

Effect of Working Capital Management on the Profitability of Steel Companies on Vietnam Stock Exchanges

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Abstract

This study examines the influence of working capital management (WCM) factors on the profitability of steel companies listed on the Stock Exchange of Vietnam. Data was collected from audited financial statements of companies for a period of 10 years, from 2010 to 2019. The number of samples eligible for research is 20 out of 26 companies, which is equivalent to 76.9%. With the help of dedicated software Stata version 14, the impact determination of WCM (through 8 independent variables: DIO, DPO, DSO, CCC, SIZ, CR, LEV, GRO) to the firm's profitability (through the dependent variable) is performed through multivariate regression models. Research results from companies in the steel industry in Vietnam during this period indicate that WCM has a strong impact on the profitability of businesses. Among 8 factors affecting the profitability of steel enterprises, factors DPO, DIO, DSO, CR, SIZ, GRO have a positive impact, boosting profitability; 2 factors CCC and LEV have a negative impact on profitability; in which, the effect of CCC is negligible. This conclusion is almost in contrast to many previously published studies due to the specifics of the industry as well as the different stages of economic development associated with the economic management policies of the State.

Keywords: Cash Conversion Cycle, Days Inventory Outstanding, Days Payable Outstanding, Days Sales Outstanding, Working Capital Management

JEL Classification Code: D22, G30, L25

1. Introduction

Working capital or net working capital is the difference between current assets and current liabilities of a company, or it is calculated by subtracting current assets from current liabilities. This relationship reflects the company's ability to pay short-term liabilities with short-term assets. Using and managing working capital has many impacts on the business performance of any business in both short-term

and long-term, from paying employees and suppliers to planning sustainable growth (Soukhakian & Khodakarami, 2019). In other words, working capital can be considered as a financial source for a company to pay its current or short-term obligations. Therefore, working capital is not only a good ratio of a company's current financial position but also a measure of its overall performance.

Since working capital is so important to business operations, managers try to use working capital effectively. From there, arose the concept of working capital management (WCM). WCM forecasts short-term and improves processes, starting with purchasing raw materials and paying suppliers and ending with receivables from customers (Soukhakian & Khodakarami, 2019). This is also the cash conversion cycle - CCC (Richards & Laughlin, 1980; Aregbeyen, 2013; Yasir, Majid, & Yousaf, 2014; Majanga, 2015; Chang, 2018). CCC is a tool that measures the time (in days) for a business to convert its investments in inventory and other resources into cash flows from sales. This is the amount of time it takes a business to sell its inventory (Days Inventory Outstanding - DIO), collect debts receivable from buyers (Days Sales Outstanding - DSO) and pay suppliers bills (Days Payable

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Outstanding - DPO) without penalty. In other words, CCC deals with money in and out of a company. DIO says how many days it takes a business to sell all its inventory. The DSO indicates the number of days it will take for the business to recover all the sale proceeds for the period. The DPO reflects the time it takes a company to pay suppliers off their bills without penalty. The purpose of working capital management is for managers to find all appropriate measures to minimize DIO and DSO and prolong DPO as much as possible.

There are many ways that a business can use to improve profitability and good management and WCM is one of the most effective ways. Therefore, there have been many studies on the relationship between WCM and profitability which have been carried out in many countries with many different fields which gave different results. These studies mainly use CCC and the three main elements of CCC (DIO, DSO and DPO) as the WCM measure. Most published studies often look at a wide range, including companies or listed companies of a country, and rarely have a study going into a particular industry or field.

Vietnam's steel industry is one of the key economic sectors of the country. In 2018, Vietnam's production output reached 14.1 million tons of crude steel, ranking 17th among the 20 largest steel producing countries in the world (Thanh, 2019). However, in general, steel enterprises in Vietnam have a small, fragmented and unsustainable production scale; production structure is narrow and monotonous; there is no technology investment condition; production capacity and product quality are low; labor productivity is not high. In terms of the form of payment, deferred payment is the method commonly applied in the Steel industry because steel products are mainly used for the construction industry. Only when the construction contractors complete the construction volume under the contract and collect the money, the steel enterprises can recover the money. Therefore, the time to recover the money sold is often prolonged, especially for projects with a large budget and using state budget. Around this time, the Government is promoting many construction activities and public investment to promote the country's economic development (Vietnam Steel Association, 2020). These features make WCM in the Vietnam Steel industry even more important and attract the attention of managers as well as create research demands on WCM for scientists.

