MANAGEMENT & ACCOUNTING REVIEW

CONTENTS

The Effect of Working Capital Management on Firm Performance in Industrial Products Sector

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ABSTRACT

Amidst the prevailing corporate ecosystem, it is incontestably that the conspicuousness of firms ought to be placed on their effectiveness in managing short-term resources particularly ensuing the manifestation of the global financial crisis. With the purpose to investigate the effect of working capital management (WCM) on firm performance, this study intends to furnish finance managers as well prospective investors in envisaging the momentous of WCM in trading-off liquidity and returns. This study adopted one-step system generalised method of moments (GMM) in order to capture for the endogeneity issues arising from the unobserved time-invariant firm-specific elements as well enhance data efficiency. Adopting a sample of 156 Malaysian public companies listed on Bursa Malaysia in the industrial products sector with the interval of 10 years (i.e. from 2007 through 2016), the study unveils the insignificant linkage between WCM proxy (i.e. CCC) and firm performance (FP). Despite the diminutive and insignificant effect of WCM on FP, the findings still demonstrate a non-linearity appositeness on the existence of optimality of WC requirements and FP. Firm size signified as a substantial control variable that might affect firm profitability as well as firm market valuation due to the competitive edges that could be gained through economies of scale.

Keywords: Working Capital Management (WCM), Firm Performance (FP), Industrial Products economic sector, Generalised method of moments (GMM)

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INTRODUCTION

Diverging from the underpinning of prominent theories that are pertinent to enlighten long-term corporate financial disposition, working capital management (hereafter WCM) has not been drawing decent attention that constrains the adequate insight related to the underpinnings that could use to elucidate the interrelationship between WCM and firm performance (Almeida & Eid Jr, 2014; Palombini & Nakamura 2011; Zariyawati, Annuar, Taufiq & Abdul Rahim, 2009). Despite the matter of fact that WCM has been delineated as one of the drivers that associates yet least comprehended antecedents for firm performance irrespective of firm size, economic sector, industry, and classifications of country for instance developed economies, economies in transition or developing economies (Bhatia & Srivastava, 2016; Losbichler & Mahmoodi, 2012). On top of the scant theories, the effectiveness of managing short-term resources has been reported depriving of apposite commitment from chief financial officers and treasurers, largely in multinational conglomerates (PWC, 2017), in view of such short-term corporate financial management affair deems as possessing reiterative base to what degree any occurrence of fallacious discretions is merely regarded as reversible mistakes (Singh & Kumar, 2014). Abundant empirical groundwork in developed nations has been attested to the effectiveness of WCM which further unveils that WCM is compelling to the solvency of firms in the relentlessly turbulent and complex business environment (Raheman, Qayyum & Afza, 2011; Padachi & Howorth, 2014).

As one of the emerging nations, Malaysia is still relying on industrial production outputs in three major sectors i.e. mining, manufacturing and electricity. Amid the three sub-sectors, the manufacturing sector contributes a sizeable weight in Malaysia's gross domestic production (GDP) stake which was 23.0% in year 2017 with the value of gross output or RM1,275.8 billion (Department of Statistics Malaysia, 2019). Unequivocally, the manufacturing industry contributes substantially in spurring job creation as well as be a catalyst for foreign direct investments, coupled with its input of being the largest exporting sector for merchandises such as electrical and electronic products wherewith the equivalent of RM372.67 billion in 2019 (Malaysia External Trade Development Corporation, 2019). Nonetheless, the opportunities come along with the emergence of business opportunities due to the relocation of factories from China due to the intensifying trade

war between China and the U.S. as well as government stimulus policies in encouraging firms to embrace the fourth Industrial revolution for productivity and be less reliant on human labour (Ministry of International Trade and Industry, 2018).

According to the report released by PWC Malaysia (2018), Malaysian firms have to put more endeavours in managing their WCM as the excerpt betoken the deterioration of cash conversion efficiency (CCE) by 10%. To put in another way, even though there is an increment in sales revenue as well net profits, the operating cash flow is still declining. In fact, one manifestation remarks the continually deterioration of efficacy in managing receivables (i.e. 50 days in year 2014 & 59 days in year 2017). Moreover, several exemplifications have been provided to expound on the inefficiencies such as inadequate proactive initiatives in controlling overdue debts and insufficient clarity of systematic procedures in monitoring customers' payment track records. On the other hand, the practices of WC are indubitably affected by the nature of the industry in a comparably extensive manner. For instance, the level of working capital requirements for the manufacturing sector is much higher compared to the service industry in view of the practical norms for manufacturers to hold more inventories for production purposes as well as granting more credits to their customers with lengthier credit terms. In such state of affairs, firms need additional cash to run their daily operations or else they may grapple with the difficulties in securing sufficient cash to pay off debts, whereby at a certain point they may face undesired complications such as financial distress, insolvency and even liquidation (Al-Maswheki, et.al., 2019). Henceforth, the efficiency of working capital management is crucial particularly for manufacturers to counterbalance the trading-off of dual essential goals which are profitability and liquidity risk.

Taking into account the substantial amount of WC investment (i.e. in this study, the composition of current assets is exceeded half of total assets) and how the adoption of WC strategies would accommodate the degree of uncertainties in a firm, the empirical findings have somehow validated the influence of WCM on financial performance and market valuation. In another respect, Wang, Akbar & Akbar (2020) reveal that the adoption of different strategies in dealing with WCM can affect a firms' financial sustainability throughout the corporate life cycle (CLC). The authors further disclose that the extent of influence of WCM is markedly substantial

during the inception stage of CLC and least influential in the maturity stage, therefore it is unwise for finance managers to implement identical WC strategies throughout the entire life cycle without detailed scrutiny of the exact WC requirements. Therefore, this study proposes to examine the effect of WCM on firm performance specifically in the industrial product industry albeit supplementing the scant contemporaneous literature.

