, setting the optimum cash level from time to time, and investing surplus cash. In addition, these cash management activities strive for: ensuring adequate cash is available for paying for expenditures when they fall due; borrowing only when necessary and minimizing borrowing costs; maximizing returns on idle cash and managing risks associated with cash flow (Lienert, 2009).

Nonetheless, Berk and DeMarzo (2016) analyzed motives for holding and managing cash of companies then added new points compared to Lienert's study. The authors mentioned three main motives of cash holding: transaction balance, precautionary balance, and compensating balance. Regarding transaction balance, it was unanimous among Lienert (2009), Berk and DeMarzo (2016) that firms need to keep an adequate amount of cash and other liquid securities to meet their near-term liabilities. Besides, the amount of money held by firms to counter the uncertainties associated with their cash flows was mentioned as a precautionary balance, which

size depends on the degree of uncertainties surrounding a firm's cash flows. The new point in Berk and DeMarzo's study is the compensating balance motive for holding cash. This means that firms might be required to deposit an amount of money in a bank's account as compensation for the bank's services. Usually, the cash tied up in the bank's account to meet a compensating balance requirement is unavailable for other uses, so the firms have to consider carefully in this balance.

2.1.2.2. Receivable Management

The receivable management involves determining a firm's credit policy and monitoring account receivables (Berk and DeMarzo, 2016). About establishing the credit policy, Berk and DeMarzo (2016) indicated three main steps which include setting credit standards, credit terms and a collection policy. Firstly, managers or credit departments of firms determine credit standards by deciding the credit risk tolerance of the company and a category of customers having the level of credit risk that fits with the company's requirements. Following this, firms decide credit terms, which refer to the length of time before payment must be made, the discount percentage, and a discount period that would offer for their customers to encourage early payments. In the last step, firms develop a collection policy that lists actions of companies dealing with late payments. To evaluate the efficiency of a credit policy, firms monitor their accounts receivable through main tools including accounts receivable days and the aging schedule. On the one hand, firms calculate the number of days of accounts receivable and then compare it with the credit term to see whether customers often pay late or not. Additionally, by using an aging schedule to find out how many days receivable accounts stay on the firm's books, managers could also observe the payment patterns and make forecasts for the firm's working capital requirements.

2.1.2.3. Inventory Management

Inventory is considered one of the irreplaceable factors of a firm's production and an essential part of its current assets, thus managing inventory plays a vital role in assuring a smoothly run working capital (Berk and DeMarzo, 2016). Specifically, inventory management involves balancing out benefits and costs associated with inventory in order to bring up an optimal level and structure of inventory including raw materials, work in progress, and finished goods needed to sustain efficient operations and sales. Subsequently, effective inventory management could free up idle funds confined in inventory and reduce relative inventory costs, which could benefit a firm's production and performance (Sekeroglu and Altan, 2014). Key advantages are the motives for firms to emphasize managing and keeping a sufficient amount of goods (Berk and DeMarzo, 2016). These benefits cover mitigating stock-outs and disappointing customers, minimizing the effects of fluctuations in customers' demand, reducing order costs and receiving quantity discounts from suppliers (Muller, 2003). However, inventory management needs to be considerate of costs of holding inventory because tying up capital in inventory is costly for a firm (Berk and DeMarzo, 2016). The costs associated with inventory include acquisition, order and carrying costs. In which, acquisition costs refer to the inventory's cost itself; order costs are the total costs of placing an order, and carrying costs consist of storage costs, insurance, taxes, etc. There is a dynamic trade-off balance between these three costs as changing one cost could affect another.

2.1.2.4. Payables Management

Payables management associates with monitoring accounts payable to ensure that payments are completed at an optimal time (Berk and DeMarzo, 2016). Different authors discuss some techniques to manage and monitor accounts payable. Berk and DeMarzo (2016) brought up one technique that was calculating the accounts payable days outstanding of a firm and comparing it to the credit terms. The comparison would illustrate if the

firm is paying late or too early, then the company could adjust its accounts payable days. The authors mentioned that a firm should make a payment on the latest day allowed in order to keep its money working for it as long as possible and take advantage of trade credit to maintain a maximum cash flow for the firm. Another method applied by many companies is stretching accounts payable, also known as paying later than the payment due period (Clayman et al., 2012). Stretching payables could take advantage of vendor grace periods.The number of additional days those payments can be extended is determined and valued by applying the company's opportunity cost for the additional days times the amount of the payable. However, paying late affects the company's perceived creditworthiness, resulting in difficulty in obtaining good trade credit terms with suppliers in the future.

2.1.3. Measurement of Working Capital Management

Aminu and Zainudin (2015) described that WCM takes into account all concepts and components ranging from raw materials to finished products and output representing inventory levels to receivable and payment representing the cash aspect. Hence, the cash conversion cycle (CCC) is used as an indicator for measuring the efficiency of managing working capital as it reflects the net time between the time payments are made by a firm for purchasing inventory and when a firm receives cash from selling products made from that inventory. Particularly, the CCC is measured by the total inventory period and receivables period less payable period (Richards and Laughlin, 1980, Brealey et al., 2012, Berk and DeMarzo, 2016). The CCC is illustrated in Figure 1.

