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TRADE-OFF BETWEEN WORKING CAPITAL AND FIXED INVESTMENT UNDER SHARIAH COMPLIANCE AND ISLAMIC ADHERENCE

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ABTRACT

This study investigates whether Shariah (Islamic Law) compliance and Islam adherence influence the relationship between working capital and fixed investment, as well as, whether this relationship further affects firm performance. Using a sample of firms listed on the Indonesia Stock Exchange over the period 2011-2018, we find that the relationship between working capital and fixed investment is linear for Shariah-compliant firms, however, this relationship is non-linear for non-Shariah-compliant firms. In addition, the result also shows that non-Shariah-compliant firms with higher working capital/fixed investment ratio have a better firm performance, however, this effect does not exist for Shariah-compliant firms. Finally, Muslim proportion of city exerts influence on the relationship between working capital/fixed investment ratio and firm performance, but Muslim proportion of province does not have this influence.

INTRODUCTION

Investment in working capital is closely associated with fixed capital investment. Firms need investment in net working capital when undertaking fixed asset investments because the increased revenues need higher accounts receivable and inventory to support and, at the same time, accounts payable increase as well (Ross et al., 2019). This is a complement relationship between working capital and fixed investment. On the other hand, when firms face financial constraints, they may have to lower working capital to support the expansion of fixed capital investment. Therefore, there also exists substitute relationship between working capital and fixed capital investment. A large body of research examines working capital management issues. Banos-Caballero et al. (2010) investigates the determinants of cash conversion cycle (CCC, hereafter) for small- and medium-sized Spanish companies. They document a target CCC length and firms with higher leverage, investment in fixed capital and returns on assets maintain a more aggressive working capital policy. Hill et al. (2010) investigate net working capital behavior based on a sample of US nonfinancial and nonutility firms. They find some factors such as sales growth and internal financing capacity affect working capital policy. They suggest that operating and financing conditions must be taken into consideration in evaluating working capital behavior. In addition, numerous papers study the relationship between working capital management and firm performance. For example, Banos-Caballero et al. (2014) investigates a sample of non-financial UK companies and identify an inverted U-shaped relationship between working capital investment and firm performance, implying an optimal level of working capital and this optimal level is lower for financially constrained firms. Almeida and Eid (2014) use a sample of Brazilian listed companies to analyze the effect of financial leverage on the relationship between working capital and firm value. They document that increasing investment in working capital reduces firm value. Aktas et al. (2015) examines the influence of working capital management based on US firms. They find an optimal level of working capital and firms that approach to optimal level enhance their

stock and operating performance through the channel of corporate investment. Moreover, some other studies focus on the relationship between investment in working capital and fixed capital. For example, Fazzari and Petersen (1993) investigate the effect of financial constraints on fixed investment based on a sample of US manufacturing firms. They find a negative coefficient on working capital investment when it is included in a fixed investment regression, suggesting a substitute relationship between working capital and fixed investment when financial constraints exist. Finally, Ding, Guariglia, and Knight (2013) investigate the links between investment in fixed and working capital and financial constraints using a panel of Chinese firms from 2000 to 2007. They find that firms with low fixed capital and high working capital have the highest fixed investment rates, regardless of highly external financial constraints, suggesting that firms with good working capital management could mitigate the influence of financial constraints on fixed investment.   Overall, working capital management issue is widely explored in previous research, especially on the determinants of working capital and the relationship between working capital and firm performance. Regarding the linkage between working capital and fixed investment, although it was once examined by Fazzari and Petersen (1993) and Ding, Guariglia, and Knight (2013), they focus on the situation when firms face financial constraints. Moreover, neither of them studies this issue based on the capital markets in Islamic countries. This research therefore fills this gap by examining the relationship between fixed and working capital investment using a sample of firms listed on the Indonesia Stock Exchange (IDX, hereafter). In addition, both the firms with and without financial constraints are included in the analysis. This research explores the Indonesia Stock Market due to the following reasons.

First, Indonesia is a large emerging market with high economic growth rate. According to the Asian Development Bank, Indonesia's economy is predicted to grow at 5 percent in 2022 and will rise to 5.2 percent in 2023. Second, in Indonesia Stock Market, there are two types of listed firms – Shariah-compliant firms (SCFs, hereafter) and non-Shariah-compliant firms (NSCFs, hereafter) – SCFs are imposed on some limitations according to the Shariah screening criteria while NSCFs are not. This provides a unique institutional setting for investigating the effect of the Shariah (Islamic law) on capital budgeting and net working capital decisions. Furthermore, financial constraints are a problem for most firms in emerging markets, especially in Indonesia, the ratio of total debt based on interest compared to total assets should not exceed 45% for SCFs. In addition, conceptually and in a broad view, Shariah prefers firms to invest more in productive assets and less in liquid ones. All these limitations may make SCFs more financially constrained and further impact the linkage between fixed and working capital investment. Finally, as abovementioned, Indonesia is a large emerging market. According to Zeidan and Shapir (2017), in emerging markets, the poor working capital management may be prevalent and severely harm the firm value more than previously thought. Therefore, how firms listed in IDX manage the relationship between working capital and fixed investment is an intriguing and important issue.

