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AGGREGATE AND DISAGGREGATE MEASURES OF OPERATING AND NON-OPERATING WORKING CAPITAL INFLUENCE ON FIRM PERFORMANCE: EVIDENCE FROM MALAYSIA

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ABSTRACT

The study is aimed at investigating the following issues: firstly, whether the different types of working capital, namely operating and non-operating working capital influence the short-term (return on assets) and long-term (Tobin's Q) firm performance differently, and secondly whether the different measures of operating working capital, namely disaggregated and aggregated (cash conversion cycle) operating working capital, influence the short-term (return on assets) and long-term (Tobin's Q) firm performance differently. It uses the panel data of 208 listed non-financial firms in Malaysia covering the period from 2013 to 2017, and the data has been sourced from Datastream. It employs the panel corrected standard errors regression model. The study has found that quicker sale of inventory increased

both the short-term and long-term performance of the firm. Likewise, faster collection of receivables increased the long-term, but not short-term, performance. However, prompter payment of payables increased both the short-term and long-term performance. The study has also found that the disaggregated working capital measures – inventory, receivables, and payables contributed to a more nuanced influence of working capital on performance, compared to the aggregated working capital. The study has provided novel evidence that– higher non-operating working capital increased firm performance.

Keywords: Working capital, short-term firm performance, long-term firm performance, PCSE regression, Malaysian firms.

JEL Classification: G3.

INTRODUCTION

The literature on corporate finance has given a greater emphasis and focus on long-term financial decisions. However, the short-term resources (i.e., current assets) and short-term obligations (i.e., current liabilities) are also important components of total assets, and it is vital too that they be given due scrutiny. The management of current assets and current liabilities is known as working capital management. The size of current assets and current liabilities varies from firm to firm. Expansion of a firm's operations could induce an increase in working capital investment (Padachi, 2006). Additional investment in the working capital is expected to have positive effects for the firms with low working capital levels, however, it may also have adverse effects and lead to the loss of shareholder value for firms with already high working capital levels.

Working capital management has always been important to the liquidity and profitability of businesses (Deloof, 2003). A conservative working capital policy would try to minimize financial distress by maintaining more than sufficient working capital investment, whereas an aggressive working capital policy would try to maximize profitability by retaining only the minimum working capital investment (Kieschnick et al., 2013). Conservative management of inventory would entail reducing the ordering cost, as well as eliminating the risk of stock-outs and cost of forgoing purchase discounts (Corsten & Gruen, 2004). Allowing the customers to pay late might increase

sales and improve customer relationship (Summers & Wilson, 2003), although it might also increase the risk of bad debts. However, aggressive inventory management would involve reducing holdings costs and the risk of obsolescence. A longer payable period might help to improve short-term liquidity, but simultaneously, it might also endanger the relationship with suppliers.

Working capital management has remained a problem for many manufacturing firms across the globe. However, the Malaysian economy showed strong signs of recovery in 2010 from the global economic crisis (Watanabe et al., 2013)2013. Because of the increased competition to enhance performance among firms in developing nations, challenges for Malaysian firms are increasing. A market research report by the PwC (2018) on the state of working capital investment of listed Malaysian firms across 14 sectors comprising 424 firms, revealed that up to RM 110 billion cash was tied up in their working capital. This implied that some of this could be released by improving the working capital performance.

Generally, studies such as those by Mohamad and Saad (2010), Ng et al. (2017), Zariyawati et al. (2017), Alarussi and Alhaderi (2018), Al-Mawsheki et al. (2019) and Sim et al. (2019) have investigated the effect of working capital management on the profitability of Malaysian firms. However, this present study differs from the aforementioned studies in several aspects. First, it has divided working capital into two primary groups – operating and non-operating working capital management. Operating working capital includes current asset and current liability accounts that change spontaneously with the firm's operating scale. These accounts include inventory, receivables, and payables. Non-operating working capital includes current asset and liability accounts that do not change spontaneously with the firm's operating scale, such as loans receivable, idle equipment, unused land or outdated machinery. These should include all other current asset and liability accounts (Le, 2019). As the two groups of working capital are of different natures, and more importantly, their influence on firm performance might be different, they are measured separately. The measure of non-operating working capital used is other net working capital (ONWC), derived by taking the sum of all non-operating current assets and then deducting from it the sum of all non-operating current liabilities (expressed as a percentage of total assets).