LITERATURE REVIEWS

Effective WCM is pivotal for a business to retain its financial sustainability, specifically for manufacturing firms where the greatest amount of the current assets comprises of inventories to prevent the disruption of production processes (Van-Horne & Wachowisc, 2000). Numerous research have been piloted in other regions which ratifies the onerous repercussion of being negligent on conscientious WC strategy implementation on firm performance (Nzioki, 2013; Onodje, 2014; Phuang & Hung, 2020; Ukaegbu, 2014; Wang, Akbar & Akbar, 2020). Indeed, one of the greatest aspirations of WCM is to warren that a firm is commensurate in fulfilling its financial commitments, in particular disbursement to suppliers and other creditors e.g. financial institutions immediately upon the maturity date (Ukaegbu, 2014). As evidenced by previous empirical investigation, a vigorous formulation of working capital policy by the finance manager is crucial for a firm to effectively manage their cash conversion cycle (hereafter CCC) elements and the implementation of policies is varied across different industries (Nazir & Afza, 2009; Filbeck & Krueger, 2005).

A firm's WC policy is intrinsically scrutinised from two perspectives which are investment and financing in three approaches towards risk undertaking i.e. aggressive, moderate and conservative (Ross, Westerfield & Jordan, 2010). Aggressive investment policy implies the practices of curtailing the holding of current assets, thereafter releasing the surplus resources into high-yield investments. Howbeit, this sort of approach is allied with higher liquidity risks at which point the firm might have a problem to settle debts on schedule as well as failure to retain customers due to a greater likelihood of having stock-outs and imposition of stringent trade credit policy by requesting customers to pay earlier (Nazir & Afza, 2009).

Table 1: Profitability and Liquidity of Working Capital Approaches

Working Capital Approach	Returns	Liquidity	Risk
Aggressive	High	Low	High
Moderate	Medium	Medium	Medium
Conservative	Low	High	Low

Source: Ng, Ye, Ong & Teh (2017)

     A disputable point of view on the empirical groundwork as regards the interval of Cash Conversion Cycle (CCC) in which the conventional supposition demonstrates the shorter the CCC, the higher the net earnings would be particularly for financially constrained firms (Motlíček & Polák, 2015). Despite the results predominantly validating the negative association between WCM and firm performance, Shin and Soenen (1998) counterclaim that firms with a comparatively liberal trade credit policy are more likely to generate a higher level of sales revenue and subsequently the level of firm profitability. Likewise, the positive interrelation between CCC and firm performance is likewise corroborated by other researches (Nobanee, Abdullatif & AlHajjar, 2011; Onodje, 2014). The justification provided by such prior outcome exemplifying that level of economic and financial market development is positively fosters the adoption of optimal working capital strategy in specific countries and industries as well (Onodje, 2014).

     The effective integration between CCC components undoubtedly might affect firm profitability (Sartosis & Hill, 1983), as an illustration if a firm orders excessive raw materials inventories may eventually imperil the efficaciousness of other two WCM components (i.e. receivables and payables) as while compelling to clear the stock, the firm may culminate in loosening its trade credit policy whereas the deferred debt collection from customers will prolong the disbursement to suppliers. Moreover, the firm has to bear with other negative incidents that might result in the deterioration of firm profitability such as escalating holding costs, risk of spoiled and unused inventories, accelerating the occurrence of irrecoverable debts, and impairing rapport with suppliers. Table 2 summarises prior studies conducted with regard to the influence of WCM towards firm performance specifically in the industrial products industry.

**Table 2: Summary of Previous Investigations about Influence
of WCM towards Manufacturing Firms**

Author (year)	Panel Units	Time	Dependent Variables	Independent Variables	Control Variables	Findings
Jakpar et al., (2017)	164 Malaysian manufacturing PLCs	2007 - 2011	ROA	ln CCC; ln DSO; ln DIO	Leverage; Firm Size	ln CCC: not sig; ln DSO: +ve sig; ln DIO: +ve sig; Leverage: -ve, sig; Firm size: +ve, sig.
Kasozi (2017)	69 manufacturing Firms listed in Johannesburg Securities Exchange	2007 - 2016	ROA	CCC, DSO, DIO, DPO,	Firm Size, Sales Growth, Leverage,	CCC: +ve, not sig; DSO: -ve, sig; DIO: +ve, sig; DPO: -ve, sig; firm size: +ve, not sig; sales growth: +ve, sig; Leverage: -ve, sig.
Ng et al. (2017)	122 Malaysian industrial products PLCs	2007 - 2012	Gross Operating Income	CCC; DSO; DIO; DPO; Current assets ratio (CAR); Current liabilities ratio (CLR).	Firm Size; Sales Growth; Leverage	CCC: +ve, sig; DSO: -ve, sig; DIO: +ve, sig; DPO: not sig; CAR: -ve, sig; CLR: +ve, sig;
Al-Mawsheki, Ahmad & Nordin (2019)	137 listed manufacturing Malaysian firms	2010 – 2016	Economic value added (EVA)	CCC	CLTA, CATA, Debt ratio, Firm size, GDP	CCC: -ve, sig; CATA: +ve, sig; CLTA: -ve, not sig; Debt ratio: +ve, sig; GDP: +ve, sig; Firm size: -ve, sig.
Akinleye & Adeboboye (2019)	20 listed manufacturing firms in Nigeria	2008 - 2017	ROCE, EPS	DSO, DPO	Firm size, Asset tangibility (ATAN)	ROCE: DSO: -ve, not sig; DPO: +ve, not sig; Firm size: -ve, sig; ATAN: -ve, not sig. EPS: DSO: -ve, not sig; DPO: -ve, not sig; Firm size: +ve, not sig; ATAN: +ve, not sig.

VARIABLES DEFINITION AND DEVELOPMENT OF HYPOTHESIS

This study constructed both accounting-based and market-based firm performance indicators which are return on assets (ROA), return on equity (ROE) and Tobin's Q. ROA is signified by earnings before interest and tax (EBIT) divided by total assets, meanwhile ROE is defined as net profits for the year divided with total equities. As both of these estimators are used to measure the financial performance of a firm, they are crucial for quantifying the financial health position as well as financial risk management. Numerous studies have adopted ROA as firm performance measurement and have regarded it as the most relevant estimator (Nazir & Afza, 2009; Zariyawati, et al., 2009; Banos-Caballero, Garcia-Teruel & Martinez-Solano, 2014; Wasiuzzaman, 2015; Jakpar, et al., 2017; Kasozi, 2017; Singhania & Mehta, 2017). Another book-value-based firm performance indicator, ROE is commonly used to interpose the rate of returns realised by business owners subsequent to the subtraction of all operational expenses, interest costs, and tax payables. There are several past studies that adopt ROE as one of their dependent variable (Afrifa & Padachi, 2016; Siraj, Mubeen & Sarwat, 2019).