This study examines whether Shariah (Islamic Law) compliance and Islam adherence influence the relationship between working capital and fixed investment, as well as, whether this relationship further affects firm performance. Using a sample of firms listed on the Indonesia Stock Exchange over the period 2011-2018 and dividing it into SCFs and NSCFs two sub-groups, we find that the relationship between working capital and fixed investment is linear for SCFs, however, this relationship is non-linear for NSCFs. This result suggests that fixed investment increases with working capital for SCFs. For NSCFs, however, fixed investment increases with working capital to some point, beyond that point, fixed investment declines as working capital further increases. It implies that Shariah does exert influence on the relationship between working capital and fixed investment. We further investigate whether the relationship between working capital and fixed investment, represented by working capital/fixed investment ratio, affects firm performance as well as whether Shariah plays a role in this effect. The result shows that for NSCFs higher working capital/fixed investment ratio leads to a better firm performance, however, this effect does not exist for SCFs. Finally, the relationship between working capital/fixed investment and firm performance is linear for firms located in low Muslim proportion province, however, this relationship does not exist in high Muslim proportion province. In contrast, Islam adherence exerts influence on the relationship between

working capital/fixed investment ratio and firm performance.

This study contributes to the literature in the following ways. First, this research extends the work of Fazzari and Petersen (1993) and Ding, Guariglia and Knight (2013) to include both financially and non-financially constrained firms in the analysis. Hopefully, we can shed more light on the linkage between capital and net working capital investment. Second, to the best of our knowledge, no other previous research examines the relationship between fixed and working capital investment taking both the Shariah and Islam adherence into consideration. This study fills this gap. Third, this research extends Banos-Caballero et al. (2014) which finds an optimal level of investment in working capital that maximizes firm value. This research moves a step further and identifies an optimal trade-off between working capital and fixed investment on the left-hand side of the optimal point, the level of working capital increases as fixed investment goes up, which may happen when firms have no financial constraints. Beyond this highest point, working capital investment declines as fixed investment further increases, indicating the situation when firms suffer from financial constraints. Compared with previous research, we consider both financial constraint and non-constraint situations The remainder of this study is organized as follows: Section 2 reviews the literature and develops the hypotheses. Section 3 describes the sample, research models and variables. Section 4 presents the empirical results, and Section 5 concludes.

LITERATURE REVIEW

Working Capital and Fixed Investment

Fazzari and Petersen (1993) propose that changes in working capital should be positively correlated with fixed investment if cash flow represents investment demand. Firms build up working capital as they invest in fixed capital in response to the increased demand. The increased sales resulting from fixed assets expansion leads to higher cash holding, accounts receivable, inventory, and accounts payable. It is called revenue effect, which is driven by increased sales, and this effect is value creating (Zeidan and Shapir, 2017). However, if the investment in working capital is not caused by increased sales, it is called CCC (cash conversion cycle) effect and is value destroying (Zeidan and Shapir, 2017). On the other hand, when firms faced financial constraints, working capital investment competes with fixed investment for funds, as argued by Fazzari and Petersen (1993). In this case, investment in working capital should be negatively related to fixed investment. Investment projects are normally separated and take a long time to finish. It is therefore costly for firms to decrease or stop spending on a project in progress because of a sudden deficit in cash flow or difficult to raise funds from capital markets, due to the relatively higher costs of adjusting fixed investment level than those of changes in working capital investment. In contrast, working capital is reversible. That is, firms can substitute working capital investment for fixed investment to lower adjustment costs and losses when a large short-term negative cash flow shock happens. When necessary, working capital investment even can become negative, providing funds to fixed investment. By doing so, firms can equalize marginal returns on working capital investment and that on fixed investment, after considering adjustment costs. The extent to which for a firm to smooth fixed investment should depend on its initial level of working capital which are related to the marginal opportunity cost of working capital adjustment. The lower marginal returns due to the higher level of working capital increase the willingness for firms to deal with the sudden cash flow reduction by releasing working capital. However, low level of working capital makes it difficult for firms to smooth fixed capital investment. Therefore, a sudden cash flow decline will lead to a major impact on fixed investment. From the above discussion, the relationship between investment in working capital and fixed capital can be inverted-U shape. For non-financially constrained firms, working capital investment rises as fixed capital increases to the top (complement stage), then, beyond the highest point, working capital investment begins to decline as fixed capital further expands (substitute stage). Some intriguing questions thus arise from the relationship between investment in working capital and fixed capital. Is there a best match between working capital and fixed investment which maximizes firm performance? What is the difference of firm performance between the stages of

complement and substitute? What is the change in firm performance along the lines at complement and substitute stages, respectively?

Banos-Calallero et al. (2014) argue that increasing accounts receivable and inventories may improve firm performance. Large inventories can lower supply costs and price fluctuation, allowing better service for their customers and avoid interruption in production process. Providing trade credit, on the other hand, can increase sales due to an effective price reduction; it also mitigates the information asymmetric between sellers and buyers by enabling the latter to verify product and services quality before making payment. Investment in trade credit thus is more profitable than in marketable securities (Banos-Calallero et al., 2014). In addition, firms may be able to get cash discounts by paying accounts payable early. However, investment in working capital can have a negative effect on firm performance. For instance, maintaining a high level of inventory leads to costs of insurance, storehouse as well as financing and opportunity costs. Moreover, high investment in working capital may limit the opportunity of firms to undertake positive NPV projects, thereby hindering firm performance. Banos-Calallero et al. (2014) propose and document an optimal working capital level that trades off the costs and benefits and maximizes firm performance. They argue that in an imperfect world, cost of external capital is higher than that of internal financing due to the capital market friction. Therefore, a firm's investment may rely on the accessibility of internal fund, approach to external capital markets or financing cost (Fazzari et al., 1988). Banos-Calallero et al. (2014) posit that the optimal level of working capital would be lower for firms with more financial constraints because a positive working capital requires financing. Firms maintain a higher level of working capital when they have better internal financing capability and more easily access to capital market (Hill et al., 2010). Ding, Guariglia, and Knight (2013) investigate the relations between investment in fixed and working capital and financial constraints. They find that firms with low fixed capital and high working capital display highest fixed investment rates, suggesting that good management in working capital may mitigate the limitation of financing constraints on fixed investment.

