The Moderating Effect of Internal Audit Quality on the Relationship between Working Capital Management and Firm Performance: Evidence from the United Arab Emirates

Magdi Ahmed Fathi El-Bannany[a,b]

Mohamad Ali Abdul Hamid[c]

Mohamed Salem M.S. Bayou[d]

Walaa Wahid Elkelish[e]

Alhashmi Aboubaker Lasyoud[e]

Sunday Simon[f]

Khaled Hussainey[g]

a Umm Al Quwain University, UAE
b Ain Shames University, Egypt
c Putra Business School, Malaysia
d American University of Ras Al Khaimah, UAE
e University of Sharjah, UAE
f Kogi State University, Nigeria
g University of Portsmouth, UK

Abstract

The study investigates the moderating effect of internal audit quality (IAQ) on the relationship between working capital management (WCM) and firm performance and examines the quadratic relationship between WCM and firm performance. Using a sample of 31 large firms listed on the UAE stock exchange from 2007 to 2017, the study finds that days sales outstanding, days inventory outstanding, and cash conversion efficiency have a positive relationship with firm performance while days payment outstanding and cash conversion cycle have a negative relationship with firm performance. The results also reveal that IAQ significantly moderates the observed relationship between WCM and firm performance. Further analysis revealed that the relationship between WCM and firm performance in UAE is quadratic or non-linear. These findings have theoretical and practical implications, as they suggest that policies for improving working capital metrics should also consider internal audit recommendations in response to firm performance. The reason is that a high-IAQ provides insight that will guide WCM decision making. This is in addition to maintaining an optimal level of investment in WCM.

Keywords – Working capital management, firm performance, internal audit quality, UAE.

Introduction

The relationship between working capital management and the financial performance of firms has long been a concern in the field of accounting and corporate finance. This phenomenon has become even more critical today, given the fiscal tightening and prevailing uncertainty around global trade. Given that WCM is the cheapest source generating cash, improvement in it can help firms maintain a good liquidity position and free up cash for investment opportunities to boost financial performance and provide a competitive advantage for firms (PWC 2017).

The existing academic literature on WCM comprises two main pathways. One stream of literature has predominantly focused on the relationship between WCM and firm performance (Deloof 2003; Eljelly 2004; Lazaridis and Tryfonidis 2006; Salman, Folajin and Oriowo 2014; Sharma and Kumar 2011; Makori and Jagongo 2013; Talonpoika Monto, Pirtti and Karri 2014; Narwal and Jindal 2019). The other strand of literature examines the quadratic or non-linear nature of the relationship between WCM and firm performance (Banos-Caballero 2013; Nha and Loan 2015; Afrifa and Padachi 2016; Simon et al. 2017). Arising from these two discursive trajectories is the presence of inconsistent results with regards to the relationship

between WCM and firm performance. Hence, in this study we argue that existing studies ignored the fact that WCM can be affected by a firm's operational efficiency. Accordingly, studies have shown that internal audit quality improves firms' operational efficiency (Chen, et al., 2020). Therefore, the present study advances the view that internal audit quality (IAQ) can increase WCM as a result of better risk assessment through more detailed understanding of the firm and its environment, including its internal control.

IAQ and WCM are fundamentally related. Most notably, the internal auditors' knowledge of the organisation and expertise in risk and control can be used by the managers to achieve greater efficiency and effectiveness in the management of working capital. This means that, IAQ via its monitoring and control function that enhances operational efficiency can additionally improve WCM variables. For instance, IAQ can effectively monitor the inflows and outflows of inventory to ensure that a firm maintains an optimum inventory level and setting criteria for inventory purchases. In terms of account receivable and payable, IAQ can help through ensuring that managers comply with the company's credit policy, monitor receivable collection and tracking of aging debts. In addition, it is helpful in evaluating the risk associated with transactions of a company. The improved linkage of IAQ and WCM is expected to result in a greater firm performance.

Despite the link between IAQ and WCM, limited research is available on the relationship between IAQ and WCM and in particular how IAQ may influence the relationship between WCM and firm performance. This current study fills this gap in the literature by examining the moderating effect of IAQ on the relationship between WCM and firm performance, which to our best knowledge, is the first of its kind. The study also extends the nascent stream of literature on the quadratic nature of working capital by determining the quadratic relationship between WCM and firm performance.

The research context is the UAE. The UAE was chosen because it is the largest economy in the Middle East and has the largest invested working capital days, according to the study conducted by the PWC. Beyond this, the UAE has experienced a rapid increase in business, services, and workforce more than any part of the region and the world at large. This growing

scale of business activities has increased their vulnerability and the complexity of the business environment in the UAE, which may have broader implications for the economies in the region. The UAE context thus provides an example to examine the moderating effect of IAQ on the relationship between WCM and firm performance.

Using a sample of 341 UAE firm observations from 2007 – 2017, the study found that a significant relationship existed between WCM variables and firm performance. Second, as expected, IAQ moderated the relationship WCM and firm performance. The result suggests that that IAQ plays a critical role in overseeing the operational activities of firms and, besides, highlights potential financial instability and stability risks against the backdrop of financing difficulty. Third, the findings show that the relationship between WCM and firm performance in UAE was quadratic or inversely U-shaped. This finding implies that the impact of WCM on firm performance depends on the level of investment in working capital, suggesting that investments in working capital have an optimal level that can maximise profitability.

