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Nonlinear Relationship Between Working Capital and Firm Performance Moderated by Financial Constraints on Manufacture Firms Listed in Indonesia Stock Exchange

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Abstract—The research aims to analyze the relationship between the working capital and firm performance of manufacturing companies listed in Indonesia stock exchange (IDX). Data were obtained from 33 manufactured from 2014 to 2018 using the Eviews 9.0 multiple regression analysis methods. The outcome showed the existence of a nonlinear relationship between both parties, which applies to the rise of financial constraints. Therefore, an increase in working capital helps firms to raise their sales till a certain optimal point is achieved. It also raises cost and risks of bankruptcy. This study, therefore, provides evidence of the nonlinear relationship between working capital management and firm performance of manufactured firms listed in the IDX.

Keywords—financial constraints, firm performance, working capital, net trade cycle

I. INTRODUCTION

Profitability is a relationship between revenues and cost, leading to the use of current or fixed assets by firms in productive activities [1]. Efficient working capital management aims to avoid excessive investment in assets and maintain a company's ability to determine the balance amid liquidity and profitability [2]. High investment in working capital has the ability to help companies increase sales, obtain a higher discount for early payments, and raise their value [3]. However, an excess investment in working capital leads to a few unwanted impacts with the ability to harm the value of shareholders [3]. This is because excess investment needs adequate financing and thereby, increasing the probability of bankruptcy [4]. These two views create a perspective that proves the existence of a tradeoff between benefits and costs for every level.

In 2018, Bank of Indonesia reported that the Prompt Manufacturing Index (PMI) was on the third quartile with 52.02%. The percentage beyond 50 showed that manufacture sectors were going through an expansion phase due to the increase in production volume with a positive impact in the domestic market. Some previous studies stated is the possibility of a nonlinear relationship between the investment level of working capital with the firm's profitability, thereby encouraging them to maximize their performance [5]. Therefore, maximizing the stock value of firms at an optimal level tends to improve their performance [3]. According to the studies carried out by a few researchers, there are inconsistencies associated with the working capital management effects on firm performance [6,7]. Hence, the result can be linear/quadratic and positive/negative, depending on the relevant variable and situations. In addition, previous studies majority focused on the linear relationship of firm performance [8-10]. Meanwhile, Baños-Caballero et al., [11], Simon et al., [12], and Afrifa [13] stated that failed to examine the nonlinear relationship between these parties. A research carried out in China, examined the nonlinear relationship using financial constraints [14]. However, according to Charitou, no research has been conducted with the firm's profitability using data from Indonesia [15].

II. LITERATURE REVIEW

According to numerous studies, working capital management affects profitability, liquidity, value, and corporate performance significantly [3]. Therefore, it is important to manage current assets and liabilities efficiently in order to reduce the risk associated with the inability to meet the companies' short-term obligations by avoiding excess investment [16], which eventually tends to affect profitability. Simon [12] et al., Afrifa [13], Pais and Gama [17], and Mun and Jang [18], stated that there is the existence of a nonlinear relationship between working capital and profitability. Furthermore, corporate performance increases by maintaining an optimum level and decreases with an increase in the working capital. Therefore, firms have to maintain an optimum

level by keeping a balance between costs and its beneficial values. In accordance with these descriptions, the following was formed:

H1: There is a nonlinear relationship between working capital and corporate performance, which is positive at a low level and vice versa.

A firm easily gains external financing without any obstacles with the non-existence of market imperfections. Therefore, they do not always have to depend on the availability of internal financing. According to Chauhan and Banerjee [19], these kinds of situations are almost impossible in reality, because investment decision is affected by the constraint and availability of external financing. They also stated that firms try to reduce their production cost by optimizing its working capital level and increasing the availability of internal financing for investment projects. In addition, working capital is affected by the financial needs of a firm, therefore, it is a significant way to affect its behavior [20]. Firms with a high capability of internal financing have more access to the capital market [21]. According to these descriptions, the following hypothesis is formed:

H_2: There is a positive relationship between working capital and corporate performance at a low investment level.