Several previous research documents an optimal working capital level which maximizes firm performance (Banos-Calallero et al., 2014), some other studies further find that efficient working capital management enhances firm performance through the channel of fixed capital investment (Aktas et al., 2015; Almeida and Eid, 2014). This study thus argues that the match between working capital and fixed capital investment is very important. When financial constraints do not exist, both working capital and fixed capital investments rise to pursue growth, thereby enhancing firm performance. However, beyond the optimal point, firms may become financially constrained due to the exhausted funds available. If firms keep pursuing growth, they have to finance the fixed investment by releasing working capital. At this stage, firm performance may become declining due to the overinvestment of fixed capital and the rising costs of working capital. This study thus proposes the following hypotheses:

H1: Investment in working capital has an inverted U-shaped relationship with fixed capital investment.

H2: Firms at the complement stage perform better than those at the substitute stage

Islam Adherence, Shariah-Compliance and the Relationship Between Working Capital and Fixed Capital Investment

Some limitations are imposed on SCFs in the Indonesia Stock Market, they include: (1) The ratio of total debt based on interest compared to total assets should not exceed 45%, and (2) The ratio of total interest income and other non-halal income compared to total operating income and other income is not more than 10% for SCFs. These limitations are frictions that may affect the relationship between working capital and fixed investments. The debt limitation may restrict the access to source of financing for SCFs, thus obstructing the build-up in working capital which can be used to fund fixed investment when necessary. The constraint on income may lower the investment opportunities of SCFs, thereby hindering the

investment in fixed capital. In addition, the Shariah prefers firms to invest more in productive assets and less in liquidity. Shariah screening criteria set by the Dow Jones Islamic index requires SCFs to hold less than 33% of liquid assets which include cash and accounts receivable. This constraint may lower the level of working capital and affect the relationship between working capital and fixed investment since it restricts the extent to which firms can release working capital to fund fixed investment, as documented by Din, Guariglia, and Knight (2013). The results in their study on Chinese firms show that firms with high working capital to cash flow and low fixed capital to cash flow have the highest fixed investment rates, even though when they face highly external financial constraints. According to the above discussion, this study posits that the debt and source of income limitations based on the Shariah screening criteria in Indonesia may cause constraints on financing and operating activities for SCFs. We thus hypothesize:

H3: The highest point on the relationship between working capital and fixed investment for SCFs is lower than that for NSCFs.

Moreover, corporate decisions are also affected by religion. An intriguing issue naturally arises, that is, in Indonesia such a highly religious country, Islam adherence or Shariah compliance, which one is more important in shaping corporate financial decisions generally, and in making working capital and fixed investment decisions in particular in this paper. As abovementioned, SCFs are imposed some limitations according to the Shariah screening criteria and those restrictions may affect financial decisions. However, religiosity could also influence corporate decisions. In their study of US firms, Hilary and Hui (2009) propose that people's characteristics may influence group behavior. People's personal identity is stemmed from social group membership such as the religion and they incorporate and follow the norms, values and attributes of the group they belong to. This influence from the dominant values and behavior of the group has implications for company behavior. A company attracts and recruits people and this brings in a certain kind of people and it is these people who form company behavior (Schneider, 1987; Hilary and Hui, 2009). Holland (1976) documents that the work environment people select is inclined to be similar to the people who choose them. We thus expect that the behavior of a company is in general consistent with the local environment of the firm. Indonesia is a highly Islamic country with more than 87% of the population being Muslims, and the proportion of Muslim varies across province. Companies located in the province with higher proportion of Muslim should employ a higher proportion of Muslims as their employees, especially managers. Consequently, corporate decisions, including working capital and fixed investment decisions, should be highly influenced by the religion of Islam. Hilary and Hui (2009) propose that religious people are risk averse, and firms located in more religious areas are more risk averse than firms located in less religious areas. It is people who make decisions rather than companies and the ways people make decisions are affected by the norms, values and attributes of their group. Firms with more risk aversion should require a higher return on investment due to the higher risk premium. In other words, firms in more religious areas should use a higher hurdle rate in capital budgeting and net working capital decisions. This study thus hypothesizes:

H4: The highest point on the relationship between working capital and fixed investments for firms located in more religious (Islamic) areas is lower than that for firms located in less religious (Islamic) areas.

DATA AND METHODOLOGY

Sample

This research focuses only on Indonesia, which has advantage of obtaining a more homogeneous sample as to financial and economic development, legal structure, public infrastructure, etc. (Hilary and Hui, 2009). The data in this research are from Eikon with Datastream for Office (formerly Datastream), an online database developed by Thomson Financial which provides databases for more than 60 markets and 175 countries worldwide (Imamah, 2019). In addition, the information about financial statements, board

characteristics, ownership structure and industry is collected manually from the annual reports of firms listed on the Indonesia Stock Exchange (IDX). The study period spans 2011-2018 because the Indonesia Shariah Stock Index (ISSI) was launched on May 12, 2011. ISSI is a composite index of Shariah stocks listed on the IDX and its constituents are Islamic stocks that listed on the IDX and included on an Islamic Securities List (DES) issued by the OJK (Ortoritas Jasa Keuangan, an Indonesian government agency and supervises the financial services sector). The insurance, banking, and securities industries are excluded from the sample since the financial structure and investment behavior of the finance related industries are different from other industries. In total, the sample includes 398 listed firms with 3,184 firm-year observations, consisting of 2,223 Shariah-compliant and 961 non-Shariah-compliant observations. To deal with outliers, this study winsorize the data by 1% of the top-and-bottom of all continuous variables.