2. Literature Review

Improving profits and honoring corporate values is always the concern of managers. Therefore, the consideration of the factors affecting profitability to propose, recommend and find effective and suitable solutions to improve profitability has been mentioned in many research. It is easy to find studies on factors that directly affect profitability such as financial

leverage, solvency, liquidity, firm size, capital structure and working capital management (Chamberlain, 1962; DeAngelo & Masulis, 1980; Bradley, Jarrell, & Kim, 1984; Capon, Farley, & Hoening, 1990; Miao, 2005; Huang & Song, 2006; Aburime, 2009; Anbar & Alper, 2011; Fareed, Ali, Shahzad, Nazir, & Ullah, 2016; Muhammad, Rehman, & Waqas, 2016; Szymańska, 2017; Grau, & Reig, 2018; Blažková, 2018; Yüksel, Mukhtarov, Mammadov, & Özsarı, 2018; Qayyum & Noreen, 2019; Vu, Do, Dang, & Nguyen, 2019; Zheng, Liu, & Huang, 2019; Nguyen & Nguyen, 2020) or external factors influencing profitability such as market concentration, industry growth, import growth, GDP growth, inflation, and profitability. yield and profit on financial markets (Bei & Wijewardana, 2012; Pattitoni, Petracchi & Spisni, 2014; Çelik, Bilen, & Bilen, 2016; Jędrzejczak-Gas, 2017; Grau & Reig, 2018; Soukhakian & Khodakarami, 2019).

Regarding the relationship between working capital management and corporate profitability, although there are quite a few studies that have been published, the results of this relationship are still controversial. Most studies find that the opposite relationship between WCM and profitability or the volatility (increase, decrease) of CCC significantly affects the profitability of a company (Shin and Soenen, 1998; Song, Liu, & Chen, 2012; Vahid, Elham, Mohsen, & Mohammadreza, 2012; Aregbeyen, 2013; Tran, 2015; Lima, Martins, & Brandão, 2015; Jamalinesari & Soheili, 2015; Kasiran, Mohamad, & Chin, 2016; Le, Ho, Le, & Le, 2017; Botoc & Anton, 2017; Ndumia & Omagwa, 2019; Oladipupo, Adekanbi, & Oluwadare, 2019; Yusuf, 2019; Gołaś, 2020).

Shin and Soenen (1998) studied at 58,985 firms over the period 1975-1994 and concluded that there is a significant relationship between the length of a firm's net trade cycle (NTC) and its profitability. They used NTC instead of CCC to measure WCM, because NTC is basically equal to the CCC where all its three components were expressed as a percentage of sales. In other words, it has a strong negative relationship between CCC and the profitability of a company. It means that the longer the NTC of a firm, the riskier it is for its profitability.

Deloof (2003) took his research on a survey of 1,009 big Belgian non-financial firms during the period of 1992 - 1996 and found a substantial negative link between gross operating income and the number of days of accounts receivable, accounts payables and inventory. It means that, in order to raise the profitability of a firm, its manager should reduce the number of days accounts receivable, accounts payables and inventory while less profitable firms wait longer to pay their bills. In other words, this study concluded that there is a strong negative link between CCC and the profitability of the firm. Mansoori and Muhammad's study (2012) of 92 industrial companies in Singapore in the period 2004-2011 or study by Lazaridis and Tryfonidis (2006) of 131 companies

listed on the Athens Stock Exchange between 2001-2004 also showed similar results.

Alipour (2011) executed a survey of 1,063 companies listed at the Tehran Stock Exchange during the period 2001 - 2006 and found a strong reverse link between CCC and profitability of these firms. In which, two component of CCC including accounts payables and inventory expressed a significant negative relationship with profitability; while accounts payables and profitability showed a direct strong relation. This research suggested managers should reduce accounts payables and inventory in order to raise firm's profitability.