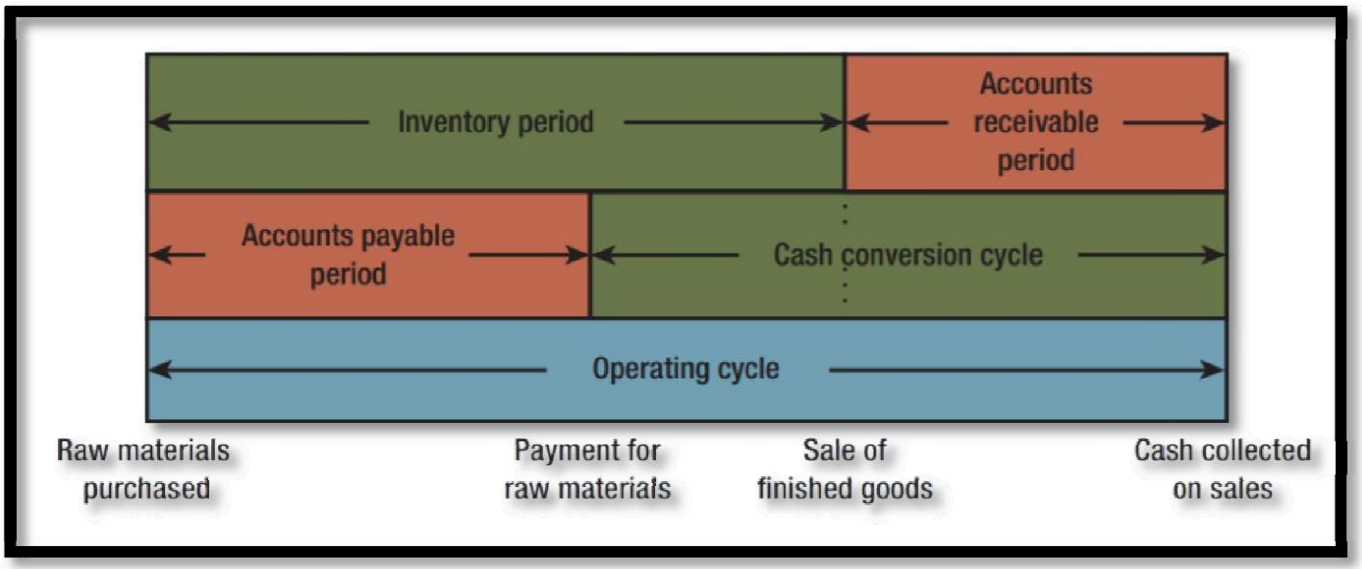

Figure 1: The Cash Conversion Cycle and Operating Cycle
Source: Brealey Et Al. (2012)

Berk and DeMarzo (2016) indicated that having a long CCC associated with a higher level of working capital required a larger amount of cash needed for firms' daily operating, which might take away a chance of a company investing that amount of money to profitable projects and generate more income for the company. Besides, Miller (1991) pointed out that the efficiency and productivity of business benefits from the optimal length of CCC, meaning when the length of CCC is optimized, the productivity of business would be improved. Since CCC captures a firm's operating side, many researchers such as Deloof (2003), Padachi (2006), Sharma and Kumar (2011)used CCC as a proxy for WCM then examined the effects of WCM on the firm's performance.

2.2.The Impact of Working Capital Management on Firm Performance

Many researchers in foreign countries and in Vietnam conducted studies on the relationship between WCM and firm performance. Hence, the authors review empirical research to determine the research gap and build up the foundation for this study.

2.2.1. Foreign Studies

Deloof (2003) investigated how WCM affected corporate profitability based on a sample of 1,009 large Belgian nonfinancial firms between 1992 and 1996. In the research, the CCC was used as a comprehensive measure of WCM, while trade credit policy and inventory policy were measured by the number of days accounts receivable, accounts payable and inventories, and corporate profitability represented by gross operating income (GOI). The author revealed a significant negative relation between GOI and the number of days of accounts receivable, inventory and accounts payable. Therefore, he recommended that managers could reduce the number of days accounts receivable and inventory to a reasonable minimum to create value for their shareholders.

Padachi (2006) carried research intending to examine the trends in WCM and its impact on firms' performance through a sample of 58 small manufacturing firms from 1998 to 2003 in Mauritius. By using panel data analysis and taking ROA as a measurement of firm performance along with inventories days, accounts receivables days, accounts payable days and CCC as explanatory variables, the author found a significant negative relation between firm performance and CCC, the number of days of accounts receivable and accounts payable in the Pooled OLS regressions. Besides, the author indicated that owner managers could increase profits by shortening their working capital cycle. Furthermore, high investment in inventories and receivables was associated with lower profitability.

Gill et al. (2010) attempted to contribute to Deloof's findings regarding the relationship between WCM and firms' profitability by researching a sample of 88 American firms listed on New York Stock Exchange from 2005 to 2007. The study was in line with the previous research (Deloof, 2003) when the authors observed a negative relationship between profitability, measured through gross operating profit, and average accounts receivable days. However, they found a significant positive relationship between the CCC and profitability. Nevertheless, the study revealed no statistically significant coefficient between average inventory days, accounts payable days and corporate profitability.

Sharma and Kumar (2011) took a sample of 263 non-financial companies listed on the Bombay Stock Exchange between 2000 and 2008. They evaluated the data using OLS multiple regression to examine the effect of working capital on the profitability of Indian firms. The results revealed that WCM correlated positively to firm profitability, measured by ROA, in Indian companies. Remarkably, while CCC and the number of days accounts receivables showed a positive relationship with corporate profitability, the number of days of accounts payable and inventory were negatively correlated with a firm's profitability.

Uzzaman and Chowdhury (2014) used the same model as Sharma and Kumar (2011) to test the effect of WCM on the profitability of 21 Bangladeshi textiles companies listed on Chittagong Stock Exchange from 2008 to 2012. The study showed a positive coefficient between WCM and profitability in Bangladeshi Textiles Companies. In which, CCC, the number of days of inventory, and accounts receivables had a positive impact on firms' profitability, but the numbers of days in accounts payable affected firms' profitability negatively.

Vartak and Hotchandani (2019) researched a sample of 14 companies listed on the Bombay Stock Exchange from 2009 to 2018 to figure out the effect of WCM on firm performance. The authors indicated that a longer CCC, average payment period and inventory period lessen profitability of firms measured by ROA. However, the findings did not show a significant relationship between firms' profitability and average payment period.

2.2.2. Studies in Vietnam

Hoang (2015) selected a data set of 98 manufacturing firms listed on HOSE from 2009 to 2014 to look into the relationship between WCM and firms' profitability. Using Pearson's correlation and fixed effects multiple regression analysis, the study found significant negative relationships between CCC, net trade cycle, average collection period, average inventory period, average payment period and ROA. The author advised managers that reducing the cash conversion cycle, net trade cycle, and WCM components to an optimal level could enhance the firm's profitability.

Le et al. (2018) investigated the impact of WCM on financial performance of 63 listed firms on HOSE from 2014 to 2016. The authors examined firm performance by different measurements including ROA, return on equity and return on sales, while CCC was used to measure the efficiency of WCM. The results revealed that CCC positively affected return on equity and return on sales, but CCC and ROA's relationship was not statistically significant.