Research Models

To test Hypothesis 1, this research estimates the following model:

$$\left(\frac{Inv}{TA}\right)_{i,t} = \alpha_0 + \alpha_1\left(\frac{OCF}{TA}\right)_{i,t} + \alpha_2(SHARIAH)_{i,t} + \alpha_3\left(\frac{\Delta WC}{TA}\right)_{i,t} + \alpha_4\left(\frac{\Delta WC}{TA}\right)^2_{i,t} + \alpha_5(TQ)_{i,t-1} + \tag{1}$$
$$\alpha_6(LEV)_{i,t-1} + \alpha_7(ROA)_{i,t-1} + \alpha_8(CG)_{i,t-1} + Firm\ Fixed\ Effects +$$
$$Year Fixed\ Effects + \mu_{i,t}$$

The dependent variable, $\left(\frac{Inv}{TA}\right)_{i,t}$, is firm i's fixed investment divided by total assets at time t. The independent variables include Shariah, which is set to one if the firm has Shariah stock and zero otherwise; $\left(\frac{\Delta wc}{TA}\right)_{i,t}$, investment in working capital divided by total assets. In addition, the square of $\left(\frac{\Delta wc}{TA}\right)_{i,t}$ is included and if its coefficient (α_4) is positive and significant, H1 will be supported. Following previous research (Fazzari and Petersen, 1993; Nur Imamah, et al., 2019), this study includes the control variables of cash flow (OCF, operating cash flow / total assets), TQ (Tobin's Q, the sum of market value of equity and book value of total debt divided by book value of total assets), LEV (financial leverage, total debt /total assets), ROA (return on assets, net income / total assets), CG (corporate governance, including board characteristics, ownership structure), firm fixed effects and year fixed effects. $\mu_{i,t}$ is error term, which is uncorrelated with any information known at time t. Control variables are all divided by total assets to avoid the size effect and lagged by one year to mitigate the endogeneity problem.

This research tries to identify the inflection point (the highest point) for the relationship between working capital and fixed investment in equation (1). The sample then is divided into complement stage (left hand side) and substitute stage (right hand side) and the performance difference between these two groups is further investigated to test if hypothesis 2 is supported. Moreover, the sample will be separated into SCFs and NSCFs two groups and the analysis of equation (1) is conducted again to test Hypothesis 3. Then, SCFs and NSCFs each is divided into complement stage (left hand side) and substitute stage (right hand side) and the performance difference between these two groups is analyzed to test hypothesis 2 again to see whether hypothesis 2 is supported or not. Finally, the sample is also separated into high- and low-religious (Islamic) areas to test if hypotheses 2 and 3 are supported.

Furthermore, this research applies model (2) to test hypotheses 5 and 6:

$$(PERFORMANCE)_{i,t} = \beta_0 + \beta_1(SHARIAH)_{i,t} + \beta_2(MUSLIM)_{i,t} +$$
$$\beta_3\left(\frac{Inv}{\Delta WC}\right)_{i,t} + \beta_4(SHARIAH)_{i,t}\left(\frac{Inv}{\Delta WC}\right)_{i,t} + \beta_5(SIZE)_{i,t-1} + \beta_6(LEV)_{i,t-1} + \beta_7(GROWTH)_{i,t-1} +$$
$$\beta_8(CG)_{i,t-1} + Firm\ fixed\ effects + Year\ fixed\ effects + \varepsilon_{i,t} \tag{2}$$

The dependent variable, PERFORMANCE $_{i,t}$, is firm i's performance at time t. This research uses ROA (return on assets, net income / total assets) and ROE (return on equity, net income / total equity) to proxy for firm performance. The independent variables include SHARIAH $_{i,t}$, (Shariah, which is set to one if the firm has Shariah stock and zero otherwise), MUSLIM (the ratio of Muslims to the population of the province where a firm is located), $\left(\frac{Inv}{\Delta WC}\right)_{i,t}$ (the relationship between fixed capital investment and working capital investment, fixed investment divided by working capital investment) and several control variables. Based on previous research (Fazzari and Petersen, 1993; Nur Imamah, et al., 2019) this study includes OCF (operating cash flow / total assets), SIZE (firm size, Ln (total assets)), LEV (financial leverage, total debt /total assets), GROWTH (sales growth, $\left(\frac{Sales_1}{Sales_0}-1\right)$), CG (corporate governance, including board characteristics and ownership structure), firm fixed effects and year fixed effects. $\varepsilon_{i,t}$, is error term, which is uncorrelated with any information known at time t.

RESULTS AND DISCUSSION

Descriptive Statistics

Table 1 reports the descriptive statistics for the variables. The mean values (median values) are 0.042 (0.003) and 0.046 (0.009) for fixed and working capital investments, respectively. The mean value (median value) of debt ratio is 0.62 (0.485), and they are 0.05 (0.034) and 0.201 (0.068) for ROA and ROE, respectively. The descriptive statistics show a wide range for some variables, we therefore winsorize the financial variables at the 1% level to mitigate the effect of outliers when performing regression analysis. Table 2 presents a correlation analysis of the variables used in this study. As can be seen from the table, Fixed investment is significant and positively associated with working capital investment, supporting the traditional view that firms need investment in working capital when undertaking fixed assets investment. In addition, some variables such as OCF and LEV, as well as ROA have high correlation with each other.

We will deal with this possible multicollinearity issue in the regression analysis. Table 3 presents the difference of main variables used in this study between SCFs and NSCFs. As can be seen from the table, the financial leverage (LEV) of SCFs is on average significantly lower than NSCFs, consistent with the debt limitation imposed on SCFs. In addition, compared with NSCFs, SCFs bring in higher operating cash flow (OCF) and are more profitable (higher ROA and ROE). Finally, SCFs have bigger board size and higher ownership by institutional investors, government and insiders. These results imply that for firms following Islamic Law (Shariah) do show different characteristics in some important financial and corporate governance variables.