Meanwhile, Tobin's Q is defined as market capitalisation of the total ordinary shares outstanding plus total debts and divided by total assets. The conspicuousness of Tobin's Q has been taken into account by prior researchers, on the ground of its propensity to mitigate the demerits of the accounting profit ratios which merely focus on historical achievements (Banos-Caballero et al., 2014). Whereas Tobin's Q places weight on future orientation as one of the gauged elements, market capitalisation portrays the confidence level of investors towards firm's capability in dealing with matters such as financial constraints, strategic alliances as well as the stability of international capital markets (Demsetz & Villalonga, 2001). Any firm with a Tobin's Q value between 0 and 1 is generally regarded as as undervalued whereby the firm would come into view as a potential target for acquisitions by its rivals or other interested bargain hunters. In different circumstances, a firm that is high in Tobin's Q, particularly the one that exceeds 1 are a signal of overvaluation, at which point the firm is viewed as increasing in its competitiveness as well as its profitability level (Fen & P'ing, 2019).

The proxy for WCM is CCC that has been extensively used in assessing short-term operational efficiencies as well as liquidity measurement of a firm (Jose, Lancaster & Steven, 1996). The formula used for the regressors are as follows: (i) days of inventory outstanding (DIO), calculated as average inventories divided by cost of sales, then multiplied by 365 days; (ii) day of accounts receivable outstanding (DSO), calculated as accounts receivables divided by sales, then multiplied by 365 days; (iii) days of accounts payable outstanding (DPO), calculated as accounts payable divided with purchases, then multiplied by 365 days; (iv) CCC was computed as DIO plus DSO and then subtract the DPO. The following is the first hypothesis: *"working capital management has a significant influence on firm performance indicators (i.e. ROA, ROE & Tobin's Q) for the PLCs in the industrial products industry"*.

Recent empirical studies imply that there is a non-linear and inversed relationship between WC investment and firm performance in pondering the scrutiny of benefits and costs implied for aggressive and conservative strategies wherein both indicators associate positively at the lower level of WC investment and negatively at the higher level of WC requirement (Banos-Caballero et al., 2014; Aktas, Croci & Petmezas, 2015; Afrifa & Padachi, 2016; Singhania & Mehta, 2017; Altaf & Ahmad Syah, 2018). As a deduction derived from the aforementioned argument, this study propounded that the interpolation between WCM and firm profitability to be a concave or a U-shape inverted relationship instead of the conventional postulation which expounds it as a linear correlation (Jose, Lancaster & Stevens, 1996; Shin & Soenen, 1998; Lazaridis & Tryfonidis, 2006; Zariyawati et al., 2009; Bhatia & Srivastava, 2016). The following hypothesis denotes the non-linear association between WCM and firm performance. Therefore , the second hypothesis is *"there is a non-linear relationship between WCM and firm performance indicators (i.e. ROA, ROE & Tobin's Q) for the PLCs in the industrial products industry"*.

Prior empirical studies have validated the positive effect of firm size on firm performance, and depend on the rationale that larger firms are disposed to have more competitive edge to reap the benefits of economies of scale as well as accessibility to financial resources by virtue of lower credit risks (Pervaiz & Akram, 2019). Furthermore, larger corporations have a propensity to retain a lower level of cash holdings, specifically firms

with good credit ratings which secure financing from the financial markets. On the other hand, larger firms are likely to experience better growth opportunities, and later leading to superior firm performance. Hitherto, empirical evidence denote that firms with mounted growth opportunities are probably undergoing greater extent of fluctuations of cash flows, inducing the need to maintain a greater extent for working capital investments (Opler, Pinkowitz, Stulz & Williamson, 1999). Over-and-above, a higher growth rate of expansion would result with a positive interrelation with firm performance due to the fact that large firms with higher credit ratings can generally obtain capital easily hence they would be more generous in granting credit to their business customers (Aktas, Croci & Petmezas, 2015; Phuong & Hung, 2020). As per the aforementioned points, the following is the next hypothesis i.e. *"firm size has a significant influence on firm performance indicators (i.e. ROA, ROE & Tobin's Q) for the PLCs in the industrial products industry"*.

Financial leverage is signified as total debts divided by total shareholders' equities. Incessantly, the ideal mixture of debt-equity source of capital has caught the limelight of the scholars as well as practitioners (Lazaridis & Tryfonidis, 2006). As illustrated by one of the ultimate theories that is used to exemplify working capital financing, the Pecking Order Theory (POT), a firm which is shortage of funds would opt for internal sources of capital (i.e. retained profits) before proceeding with the issuance of external supply of financing (i.e. long-term debts and equity). Excessive utilisation of debts imply a lower amount of free cash flow available for operational use, and as a result a firm might undergo an unnecessary level of financial risk which may result in an insolvency issue. As such, a majority of earlier documentation has demonstrated a negative effect of financial leverage on firm's profitability (Bhatia & Srivastava, 2016; Jakpar et al., 2017; Kasozi, 2017; Ng et al., 2017; Siraj et al., 2019; Wang et al., 2020). In spite of this, a matter of contention arises when other studies counterclaim that a mounting level of debt may well lead to an augmented business growth occasion. The higher level of gearing would induce more rigid scrutiny from external creditors which prompts firms to ensure the pursuit of an optimum working capital strategy in order to maximising firm earnings. In a nutshell, a finance manager has to commit to curtailing the depletion of resources occuring due to idle time as the cost of debt is generally higher compared to the utilisation of internal capital (Banos-Caballero et al., 2014). Therefore,

the next hypothesis is *"financial leverage has a significant influence on firm performance indicators (i.e. ROA, ROE & Tobin's Q) for the PLCs in the industrial products industry"*.