Napompech (2012) when performing regression analysis on samples of 255 companies listed on the Stock Exchange of Thailand from 2007 to 2009 found an inverse relationship between operating gross profit and inventory conversion time and receivable debt collection. She suggested that managers can increase the profitability of a firm by reducing the CCC, inventory conversion period and receivable collection period. This study also reminded that these surveyed companies cannot raise their profitability by deferring payments to their suppliers. Through considering the impact of factors reflected on the working capital on engineering product market competition performance, Song, Liu, and Chen (2012) found that the engineering working capital turnover ability, inventory turnover, liquid assets turnover, and receivables turnover have a positive impact on market competition performance. The study also found that the cash conversion cycle and the liquidity of working capital have a negative impact on competitive activities in the market.

Vural, Sökmen, and Çetenak (2012) studied 75 listed manufacturing firms on Istanbul Stock Exchange for the 2002 - 2009 period and concluded that the CCC and accounts payables are negatively related to profitability of a firm. It means that managers of a company can raise its profitability by reducing the collection period of accounts payables and CCC. At the same time, this work did not find any link between the number of day inventory, accounts payables and profitability.

Studying the effect of working capital management on the performance of companies listed on the Tehran Stock Exchange (TSE), Vahid, Elham, Mohsen, and Mohammadreza (2012) found the factors of the Average Collection Period, Inventory Turnover, Average Payout, Cash Conversion Cycle, and Net Trade profitability have a negative impact on profitability. This research also shows that the cash conversion cycle factor, although negatively related to profitability, is negligible. Gul et al. (2013) surveyed the impact of WCM on the profitability of 55 small and medium enterprises in Pakistan from 2006 - 2012 and found a positive relation between accounts payables and profitability; while there is a reverse link between accounts payables, inventory and CCC with increased profitability.

The study of Aregbeyen (2013) on the effectiveness of working capital management on the profitability of 48 large manufacturing firms on the Nigerian Stock Exchange (NSE) between 1993 and 2005 shows that WCM significantly reduces the profitability. The article concludes that improving WCM efficiency is essential and recommends that Nigerian manufacturing companies shorten the Average Collection Period, Average Payment Period, Inventory Turnover in Days and Cash Conversion Cycle. Studying the impact of working capital management on the profitability of SMEs in the Eurozone, Lima, Martins, and Brandão (2015) found such factors as average collection period, average payment period, average inventory period, cash conversion cycles are negatively associated with profitability. In examining the relationship between WCM and the performance of Sri Lankan listed manufacturing companies between 2011 and 2016, Vijayakumaran (2017) found that when working capital was low, the relationship was positive, conversely, when the level of working capital is high, the relationship is reversed. Deriving from this, the researchers recommend that the optimal working capital for businesses is to balance the costs and benefits of maintaining working capital and thereby maximize their performance.

For the purpose of examining the relationship between working capital management and firm profitability, using table data set on high-growth firms from Central, Eastern and Southeast Europe from 2006 to 2015, Botoc and Anton (2017) found an inverse U-shaped relationship between working capital level and firm's profitability. From there, they point out the importance of short-term financial decisions in enhancing high-growth firms' profits. Nobanee (2017) when looking at the relationship between working capital performance and profitability of construction firms listed in the United Arab Emirates found a negative relationship between the cycle of net trade and the profits of the construction firms over a period of crisis. The study results also show a positive and important relationship between the net trade cycle and the profitability of UAE construction companies during the non-crisis period.

Vijayakumaran and Vijayakumaran (2017), while studying Sri Lanka's listed manufacturing firms from 2011 to 2016, found that when working capital is low, the relationship between WCM and profitability is positive. On the contrary, when the level of working capital is high, this relationship is reversed. From there, the researchers recommend the optimal working capital for businesses to balance the costs and benefits of maintaining working capital and thereby maximizing operational efficiency. Oladipupo, Adekanbi and Oluwadare (2019) found that in companies listed on the Nigerian Stock Exchange, cash collection and spending have negative effects; the current ratio of payment and inventory period both have a positive impact on the rate of return of assets. From there, they recommend that while maintaining

a shorter collection, they do not extend the payment time for creditors to enjoy a cash discount (if any) and businesses should be proactive in managing the principle. materials to avoid idle resources that could negatively impact their financial performance.