Second, this present study has further conceived using two alternative measures of operating working capital – disaggregate and aggregate

– separately. Three disaggregate measures of operating working capital are used in the present study, each of which was derived using each of the three operating working capital component accounts, i.e., inventory, receivables, and payables (Zariyawati et al., 2017). The measures for these three operating working capital components are inventory conversion period (ICP), average collection period (ACP), and average payment period (APP), respectively. As an alternative, the study has also used the aggregate measure of operating working capital, which is the cash conversion cycle (CCC), and this is measured as the summation of ICP and ACP minus APP (Vural et al., 2012). The use of these disaggregate and aggregate measures of operating working capital has allowed the study to examine which of the two measures could explain firm performance better. Third, the study has also used the following two measures of firm performance, return on asset (ROA) and Tobin's Q (TQ). In this context, ROA is a short-term accounting-based measure, whereas TQ is a market-based, and arguably, a long-term measure of a firm's performance (Masadeh et al., 2015; Smirlock et al., 1984).

Although accounting-based data has been useful in capturing firm performance (Giner & Reverte, 2006), investors and economists have been more concerned with market-based performance measure (Ullmann, 1985; Woo et al., 1992). Market-based measure reflect the market (investors') perception of the expected future performance of the firms (Dubofsky & Varadarajan, 1987; Wisner & Eakins, 1994), and is less influenced by company-specific financial reporting rules and managerial manipulation (McGuire et al., 1988). In an attempt to resolve these issues, various studies have found TQ to be a more accurate measure of firm performance, compared to the use of the accounting-based firm performance measures (Wolfe & Sauaia, 2005). According to Barney (2007), TQ has various advantages over the accounting-based firm performance measures since TQ does not rely only on profits, which are framed by accounting rules. Moreover, TQ, it has been argued, is seen as a long-term firm performance measure (Dwivedi & Jain, 2005) and is based on current information that reflects the present value of future cash flows (Ganguli & Agrawal, 2009; Wahla & Hussain, 2012). A TQ value higher than 1 would mean that the firm has created more value by using invested resources (Li et al., 2004), has better investment opportunities (Lang et al., 1989), and has a higher growth potential (Brainard & Tobin, 1968). While the value lower than 1 indicates that the firm's market value is less than the book value of the assets, which means that the market value

of the firm's assets, based on investors' assessment, is less than the investment made (at cost) in the firm's assets.

Even though the data of accounting return has been criticized as not sufficiently representing genuine economic value, not the least, because of its possibility of being manipulated by managers (Johnson & Kaplan, 1987), it has still been widely accepted and applied in many contexts (Maines & Wahlen, 2006) by various users in decision making (Giner & Reverte, 1999; Truica & Trandafir, 2009). Therefore, this present study has used both the accounting-based and market-based measures of firm performance and has defined them as short-term performance (ROA) and long-term performance (TQ) respectively (Dwivedi & Jain, 2005; Rafindadi & Bello, 2019). The rest of the article has been organized into five sections as follows: Section 2 provides a brief review of previous studies. Section 3 describes the data source and the research methodology. In Section 4, the results of analysis are discussed. Finally, Section 5 provides the conclusion.

LITERATURE REVIEW

There is a growing body of literature analyzing the working capital management and firm performance relationship in different countries, for example studies like Vătavu (2014) in Romania; Adekola et al. (2017) in Nigeria; Adam et al. (2017) in Ghana; Tahir and Anuar (2015) in Pakistan; Afrifa and Padachi (2016) in the UK; and Bhatia and Srivastava (2016) in India. The findings of these studies highlighted a number of variables that have had a significant impact on a firm's performance. The prevalent variables used to explain firm performance were namely, inventory conversion period, average collection period, average payment period, cash conversion cycle, liquidity, firm size, leverage, and sales growth. However, the findings of these studies were rather divergent, primarily due to the underlying differences in the period of study, performance measures used, and the use of different sets of firm-specific and country-specific explanatory factors.