Sales growth is denoted as the increment or reduction of sales revenue wherein the formula is sales for present year minus sales for previous year and divided by sales for previous year. Sales growth has been identified as one of the cogent variables to be controlled due to the reasoning that sales could generate income as well as being one of the essential supplies of financial resources (Singhania & Metha, 2017). Furthermore, a firm with a higher sales growth is often linked with greater cash requirements used to fund their operational needs. In other words, it would elongate the CCC considering a higher storage of inventories and an elevated amount of receivables eventuating at succeeding a higher transaction volume. Prior results have indicated a positive association between sales growth and firm performance (Abuzayed, 2012; Wasiuzzaman, 2015; Kasozi, 2017; Wang, Akbar & Akbar, 2020). In accordance with the above discussion, the nest hypothesis is *"annual sales growth has a significant influence on firm performance indicators (i.e. ROA, ROE & Tobin's Q) for the PLCs in the industrial products industry"*.

The contentious point of observation on the disparity management of asset-liability albeit might resultant in growth of turnover margin, however inducing the escalating risk of insolvency at the expense of shareholders' wealth (Padachi, 2006). As a proxy for working capital investment, the current assets ratio is signified by the amount of current assets divided by total assets. Other scholars explicate the aforesaid ratio implying the risk appetite of top management towards short-term investments (Nazir & Afza, 2009; Sharma & Kumar, 2011), yet there is lack of consensus on the optimal composition of current assets as divergent regions and economic sectors are likely to affect working capital requirements (Kasozi, 2017). A recent study by Chiang, Cheng, Lee and Liao (2019) among Taiwanese listed companies from 2000 to 2016, indicate that underinvestment in net working capital would substantially affect firm profitability in negative manner, while overinvestment does not have much effect on firm earnings, particularly on electronics manufacturing firms where a conservative WC investment strategy could boost earnings through increased levels of inventories and implementation of a lenient credit policy. Therefore the

next hypothesis is *"current assets ratio has a significant influence on firm performance indicators (i.e. ROA, ROE & Tobin's Q) for the PLCs in the industrial products industry"*.

Current liabilities ratio (CLTA) is denoted as short-term liabilities divided by total assets (Nazir & Afza, 2009). In brief, computation of CLTA allows investors to scrutinise the WC financing strategies as well long-term obligations. CLR is used to measure the degree of aggressiveness in terms of the financing approach which prevails upon the firm which is recurrently utilising the short-term sources of capital to fund their investments in current assets. The prevalence of this strategy permits firms to have more flexibility when it comes to utilisation of funding facilities, which predisposes to be subjected with less restrictions and lower financing cost (Ng et al., 2017). Nonetheless, the drawback of this sort of strategy implicates the heightening of default risks due to the shorter maturity of obligations which might constrain a firm's ability to do settlement explicitly if there is any deviation of unexpected cash flows during the hike in interest rates (Sharma, 2009). Therefore , the next hypothesis is *"current liabilities ratio has a significant influence on firm performance indicators (i.e. ROA, ROE & Tobin's Q) for the PLCs in the industrial products industry"*.

In this study, one of the external antecedents i.e. gross domestic production (GDP) and annual growth rate has been taken into consideration as working capital requirements might vary across different economic cycles as well as industries. Previous empirical attestation validates that macroeconomic indicators have asserted a certain influence on the practice of how firms are managing their receivables (Smith, 1987) and their level of investment in inventories (Mansoori & Muhammad, 2012). In addition, Lamberson (1995) concedes that economic cycle influences the level of working capital investment as a booming economy stimulates a firm's sales revenue which results in enhancing the level of profitability or vice versa. Moreover, preceding studies unveil that it might sound unreasonable to disregard the variation of general economic scenarios which may be the determinating factor in affecting a firm's sales revenue considering the shifting of customers' demand towards goods and services as well the availability of capital in the financial markets seeing that retained earnings is regarded as the dominant source of finance for working capital investment (Enqvist, Graham & Nikkinen, 2014). Therefore the last hypothesis is *"GDP*

growth rate has a significant influence on firm performance indicators (i.e. ROA, ROE & Tobin's Q) for the PLCs in the industrial products industry''.

SAMPLE, DATA AND METHODOLOGY

This study adopted panel units i.e. cross-sectional study encompassing Malaysian public-listed companies consisting of both main and secondary (i.e. ACE) markets as well as longitudinal data over 10 years from the period 2007 to 2016. The sources of secondary data that were used to run empirical testing on the research hypotheses included auditing annual financial reports of companies listed on Bursa Malaysia and financial analysis from Morningstar Incorporation. Conceding the fact that it is challenging to collect data from SMEs, the research focussed on public listed firms which are commonly large-scale firms. Moreover, Afrifa (2013) concedes that SMEs are unwilling to reveal information due to the concern that disclosure might make it known to its competitors.

The main source of data i.e. the annual financial reports published on the Bursa Malaysia website was deemed as a reliable and an extensive source of information, concerning pecuniary as well as submission of the reports or announcements to keep investors and the public fully informed of all facts and information for an accurate and timely disclosure (Bursa Malaysia, 2019). Supplementary to the financial reports, other sources of data i.e. Morningstar Inc. was also employed as the independent investment research provider furnishes both quantitative and non-financial data and information about a company's performance, for instance, ratio analysis, shareholding analysis, stock performance, valuation, announcement, analysis of financial statements and etc. Morningstar is deliberated as one useful and unbiased sources of information in order to assist investors to make their investment decision (Kamal, 2013).

For the screening task, the researcher filtered the companies with no lost values or no values for the entire time period (2007 -2016) in order to establish the consistency of the data set. Subsequently, data filtration took into account certain selection criteria such as consistent financial month ended for the fitted time frame of ten years (i.e. 2007 - 2016), absence of abnormal financial figures i.e. negative shareholder equity amount, and without missing numbers for data file compilation.