Table 1: Descriptive Statistics (ISSI)

Variables	Obs.	Minimum	Maximum	Mean	Median	Standard Deviation
INV	3451	-11.856	29.772	0.042	0.003	0.868
WC	3433	-11.907	31.402	0.046	0.009	0.847
OCF	3451	-29.08	68.577	0.078	0.047	1.42
TQ	3453	0.025	1984.616	2.375	1.087	33.891
LEV	3452	-0.049	89.841	0.622	0.485	1.845
ROA	3452	-10.589	55.007	0.05	0.034	0.293
ROE	3461	-160.712	161.755	0.201	0.068	4.957
SIZE	3453	7.69	19.646	14.55	14.552	1.686
GRO	3378	-16.945	6051.089	2.306	0.092	107.74
BS	3419	0.693	3.367	2.13	2.079	0.354
BI	3418	0	2	0.24	0.238	0.118
INST	3583	0	4.824	0.602	0.661	0.312
GOV	3583	0	0.900	0.027	0	0.131
INSI	3583	0	1	0.028	0	0.105
EXT	3583	0	1	0.023	0	0.082

This table reports the summary statistics for the variables. INV is firms' fixed investment divided by total assets. WC is investment in working capital divided by total assets. OCF is operating cash flow divided by total assets. TQ is the sum of market value of equity and book value of total debt divided by book value of total assets. LEV is total debt divided by total assets. ROA is net income divided by total assets. ROE is total equity divided by total equity. SIZE is Ln (total assets). GRO is (Sales1/Sales0)-1. BS is the number of directors on the boards. BI is the percentage of independent directors on the board. INST is the percentage of the shares owned by institutional investors. GOV is the percentage of the shares owned by the government. INSI is the percentage of the shares owned Insiders. EXT is the percentage of the shares owned by external shareholders.

Table 2: Pearson Correlation Matrix for the Variables

	INV	SHA	WC	OCF	TQ	LEV	ROA	SIZE	BS	BI	INST	GOV	INSI	EXT	GRO
INV	1														
SHA	0.025	1													
WC	0.773 ***	0.022	1												
OCF	0.316 ***	0.029 *	0.097 ***	1											
TQ	0.078 ***	0.004	-0.002	0.87 ***	1										
LEV	0.084 ***	-0.112 ***	0.014	0.705 ***	0.852 ***	1									
ROA	0.071 ***	0.035	-0.001	0.879 ***	0.981 ***	0.783 ***	1								
SIZE	-0.074 ***	-0.023	-0.057 ***	-0.023	-0.044 **	-0.107 ***	-0.013	1							
BS	-0.003	0.074 ***	-0.007	0.053 ***	0.027	-0.018	0.057 ***	0.631 ***	1						
BI	-0.012	-0.01	0.002	-0.055 ***	-0.03 *	-0.028	-0.192 ***	-0.007		1					
INST	0.012	-0.006	0.004	0.024	0.015	0.027	0.015	-0.145 ***	-0.039 **	0.028	1				
GOV	-0.005	0.049 ***	-0.007	-0.001	-0.002	-0.012	0.003	0.222 ***	0.175 ***	-0.12 ***	-0.425 ***	1			
INSI	-0.005	0.024	-0.008	-0.005	-0.009	-0.033 *	-0.007	-0.084 ***	-0.076 ***	0.035 **	-0.313 ***	-0.054 ***	1		
EXT	-0.004	-0.017	0.019	-0.020	-0.006	-0.013	-0.008	-0.157 ***	-0.064 ***	0.011	-0.24 ***	-0.057 ***	0.063 ***	1	
GRO	-0.005	0.009	-0.003	-0.003	-0.001	-0.005	-0.001	0.009	-0.010	0.006	-0.037 **	-0.004	0.006	0.058 ***	1

*This table reports the Person correlation matrix for the variables. INV is firms' fixed investment divided by total assets. WC is investment in working capital divided by total assets. OCF is operating cash flow divided by total assets. TQ is the sum of market value of equity and book value of total debt divided by book value of total assets. LEV is total debt divided by total assets. ROA is net income divided by total assets. ROE is total equity divided by total equity. SIZE is Ln (total assets). GRO is (Sales1/Sales0)-1. BS is the number of directors on the boards. BI is the percentage of independent directors on the board. INST is the percentage of the shares owned by institutional investors. GOV is the percentage of the shares owned by the government. INSI is the percentage of the shares owned Insiders. EXT is the percentage of the shares owned by external shareholders. * Significance at the 10% level. ** Significance at the 5% level. *** Significance at the 1% level.*

Table 3: The Value Difference of Variables between Shariah and Non-Shariah Firms

Variable	Mean			Median			Differences	
	All	SCFs	NSCFs	All	SCFs	NSCFs	T-Test	Mann-Whitney Z
INV	0.042	0.044	0.038	0.003	0.003	0.001	-0.172	1.841*
WC	0.045	0.043	0.051	0.009	0.009	0.009	0.256	0.372
OCF	0.077	0.108	0.001	0.047	0.054	0.029	-1.987**	6.683***
TQ	2.374	2.484	2.09	1.055	1.087	1.101	-0.306	0.263
LEV	0.621	0.492	0.953	0.485	0.433	0.662	6.632***	23.045***
ROA	0.05	0.07	-0.002	0.034	0.042	0.0172	-1.955*	11.284***
ROE	0.2	0.23	0.124	0.067	0.092	0.026	-0.576	13.697***
SIZE	14.550	14.554	14.54	14.554	14.555	14.55	-0.22	0.233
GRO	2.306	2.941	0.589	0.092	0.094	0.085	-0.58	1.994**
BS	2.130	2.15	2.076	2.079	2.079	2.079	-5.36***	4.763***
BI	0.24	0.24	0.24	0.235	0.231	0.25	0.25	1.322
INST	0.602	0.626	0.545	0.661	0.673	0.595	-7.144***	6.588***
GOV	0.027	0.032	0.015	0	0	0	-3.696***	3.59***
INSI	0.028	0.03	0.023	0	0	0	-2.07**	2.231**
EXT	0.023	0.023	0.023	0	0	0	-0.06	0.318