Afza and Adnan (2007) investigated the relationship between aggressive and conservative working capital policies and their relationship with firm performance for 17 industrial groups within a sample of 263 firms listed on the Karachi Stock Exchange for the period 1998-2003. The negative relationship between aggressive working capital financing

and investment policies and firm performance suggested that firms yielded lower performance when they had followed aggressive working capital financing and investment policies. Abuzayed (2012) investigated the relationship between working capital management and firm profitability for 52 firms listed on the Amman Stock Exchange from 2000 to 2008. Results of the study found that gross profit was positively correlated with cash conversion cycle and average collection period, but negatively correlated with inventory conversion period. Bhatia and Srivastava (2016) conducted a study on 179 non-financial firms listed on the Bombay Stock Exchange and determined that by decreasing the cash conversion cycle days, average inventory days, and average receivable period, and by increasing the average payment period, firms can increase profitability.

Zhang et al. (2017) conducted a study on 140 SMEs listed on the London Stock Exchange between 2008 and 2016. Findings revealed that longer cash conversion cycle, longer average payment period, longer average receivable period, and longer average inventory days increased firm profitability. In another study on Indonesian firms, Kusuma and Bachtiar (2018) reported that shorter cash conversion cycle, higher inventory turnover, and shorter average payment period increased firm performance.

Compared to the numerous studies mentioned above on working capital and firm performance in developed and other developing countries, there have been relatively, few studies carried out in Malaysia. For example, Mohamad and Saad (2010) examined the influence of working capital management on profitability for 172 firms listed on Bursa Malaysia from 2003 to 2007. Their study employed TQ, return on invested capital and ROA as the proxies for firm profitability. Correlation and multiple regression analyses indicated that working capital measures, namely cash conversion cycle, current asset to current liabilities ratio, current asset to total asset ratio, current liabilities to total asset ratio, and total debt to total asset ratio significantly influenced the three measures of profitability.

Zariyawati et al. (2017) investigated the relationships between cash conversion cycle, inventory turnover in days, average collection period, average payment period and firm profitability for 30 large and 70 small firms listed on Bursa Malaysia from 2009 to 2013. ROA was employed as a proxy of firm profitability. The Hausman specification resulted in the adoption of the random effect method, which suggested

that large firms could increase their profitability by increasing the average payment period, while small firms could increase their profitability by reducing the average collection period and inventory days. Alarussi and Alhaderi (2018) examined the relationship between working capital and profitability of 120 Malaysian listed firms from 2012 to 2014. They selected return on equity (ROE) and earning per share (EPS) to measure firm profitability. Their study provided evidence that working capital components differently influenced different profitability measures. In the regression results, they found that working capital significantly and positively influenced EPS, but not ROE. Recently, Wong et al. (2019) investigated the impact of working capital on SME's profitability from 2005 to 2012. Their findings revealed that Malaysian SMEs created value by adopting efficient working capital practices.

Researchers have also employed different measures of working capital and their efforts have provided mixed results. For example, studies by Akbar (2014), Gul et al. (2013), Makori and Jagongo (2013), and Rehman and Anjum (2013), showed that cash conversion, inventory turnover ratio and average payment period significantly influenced firm profitability. In contrast, some studies showed no relationship between the mentioned measures and firm profitability (see Arshad & Gondal, 2013 and Manzoor, 2013). Previous studies such as the work by Kusuma and Bachtiar (2018), Rehman and Anjum (2013) and Wuryani (2015) used the aggregate measure of net working capital ratio that included inventory, accounts receivable, and accounts payables along with its component measures of ICP, ACP and APP in the same model. It is argued here that this practice was inappropriate because then working capital would have been measured multiple times leading to multicollinearity arising from the inter-dependent 'independent' variables. Therefore, the present study has avoided this problem by ensuring that no two related variables or measures of working capital are included in the same model. Crucially, the previous studies have not identified these following areas of concern: (1) whether the disaggregate measures of operating working capital are, or the aggregate measure of operating working capital is, more useful in explaining firm performance, (2) whether non-operating working capital would influence firm performance differently than operating working capital, and (3) whether working capital would affect short-term performance (ROA), long-term performance (TQ), or both. This present study has tried to fill in the aforementioned knowledge gaps.

METHODOLOGY

This study has used secondary data which were retrieved from the Thompson Reuters financial and economic database, Datastream. The sample consisted of non-financial firms listed on Bursa Malaysia for the period 2013-2017. A total of 776 non-financial firms were listed on Bursa Malaysia in all sectors (Bursa Malaysia, 2020). This study has focused only on three sectors that had more than 100 firms each, and they are as follows: (a) industrial products and services, (b) consumer products and services, and (c) construction. Only these three sectors have been selected as only these had more than 100 firms each, and possessed full data for the five-year time frame of the study, that is, from 2013-2017.