METHODOLOGY

The researcher intended to test the hypothesis with regard to the influence of working capital management on firm performance, through dynamic panel data which is defined as the pooling of observations on a cross-section of study objects i.e. public listed companies (PLCs) throughout several time periods (Baltagi, 2005). Panel data analysis has been extensively adopted in previous studies for data estimation and modelling, due to the following benefits: (i) it allows researchers to control for unobservable firm-specific or time-invariant variables which could eliminate the exposure of biased outcomes which may perhaps arise from the heterogeneous firm explicit features that results in erroneousness estimation due to its complexity in approximation or even difficulty in accessing the data; (ii) it improves the efficiency of the econometric estimations by taking into consideration individual differences between cross sections as well as the time differences between the periods inclusive dummy variables (Hsiao, 2003). Dynamic panel estimators were constructed with the following proviso: (i) small T, large N panels, indicating small number of time periods and large number of cross-section units; (ii) a linear functional relationship; (iii) one dependent variable that is dynamic, depending upon its peculiar prior accomplishment; (iv) explanatory variables are tolerable not be unequivocally exogenous, signifying that those variables are conceded to be correlated with elapsed and plausibly recent realizations of the errors; (v) predetermined idiosyncratic effects; and (vi) heteroscedasticity and serial correlation is permitted within individuals but not across them (Roodman, 2009). Dynamic panel data allows for dependent variables to possess the property of dynamism i.e. relying on its own historical realizations, whereby y is not required to be strictly exogenous, i.e. y could correlate with past and likely present realization of the errors. In addition, dynamic panel estimators permit Heteroskedascity and autocorrelation within individuals, however not across them (Roodman, 2009). The researcher therefore gauged the model using the one-step generalised method of moments (GMM) estimator (Arellano & Bond, 1991), where it permits the controlling of the endogeneity problem by inserting instrumental variables.

In shedding light on the effect of WCM on firm performance, the researcher applied several estimations in order to produce more robust empirical estimations. In this study, one endogenous variable (i.e. firm's

performance) was regressed against seven exogenous variables. The regressors were CCC, firm size, annual sales growth rate, financial leverage, current assets ratio, current liabilities ratio and gross domestic production (GDP) growth rate. This research included control variables to augment the robustness of the study. Control variables enable the model specification to be to a greater extent explicit in providing justification for interpreting the findings. Data analysis was done through the STATA/MP 14.0 software. The delineation of the model estimation is as follows:

$$FP_{i,t} = \beta_0 + \beta_1 CCC_{it} + \beta_2 CCC^2_{it} + \beta_3 SIZE_{it} + \beta_4 GROWTH_{it} + \beta_5 LVRG_{it} + \beta_6 CATA_{it} + \beta_7 CLTA_{it} + \beta_8 GDP_{it} + \eta_i + \upsilon_{it}$$

Notes: FP = Measurement of firms' profitability (i.e. accounting firm measurement: return on assets & returns on equities and market firm measurement: Tobin's Q); CCC = Cash Conversion Cycle; SIZE = Firm Size; GROWTH = annual sales growth rate; LVRG = Financial Leverage; CATA = current assets ratio; CLTA = current liabilities ratio; GDP = annual GDP growth rate; i = firm; t = time; the measurement errors components are υ = individual error component (a particular characteristics of each firm), and = unobserved time-invariant firm-specific effect.

EMPIRICAL ANALYSIS AND DISCUSSION

Descriptive Analysis and Correlation Analysis

Descriptive analysis is often used as a fundamental analysis in order to describe the attributes of a phenomenon that occurs in a particular population i.e. sample. Table 3 demonstrates the descriptive analysis of the criterion variables and regressors for unbalanced panel units with a total of 1,559 observations. The mean values for ROA, ROE and Tobin's Q were 2.63%, 3.55% and 1.65 respectively. In the interval, the average length of CCC was 112 days, at which point consisted of using an average 106 days to convert raw material inventories into finished goods inventories, followed by 92 days used to collect outstanding receivables from customers, and finally deduct 78 days i.e. the period of deferment of payment to suppliers. Looking at this fact, the findings may imply that firms may will still require additional financial resources to fund their working capital investment seeing that a positive CCC would possibly imply that firms are required to pay to their

suppliers 112 days earlier before they receive cash from their customers. The findings are not coherent with prior outcomes, viewing that the efficiency of WCM may vary across different time frames and countries as well (Ng et al., 2017; Kasozi, 2017; Soukhakian & Khodakarami, 2019).

The average firm size (i.e. log of total assets) specified 19.00 times and annual sales growth rate was 16.84%. The average financial leverage was 1.87, indicating that a mean value of approximately 47% of the total assets are funded using debts. Due to the nature of industry, firms hold more than half of their total assets in the form of current assets i.e. 51.2% and current liabilities comprise of 45.24% out of total assets owned by the firms. The finding points toward a substantial composition of current assets which exceeds one half of the total assets. Henceforth, effective management of short-term assets particularly inventories appears to be much relevant in realising an enhanced level of profitability.

Table 3: Descriptive Analysis

Variable	No. of observations	Mean	Standard Deviation
ROA	1559	2.63%	8.497783
ROE	1559	3.55%	17.01282
Tobin's Q	1559	1.6505442	12.81929
DIO	1559	105.76 days	130.4491
DSO	1559	91.90 days	82.42135
DPO	1559	77.82 days	103.397
CCC	1559	112 days	134.8702
SIZE	1559	19.00234	1.417791
GROWTH	1559	16.835 %%	421.9806
LVRG	1559	1.870638	2.465701
CATA	1559	51.20%	17.01555
CLTA	1559	45.24%	52.02123
GDP	1559	4.77%	2.268

Source: Author (2020)

Correlation analysis is one of the most all-embracing estimation that gauges the intensity of relationship between variables as with the appositeness of one variable that is inclined to change when associated with other variables. As demonstrated in Table 4, CCC and all working

capital components except DPO have a negative and significant correlation with both accounting-based (i.e. ROA and ROE) and market valuation indicators. It implies that the magnitude of predisposition between DIO and firm performance indicators (i.e. ROA, ROE and Tobin's Q) have very feeble and inverse magnitude of predisposition i.e. -0.0953, -0.136, and -0.0849 respectively. In other words, the increase in the days used to convert materials into finished goods would result in the decrease in firm's financial performance and market value. On the other side, the magnitude of efficient debt collection from customers manifests a slightly greater propensity on firm performance as compared with DIO, in which the finding still portrays a very weak association i.e. ROA: -0.1854, ROE: -0.184 and Tobin's Q: -0.1146). Other than that, the relationship between ROA and DIO demonstrated a very frail magnitude which was -0.0682, at which point the deferment would bring about negative consequences such as interruption of production due to unavailability of materials, imperil rapport with suppliers, lose reputation, and so on. On the other hand, DPO has no correlation with ROE and Tobin's Q. Similarly the CCC had a significant and inverse connection with both accounting and market firm's performance estimators, which are ROA, ROE, and Tobin's Q had a magnitude of -0.1232, -0.1658, and -0.1074 (at p-value of 0.01).