NGUYEN et al. (2020) found out that WCM (measured by CCC) and its components (accounts receivable turnover in days, inventory turnover in days, and accounts payable turnover in days) affected negatively on firms' profitability (measured by ROA and Tobin's Q) through a sample of 119 non-financial listed companies on HNX and HOSE in Vietnam from 2010 to 2018. The authors suggested that firms could improve its profitability by shortening the money collecting period from clients, accelerating inventory flow and holding a low payment time to creditors.

The empirical studies analyzed different results of the influence of WCM on firm performance. In Vietnam, the number of research on the topic has been limited, especially in the F&B industry. Therefore, the authors base on empirical studies and use the latest updated information to research the impact of WCM on the performance of F&B companies listed on the Vietnam stock market from 2010 to 2020.

3. Methodology

3.1. Research Hypotheses

Based on empirical studies reviewed, the authors build appropriate hypotheses in this research. Particularly, four hypotheses are selected to examine the impact of WCM and its components on the performance of public F&B companies in Vietnam.

3.1.1. Accounts Receivable Days and Firm Performance

Accounts receivable days reflect the length of time between when a company sells its goods and collects payments from its customers. Some of the previous studies includingPadachi (2006), Hoang (2015), Vartak and Hotchandani (2019), NGUYEN et al. (2020) indicated that firms holding a more extended number of days of accounts receivable have less profitability. Sharma and Kumar (2011), Uzzaman and Chowdhury (2014) showed a different result that the increase in the number of days of accounts receivable leads to a growth in firms' profitability. Hence, the first hypothesis is developed:

• H1: Accounts receivable days have a negative impact on firm performance.

3.1.2. Inventory Days and Firm Performance

Inventory days refer to the average period since firms hold inventory until they turn it into final products and sell in the market. F&B firms tend to store up a large inventory, which causes a high storage cost and affects firms' performance. Sharma and Kumar (2011), Hoang (2015), Vartak and Hotchandani (2019), and NGUYEN et al. (2020) examined the impact of inventory days on firms' profitability, and they concluded that less profitable firms have more days inventory outstanding.

Hence, the second hypothesis is developed:

• H2: Inventory days have a negative impact on the firm performance.

3.1.3. Account Payable Days and Firm Performance

Accounts payable days represent the delay between when a company receives inventory and when the company actually pays cash back for suppliers. The studies of Padachi (2006),Sharma and Kumar (2011), Hoang (2015),NGUYEN et al. (2020)indicated that a longer payable period would lessen the profitability of firms. However, Vartak and Hotchandani (2019) found no significant relationship between the firms' average payment period and firm performance. Hence, the third hypothesis is developed:

• H3: Accounts payable days have a negative impact on the firm performance.

3.1.4. Cash Conversion Cycle and Firm Performance

The cash conversion cycle (CCC) is the lag time between the firms' payments for its raw materials and the cash collection from the sales of its products. Padachi (2006), Hoang (2015), Vartak and Hotchandani (2019), NGUYEN et al. (2020) indicated that more profitable firms had a shorter cash conversion cycle. Nevertheless, Sharma and Kumar (2011), Uzzaman and Chowdhury (2014) revealed a positive relationship between CCC and firm performance in their studies. Hence, the fourth hypothesis is developed:

• H4: The cash conversion cycle has a negative impact on the firm performance.

3.2. Research Model

In this study, the authors choose to follow the model built by Sharma and Kumar (2011) to examine the impact of WCM on the firm performance of listed F&B companies in Vietnam. There are two reasons why the authors refer to Sharma and Kumar's model. Firstly, variables used in the model are classical and able to provide a comprehensive view of the two most important research objectives, WCM and firm performance. Secondly, the model has been used widely and has become a foundation for Vietnamese and global studies. In the model, CCC is considered as an indicator for WCM. Besides, accounts receivable days, inventory days, and accounts payable days are taken into account to examine the efficiency of managing working capital in terms of receivable management, inventory management, and payable management. Notably, firm performance is measured by the most popular accounting-based measurement: return on assets (ROA). The model is illustrated in Figure 2.