Table 1

Frequency of Firms by Sector

Sectors	Number of listed firms	Available in Datastream	Sampled firms
Industrial products & services	220	96	84
Consumer products & services	179	115	89
Construction	111	74	35
	510	255	208

The Datastream database categorized sectors differently from Bursa Malaysia. The present study has combined the industrial engineering and industrial metals and mining sectors (as categorized by Datastream) into the industrial products and services sector. Similarly, the food producers and household goods and home construction sectors have been combined and re-categorized as the consumer products and services sector. Only data for 255 firms was available throughout the years 2013 to 2017 in Datastream. However, 47 of these firms were removed from the study sample because their data seemed to lack credibility, e.g., they had very high ACP, ICP, APP, or CCC. As a result, the study was left with a sample of 208 firms. Table 1 shows the number of firms in these three sectors, while Table 2 lists the definitions of the dependent, independent and control variables used in the study.

Table 2

Definition of Variables

Variable	Label	Name	Definition
Dependent variable			
Performance	ROA	Return on assets	Net profit / Total assets
	TQ	Tobin's Q	(Market value of equity + Book value of liability) / Book value of total assets
Independent variables			
Working capital	ICP	Inventory conversion period	Inventory / Net sales x 365
	ACP	Average collection period	Accounts receivable / Net sales x 365
	APP	Average payment period	Accounts payable / Net sales x 365
	CCC	Cash conversion cycle	ICP+ACP-APP
	ONWC	Other net working capital ratio	Other current assets-other current liabilities / Total assets Where other current assets mean current assets minus accounts receivable, while other current liabilities means current liabilities minus accounts payable.
Control variables	FS	Firm size	Natural logarithm of total assets
	DR	Debt ratio	Total liabilities / Total assets

The analysis of the data was carried out in two stages. The first stage explored the descriptive statistics for all variables, and these included their mean, minimum, maximum, standard deviation, skewness, and kurtosis. In the second stage, the relationship between the working capital measures and firm performance was examined using linear regression with the panel-corrected standard errors method.

ANALYSIS AND DISCUSSION OF RESULTS

This section presents the analysis and discussion. Table 3 shows the key descriptive statistics of the variables used in the study for the 208 firms from 2013 to 2017. ICP is the average number of days a firm takes to sell its inventory. A lower ICP reveals that the firm is taking a shorter time to turn its inventory into sales. ACP represents the average number of days a firm takes to collect its receivables from its customers. In other words, ACP indicates the efficiency in collecting the receivables. Similarly, APP is the average number of days that payment for a purchase is outstanding, which indicates how many days, on average, a firm takes to pay off its suppliers. APP may also indicate the credit terms granted by the suppliers. A longer APP may indicate a longer credit term granted by suppliers. ONWC indicates the proportion of other net working capital (other than inventory, receivables, and payables, over total assets) a firm has used. CCC is ICP plus ACP minus APP, and indicates the average number of days between a firm paying its suppliers and the firm collecting from its customers. A shorter CCC is broadly taken to reflect a more efficient management of working capital. It also reflects less amount of inventory and receivables that are not financed by payables. In fact, a negative CCC implies that a firm's payables are more than sufficient to finance its inventory and receivables. In other words, it means that the firm collects from the sale of inventories, and the collection of receivables, earlier than it pays for its payables.

Table 3

Descriptive Statistics

	N	Mean	Minimum	Maximum	Std. Dev.	Skewness	Kurtosis
ROA	1040	0.047	-0.572	0.607	0.114	-1.170	9.490
TQ	1040	1.055	0.545	2.733	0.461	1.837	6.419
ICP	1040	114.250	5.000	512.000	106.665	2.003	7.150
ACP	1040	113.263	4.000	676.000	95.103	2.084	8.794
APP	1040	79.970	10.000	321.000	71.244	1.629	5.352
CCC	1040	148.754	-657.000	1077.000	150.821	1.501	9.433
ONWC	1040	0.106	-0.505	0.765	0.202	0.037	3.043
FS	1040	13.065	10.015	17.593	1.402	0.475	3.253
DR	1040	0.413	0.025	0.936	0.187	0.121	2.389