Table 4: Spearman Rank Correlation

	ROA	ROE	Tobin's Q	CCC	DIO	DSO	DPO	SIZE	GROWTH	LVRG	CATA	CLTA	GDP
ROA	1.0000												
	1559												
ROE	0.9618	1.0000											
	1559	1559											
	0.0000												
Tobin's Q	0.1729	0.1858	1.0000										
	1559	1559	1559										
	0.0000	0.0000	0.0000										
CCC	-0.1232	-0.1658	-0.1074	1.0000									
	1559	1559	1559	1559									
	0.0000	0.0000	0.0000	0.0000									
DIO	-0.0953	-0.1360	-0.0849	0.6975	1.0000								
	1559	1559	1559	1559	1559								
	0.0002	0.0000	0.0008	0.0000									
DSO	-0.1854	-0.1840	-0.1146	0.4906	0.2565	1.0000							
	1559	1559	1559	1559	1559	1559							
	0.0000	0.0000	0.0000	0.0000	0.0000								
DPO	-0.0682			-0.2864	0.0505	0.3957	1.0000						
	1559			1559	1559	1559	1559						
	0.0071			0.0000	0.0462	0.0000							
SIZE	0.3494	0.3964	0.0636	-0.2675	-0.2596	-0.3576	-0.1526	1.0000					
	1559	1559	1559	1559	1559	1559	1559	1559					
	0.0000	0.0000	0.0120	0.0000	0.0000	0.0000	0.0000						

GROWTH	0.3224	0.3463	0.0965	-0.1411	-0.1560	-0.1437	-0.0829	0.1737	1.0000	
	1559	1559	1559	1559	1559	1559	1559	1559	1559	
	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0010	0.0000		
LVRG	-0.2417	-0.0871	0.1422	-0.1896	-0.1729		0.1455	0.2675	0.0941	1.0000
	1559	1559	1559	1559	1559		1559	1559	1559	1559
	0.0000	0.0006	0.0000	0.0000	0.0000		0.0000	0.0000	0.0002	
CATA	0.2085	0.1929		0.2954	0.1455	0.1590	-0.1757	0.0597		-0.1294	1.0000
	1559	1559		1559	1559	1559	1559	1559		1559	1559
	0.0000			0.0000	0.0000	0.0000	0.0000	0.0184		0.0000	
CLTA	-0.1922	-0.0504	0.0648	-0.0883	-0.1164	0.0668	0.1099	0.1638	0.1267	0.8307	1.0000
	1559	1559	1559	1559	1559	1559	1559	1559	1559	1559	1559
	0.0000		0.0105	0.0005	0.0000	0.0084	0.0000	0.0000	0.0000	0.0000	
GDP	0.0555	0.0583	0.0470				-0.0551	0.1870			0.1039	1.0000
	1559	1559	1559				1559	1559			1559	1559
	0.0283	0.0214	0.0638				0.0296	0.0000			0.0000	0.0000

In aother respect, firm size had a positive and significant correlation with ROA, ROE, and Tobin's Q in which the correlation coefficients (R) were 0.3494, 0.3964, and 0.0636 respectively. Correspondingly, the coefficient of determination (R^2) for the aforementioned DVs were equivalent to 0.12, 0.16, 0.0041, which points in the direction of about 12%, 16%, and 0.4% of changes in ROA, ROE, and Tobin's Q can be "explained" by the association with firm size. Meanwhile, other regressors which are sales growth, leverage, CATA, CLTA and GDP all have a very weak relationship with firm performance indicators with the range of coefficient determination value of between 0.002 to 0.12. The VIF mean value was 1.07, indicating the absence of a multicollinearity issue as it is below the general applied threshold of 10.0 (Hair, Black, Babin, Anderson & Tatham, 2014).

DYNAMIC PANEL REGRESSION ANALYSIS

Table 5, Table 6 and Table 7 exhibit the five panel regression outcomes which are as follows: ordinary least square model (column two), within groups or fixed-effect model (column three), Arellano-Bond first-differenced, t-2 GMM (column four), Arellano-Bond first-differenced, t-3 GMM (column five), Blundell-Bond one-step, t-2 system GMM (column six), and Blundell-Bond one-step, t-3 system GMM (column seven) for the DVs of ROA, ROE, and Tobin's Q respectively.

Table 5: Estimation of the Model Specification for Returns on Asset (ROA)

Regressors	OLS levels	Within groups	1st DIF GMM t-2	1st DIF GMM t-3	1st SYS GMM t-2	1st SYS GMM t-3
ROA_{t-1}	0.5145***	0.1860***	0.1748***	0.0425	0.4656***	0.5065***
	(0.0456)	(0.0417)	(0.0401)	(0.0735)	(0.0478)	(0.0623)
CCC	-0.0037	-0.0040	-0.0073	-0.0067	-0.0019	-0.0025
	(0.0043)	(0.0068)	(0.0127)	(0.0147)	(0.0061)	(0.0064)
CCC^2	-0.8617	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000
	(-18.2464)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
SIZE	5.8938***	5.5888***	4.2278**	5.2865**	4.8613***	5.8594***
	(1.0494)	(1.3668)	(1.6658)	(2.2190)	(1.2969)	(1.4698)
GROWTH	-0.0009***	-0.0004	-0.0000	-0.0000	-0.0007	-0.0012*
	(0.0003)	(0.0004)	(0.0006)	(0.0008)	(0.0006)	(0.0007)
LVRG	-0.0310	-0.0015	0.0305	0.0815	0.0112	0.1556
	(0.1560)	(0.1224)	(0.0654)	(0.1045)	(0.0961)	(0.1518)