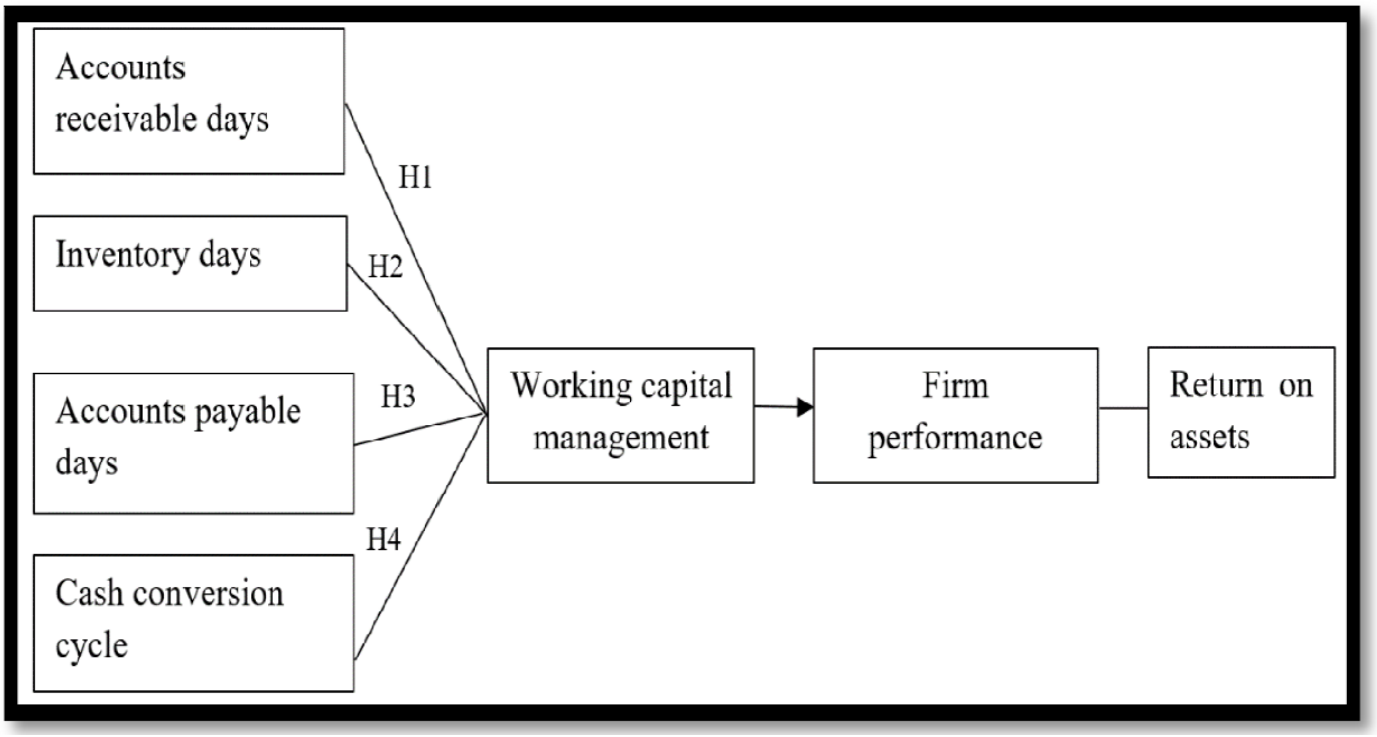

Figure 2: Theresearch Model

Source: Synthesized By The Authors

3.3. Research Methods

The research uses a quantitative approach to examine the impact of WCM on the performance of listed F&B firms in Vietnam. Besides, the authors apply research techniques such as descriptive statistics, correlation analysis, and OLS regression to explore the relationship between a dependent variable and explanatory variables and control variables in the research model. Additionally,multicollinearity testing, heteroscedasticity testing, and autocorrelation testing are adopted to assess the models' validity and fix problems of the models. Thence, the authors summarize and analyze research results.

3.4. Sample and Data Collection

3.4.1.Sample Selection

In this research, F&B firms are selected based on the Industry Classification Benchmark, provided by Finnpro platform, a Vietnamese professional financial database platform. Recently, 63 F&B companies have been listed on the two largest stock exchanges in VietNam, HNX and HOSE. After excluding firms with missing data, there are remaining 42 listed F&B in the sample. The authors make the sample selection as in Table 1 below.

Firms listed on HNX	360
Firms listed on HOSE	377
=	737
Less non F&B firms	(674)
=	63

Less firms with missing annual financial statements	(21)
Total	42

Table 1: Sample Selection

Source: HNX, HOSE

3.4.2. Data Collection

The database used in the study is retrieved from the official financial statements of 42 listed F&B companies on HNX and HOSE over the 11-year period between 2010 and 2020, and the updated data from the financial and economic website as finance.vietstock.vn.

3.5. Regression Equations

The study adopts a classical regression that is the OLS regression. The OLS regression analysis is a common statistical analyzing method that could estimate the relationship between one or more explanatory variables and a dependent variable. In this research, return on assets (ROA) is the dependent variable for firm financial performance. ROA was the most typical accounting-based measurement of firm performance and frequently used in previous research such as Padachi (2006), Sharma and Kumar (2011), Uzzaman and Chowdhury (2014), Hoang (2015), Le et al. (2018), Vartak and Hotchandani (2019), NGUYEN et al. (2020). Independent variables comprised CCC as a comprehensive measure for WCM, accounts receivable days (ARD), inventory days (IVD), accounts payable days (APD), representing components of WCM. Besides, sales growth of firm (GROWTH), firm leverage (LEV), firm size (SIZE), current ratio (CR) are employed as control variables in the model. Moreover, in the equations, t denotes years (time-series dimension) ranging from 2010-2020 and denotes error term.

OLS regression model for this research is presented as:

ROA β β ARD β GROWTH β LEV β CR β SIZE ε 1

ROA β β IVD β GROWTH β LEV β CR β SIZE ε 2

ROA β β APD β GROWTH β LEV β CR β SIZE ε 3

ROA β β CCC β GROWTH β LEV β CR β SIZE ε 4

3. **6.Variable Calculation**

The summary of research variables is presented in Table 2.

Variable Type	Variable Name	Proxy Denotation	Equation	Unit
Dependent variable	Return on assets	ROA	#$%& / &'()*)++,(+	%

Independent variables	Accounts receivable days	ARD	-..'/0(+1,.,23)4*, ——— -3,1)5,6)2*7+)*,+	Day(s)
	Inventory days	IVD	%03,0('17 ——— -3,1)5,6)2*789:;	Day(s)
	Accounts payable days	APD	-..'/0(+<)7)4*, ——— -3,1)5,6)2*789:;	Day(s)
	Cash conversion cycle	CCC	888 %=> -?> A -D>	Day(s)
Control variables	Sale growth	GROWTH	;)*,+ @ A ;)*,+ ——— ;)*,+	%
	Firm leverage	LEV	&'()**2)42*2(2,+ ——— &'()*)++,(+	%
	Firm size	SIZE	ln +)*,+	VND Billion
	Current ratio	CR	8/11,0()++,(+ ——— 8/11,0(*2)42*2(,+	%

Table 2: The Summary of Research Variables
Source: Synthesized By The Authors

4. Findings and Analysis

4.1.Descriptive Statistics

The descriptive statistics result is presented in Table 3, showing the mean, standard deviation, minimum and maximum value of variables used in the study.

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	462	.105	.086	-.062	.337
ARD	462	38.112	32.874	.905	172.508
IVD	462	95.271	70.055	17.637	380.484
APD	462	32.575	26.581	2.393	165.163
CCC	462	102.042	81.992	-4.403	514.333
GROWTH	420	.099	.249	-.441	1.002
LEV	462	.465	.204	.042	1.168
CR	462	1.872	1.042	.698	6.703
SIZE	462	20.73	1.671	17.683	25.475

Note: ROA-return on assets; ARD-accounts receivable days; IVD-inventory days; APD-accounts payable days; CCC-cash conversion cycle; GROWTH-sales growth of firms; LEV-firm leverage; CR-current ratio; SIZE-firm size.

Table 3: Variables Descriptive Statistics

Source: Data Analyzed by Stata 14

Looking at the details, ROA has the mean value of 0.105 with a standard deviation of 0.086. This indicates that listed F&B firms in Vietnam could generate 10.5% in earnings before tax and interests by using its total assets on average. The minimum ROA is recorded at -0.062, while the maximum figure of the variable is 0.337.