This table reports the value difference of the variables between Shariah and nob-Shariah firms. INV is firms' fixed investment divided by total assets. WC is investment in working capital divided by total assets. OCF is operating cash flow divided by total assets. TQ is the sum of market value of equity and book value of total debt divided by book value of total assets. LEV is total debt divided by total assets. ROA is net income divided by total assets. ROE is total equity divided by total equity. SIZE is Ln (total assets). GRO is (Sales1/Sales0)-1. BS is the number of directors on the boards. BI is the percentage of independent directors on the board. INST is the percentage of the shares owned by institutional investors. GOV is the percentage of the shares owned by the government. INSI is the percentage of the shares owned Insiders. EXT is the percentage of the shares owned by external shareholders. * Significance at the 10% level. ** Significance at the 5% level. *** Significance at the 1% level.

The Relationship between Working Capital and Fixed Investments

Table 4 reports the results of multivariate regressions on the relationship between working capital and fixed asset investment. Column 1 includes working capital investment (WC) as the main independent variable; Column 2 adds the squared working capital investment (WC2) into the regression, Column 3 includes Shariah and, finally, Column 4 adds the interaction items between Shariah and working capital investment as well as Shariah and the squared working capital investment. As can be seen from Column I, the coefficient on WC is significant at the 1% level and in Column 2, the coefficient on WC is significant, however, that on WC2 is not significant at traditional levels. These results suggest that working capital investment is positively associated with fixed investment and the relationship is linear when Shariah is not included. Columns 3 and 4 take Shariah into consideration. As can be seen in Column 3, the coefficient on Shariah is significant at the 5% level, indicating that SCFs invest more in fixed assets than NSCFs. In addition, the coefficient on WC (working capital investment) is significant and positive, but that on WC2 (squared working capital investment) is not significant. Finally, Column 4 shows that the coefficients on WC and WC2 are both significant at the 1% level, the sign of the former is positive, but it is negative for the latter. Regarding the interaction items, the coefficient on Shariah*WC is not significant but that on Shariah*WC2 is positive and significant at the 1% level. The results suggest that the relationship between working capital and fixed investment is non-linear for NSCFs, but it is linear for SCFs. It implies that for Shariah-compliant firms, fixed investment increases with working capital investment, however, for non-Shariah-compliant firms, in the beginning fixed investment increases with working capital investment to some point, beyond that point, fixed investment decreases as working capital investment increases. Hypothesis 1 is supported for NSCFs, but it is not for SCFs. Furthermore, Hypothesis 3 that the highest point on the relationship between working capital and fixed investment

Table 4: Multivariate Regression of the Effect of Working Capital on Fixed Investment

Dummy Variable: Shariah (ISSI)				
Dependent Variable: INV				
	1	**2**	**3**	**4**
C	-0.178*** (0.061)	-0.18*** (0.056)	-0.199*** (0.056)	-0.104 (0.09)
SHARIAH_ISSI			0.041* (0.024)	0.006 (0.01)
OCF	0.398* (0.207)	0.402** (0.205)	0.402* (0.205)	0.42** (0.199)
WC	0.859*** (0.08)	0.821*** (0.18)	0.822*** (0.18)	0.529*** (0.113)
WC2		0.001 (0.006)	0.001 (0.006)	-0.085*** (0.014)
SHARIAH_ISSI*WC				0.209(0.174)
SHARIAH_ISSI*WC2				0.091***(0.007)
Control variables	YES	YES	YES	YES
Firm	YES	YES	YES	YES
Year	YES	YES	YES	YES
R^2	0.847	0.847	0.848	0.918
Adj R^2	0.777	0.777	0.777	0.853
F-statistics	28.773***	28.732***	28.703***	46.928***
N	3,322	3,322	3,322	3,322

*This table reports regression results of the effect of working capital on fixed investment. SHARIAH_ISSI is a dummy variable that sets one if the firm is included in the Indonesia Shariah Stock Index, or zero otherwise. WC is investment in working capital divided by total assets. WC2 is the squared term of the investment in working capital divided by total assets. OCF is operating cash flow divided by total assets. Control variables include: INV is firms' fixed investment divided by total assets. TQ is the sum of market value of equity and book value of total debt divided by book value of total assets. LEV is total debt divided by total assets. ROA is net income divided by total assets. ROE is total equity divided by total equity. SIZE is Ln (total assets). GRO is (Sales1/Sales0)-1. BS is the number of directors on the boards. BI is the percentage of independent directors on the board. INST is the percentage of the shares owned by institutional investors. GOV is the percentage of the shares owned by the government. INSI is the percentage of the shares owned Insiders. EXT is the percentage of the shares owned by external shareholders. * Significance at the 10% level. ** Significance at the 5% level. *** Significance at the 1% level.*

The Relationship between Working Capital/Fixed Investment Ratio and Performance

Table 5 reports the results for the regression of the impact of working capital/fixed investment ratio on firm performance represented by ROA (return on assets). Working capital/fixed investment ratio is included in regression 1 in addition to control variables, as shown in Column 1. The squared term of working capital/fixed investment ratio is also added regression 2 to determine whether the relationship between working capital/fixed investment ratio and firm performance is non-linear. Finally, in Column 3, the interaction between Shariah and working capital/fixed investment as well as the interaction between Shariah and the squared term of working capital/fixed investment are also included to determine whether the relationship of Shariah-compliant firms is different from that of non-Shariah-compliant firms or not. As can be seen from Table 5, the coefficient on working capital/fixed investment (WCINV) is significant only in regression 1, suggesting that higher working capital/fixed investment ratio leads to better performance and Shariah does not exert influence on the effect of working capital/fixed investment on firm performance. This is not consistent with our hypothesis 6 that the relationship between fixed and working capital investment is the channel through which Shariah compliance affects firm performance. Finally, Hypothesis 2 that firms at the complement stage perform better than those at the substitute stage is not supported as well.