CATA	0.1221***	0.1382***	0.1298***	0.1352**	0.0669	0.0821
	(0.0435)	(0.0464)	(0.0480)	(0.0673)	(0.0448)	(0.0552)
CLTA	-0.0436***	-0.0399***	-0.0364**	-0.0388***	-0.0373**	-0.0445***
	(0.0121)	(0.0120)	(0.0142)	(0.0145)	(0.0147)	(0.0152)
GDP	1.2868	-0.1005	-0.0527	-0.0551	-0.0470	-0.0583
	(1.3841)	(0.0921)	(0.0755)	(0.0792)	(0.0842)	(0.0904)
No. of observation	1402	1402	1,246	1,246	1,402	1,402
m1	-1.58	4.03	-6.23	-4.84	-6.38	-6.07
m2	1.54	5.69	-0.22	-0.88	0.85	0.96
Sargan			0.000	0.000	0.000	0.000
Diff-Sargan					1.000	1.000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Author (2020)
Notes: ROA = return on assets; CCC = Cash Conversion Cycle; SIZE = Firm Size; GROWTH = annual sales growth rate; LVRG = Financial Leverage; CATA = current assets ratio; CLTA = current liabilities ratio; GDP = annual GDP growth rate

For the first methodology i.e. pooled OLS, the R^2 of the proxies for firm's accounting performance measurements which are ROA, ROE and Tobin's Q were 0.4632, 0.4919 and 0.2585 respectively, signifying that all regressors were able to depict at least one-fourth of the aftereffect on firms' financial performance. Although CCC does not significantly affect financial performance, the negative indication manifests that the protracted duration of CCC would somehow deteriorate firm performance. This finding conforms with recent studies (Jakpar et al., 2017; Kasozi, 2017). Despite the diminutive as well insignificant effect of WCM on FP, the findings still demonstrate a non-linearity appositeness on the existence of optimality of WC requirements and firm performance, and the result is contradictory with previous studies (Afrifa & Padachi, 2016). Despite the fact, Tobin's Q is much greatly affected by its own lagged variables instead of other variables attested in the model.

Over and above, firm size is strongly significant in affecting accounting estimators and the finding conforms to earlier studies (Abuzayed, 2012; Bhatia & Srivastava, 2016; Jakpar et al., 2017; Ng et al., 2017; Siraj et al., 2019; Phuang & Hung, 2020). Therefore, the elucidation may appertain to the larger the size of the firm, it has much preeminent bargaining power with its suppliers and customers likewise nobility to have better efficiency in term of resources utilisation in contemplation of lower unit cost of production. Moreover, the previous evidence has been upholding that firm size is one of the most prominent antecedents that appertain to firm performance.

Apart from that, financial leverage has been ascertained as having a negative and significant influence but merely on ROE (Abuzayed, 2012; Bhatia & Srivastava, 2016; Jakpar et al., 2017; Kasozi, 2017; Ng et al., 2017; Wasiuzzaman, 2015; Zariyawati, Annuar & Pui-San, 2016; Wang et al., 2020). Conceding that a firm is superior in managing its operational efficiencies or in other words able to keep its level of working capital at an optimal level will then possess more retained earnings, and making the firm less reliant on external capital to fund its working capital requirements. In other respects, leveraged firms are usually linked with a higher degree of financial risk that compels a higher cost of funding that is required by financial providers and results in bringing about a decline in shareholders' yields.

Similarly, sales growth conjointly exhibited a negative and significant effect on ROA and ROE with the exception that it is only applicable in static panel data methodologies. The plausible exposition is with the growth in sales, it may well set off the upsurge of working capital requirements that could result in glitches such as overtrading which might trigger undesired consequences on firms' profitability in particular in firms that are inferior in liquidity management. To add to that, the insignificant and negative influence of sales growth on accounting performance indicators are established in other methodologies wherein the verdict is coherent with preceding research (Bhatia & Srivastava, 2016; Ng et al., 2017). In spite of this, GDP had an insignificant yet positive influence on all estimators of firm performance and the finding is coherent with previous research (Zariyawati et al., 2016).

Table 6: Estimation of the Model Specification for Returns on Equities (ROE)

Regressor	OLS levels	Within groups	1st DIF GMM t-2	1st DIF GMM t-3	1st SYS GMM t-2	1st SYS GMM t-3
ROE_{t-1}	0.3476***	0.0679	0.0754	-0.0408	0.3007***	0.2722***
	(0.055)	(0.0583)	(0.0634)	(0.0748)	(0.0505)	(0.0869)
CCC	-0.0065	-0.0046	-0.0018	-0.0241	-0.0035	-0.0141
	(0.0102)	(0.0166)	(0.0329)	(0.0297)	(0.0162)	(0.0138)
CCC²	-0.0011	-0.0000	-0.0000	0.0000	-0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
SIZE	10.2161***	9.6498***	5.0120*	-0.0241	7.7630***	9.1731***
	(1.502407)	(1.9157)	(2.7709)	(0.0297)	(1.7974)	(2.3422)
GROWTH	-0.0016***	-0.0011*	0.0002	-0.0241	-0.0009	-0.0021
	(0.0006)	(0.0006)	(0.0013)	(0.0297)	(0.0010)	(0.0015)

LVRG	-2.4885	-2.6081***	-2.3644***	-2.2365***	-2.2941***	-2.1251***
	(0.5240)	(0.4536)	(0.2200)	(0.2047)	(0.3094)	(0.2662)
CATA	0.2565***	0.3062***	0.3656***	0.3421***	0.1926**	0.1780
	(0.0767)	(0.0829)	(0.0978)	(0.1122)	(0.0940)	(0.1130)
CLTA	-0.0377	-0.0316	-0.0056	-0.0183	-0.0083	-0.0241
	(0.0328)	(0.0329)	(0.0312)	(0.0319)	(0.0358)	(0.0341)
GDP	4.2101	-0.2874	-0.1776	-0.1694	-0.1324	-0.1325
	(3.5370)	(0.2114)	(0.1395)	(0.1359)	(0.1443)	(0.1381)
No. of observation	1402	1,402	1,246	1,246	1,402	1,402
m1	-1.98	7.4106	-4.04	-3.40	-4.56	-3.99
m2	2.83	11.1257	0.05	-0.29	1.17	1.36
Sargan			0.000	0.000	0.000	0.000
Diff-Sargan					1.000	1.000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Author (2020)
Notes: ROE = return on equities; CCC = Cash Conversion Cycle; SIZE = Firm Size; GROWTH = annual sales growth rate;
LVRG = Financial Leverage; CATA = current assets ratio; CLTA = current liabilities ratio; GDP = annual GDP growth rate