The mean values indicate that the sample firms, on average took 114 days to sell their inventory, 113 days to collect receivables, and 80 days to pay for payables. The mean CCC value indicates that the average time between paying the payables and collecting from sales was 149 days. The mean value of ONWC implies that the excess of other current assets (other than inventory and receivables) over other current liabilities (other than payables) was, on average, equivalent to 10.6 percent of total assets. Among control variables, the average firm size (total assets) of the sample firms was RM1.542 billion (not shown in Table 3), but which is reflected by the mean of the natural of total assets of these firms, 13.065. In the sample, only 26 percent of the firms had assets of more than RM1 billion. Finally, the debt ratio shows that firms were on average using debt to finance 41 percent of the assets.

Table 4

Frequency Distribution of ROA and TQ

	Range	Frequency	Percent	Cumulative Percent
ROA	Less than -2.50%	63	6.1	6.1
	-2.51% to 0%	132	12.7	18.8
	0.01% to 2.50%	591	56.8	75.6
	More than 2.50%	254	24.4	100.0
	Total	1040	100	
TQ	Less than 0.75	248	23.8	23.8
	0.76 to 1.00	385	37.0	60.9
	1.01 to 1.25	389	37.4	98.3
	More than 1.25	18	1.7	100.0
	Total	1040	100	

While Table 3 provides the mean values of both ROA and TQ, Table 4 provides the frequency distribution across the ROA and TQ categories. The ROA distribution seems normal; only 18.8 percent of the firms had a negative ROA, while 56.8 percent had ROA from 0.01 percent to 2.50 percent. Table 3 shows that the average ROA was 4.7 percent over the five-year period under investigation. Although Table 3 shows that the average TQ was slightly above 1, Table 4 shows that 61 percent of the firms had TQ values of less than 1 and only 39

percent had values higher than 1, meaning that the market or investors seemed to perceive that for the majority of the firms, the firms' assets were worth less then compared to the cost of investments made in those assets before then.

Table 5 shows the frequency distribution for the ICP, ACP, APP, and CCC categories. The frequency distributions for the first three have been grouped into the following five categories – less than 30 days, 31 to 90 days, 91 to 180 days, 181 to 360 days, and more than 360 days.

Table 5

Frequency Distribution of ICP, ACP, APP and CCC

	Range	Frequency	Percent	Cumulative Percent
ICP	Less than 30 Days	149	14.3	14.3
	31 to 90 Days	428	41.2	55.5
	91 to 180 Days	282	27.1	82.6
	181 to 360 Days	134	12.9	95.5
	More than 360 Days	47	4.5	100
	Total	1040	100	
ACP	Less than 30 Days	100	9.6	9.6
	31 to 90 Days	456	43.8	53.5
	91 to 180 Days	312	30.0	83.5
	181 to 360 Days	144	13.8	97.3
	More than 360 Days	28	2.7	100.0
	Total	1040	100	
APP	Less than 30 Days	275	26.4	26.4
	31 to 90 Days	447	43	69.4
	91 to 180 Days	216	20.8	90.2
	181 to 360 Days	86	8.3	98.5
	More than 360 Days	16	1.5	100
	Total	1040	100	
CCC	Less than 0 Days	141	13.6	13.6
	1 to 90 Days	237	22.8	36.3
	91 to 180 Days	351	33.8	70.1
	181 to 360 Days	243	23.4	93.5
	More than 360 Days	68	6.5	100
	Total	1040	100	

The data indicated that the (mode) majority of Malaysian firms generally took between 31 to 90 days to sell their inventory (41.2%), to collect receivables (43.8%), and to pay payables (43%). However, for 33.8% (mode) of the firms, their cash conversion cycle (CCC), i.e., the delay between paying payables and collecting receivables, was between 91 to 180 days.

Table 6 presents the frequency distribution of the ONWC variable. The frequency distribution is grouped into the following four categories – less than zero, zero to 0.25, 0.26 to 0.50 and more than 0.50. Table 6 shows that ONWC in 44.7 percent of the firms ranged between zero to 0.25. In 31.1 percent of the firms, ONWC was less than zero, while in only 2.7 percent of the firms, it was more than 0.50. These seemed to imply that in almost half of the firms, excess current assets over current liabilities, not including inventory, receivables, and payables, accounted for between 0 and 25 percent of the firms' total assets.