Table 5: Multivariate Regression of the Effect of Working Capital/Fixed Investment on ROA

Dummy Variable: Shariah (ISSI)			
Dependent Variable: Performance (ROA)			
	1	2	3
C	-4.782*** (0.967)	-4.781*** (0.966)	-4.782*** (0.969)
WCINV	0.000** (0.000)	0.000 (0.000)	0.000 (0.000)
WCINV2		0 (0)	0 (0)
WCINV*SHARIAH			0.000 (0.000)
WCINV2*SHARIAH			0 (0)
Control variables	YES	YES	YES
Firm	YES	YES	YES
Year	YES	YES	YES
R^2	0.844	0.844	0.844
Adj R^2	0.778	0.778	0.778
F-statistics	27.993***	27.916***	27.765***
N	3,179	3,179	3,179

*This table reports the regression results of the effect of working capital/fixed investment on ROA. WCINV is investment in working capital divided by fixed investment. WCINV2 is the squared term of the investment in working capital divided by fixed investment. SHARIAH is a dummy variable that sets one if the firm is included in the Indonesia Shariah Stock Index, or zero otherwise. Control variables include: INV is firms' fixed investment divided by total assets. TQ is the sum of market value of equity and book value of total debt divided by book value of total assets. LEV is total debt divided by total assets. ROA is net income divided by total assets. ROE is total equity divided by total equity. SIZE is Ln (total assets). GRO is (Sales1/Sales0)-1. BS is the number of directors on the boards. BI is the percentage of independent directors on the board. INST is the percentage of the shares owned by institutional investors. GOV is the percentage of the shares owned by the government. INSI is the percentage of the shares owned Insiders. EXT is the percentage of the shares owned by external shareholders. * Significance at the 10% level. ** Significance at the 5% level. *** Significance at the 1% level.*

The Effect of Islam Adheres on Firm Performance

Table 6 presents the results of the influence of Islam adherence on firm performance. In Column 1, we include the interaction between Muslim proportion of province and working capital/fixed investment as well as the interaction between Muslim proportion of province and the squared working capital/fixed investment in the regression, in addition to working capital/fixed investment and its squared term and control variables. In Column 2, the Muslim proportion of province is replaced by the Muslim proportion of city, and we run regression in the same way again. As can be seen in Column 1, the coefficient on working capital/fixed investment is positive and significant at the 10% level, however, the interaction between Muslim proportion of province and working capital/fixed investment is negative and significant at the 10% level. Both the coefficients on squared working capital/fixed investment as well as the interaction between Muslim proportion of province and the squared working capital/fixed investment are not significant, suggesting that firm performance improves as the working capital/fixed investment increases for firms located in low Muslim proportion province and the relationship between working capital/fixed investment is linear rather than non-linear for non-Shariah-compliant firms. In addition, for Shariah-compliant firms, both working capital/fixed investment and its squared term do not exert influence on firm performance, implying that working capital/fixed investment does not influence firm performance in high Muslim proportion province. Furthermore, in Column 2, with the Islam adherence being represented by the Muslim proportion of city, the results show that in high Muslim proportion city, the relationship between working capital/fixed investment and firm performance is quadratic, that is, in the beginning, firm performance improves as working capital/fixed investment increases to some pint, beyond that point, firm performance turns lower with working capital/fixed investment. In contrast, in low Muslim proportion city, the relationship does not exist either linear or quadratic. Hypotheses 5 and 6 are thus supported partially.

Table 6: Multivariate Regression of the Effect of Islam Adherence on the Relationship Between Working Capital/Fixed Investment and ROA

	1	2
C	-4.85*** (0.961)	-0.038 (0.136)
WCINV	0.004* (0.002)	0.000 (0.000)
WCINV2	-0.000 (0.000)	0.000 (0.000)
WCINV*MUSLIM_PROP_PROV_DUM	-0.004* (0.002)	
WCINV2*MUSLIM_PROP_PROV_DUM	0.000 (0.000)	
WCINV*MUSLIM_PROP_CITY_DUM		0.000*** (0.000)
WCINV2*MUSLIM_PROP_CITY_DUM		-0.000*** (0.000)
Control variables	YES	YES
Firm	YES	YES
Year	YES	YES
R^2	0.843	0.488
Adj R^2	0.778	0.418
F-statistics	27.877***	5.774***
N	3,161	2,667

*This table reports the regression results of the effect of Islam adherence on the relationship between working capital/fixed investment and ROA. WCINV is investment in working capital divided by fixed investment. WCINV2 is the squared term of the investment in working capital divided by fixed investment. MUSLIM_PROP_PROV_DUM is a dummy variable that sets one if the firm is in the high Muslim proportion province, or zero otherwise. MUSLIM_PROP_CITY_DUM is a dummy variable that sets one if the firm is in the high Muslim proportion city, or zero otherwise. Control variables include: INV is firms' fixed investment divided by total assets. TQ is the sum of market value of equity and book value of total debt divided by book value of total assets. LEV is total debt divided by total assets. ROA is net income divided by total assets. ROE is total equity divided by total equity. SIZE is Ln (total assets). GRO is (Sales1/Sales0)-1. BS is the number of directors on the boards. BI is the percentage of independent directors on the board. INST is the percentage of the shares owned by institutional investors. GOV is the percentage of the shares owned by the government. INSI is the percentage of the shares owned Insiders. EXT is the percentage of the shares owned by external shareholders. The definitions of the variables are as presented in Table1. * Significance at the 10% level. ** Significance at the 5% level. *** Significance at the 1% level.*