Regarding ARD, the average accounts receivable days of F&B companies is 38.112 with a standard deviation of 32.874, ranging from 0.905 to 172.508. Normally, F&B firms took around 38 days to collect payments from its customers.

When it comes to IVD, the mean of IVD is reported at 95.271, referring to the fact that F&B businesses needed about 95 days to push its inventory out and convert it into sales on average. While the fastest companies needed approximately 18 days to turn over their inventory, the slowest required 380 days to clear out the stock. Besides, the standard deviation of the variable has a value of 70.055.

Regarding APD, F&B firms usually paid for goods and services offered by suppliers in an average period of 32.575 days. The longest time that companies took to fulfill its accounts payable was 165.163 days. By contrast, the shortest payment period was recorded at 2.393 days. Additionally, the standard deviation of APD is 26.581.

In addition, the mean value of CCC is 102.042, showing that F&B firms needed 102.042 days to complete its cash conversion cycle, beginning with initial payments for firms' inventory to receiving cash from sales of

final products. There is a huge gap between the minimum and the maximum figure of CCC, recorded at -4.403 and 514.333, respectively. Besides, CCC has a standard deviation of 81.992.

Furthermore, the companies witnessed their sales growth by nearly 10% annually on average. Noticeably, the mean of LEV is recorded at 46.5%, which indicates that 46.5% of the total assets of F&B firms were financed by debts. Besides, the average CR is 1.872, showing the good liquidity of F&B firms and indicating that they were able to pay their current liabilities by utilizing their current assets on average. Moreover, the table shows that a typical firm in the study had a size of 20.73, as determined by the natural logarithm of its sales, with a standard deviation of 1.671.

4.2 . Correlation Analysis

The correlation matrix is conducted to explore the association between chosen variables, as shown in Table 4.

Variables	ROA	ARD	IVD	APD	CCC	GROWTH	LEV	CR	SIZE
ROA	1.000								
ARD	-0.243*	1.000							
IVD	-0.363*	0.461*	1.000						
APD	-0.269*	0.388*	0.544*	1.000					
CCC	-0.355*	0.689*	0.896*	0.334*	1.000				
GROWTH	-0.010	0.127*	0.176*	0.207*	0.149*	1.000			
LEV	-0.542*	0.195*	0.329*	0.359*	0.269*	0.034	1.000		
CR	0.389*	-0.078	-0.183*	-0.261*	-0.127*	-0.052	-0.765*	1.000	
SIZE	-0.057	0.154*	0.181*	0.330*	0.124*	0.106*	0.100*	-0.187*	1.000

Note:*** p<0.01, ** p<0.05, * p<0.1 indicated respectively the significance at 1%, 5% and 10% levels.

ROA-return on assets; ARD-accounts receivable days; IVD-inventory days; APD-accounts payable days; CCCcash conversion cycle; GROWTH-sales growth of firms; LEV-firm leverage; CR-current ratio; SIZE-firm size.

Table 4: The Correlation Matrix Between Variables
Source: Data Analyzed By Stata 14

Overall, most of the correlation coefficients between variables are lower than 0.85, the level of correlation causes multicollinearity in the model, except the correlation between CCC and IVD 0.896. However, CCC and IVD are independent variables in two separate regression models, so they do not cause the models' defects or the multicollinear phenomenon. As can be seen from the table, ROA correlates negatively with all measures of WCM, namely ARD, IVD, APD, and CCC. Specifically, IVD shows the strongest negative correlation with ROA, at -0.363 with a significance level of 10%. This is followed by a correlation coefficient between CCC and ROA, at -0.355 at the 10% significance level. Next come the correlation values between APD, ARD and ROA, at -0.269, -0.243 with the significance level of 10%, respectively.

Regarding control variables, there is a significant negative correlation between LEV and ROA at -0.542, while a significant positive correlation is found between CR and ROA at 0.389. Additionally, the result reveals a negative correlation between SIZE, GROWTH and ROA, reported at -0.057 and -0.01.

3. The Regression Results

The research employed the OLS regression method to analyze the impact of WCM on firm performance in the case of 42 listed F&B companies in Vietnam between 2010 and 2020 with 420 observations. The results are presented in Table 5.

MODEL	ROA-ARD	ROA-IVD	ROA-APD	ROA-CCC
	(1)	(2)	(3)	(4)
ARD	-0.000320***			
	(0.000112)			
GROWTH	0.00740	0.0123	0.00807	0.0118
	(0.0140)	(0.0140)	(0.0142)	(0.0138)
LEV	-0.231***	-0.208***	-0.234***	-0.207***
	(0.0273)	(0.0281)	(0.0276)	(0.0277)
CR	-0.00273	-0.00145	-0.00451	-0.000573
	(0.00522)	(0.00518)	(0.00519)	(0.00518)
SIZE	0.000222	0.000794	0.000678	0.000374

	(0.00216)	(0.00214)	(0.00226)	(0.00211)
IVD		-0.000228***		
		(5.65e-05)		
APD			-0.000295**	
			(0.000149)	
CCC				-0.000221***
				(4.92e-05)
Constant	0.226***	0.210***	0.219***	0.218***
	(0.0513)	(0.0511)	(0.0530)	(0.0505)
Observations	420	420	420	420
R-squared	0.3144	0.3274	0.3076	0.3336
Adj R-squared	0.3062	0.3139	0.2992	0.3255
Prob> F	0.0000	0.0000	0.0000	0.0000

Standard errors in parentheses

Note:*** p<0.01, ** p<0.05, * p<0.1 indicated respectively the significance at 1%, 5% and 10% levels. ROAreturn on assets; ARD-accounts receivable days; IVD-inventory days; APD-accounts payable days; CCC-cash conversion cycle; GROWTH-sales growth of firms; LEV-firm leverage; CR-current ratio; SIZE-firm size.