Soukhakian and Khodakarami (2019) when studying the relationship between working capital management and efficiency as well as the regulatory role of macroeconomic factors (inflation and GDP) in Iran’s listed manufacturing firms, has found that the cash conversion cycle is negatively related to an asset’s rate of return (ROA). Macroeconomic variables are positively and significantly related to ROA, but do not adjust the relationship between working capital management and business performance.

3. Research Data and Models

3.1. Research Data

The research data of the article are collected directly and is based on the audited financial statements of joint-stock companies in the steel industry officially published on the Vietnam Stock Exchange for a period of 10 years, from 2010 to 2019. As of March 31, 2020, on the Vietnamese stock exchange, there are a total of 26 listed companies in the steel industry; including 9 companies on the HOSE (Ho Chi Minh Stock Exchange, 2020); HNX has 4 companies (Hanoi Stock Exchange, 2018) and UPCOM has 13 companies (Cafef, 2020; cophieu68.vn, 2020; VietstockFinance, 2020). Some companies are excluded from the sample because they entered the stock market after 2010 or because their few years of financial statements have not been audited. As a result, 20 companies met the conditions for sampling with 200 observations, accounting for 76.9%.

3.2. Research Models

So as to measure the profitability of steel companies on Vietnam Stock Exchange, this study uses ratio the Return On Assets (ROA) as the dependent variable, reflecting the profitability of assets and eight independent variables, including:

- DSO (Days Sales Outstanding): reflecting the collection policy.
- DIO (Days Inventory Outstanding): reflecting the inventory policy.
- DPO (Days Payable Outstanding): reflecting the payment policy.
- CCC (Cash Conversion Cycle): reflecting the WCM.
- SIZ (Size): reflecting the firm’s size.
- LEV (Financial Leverage): reflecting the financial structure of the company.
- CR (Current Ratio): reflecting the current payment ability of the company.

- GRO (Growth): reflecting the growth speed of the company. All of these variables are described concretely in Table 1 below.

Regression model was built on the basis of using tabular data to evaluate the impact of 8 different factors (including DSO, DIO, DPO, CCC, SIZ, LEV, CR, GRO) on fertility profit (measured by ROA) of 20 steel companies listed on the Vietnam stock market from 2010 to 2019. The regression model is set up as follows:

$$\text{Model 1: ROA} = \beta_0 + \beta_1 \cdot \text{DSO} + \beta_2 \cdot \text{SIZ} + \beta_3 \cdot \text{LEV} + \beta_4 \cdot \text{GRO} + \beta_5 \cdot \text{CR} + \varepsilon$$

$$\text{Model 2: ROA} = \beta_0 + \beta_1 \cdot \text{DIO} + \beta_2 \cdot \text{SIZ} + \beta_3 \cdot \text{LEV} + \beta_4 \cdot \text{GRO} + \beta_5 \cdot \text{CR} + \varepsilon$$

$$\text{Model 3: ROA} = \beta_0 + \beta_1 \cdot \text{DPO} + \beta_2 \cdot \text{SIZ} + \beta_3 \cdot \text{LEV} + \beta_4 \cdot \text{GRO} + \beta_5 \cdot \text{CR} + \varepsilon$$

$$\text{Model 4: ROA} = \beta_0 + \beta_1 \cdot \text{CCC} + \beta_2 \cdot \text{SIZ} + \beta_3 \cdot \text{LEV} + \beta_4 \cdot \text{GRO} + \beta_5 \cdot \text{CR} + \varepsilon$$

where: $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4,$ and β_5 are correlation coefficients.
 ε : is error.