CONCLUDING COMMENTS

This study examines whether Shariah (Islamic Law) compliance and Islam adherence influence the relationship between working capital and fixed investment, as well as, whether this relationship further affects firm performance. Using a sample of firms listed on the Indonesia Stock Exchange over the period 2011-2018 and dividing it into Shariah-compliant firms (SCFs) and non-Shariah-compliant firms (NSCFs) two sub-groups, we find that the relationship between working capital and fixed investment is linear for SCFs, however, this relationship is non-linear for NSCFs. This result suggests that fixed investment increases with working capital for SCFs. For NSCFs, however, fixed investment increases with working capital to some point, beyond that point, fixed investment declines as working capital further increases. It implies that Shariah does exert influence on the relationship between working capital and fixed investment. We go a step further to investigate whether the relationship between working capital and fixed investment, represented by working capital/fixed investment ratio, affects firm performance as well as whether Shariah plays a role in this effect. The result shows that for NSCFs higher working capital/fixed investment leads to a better firm performance, however, this effect does not exist for SCFs.

Finally, the sample is divided into two sub-groups, based on the Muslim proportion of the population in a province and in a city, respectively. In which, the proportion higher than proportion median set as High group, otherwise Low group. The results indicate that the relationship between working capital/fixed investment and firm performance is linear for firms located in low Muslim proportion province, however, this relationship does not exist in high Muslim proportion province. In contrast, Islam adherence exerts influence on the relationship between working capital/fixed investment and firm performance, as evidenced by quadratic relationship that in the beginning firm's performance increases to some point, after that, firm performance declines as working capital/fixed investment goes up. Overall, the results of this study

suggest that Shariah exerts influence on the relationship between working capital and fixed investment, and in turn, affect the relationship between working capital/fixed investment. Finally, Islam adherence, represented by Muslim proportion of population also may affect the relationship between working capital/fixed investment and firm performance.

For non-Shariah-compliant firms, managers should keep their eyes on firms' liquidity to prevent default risks; while for Shariah-compliant firms, managers should make the best use of working capital to transfer into fixed investment to reach the firm value maximization. For policymakers, they should facilitate a sound short-term financing environment to increase firms' liquidity. Future research can extend our findings to figure out whether the relationship between working capital and fixed investment can also be moderated by corporate governance and whether there is a substitute effect between corporate governance and Shariah laws on the relationship between working capital and fixed investment.

REFEREENCES

Aktas, N., E. Croci, and D. Petmezas (2015) "Is working capital management value-enhancing? Evidence from firm performance and investments," *Journal of Corporate Finance*, vol. 30, p. 98-113.

Almeida, J.R.D, and Jr. W. Eid (2014) "Access to finance, working capital management and company value: Evidence from Brazilian companies listed on BM&FBOVESPA," *Journal of Business Research,* vol. 67, p. 924-934.

Banos-Caballero, S., P.J. Garcia-Teruel and P. Martinez-Solano (2010) "Working capital management in SMEs," *Accounting and Finance,* vol. 50, p. 511-527.

Banos-Caballero, S., P.J. Garcia-Teruel and P. Martinez-Solano (2014) "Working capital management, corporate performance, and financial constraints," *Journal of Business Research*, vol. 67, p. 332-338.

Fazzari, S., G. Hubbard and B. Petersen (1988) "Financing constraints and corporate investment," *Brookings Paper on Economic Activity*, vol. 19, p. 141-195.

Fazzari, S.M. and B.C. Petersen (1993) "Working capital and fixed investment: new evidence on financing constraints," *Journal of Economics*, vol. 24, p. 328-342.

Ding, S., A. Guariglia and J. Kinght (2013) "Investment and financing constraints in China: Does working capital management make a difference?" *Journal of Banking & Finance*, vol. 37, p. 1490-1507.

Hilary, G. and K.W. Hui (2009) "Does religion matter in corporate decision making in America?" *Journal of Financial Economics*, vol. 93, p. 455-473.

Hill, M.D., G.W. Kelly and M.J. Highfield (2010) "Net operating capital behavior: A first look," *Financial Management*, Summer, 783-805.

Holland, J. (1976) "Vocational preferences." In: Dunnette, M. (Ed.), Handbook of Industrial and Organizational Psychology. Rand McNally, Chicago, 521-570.

Nur Imamah, T.J. Lin, Suhadak, S.R. Handayani and J.H. Hung (2019) "Islamic law, corporate governance, growth opportunities and dividend policy in Indonesia stock market" *Pacific-Basin Finance Journal*, vol. 55, p. 110-126.

Ross, S.A., R.W. Westerfield, J. Jaffe and B.D. Jordan (2019) Corporate Finance 12[th]Edition, McGraw

Hill.

Schneider, B. (1987) "The people make the place," *Personnel Psychology*, vol. 40, p. 437-453.

Wu, W., O.M. Rui and C. Wu (2012) "Trade credit, cash holdings, and financial deepening: Evidence from a transitional economy," *Journal of Banking & Finance*, vol. 36, p. 2868-2883.

Zeidan, R. and O.M. Shapir (2017) "Cash conversion cycle and value-enhancing operations: Theory and evidence for a free lunch," *Journal of Corporate Finance,* vol. 45, p. 203-219.

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