Table 5: Results of the OLS Regression Models
Source: Data Analyzed By Stata 14

Overall, independent variables in OLS models, namely ARD, IVD, APD, CCC, show a significant adverse effect on the dependent variable, ROA. In particular, the coefficient of ARD was the greatest, at-0.00032,implying the statistically most significant and negative effect on the performance of public F&B companies in Vietnam, among WCM components. Next came the coefficient of APD, IVD, and CCC,at -0.000295, -0.000228, -0.000221 indicating the negative impact on ROA, respectively. This is a brief analysis of OLS regression models. The detailed analysis is provided in the research result summary and discussion in section 4.5 after the models are tested.

4.4. Model Testing

4.4.1. Multicollinearity Test

Multicollinearity phenomenon occurs when variables in a model are highly correlated with each other. The multicollinearity can be detected by using a correlation matrix or variance inflation factors (VIF).The VIF is measured as:

1

$$=\%F_E 1\_\_\_\_\_ A\ ?_E$$

Where: k is variable; $?_E$ is a correlation coefficient between variable k with other independent variables in a model

Gujarati et al. (2012) mentioned that if the VIF value is smaller than 10, multicollinearity does not exist in a model and vice versa. The VIF test results are presented in Table 6 – 9.

Variable	VIF	1/VIF
CR	2.59	0.386
LEV	2.59	0.386
ARD	1.1	0.913
SIZE	1.08	0.927
GROWTH	1.03	0.975
Mean VIF	1.68	

Table 6: VIF Test Result of the Model (1) ROA-ARD

Source: Data Analyzed by Stata 14

Variable	VIF	1/VIF
LEV	2.810	0.356
CR	2.600	0.384
IVD	1.250	0.801
SIZE	1.090	0.921
GROWTH	1.040	0.960

Mean VIF	1.760	

Table 7: VIF Test Result of the Model (2) ROA-IVD

Source: Data Analyzed by Stata 14

Variable	VIF	1/VIF
LEV	2.630	0.380
CR	2.530	0.395
APD	1.310	0.762
SIZE	1.180	0.851
GROWTH	1.050	0.954
Mean VIF	1.740	

Table 8: VIF Test Result of the Model (3) ROA-APD

Source: Data Analyzed by Stata 14

Variable	VIF	1/VIF
LEV	2.750	0.363
CR	2.620	0.381
CCC	1.170	0.854
SIZE	1.070	0.939
GROWTH	1.030	0.967
Mean VIF	1.730	

Table 9: VIF Test Result of the Model (4) ROA-CCC

Source: Data Analyzed by Stata 14

As can be seen from the tables, the VIF values of all variables are less than 10. Specifically, the mean of VIF is 1.680,1.760, 1.740, 1.730 for model 1, model 2, model 3, model 4, respectively. From the result, the authors can conclude that there is no appearance of multicollinearity in these models.

4.4.2. Heteroskedasticity Test

Heteroskedasticity occurs when the standard errors of a variable are non-constant over a period of time. Notably, heteroskedasticity violates one assumption for linear regression modeling which indicates that the variance of error terms is consistent across the values of the independent variables.

To test the heteroskedasticity of the models, the authors use Breusch-Pagan/Cook-Weisberg test. The null hypothesis of Breusch-Pagan/Cook-Weisberg test is that error variances are constant versus the alternative that error variances are not equal. On the one hand, the null hypothesis is rejected when the outcome of testing Prob> chi2, which is the probability of obtaining the chi-square statistic, is smaller than 0.05 and vice versa. The results of the testing are presented in Table 10.

Model	Test Result
ROA-ARD	Breusch-Pagan/Cook-Weisberg test for heteroskedasticity Ho: Constant variance Variables: fitted values of ROA chi2(1) = 64.14 Prob> chi2 = 0.0000
ROA-IVD	Breusch-Pagan/Cook-Weisberg test for heteroskedasticity Ho: Constant variance Variables: fitted values of ROA chi2(1) = 61.41 Prob> chi2 = 0.0000
ROA-APD	Breusch-Pagan/Cook-Weisberg test for heteroskedasticity Ho: Constant variance Variables: fitted values of ROA chi2(1) = 64.95 Prob> chi2 = 0.0000
ROA-CCC	Breusch-Pagan/Cook-Weisberg test for heteroskedasticity Ho: Constant variance Variables: fitted values of ROA chi2(1) = 64.69 Prob> chi2 = 0.0000

Table 10: Result of Testing Heteroskedasticity

Source: Data Analyzed By Stata 14

The value of Prob> chi2 in all four testings of the OLS regression model is 0.0000, which is lower than 0.05 so that the null hypothesis is rejected for all models. Hence, the OLS models suffer from heteroskedasticity.Therefore, the authors use Robust OLS models to fix the heteroskedasticity. The Robust OLS models are illustrated in Table 12 – 15.

4.4.3. Autocorrelation Test

Autocorrelation is referred to as lagged correlation, which happens when values of the same variables are autocorrelated up to some lag across different observations in panel data. In this research, the Wooldridge test is applied to test whether there is any sign of autocorrelation. The testing result is presented in Table 11.

Model	Test Result
ROA-ARD	Wooldridge test for autocorrelation in panel data H0: no first order autocorrelation F(1, 41) = 24.131 Prob> F = 0.0000
ROA-IVD	Wooldridge test for autocorrelation in panel data H0: no first order autocorrelation F(1, 41) = 24.510 Prob> F = 0.0000
ROA-APD	Wooldridge test for autocorrelation in panel data H0: no first order autocorrelation F(1, 41) = 24.710 Prob> F = 0.0000
ROA-CCC	Wooldridge test for autocorrelation in panel data H0: no first order autocorrelation F(1, 41) = 24.529 Prob> F = 0.0000

Table 11: Result of Testing Autocorrelation

Source: Data Analyzed By Stata 14

Looking at Table 11, the value of Prob> F = 0.0000 in all four OLS models, which is a significant value and smaller than 0.05, then the null hypothesis is rejected. It is indicated that there is an autocorrelation problem in all four OLS models.

Thence, the authors use OLS estimates with the Newey-West estimation of the covariance matrix to tackle the problem and show the result in Table 12 – 4.13.

4.5. Research Result Summary and Discussion

Table 12, Table 13, Table 14 and Table 15 display the regression results of three methods: OLS, Robust OLS, and Newey West OLS. Furthermore, the authors analyze the impact of WCM on the performance of listed F&B in Vietnam based on the research outcomes.