Table 6

Frequency Distribution of ONWC

	Range	Frequency	Percent	Cumulative Percent
ONWC	Less than 0.00	323	31.1	31.1
	0.00 to 0.25	465	44.7	75.8
	0.26 to 0.50	224	21.5	97.3
	More than 0.50	28	2.7	100
	Total	1040	100	

Linear Regression with Panel Corrected Standard Errors

As the literature review has revealed, there are different measures of working capital and firm performance. The present study has used four empirical models in order to examine whether the disaggregate measures of operating working capital (ICP, ACP, and APP) affect, or the aggregate measure (CCC) of operating working capital affects, a firm's performance more, both in the short-term (ROA) and long-term (TQ). The regression models are specified as follows:

Model 1 – disaggregate operating working capital - shortterm performance

$$ROA_{i,t} = \alpha_0 + \beta_1 ICP_{i,t} + \beta_2 ACP_{i,t} + \beta_3 APP_{i,t} + \beta_4 ONWC_{i,t} + \beta_5 FS_{i,t} + \beta_6 DR_{i,t} + \varepsilon_{i,t} \quad (1)$$

Model 2 – aggregate operating working capital - short-term performance

$$ROA_{i,t} = \alpha_0 + \beta_1 CCC_{i,t} + \beta_2 ONWC_{i,t} + \beta_3 FS_{i,t} + \beta_4 DR_{i,t} + \varepsilon_{i,t} \quad (2)$$

Model 3 – disaggregate operating working capital - long-term performance

$$TQ_{i,t} = \alpha_0 + \beta_1 ICP_{i,t} + \beta_2 ACP_{i,t} + \beta_3 APP_{i,t} + \beta_4 ONWC_{i,t} + \beta_5 FS_{i,t} + \beta_6 DR_{i,t} + \varepsilon_{i,t} \quad (3)$$

Model 4 – aggregate operating working capital - short-term performance

$$TQ_{i,t} = \alpha_0 + \beta_1 CCC_{i,t} + \beta_2 ONWC_{i,t} + \beta_3 FS_{i,t} + \beta_4 DR_{i,t} + \varepsilon_{i,t} \quad (4)$$

Where α_0 is the constant, and β_1, β_2, β_3, β_4, β_5, and β_6 are regression coefficients, while is the error term.

The time-series data exhibited autocorrelations, while the cross-section data displayed heteroscedasticity. As a result, the standard errors estimated by the ordinary least squares (OLS) method would be considered to be incorrect (Bailey & Katz, 2011). Table 7 exhibits the results of heteroscedasticity and cross-sectional dependence. The cross-sectional dependence was estimated using the Pesaran test, Friedman test and Frees test. The Pesaran and Friedman tests showed conflicting results, and therefore, the present study had to rely on the Frees test. The results indicated the presence of heteroscedasticity and autocorrelation and correlation among cross-sections.

Although the Generalized Least Squares (GLS) method (Parks, 1967) is considered theoretically superior to the OLS, it is generally only applicable to time series cross-sectional data (Beck & Katz, 1995). A practical and better alternative is the Feasible GLS (FGLS). However, FGLS tends to underestimate the precise variability of the estimator, if the time period is less than the cross-sectional units (Beck & Katz, 1995; Jönsson, 2005). To avoid these problems, the Panel Corrected Standard Errors (PCSE) method, which yields robust covariances has been suggested in the analysis of time-series cross-sectional data (Beck & Katz, 1995). When computing the standard errors and the variance–covariance estimates, PCSE removes the heteroscedastic and cross-sectional dependence problems across panels (Moundigbaye et al., 2018).

Table 7

Heteroscedasticity and Correlation Tests

Model 1	Model 2	Model 3	Model 4
Breusch-Pagan / Cook-Weisberg test for heteroscedasticity			
chi2(1) = 32.17 Prob > chi2 = 0.0000	chi2(1) = 17.79 Prob > chi2 = 0.0000	chi2(1) = 1273.37 Prob > chi2 = 0.0000	chi2(1) = 1298.39 Prob > chi2 = 0.0000
Modified Wald test for groupwise heteroscedasticity			
chi2 (208) = 2.7e+06 Prob>chi2 = 0.0000	chi2 (208) = 1.4e+06 Prob>chi2 = 0.0000	chi2 (208) = 1.2e+06 Prob>chi2 = 0.0000	chi2 (208) = 1.1e+06 Prob>chi2 = 0.0000
Pesaran's test of cross-sectional dependence			
Prob>chi2 = 0.000	Prob>chi2 = 0.000	Prob>chi2 = 0.000	Prob>chi2 = 0.000
Friedman's test of cross-sectional dependence			
Prob>chi2 = 1.000	Prob>chi2 = 1.000	Prob>chi2 = 1.000	Prob>chi2 = 1.000
Frees' test of cross-sectional independence			
Prob>chi2 = 3.979	Prob>chi2 = 4.949	Prob>chi2 = 11.109	Prob>chi2 = 10.635