Table 1: Summary of variables in the model

Variable	Formula	Expected Sign
<i>Dependent variable</i>		
ROA =	Net Income	
	Average Total Assets	
<i>Independent variable</i>		
DSO =	Average Account Receivables	x 365
	Net Sales	
DIO =	Average Inventory	x 365
	Cost of Goods Sold	
DPO =	Average Account Payables	x 365
	Cost of Goods Sold	
CCC =	DSO + DIO - DPO	-
SIZ =	Natural logarithm of Net Sales	+
LEV =	Total Debts	-
	Total owners' equity & liabilities	
CR =	Current Assets	+
	Current Debt	
GRO =	(Net Sales _t - Net Sales _{t-1})	+
	Net Sales _{t-1}	

4. Results and Discussion

4.1. Descriptive Statistics

Descriptive statistics of all 9 collected variables are summarized in Table 2. Table 2 shows that the mean value of the profits of 20 companies is 3.39% with a standard deviation of 6.18%. The maximum value for ROA is 25.45% while the minimum is - 25.57%. On an average, these firms took about 103 days to convert their inventory into sales. However, the quickest firm took approximately 6 days to clear its inventory; while this figure of the slowest firm was nearly three years (1,002 days). These companies granted the credit period at nearly two months (58 days) while they paid their suppliers after 160 days (or later five-month) on an average. Overall CCC ranged only two days (see Table 2).

4.2. Correlation Analysis

From Table 3, it can be seen that four independent variables including DSO, DIO, DPO and LEV have a negative relationship with profitability. This is consistent with most researches by Shin and Soenen (1998), Deloof (2003), Lazaridis and Tryfonidis (2006), Napompech (2012), Mansoori and Muhamad (2012), Tran (2015), Le, Ho, Le, and Le (2017), etc. The remaining independent variables have a positive relationship with profitability (see Table 3).

4.3. Multiple Regression Analysis

So as to find the link between CCC and each of its components on profitability, after moving data from excel and coding them in Stata 14, we run regressions for all four above mentioned models by both Fixed Effects Model (FEM) and Random Effects Model (REM). Then we compared these models by Hausman command. With P-value or α lower than 0.05%, we chose FEM (and vice versa) as well as checked its defects comprising Multi-collinearity, Heteroskedasticity and Autocorrelation. After that, we correct them and we got the below concrete results.

$$ROA = - 0.176108 + 0.000078*DSO + 0.017386*SIZ - 0.172742*LEV + 0.008918*GRO + 0.045*CR.$$

From Table 4, DSO has a positive relationship with profitability and its correlation coefficient is 0.000078 and P-value of 0.015; or this relationship has a statistical significance at 5% level. It means that, the higher of DSO, the better for the profitability of these companies. This result is opposite to many studies by Shin and Soenen (1998), Deloof (2003), Lazaridis and Tryfonidis (2006), Gill, Biger, and Mathur (2010), Napompech (2012), Mansoori and Muhamad (2012), Gul et al. (2013), Tran (2015), Le, Ho, Le, and Le (2017), etc. (see Table 4).

Table 2: Descriptive statistics

sum					
Variable	Obs	Mean	Std. Dev.	Min	Max
-----+-----					
Name	0				
Year	200	2014.5	2.879489	2010	2019
ROA	200	.0339356	.0618349	-.2556662	.254517
DSO	200	58.94595	96.16931	8.277415	890.2455
DIO	200	103.1946	118.5696	5.717406	1002.014
-----+-----					
DSO	200	160.126	188.4197	21.94517	1762.583
CCC	200	2.014546	49.75887	-146.3578	353.7723
SIZ	200	14.70584	1.459341	9.966556	17.96904
LEV	200	.638707	.1309642	.2483525	.9310266
GRO	200	.1941348	.6861765	-.9862477	5.510258
-----+-----					
CR	200	1.285862	.4415298	.5647412	3.71911
NAME	200	10.5	5.780751	1	20

Table 3: Correlation coefficients between variables

. corr ROA DSO DIO DPO SIZ LEV GRO CR									
(obs=200)									
	ROA	DSO	DIO	DPO	SIZ	LEV	GRO	CR	
ROA	1.0000								
DSO	-0.2255	1.0000							
DIO	-0.2037	0.7688	1.0000						
DPO	-0.2554	0.9051	0.9190	1.0000					
SIZ	0.2556	-0.4864	-0.4206	-0.4020	1.0000				
LEV	-0.4759	0.2157	0.1809	0.3185	0.1202	1.0000			
GRO	0.1759	-0.1021	-0.1464	-0.1461	0.0492	0.0160	1.0000		
CR	0.3364	-0.0000	0.0058	-0.1625	-0.3794	-0.7567	0.0267	1.0000	