Model (1) ROA-ARD			
	OLS	Robust OLS	Newey West OLS
ARD	-0.000320***	-0.000320***	-0.000320**
	(0.000112)	(0.000122)	(0.000143)
GROWTH	0.00740	0.00740	0.00740
	(0.0140)	(0.0143)	(0.015 0)
LEV	-0.231***	-0.231***	-0.231***
	(0.0273)	(0.0276)	(0.0319)
CR	-0.00273	-0.00273	-0.00273
	(0.00522)	(0.00651)	(0.00729)
SIZE	0.000222	0.000222	0.000222
	(0.00216)	(0.00232)	(0.00303)
Constant	0.226***	0.226***	0.226***
	(0.0513)	(0.0554)	(0.0703)
Observations	420	420	420
R-squared	0.314	0.314	
Standard errors in parentheses			

Note:*** p<0.01, ** p<0.05, * p<0.1 indicated respectively the significance at 1%, 5% and 10% levels. ROAreturn on assets; ARD-accounts receivable days; IVD-inventory days; APD-accounts payable days; CCC-cash conversion cycle; GROWTH-sales growth of firms; LEV-firm leverage; CR-current ratio; SIZE-firm size.

Table 12: Research Result Summary for ARD Variable

Source: Data Analyzed By Stata 14

Looking at Table 12, the coefficient of ARD isnegative and unchanged over various regression methods, showing a negative effect of ARD on ROA. Nevertheless, its significance levelexperiences a slight difference between regression models, recorded at 1% in OLS and Robust OLS versus 5% in Newey OLS. However, all significance levels of ARD are acceptable andstatisticallymeaningful.Besides, the coefficient values of control variables are the same across different regression methods. Remarkably, there is a significantly negative relationship between LEV and ROA. Therefore, the final regression ROAARD model will be as follow:

ROA = -0.00032*ARD + 0.0074*GROWTH - 0.231*LEV - 0.00273*CR + 0.000222*SIZE (1)

Particularly, increasing the number of days of accounts receivables by one unit is associated with a drop in ROA by 0.032%. This is indicated that the faster a company collects money from its customers, the more profitable the firm is. In other words, a shorter amount of time that a company takes to collect cash from its customers leads to a smaller amount of money tied up in receivables; therefore, the company can use the collected funds to reinvest in other operating activities and earn more profit. Hence, firms can improve their performance by reducing accounts receivable days. The result contradicts the findings of Sharma and Kumar (2011), Uzzaman and Chowdhury (2014). However, the result is in line with previous studies of Padachi (2006), Hoang (2015), Vartak and Hotchandani (2019), NGUYEN et al. (2020).

Model (2) ROA-IVD			
	OLS	Robust OLS	Newey West OLS
IVD	-0.000228***	-0.000228***	-0.000228***
	(5.65e-05)	(4.70e-05)	(5.78e-05)
GROWTH	0.0123	0.0123	0.0123
	(0.0140)	(0.0143)	(0.0152)
LEV	-0.208***	-0.208***	-0.208***
	(0.0281)	(0.0279)	(0.0327)
CR	-0.00145	-0.00145	-0.00145
	(0.00518)	(0.00629)	(0.00708)

SIZE	0.000794	0.000794	0.000794
	(0.00214)	(0.00235)	(0.00306)
Constant	0.210***	0.210***	0.210***
	(0.0511)	(0.0557)	(0.0707)
Observations	420	420	420
R-squared	0.327	0.327	

Standard errors in parentheses

Note:*** p<0.01, ** p<0.05, * p<0.1 indicated respectively the significance at 1%, 5% and 10% levels. ROA-return on assets; ARD-accounts receivable days; IVD-inventory days; APD-accounts payable days; CCC-cash conversion cycle; GROWTHsales growth of firms; LEV-firm leverage; CR-current ratio; SIZE-firm size.

Table 13: Research Result Summary for IVD Variable

Source: Data Analyzed by Stata 14

As shown in Table 13, aside from changes in the standard errors of variables, there is no sign of the difference in the coefficient value of variables and its significance level between regression models. Noticeably, IVD has a negative and statistically significant impact on ROA with the significance level of 1%. Plus, the control variable, LEV, negatively and significantly affects the dependent variable, ROA. From the table above, the final regression ROA-IVD model will be as follow:

ROA = -0.000228*IVD + 0.0123*GROWTH - 0.208*LEV - 0.00145*CR + 0.000794*SIZE (2)

The coefficient of IVD is -0.000228, indicating that when a day increases in the average inventory period corresponding with the decline of -0.0228% in ROA. Additionally, LEV and CR show a negative impact on ROA. In which, when 1 unit goes up in LEV, ROA falls by 20.8%. By contrast, there is a positive relationship between GROWTH, SIZE and ROA. As can be seen from the result, inventory days affect negatively and significantly firm performance. Therefore, it indicates that a shorter average inventory period shows the better ability of a firm to convert its inventory into sales and better firm performance. Besides, reducing the inventory days lowers holding costs associated with inventory then improves firm performance. This finding is consistent with the results found by Sharma and Kumar (2011), Hoang (2015), Vartak and Hotchandani (2019), NGUYEN et al. (2020)

Model (3) ROA-APD			
	OLS	Robust OLS	Newey West OLS
APD	-0.000295**	-0.000295**	-0.000295**

	(0.000149)	(0.000120)	(0.000147)
GROWTH	0.00807	0.00807	0.00807
	(0.0142)	(0.0145)	(0.0152)
LEV	-0.234***	-0.234***	-0.234***
	(0.0276)	(0.0275)	(0.0318)
CR	-0.00451	-0.00451	-0.00451
	(0.00519)	(0.00635)	(0.00712)
SIZE	0.000678	0.000678	0.000678
	(0.00226)	(0.00239)	(0.00310)
Constant	0.219***	0.219***	0.219***
	(0.0530)	(0.0561)	(0.0709)
Observations	420	420	420
R-squared	0.308	0.308	

Standard errors in parentheses

Note:*** p<0.01, ** p<0.05, * p<0.1 indicated respectively the significance at 1%, 5% and 10% levels. ROA-return on assets; ARD-accounts receivable days; IVD-inventory days; APD-accounts payable days; CCC-cash conversion cycle; GROWTHsales growth of firms; LEV-firm leverage; CR-current ratio; SIZE-firm size.