Table 8

Linear Regression with Panel Corrected Standard Errors (PCSE)

	ROA						TQ					
	Model 1			Model 2			Model 3			Model 4		
	Coeff.		*p*-value	Coeff.		*p*-value	Coeff.		*p*-value	Coeff.		*p*-value
C	-0.164	***	0.000	-0.154	***	0.000	-0.374	**	0.027	-0.296	**	0.045
ICP	-0.072	***	0.000	-		-	-0.689		0.000	-		-
ACP	0.015		0.469	-		-	-0.184	***	0.004	-		-
APP	-0.116	***	0.004	-		-	-0.349	***	0.004	-		-
CCC	-		-	-0.041	***	0.000	-		-	-0.507	***	0.000
ONWC	0.262	***	0.000	0.212	***	0.000	1.798	***	0.000	1.521	***	0.000
FS	0.015	***	0.000	0.015	***	0.000	0.076	***	0.000	0.077	***	0.000
DR	0.038		0.326	-0.026		0.372	1.415	***	0.000	1.067	***	0.000
Adjusted R^2		0.203			0.178			0.127			0.114	

Note. *Significant at a = 0.10; **Significant at a = 0.05; ***Significant at a = 0.01.

Table 8 presents the results of the linear regression using panel corrected standard errors method for all the four models. Results reveal that both the disaggregate and aggregate measures of operating working capital were relevant and affected both the short-term as well as long-term firm performance. Models 1 and 2 show that ICP, APP, and CCC negatively influenced ROA. This means, first of all, the lower the ICP, i.e., the sooner inventory was sold, the higher was the ROA, i.e., the higher the firm performance. This result supported the findings in the studies by Arunkumar and Ramanan (2013) and Makori and Jagongo (2013). However, this result contradicted the findings in studies by Arshad and Gondal (2013), Gul et al. (2013), and Jakpar et al. (2017) which found a positive impact of ICP on firm performance. Second, the lower the APP, i.e., the sooner suppliers were paid, the higher the ROA, i.e., the higher the firm performance.

This result supported the findings of Makarani and Bineshian (2013) and Manzoor (2013). However, this finding contradicted the findings of studies by Gul et al. (2013) and Kusuma and Bachtiar (2018). Third, ACP was not significant, indicating that the collection of receivables did not appear to influence short-term firm performance. This result is in contrast to the findings in Jakpar et al. (2017). Fourth, the lower the CCC, i.e., the shorter the period between a firm paying its suppliers and collecting from its customers, the higher the firm performance. This result supported the findings in Mohamad and Saad (2010), but contradicted the findings in Jakpar et al. (2017). Fifth, about non-operating working capital, the higher the ONWC, i.e., the greater a firm's proportion of other (excluding inventory, receivables, and payables) net working capital over total assets, the higher the firm's performance. There have been no comparable findings from previous studies regarding this issue.

Models 3 and 4 show that all the three disaggregate measures (ICP, ACP, and APP) and the aggregate measure (CCC) of operating working capital were significant in influencing TQ. The coefficients of ICP, ACP, APP, and CCC were all negative, implying that the quicker conversion of inventory to sales, prompter collection of receivables, faster payment of payables, and the shorter the period between paying suppliers and collecting from customers, each of these resulted in higher long-term firm performance. The findings of the negative influence of ICP and ACP on firm performance were supported by the findings in Bhatia and Srivastava (2016). However, these findings

contradicted the findings of the study by Nurein et al. (2015). The finding of the negative influence of APP on firm performance was at odds with the studies by Bhatia and Srivastava (2016) and Nurein et al. (2015), who found a positive impact on firm performance (TQ). The negative influence of CCC on firm performance was supported in studies by Bhatia and Srivastava (2016), Nurein et al. (2015) and Singh et al. (2017). However, contradictory findings were obtained in a study by Vural et al. (2012), which found a positive and significant impact on firm performance (TQ).