Through scrutinising findings of both ROA and ROE, the current asset ratio validated a positive and significant effect. Put in another way, the result implies that in a situation where a firm holds more proportion of current assets, the higher the firm's earning capacity would be. The finding is consistent with previous studies (Nazir & Afza, 2009; Al-Mawsheki et al., 2019; Soukhakian & Khodakarami, 2019). Nonetheless, the results are contradictory with other preceeding evidence (Garcia-Teruel & Martinez-Solano, 2007; Lyngstadaas & Berg, 2016; Wasiuzzaman, 2015), even supposing corroborations conducted in the identical industry (Jakpar, 2017; Kasozi, 2017; Ng et al., 2017). To add to that, it may pertain to the nature of the industrial products industry itself in which the adoption of a conservative working capital investment strategy may well prevent the disruption of production as well as implementing a lenient trade credit policy. Nevertheless, the finding reveals that the effect of CATA on Tobin's Q is negative and significant, wherein indicating that a higher level of current assets would reduce a firms' market valuation which may be due to higher opportunity costs which is caused by idle cash tie up in the short-term asset investment. The disputation of results is comparable with prior studies (Yunos et al., 2018).

Table 7: Estimation of the Model Specification for Tobin's Q

Regressors	OLS levels	Within groups	1st DIF GMM t-2	1st DIF GMM t-3	1st SYS GMM t-2	1st SYS GMM t-3
Tobin's Q$_{t-1}$	0.4587***	0.3972***	0.4578***	0.0205**	0.4589***	0.0293**
	(0.0252)	(0.0303)	(0.0136)	(0.0089)	(0.0250)	(0.0113)
CCC	0.003747	0.0063	0.0150	0.0047	0.0061	0.0035
	(0.0038)	(0.0063)	(0.0151)	(0.0062)	(0.0054)	(0.0039)
CCC²	-0.0061	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000
	(0.0072)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
SIZE	0.5923	0.2762	0.1444	-0.1294	0.4105	0.0036
	(0.6497)	(0.4185)	(0.4229)	(0.5582)	(0.5432)	(0.3999)
GROWTH	-0.0001	-0.0000	-0.0001	-0.0000	-0.0001	-0.0001
	(0.0002)	(0.0002)	(0.0003)	(0.0002)	(0.0002)	(0.0002)
LVRG	-0.0048	0.0029	0.0137	0.1305	0.0076	0.1375
	(0.1072)	(0.0082)	(0.0253)	(0.2157)	(0.0163)	(0.1942)
CATA	0.0010	-0.0048	-0.0130	-0.0433**	-0.0099	-0.0294*
	(0.0074)	(0.0062)	(0.0157)	(0.0194)	(0.0129)	(0.0175)
CLTA	-0.0009	-0.0048	0.0031	0.0027	0.0025	0.0042
	(0.0014)	(0.0062)	(0.0044)	(0.0033)	(0.0028)	(0.0039)
GDP	1.0560	-0.1411	-0.1731	-0.1172	-0.1837	-0.1278
	(0.7304)	(0.2386)	(0.2624)	(0.1334)	(0.2701)	(0.1371)
No. of observation	1402	1,402	1,246	1,246	1,402	1,402
m1	0.99	2.7911	-1.22	-1.02	-1.19	-1.24
m2	-0.97	8.7144	-1.01	-1.01	-1.00	-1.01
Sargan			0.000	1.000	0.000	1.000
Diff-Sargan					1.000	1.000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Author (2020)
Notes: CCC = Cash Conversion Cycle; SIZE = Firm Size; GROWTH = annual sales growth rate; LVRG = Financial Leverage;

CATA = current assets ratio; CLTA = current liabilities ratio; GDP = annual GDP growth rate

In much the same way, CLTA exhibited a negatively and significantly on ROA considering that it will deteriorate firm profitability in the case that firms adopt an aggressive working capital financing strategy whereabouts in case that a greater extent of short-term financing being employed to fund assets would engender higher financial risks, due to shorter duration is provided to fulfil its financial obligations (Nazir & Afza, 2009; Ng et al., 2017; Soukhakian & Khodakarami, 2019). In such situation, investors are more inclined to require for higher returns to trade-off the elevated risks and propagating higher cost of financing.

CONCLUSION

This research aimed to attest empirical evidence in lieu of the influence of working capital management and firm performance, among 156 Malaysian PLCs in the industrial product economic sector over 10 years (i.e. years 2007-2016). Two model specifications were developed to validate the inferential hypotheses, employing both accounting-based firm performance proxy, return on assets (ROA) and market-based performance indicator, Tobin's Q synchronous WCM estimator (i.e. CCC) and control variables (i.e. firm size, sales growth, financial leverage, current assets ratio, current liabilities ratio and GDP growth rate) which was a priori validation having the likelihood to overshadow the antecedences that influence firm performance. The Dynamic Panel Data Methodology (i.e. one step system generalised method of moments) was employed to conduct data analysis, to control for unobserved heterogeneity, greater efficiency and likewise catering for the possible endogeneity problem. The results indicate the diminutive as well insubstantial influence of working capital management on firm performance, in spite of the exertion in the opposite direction i.e. inversed association with ROA and positive appositeness with Tobin's Q. In other words, shortening the duration of CCC would increase the efficiency of asset utilisation which however slightly deteriorates the expectation of investors towards the firms' future earnings ability.

Firm size was positive significantly linked with ROA, signifying large industrial product companies are inclined to take more initiatives in managing short-term resources in pursuant of economies of scale as well as preserving adequate levels of cash holdings in furtherance of prospective development. Nonetheless, the annual sales growth rate and GDP were positively insignificantly related to any of the performance indicators, coupled with the elucidation stating the actualisation of industrial product firms' performance may possibly depend on the economic progression of other emerging nations (e.g. China and India) as well as supplementary to other industries (e.g. construction, electric and electronic economic sectors). This study intended to provide certain insights for finance managers and investors in emerging nations such as Malaysia due to the meagre literature putting forward the momentous of working capital management towards firm performance. In short, firms with more aggressive short-term investment policies in conjunction with a conservative financing policy are inferred

with the postulation of attaining better returns in book value. Apropos of the distinctiveness of industrial products economic sector, a greater extent of short-term source of funding e.g. trade credit and short-term bank credit facilities would increase market valuation with the rationale of lower cost of capital. For prospective researchers, there are some antecedents such as ownership structure, agency costs, firm ages which may be further explored.

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