Table 14: Research Result Summary For APD Variable

Source: Data Analyzed By Stata 14

Model 3 witnesses modifications of standard errors of variables in three regression methods. Nevertheless, the coefficients of variables and its significance levels are stable over regression models. Furthermore, the coefficient of APD with 5% level of significance points out the meaningful and negative relationship between APD and ROA. Besides, similar to the two models above, LEV has a negative and significant effect on ROA. From the table above, the final regression ROA-APD model will be as follow:

ROA = -0.000295*APD + 0.00807*GROWTH - 0.234*LEV - 0.00451*CR + 0.000678*SIZE (3)

In particular, the coefficient of APD, at -0.000295, implies that increasing a day in the average inventory period leads to a decrease of -0.0295% in ROA, showing an inverse and statistically significant relation with

firm performance. The result is on the same page with the findings of Padachi (2006), Sharma and Kumar (2011), Uzzaman and Chowdhury (2014), Hoang (2015), NGUYEN et al. (2020). This result would indicate that firms taking a longer time to pay back their creditors are less profitable. Hence, businesses could reduce the accounts payable days up to a reasonable extent to increase profitability.

Besides, in the model, control variables show various effects on ROA. In particular, when increasing LEV by 1 unit, ROA goes down by 23.4%. On the contrary, GROWTH and SIZE affect ROA positively. While 1 unit goes up in GROWTH, leading to a 0.807% increase in ROA, 1 unit rises in SIZE, associating with a 0.0678% increase in ROA.

Model (4) ROA-CCC

	OLS	Robust OLS	Newey West OLS
CCC	-0.000221***	-0.000221***	-0.000221***
	(4.92e-05)	(4.35e-05)	(5.41e-05)
GROWTH	0.0118	0.0118	0.0118
	(0.0138)	(0.0141)	(0.0150)
LEV	-0.207***	-0.207***	-0.207***
	(0.0277)	(0.0275)	(0.0321)
CR	-0.000573	-0.000573	-0.000573
	(0.00518)	(0.00636)	(0.00715)
SIZE	0.000374	0.000374	0.000374
	(0.00211)	(0.00229)	(0.00298)
Constant	0.218***	0.218***	0.218***
	(0.0505)	(0.0547)	(0.0694)
Observations	420	420	420
R-squared	0.334	0.334	

Standard errors in parentheses

Note:*** p<0.01, ** p<0.05, * p<0.1 indicated respectively the significance at 1%, 5% and 10% levels. ROAreturn on assets; ARD-accounts receivable days; IVD-inventory days; APD-

accounts payable days; CCC-cash conversion cycle; GROWTH-sales growth of firms; LEV-firm leverage; CR-current ratio; SIZE-firm size.

Table 15: Research Result Summary for CCC Variable

Source: Data Analyzed by Stata 14

Model 4 also experiences changes in standard errors of variables across regression model types. Like models 1, 2 and 3, there are no differences in the coefficients of variables and theirsignificance level between regression methods. The most noticeable point in the result is the negative impact of CCC on ROA at the significance level of 1%. Additionally, a meaningful adverse relationship between LEV and ROA has been found in the result of regression models.From the table above, the final regression ROA-CCC model will be as follow:

ROA = -0.000221*CCC + 0.0118*GROWTH - 0.207*LEV - 0.000573*CR + 0.000374*SIZE(4)

Remarkably, the coefficient of CCC is -0.000221, which means that extending one day in CCC reduces ROA by 0.0221%. Thus, a longer cash conversion cycle lessens firms' profitability and makes the more unsatisfactory firm's performance. Hence, to enhance firm performance, business administrators could consider shortening the CCC. This researchresult differs from the studies' outcomes of Sharma and Kumar (2011), Uzzaman and Chowdhury (2014). Nevertheless, the finding supports previous research of Padachi (2006), Hoang (2015), Vartak and Hotchandani (2019), NGUYEN et al. (2020).

Based on the result discussion, it is possible to accept the four initial hypotheses, which are:

- H1: Accounts receivable days have a negative impact on firm performance.
- H2: Inventory days have a negative impact on the firm performance.
- H3: Accounts payable days have a negative impact on the firm performance.
- H4: The cash conversion cycle has a negative impact on the firm performance.

5. Conclusion

Working capital management is an essential aspect of companies' overall strategies for increasing shareholder value. This research sheds light on how WCM affects the performance of F&B listed on Vietnam stock market. In the study, the authors apply OLS regression models designed by Sharma and Kumar (2011) on the panel data of 42 F&B firms listed on HNX and HOSE from 2010 to 2020 and use model testings to explore the negative and statistically significant impact of WCM and its components on the performance of public F&B companies in Vietnam.

Notably, in four explanatory variables, accounts receivable days show the most substantial negative and statistically significant influence on firm performance. This result is not in line with research findings done by Sharma and Kumar (2011), Uzzaman and Chowdhury (2014). However, the result supports previous studies of Padachi (2006), Hoang (2015), Vartak and Hotchandani (2019), NGUYEN et al. (2020). Next comes

accounts payable days, influencing negatively and significantly on firm performance. This outcome agrees with the results found by Padachi (2006), Sharma and Kumar (2011), Uzzaman and Chowdhury (2014), Hoang (2015), NGUYEN et al. (2020). The following statistically significant and negative determinant of firm performance is inventory days. The result is in line with the findings of Sharma and Kumar (2011), Hoang (2015), Vartak and Hotchandani (2019), NGUYEN et al. (2020). Bottom of the list, the CCC performs a statistically significant and inverse effect on the performance of listed F&B firms in Vietnam. This finding contradicts the previous outcomes of Sharma and Kumar (2011), Uzzaman and Chowdhury (2014). However, the result is in line with previous research of Padachi (2006), Hoang (2015), Vartak and Hotchandani (2019), NGUYEN et al. (2020).

In conclusion, the research has brought further evidence of the effect of WCM on the performance of public F&B companies in Vietnam for business managers to consider and change business management systems to improve economic outcomes. However, this analysis might encounter some limitations of research phrases and data sample, which does not fully reflect the development of the industry. Hence, further studies should carry out a more significant data sample to accomplish a more complete and objectiveoutcome.

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