Table 4: Regression result of Model 1

. xtglS ROA DSO SIZ LEV GRO CR,panel(h) corr(ar1)						
Cross-sectional time-series FGLS regression						
Coefficients: generalized least squares						
Panels: heteroskedastic						
Correlation: common AR(1) coefficient for all panels (0.2629)						
Estimated covariances = 20 Number of obs = 200						
Estimated autocorrelations = 1 Number of groups = 20						
Estimated coefficients = 6 Time periods = 10						
Wald chi2(5) = 154.05						
Prob > chi2 = 0.0000						
ROA	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
DSO	.000078	.0000321	2.43	0.015	.0000152	.0001408
SIZ	.017386	.0029559	5.88	0.000	.0115925	.0231795
LEV	-.1727417	.0405013	-4.27	0.000	-.2521229	-.0933606
GRO	.0089177	.0034125	2.61	0.009	.0022293	.015606
CR	.0450045	.01322	3.40	0.001	.0190939	.0709152
_cons	-.1761078	.0690079	-2.55	0.011	-.3113608	-.0408548

Similarly, the regression results of model 2 ($ROA = \beta_0 + \beta_1 * DIO + \beta_2 * SIZ + \beta_3 * LEV + \beta_4 * GRO + \beta_5 * CR + \epsilon$) show that DIO also has a positive relationship with profitability and its correlation coefficient is 0.0000651 and P-value of 0.023; or this relationship has a statistical significance at 5% level. It means that, the longer of INV, the better the profitability of the steel companies. This result contrasts to studies by Deloof (2003), Napompech (2012), Alipour

(2011), Mansoori and Muhamad (2012), Gul et al. (2013), Tran (2015), Le, Ho, Le, and Le (2017).

Research by Lazaridis and Tryfonidis (2006) also revealed this negative association, while Gill, Biger, and Mathur (2010) detected a positive tie between DIO and profitability although this relation is also insignificant statistically.

$$ROA = - 0.183293 + 0.000065 * DIO + 0.017422 * SIZ - 0.168527 * LEV + 0.009274 * GRO + 0.0465 * CR.$$

$$ROA = - 0.193043 + 0.000046*DPO + 0.017823*SIZ - 0.171292*LEV + 0.009249*GRO + 0.05*CR.$$

$$ROA = - 0.114859 - 0.000119*CCC + 0.014578*SIZ - 0.175014*LEV + 0.014336*GRO + 0.033*CR.$$

From Table 5, DPO also has a positive relationship with profitability and its correlation coefficient is 0.0000463 and P-value of 0.006; or this relationship has a statistical significance at 5% level. This suggests that the longer a company extends its supplier billing period, the more opportunities it has to increase its working capital; from there, the profitability increases. In other words, in order to increase profits, companies need to extend the payment time of the goods within their allowances so that they don't get penalized for overdue payments (see Table 5).

This result is the same with studies by Lazaridis and Tryfonidis (2006), Alipour (2011) and Gul et al. (2013). However, it differs from the findings by Deloof (2003), Mansoori and Muhamad (2012), Tran (2015), Le, Ho, Le, and Le (2017). This result contradicts the conclusions of Gill, Biger, and Mathur (2010), Napompech (2012) and Vural, Sökmen, and Çetenak (2012) when their studies concluded that there was no statistically significant relationship between DPO and profitability.

For regression model 4, while running the regression with CCC, because P-value or α value is 0.05% higher, we choose REM (instead of FEM). We then compare REM and Ordinary Least Square (OLS) and select OLS as well as check and fix its defects. Finally, we have the results.

The regression results in Table 6 show that: With the statistical significance of 10% and the correlation coefficient of 0.0001085, P-value of 0.387, CCC has an inverse relationship with profitability. This result is similar to the most studies by Shin and Soenen (1998), Lazaridis and Tryfonidis (2006), Vural et al. (2012), Mansoori and Muhamad (2012), Gul et al. (2013), Tran (2015), Le, Ho, Le, and Le (2017), etc. This is in contrast to the research results of Gill, Biger, and Mathur (2010) when they found a positive relationship between CCC and profitability (see Table 6).