As with the previous models, ONWC also positively influenced TQ in Model 3 and Model 4. This variable has not been used widely in previous studies. The intent in the present study was to model the ONWC as a separate variable, and not consolidate it with the other working capital accounts. This was done to see if non-operating working capital would have a different influence on firm performance, compared to operating working capital. Interestingly, ONWC, the measure of non-operating working capital, positively influenced firm performance, whereas measures of operating working capital negatively influenced firm performance.

Although less inventory, receivables (only for long-term firm performance), and even payables seemed to increase firm performance, in contrast, more other working capital accounts appeared to increase firm performance. This also holds an important implication for research into the influence of the working capital on firm performance – all working capital accounts should not be consolidated into an aggregate sum, e.g., net working capital expressed as a percentage of total assets, as this will lump all the operating working capital accounts (inventory, receivables, and payables) with the non-operating working capital accounts. Had this been done, the nuanced influences of different working capital components on firm performance found here would have remained uncovered. Less operating working capital (inventory, receivables, and payables), but more non-operating working capital, seemed to increase firm performance.

Additional results show the impact of two control variables, namely firm size and debt ratio, on firm performance. Firm size has been found to be positive and significant in all four models, while debt ratio was positive and significant in the third and fourth models. These findings seemed to imply that firm size influenced both the short-term

(ROA) and long-term firm performance (TQ). In other words, larger firms showed better performance, whereas debt ratio only influenced long-term firm performance (TQ). This meant that higher financial leverage (use of debt) increased long-term firm performance.

Another notable finding was the slight difference in the adjusted R-square among the four models, in particular, between Model 1 and Model 2, and also between Model 3 and Model 4. The adjusted R-square was greater for Model 1 (than Model 2), and Model 3 (than Model 4), indicating that the use of the three disaggregate measures of operating working capital was slightly better than the use of the single aggregate measure of operating working capital in explaining firm performance, both for the short-term and long-term.

CONCLUSION

The aim of this study was to provide recent empirical evidence about the working capital management practices of Malaysian firms and the relationship between working capital and firm performance. This study used the panel data set of non-financial firms listed on Bursa Malaysia. From a total of 776 non-financial manufacturing firms listed on Bursa Malaysia, 208 firms were selected because they had complete data, i.e., throughout the period of study from 2013 to 2017 in Datastream. Although a handful of studies have been published about the relationship between working capital management and firm performance in Malaysia, most of these had used the OLS estimation, a method in which the standard errors were likely to be incorrect. Therefore, the present study has tried to estimate this relationship using the more robust four panel corrected standard error (PCSE) models.

This study has established that operating and non-operating working capital have different impacts on firm performance. More specifically, less operating working capital, but more non-operating working capital, increased firm performance. In relation to operating working capital, the present study has also found that the set of disaggregate measures, which were derived from the three operating working capital components, namely inventory, receivables, and payables, were slightly better than the single aggregate measure, which was derived by consolidating or netting the three operating working

capital components, in explaining firm performance. Furthermore, the study found that the set of operating working capital components that influenced short-term firm performance was different from the set of operating working capital components that influenced long-term firm performance. Only two operating working capital components, i.e., inventory and payables, negatively influenced short-term firm performance, but all three operating working capital components, i.e., inventory, receivables, and payables, negatively influenced long-term firm performance.

All the above findings seemed to imply that receivables (or collection of receivables), unlike inventory (or sale of inventory) and payables (or payment of payables), were not critical to a firm's short-term performance, although they were critical, along with inventory and payables, to a firm's long-term performance. More specifically, quicker sale of inventory and prompter payment of payables would improve both short-term and long-term firm performance. In contrast, earlier collection of receivables would improve only long-term firm performance.

Overall, these results have reinforced the conventional ideas that quicker inventory sale and earlier receivables collection could enhance a firm's performance. Nonetheless, the results also revealed a couple of counter-intuitive ideas. First, prompter, rather than later, payment of payables would raise a firm's performance. Second, the use of more, rather than less, non-operating working capital would improve a firm's performance. However, the findings from the present study have been limited to the firms in only three non-financial sectors, as such it is recommended that future research should explore a wider range of other sectors.

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