III. METHODS

This research uses secondary data obtained from libraries, documentary, and financial reports published in intermediary media such as the idx.co.id and www.sahamok.com obtained from 2014 till 2018. A total of 162 companies were listed in IDX, however, amongst them, 44 companies failed to publish its financial report, while approximately 27 companies used different currency in its financial report. Furthermore, 58 companies did not pay dividends continuously, therefore, after performing purposive sampling, only 33 companies met the criteria for this research. The data in this research were tested using Eviews, with the multiple regression method used to determine the relationship between independent and dependent variables, asset size, financial leverage, growth, and operating cash flows. The measurement for each variable is shown in table 1 as follows:

TABLE I.   VARIABLE AND MEASUREMENT

Variable	Proxy	Measurement	References
Dependent			
Firm Performance	ROA	$\dfrac{\text{Earnings Before Interest and Taxes}}{\text{Total Asset}}$	[14]
	TOBINS'S Q	$\dfrac{\text{Market value of equity + Book value of total asset – Book value of equity}}{\text{Book value of the total asset}}$	[13]
Independent			
Working Capital	NET	(Account Receivables/Sales) x 365 + (Inventories/Sales) x 365 – (Account payable/Sales) x 365	[14]
	NET2	[(Account Receivables/Sales) x 365 + (Inventories/Sales) x 365 – (Account payable/Sales) x 365]2	[14]
Control			
Asset Size	AS	Log (Total asset)	[14]
Financial Leverage	FL	$\dfrac{\text{Total Debt}}{\text{Total Asset}}$	[14]
Growth	Gr	$\dfrac{\text{Sales this year – Sales previous year}}{\text{Sales previous year}}$	[14]
Operating Cash Flows	OCF	$\dfrac{\text{Operating income before depreciation and amortization – interest expense – income tax expense}}{\text{Total Asset}}$	[14]
Moderating			
Financial Constraints			
Cash Flow	CF	$\dfrac{\text{Earnings Before Interest and Tax + Depreciation}}{\text{Total Assets}}$	[11]
Cost Of External Finance	EFC	$\dfrac{\text{Financial Expenses}}{\text{Total Debt}}$	[11]

Table 1. Cont.

Dividend Payout Ratio	DPR	$\dfrac{\text{Dividends}}{\text{Net Profit}}$	[11]
Interest Coverage Ratio	ICR	$\dfrac{\text{Earnings Before Interest and Tax}}{\text{Financial Expense}}$	[11]
Sales Size	SS	Log (Total Sales)	[11]

IV. RESULTS AND DISCUSSION

The result of table 2 shows an insignificant effect on working capital as measured by the Net Trade Cycle and its square on measuring firm performance, return on assets (ROA), and Tobin's Q with positive and negative coefficients. This shows an indirect relationship between these two variables [14].

The results of Table 2 also show that financial leverage has no significant and insignificant effect on return on assets (ROA) and Tobin's Q, respectively. These results are not in accordance with the research of Laghari and Chengang [14], which stated that financial leverage has a negative and positive effect on both variables. This study also used operating cash flow as a control variable, which has a negative and positive significant effect on these variables. This is in accordance with the study conducted by Laghari and Chengang [14], which stated that operating cash flow has a significant positive effect on Tobin's Q, and none on ROA.

TABLE II.   TEST RESULTS OF HYPOTHESIS 1

Eq. 1 ROA				Eq. 12 Tobin's Q			
Variable	*Coef.*	*Sig.*	*Desc.*	*Variable*	*Coef*	*Sig.*	*Desc.*
C	-0.1195	0.0123	-	C	-24.6477	0.0000	-
NET	0.0003	0.1050	Insignificant	NET	0.0381	0.1347	Insignificant
NET2	-1.62E-06	0.0782	Insignificant	NET2	-0.0002	0.1217	Insignificant
TQ	0.0005	0.0327	significant	TQ	0.7817	0.0000	significant
ROA	0.6697	0.0000	significant	ROA	20.2392	0.0001	significant
OCF	-0.1615	0.0071	significant	OCF	16.3257	0.0234	significant
FL	-0.0126	0.5028	Insignificant	FL	-1.3281	0.5492	Insignificant
Gr	0.0869	0.0000	significant	Gr	6.5984	0.0084	significant
Asset size	-0.0559	0.0010	significant	Asset size	-1.5123	0.4388	Insignificant

Sources: Panel data regression Eviews 9.0 output

According to table 3, when the working capital is measured by Net Trade cycle, its square is moderated by financial constraints and cash flow, with a significant effect and nonlinear relationship on ROA and Tobin's Q [14]. However, the different directions on the Net Trade Cycle and its square show a nonlinear relationship between working capital investment and firm performance when moderated with the cost of external finance [14].