5. Conclusions

As an important operational tool, directly related to performance, WCM helps managers balance short-term assets and liabilities. The impact of WCM on profitability in this article relates to the Steel Industry companies listed on the Vietnamese stock market for the 10-year period from 2010 to 2019. From the research results, it is possible to find a significant difference in the effects of 8 different independent variables on profitability. Specifically, all three independent variables (DPO, DIO, and DSO) have a positive relationship with the profitability of the Steel Industry companies and all their P-value are smaller than 0.03, or

Table 5: Regression result of Model 3

. xtgls ROA DPO SIZ LEV GRO CR,panel(h) corr(ar1)							
Cross-sectional time-series FGLS regression							
Coefficients: generalized least squares							
Panels: heteroskedastic							
Correlation: common AR(1) coefficient for all panels (0.2643)							
Estimated covariances = 20 Number of obs = 200							
Estimated autocorrelations = 1 Number of groups = 20							
Estimated coefficients = 6 Time periods = 10							
Wald chi2(5) = 156.16							
Prob > chi2 = 0.0000							

ROA		Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
-----+-----							
DSO		.0000167	2.77	0.006	.0000136	.000079	
SIZ.		.0178227	.0028916	6.16	0.000	.0121553	.02349
LEV		-.1712915	.0401916	-4.26	0.000	-.2500656	-.0925174
GRO		.0092485	.0033727	2.74	0.006	.0026382	.0158588
CR		.0503054	.0133049	3.78	0.000	.0242283	.0763825
_cons		-.1930425	.0694506	-2.78	0.005	-.3291632	-.0569218

Table 6: Regression result of Model 4

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. xtreg ROA CCC SIZ LEV GRO CR, robust

Random-effects GLS regression      Number of obs = 200
Group variable: NAME                Number of groups = 20
R-sq:                               Obs per group:
    within = 0.2689                  min = 10
    between = 0.6991                 avg = 10.0
    overall = 0.3687                 max = 10
                                   Wald chi2(5) = 54.08
corr(u_i, X) = 0 (assumed)          Prob > chi2 = 0.0000

                                   (Std. Err. adjusted for 20 clusters in NAME)
-----+-----
|               Robust
-----+-----
ROA |               Coef.      Std. Err.      z          P>|z|      [95% Conf. Interval]
-----+-----
DSO |      -0.001085      .0001254      -0.87      0.387      -0.0003543      .0001373
SIZ. |       .0150809      .0029988       5.03      0.000      .0092034      .0209585
LEV  |      -0.1979823      .0510408      -3.88      0.000      -0.2980204      -0.0979442
GRO  |       .0140963      .0053901       2.62      0.009      .0035318      .0246608
CR   |       .0286672      .0171924       1.67      0.095      -0.0050293      .0623637
_cons |      -0.1007696      .0553956      -1.82      0.069      -0.209343      .0078037
-----+-----
sigma_u | .01153046
sigma_e | .04806257
rho     | .05442227 (fraction of variance due to u_i)
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these links have a statistical significance at 5% level. This means that, the longer number of days of DPO, DIO, and DSO, the better it is for the profitability of these companies. In contrast, CCC has a negative tie with profitability which means that a shorter CCC leads to better profitability; but it has no meaning in terms of statistical significance (more than 38%). Besides, this study also finds the certain impact of a scale, a financial structure (that has a biggest coefficient, at least 0.16), a current payment ability, a growth speed of a company on its profitability.

The results of this study once again contributes to confirm the positive effect of WCM on the profitability of companies. The limitation of this paper is only to consider the impact of WCM on profitability through ROA, but not consider the impact of WCM on other profitability indicators (ROE, ROS, ROIC, ROCE). On the other hand, the research sample of the article is not extensive, only encapsulated in listed companies in the Steel Industry in Vietnam. Hopefully, in the future, these limitations will be taken care of in another in-depth, more extensive study.

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