This research is also similar to the study carried out by Laghari and Chengang [14] where the Net Trade Cycle and its square showed significant and insignificant effects on ROA and Tobin's Q, in accordance with its dividend payout ratio. Table 3 also shows an insignificant effect on both variables with a nonlinear relationship in accordance with the research conducted by Laghari and Chengang [14]. This research also shows that when working capital was measured with moderation from financial constraints, the size of its sales has a significant and insignificant effect. The existence of opposite directions on their working capital shows that there is also a nonlinear relationship between the size and performance of the sale of a company, as stated by Laghari and Chengang [14].

TABLE III.   TEST RESULTS OF HYPOTHESIS 2

Model 2 ROA				Model 7 Tobin's Q			
Variable	*Coef.*	*Sig.*	*Desc.*	*Variable*	*Coef*	*Sig.*	*Desc*
C	-0.0647	0.2039	-	C	-19.5114	0.0010	-
CF*NET	-0.0055	0.0000	Significant	CF*NET	0.1892	0.1687	Insignificant
CF*NET^2	2.64E-05	0.0000	significant	CF*NET^2	-0.0006	0.3718	Insignificant
Model 3 ROA				Model 8 Tobin's Q			
Variable	*Coef.*	*Sig.*	*Desc.*	*Variable*	*Coef.*	*Sig.*	*Desc.*
C	-0.0348	0.4871	-	C	-22.8753	0.0003	-
EFC*NET	-0.0022	0.8233	Insignificant	EFC*NET	0.6568	0.5878	Insignificant

Table 3. Cont.

EFC*NET^2	3.39E-05	0.4127	Insignificant	EFC*NET^2	-0.0030	0.5602	Insignificant
Model 4 ROA				**Model 9 Tobin's Q**			
Variable	*Coef.*	*Sig.*	*Desc.*	*Variable*	*Coef.*	*Sig.*	*Desc.*
C	-0.0873	0.0841	-	C	-16.6647	0.0037	-
DPR*NET	0.0011	0.0040	Significant	DPR*NET	-0.0286	0.5060	Insignificant
DPR*NET2	-5.25E-06	0.0075	significant	DPR*NET2	7.30E-05	0.7414	Insignificant
Model 5 ROA				**Model 10 Tobin's Q**			
Variable	*Coef.*	*Sig.*	*Desc.*	*Variable*	*Coef.*	*Sig.*	*Desc.*
C	-0.0692	0.1588	-	C	-13.5530	0.0165	-
ICR*NET	2.83E-06	0.3930	Insignificant	ICR*NET	0.0003	0.3963	Insignificant
ICR*NET2	-2.11E-08	0.2867	Insignificant	ICR*NET2	-2.29E-06	0.3114	Insignificant
Model 6 ROA				**Model 11 Tobin's Q**			
Variable	*Coef.*	*Sig.*	*Desc.*	*Variable*	*Coef.*	*Sig.*	*Desc.*
C	-0.6524	0.0000	-	C	1.7112	0.9214	-
Sales size*NET	-0.0009	0.0004	Significant	Sales size*NET	0.0188	0.4992	Insignificant
Sales size*NET^2	3.70E-06	0.0004	significant	Sales size*NET^2	-9.54E-05	0.4272	Insignificant

Sources: Panel data regressions Eviews 9.0 output

V. CONCLUSION

In conclusion, the working capital investment, which is measured with the Net Trade cycle and its square, has a nonlinear relationship with firm performance in accordance with the ROA and Tobin's Q. Therefore, an increase leads to a rise in firm performance till its optimal point. However, a rise beyond this point, leads to a decrease in firm performance, due to additional costs incurred by the company to maintain and monitor its working capital. Therefore, firms tend to use this research as a reference to pay more attention to their investment in order to anticipate and high performance. In addition, the result has the ability to help investors in considering and reviewing firm performance to avoid bankruptcy and waste of resources.

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