This paper offers several novel contributions to the existing literature. First, unlike previous studies that focused on the direct impact on WCM on firm performance, this study links IAQ to WCM performance. To our knowledge, this is the first study to determine the moderating effect of IAQ on the relationship between WCM and firm performance. This study provides fresh insights into how IAQ in response to WCM influences firm performance. Second, despite the demonstrated importance of the quadratic nature of investment in WCM in the literature, a dearth of research exists on this topic in the UAE. The study provides the first evidence that the relationship between WCM and firm performance in UAE is quadratic or inversely U-shaped. This finding has policy implications for firms in the UAE and other firms in the region, as it indicates that investments in WCM have an optimal level that maximises firm performance. Hence, firms need to maintain an optimal level of WCM since deviation from such level could have a detrimental effect on their operation.

Literature Review and Hypotheses Development

Literature review

Working capital management is an essential component of financial requirements and a primary source of internal finance. WCM has been defined as the difference between current assets and current liabilities (Guthman and Dougall 1984; Filbeck and Krueger 2005; Pandey 2013; Simon, Sawandi and Abdul-Hamid 2017). In a nutshell, WCM explains the interrelationship between the current assets and the current liabilities of firms and how their mix will guarantee smooth operations. Researchers have long been mindful of the impact of WCM on firm performance; however, it received more considerable attention after the work of Deloof (2003) as Singh and Kumar (2014) summarised and underwent significant growth during and after the global financial crisis of 2007/2008 (Simon et al. 2018). For example, Wang (2002) examines the association between liquidity management and operating performance and between liquidity and corporate value in Japan and Taiwan. Empirical results revealed that both Japan and Taiwan showed a significant and negative relationship between CCC and ROA and CCC and ROE. The two exhibited sensitivity to industry factors. Similarly, Deloof (2003) determine the relationship between WCM and corporate profitability of 1,009 Belgian non-financial firms from 1992 to 1996. The results show that a negative and significant relationship existed between profitability proxied by gross operating income and WCM measures.

Gill et al. (2010) examines 88 American firms listed on the New York Stock Exchange from 2005 to 2007. They found a significant positive and negative correlation of cash conversion period and accounts receivable on profitability as measured by gross operating profit. In contrast, the inventory period, payable period, and firm size were not significantly correlated with profitability. Raheman et al. (2010) focus on a sample of 204 manufacturing firms listed on the Karachi Stock Exchange in Pakistan from 1998 to 2007 and found a significant and negative impact of the cash conversion cycle, net trade cycle, inventory, and receivables on net operating profit. Accounts payable was found to be positively correlated with net operating profit. However, both receivables and payables relationships with net operating profit were not validated. Banos-Caballero et al. (2012) study Spanish SMEs between 2001 and 2005. They found that firms operate with a certain level of cash conversion cycle length that

guarantees the desired target, noting that older firms and companies with a higher cash flow experience a longer cash cycle. Mathuva (2009) study the influence of components of WCM on the profitability of 30 firms listed on Nairobi Stock Exchange for the period from 1993 to 2008. He found a significant and negative relationship between the account collection period, cash conversion, and firm profitability. The results also revealed a significant and positive relationship between the inventory period and the payment period on profitability. Nazir and Afza (2009) examine 132 manufacturing firms from 14 diverse industry groups listed on the KSE to establish the working capital requirements and determine factors that affect Pakistan firms from 2004 to 2007. Results showed that either too low or too high working capital renders the firm ineffective and reduces the benefits of WCM. They also found that external and internal factors were responsible for the variability in WCM. They adopted these internal and external factors to establish the determinants of working capital requirements of firms' performance.

Goncalves, Gaio and Robles (2018) examine the impact of WCM on firm profitability in different economic cycles. They evaluated a sample of 400 unlisted firms from the United Kingdom between 2006 and 2014. Their results revealed a negative and significant relationship between WCM efficiency and profitability. Meanwhile, the results of the economic cycles suggest that efficient WCM is important during poor economic times for firms because WCM tends to provide financing relief during a crisis. Simon, Sawandi and Abdul-Hamid (2018) evaluate the association between WCM and firm performance drawing upon the lessons that firms learned during and after the financial crisis of 2007 to 2008. They evaluated a sample of 75 listed firms on the Nigerian stock exchange between 2007 and 2015 and found that WCM variables influence the performance of firms and that firms and managers must understand and formulate WCM policies that reflect their peculiar conditions. Like Goncalves et al. (2018), Simon et al. (2018) further found that WCM has more explanatory powers during the period after than during a crisis, suggesting that during a crisis, working capital is affected. The test of differences conducted found that Cramer Z scores were all significant, indicating that a significant difference existed between the two periods.

Other related literature examines the non-linear relationship between WCM and firm performance. For example, Banos-Caballero et al. (2014) examine the relationship between WCM, corporate performance, and financial constraints of some selected samples of non-financial companies in the United Kingdom. Banos-Caballero et al. (2014) found that the relationship was U-shaped or non-linear, which is contrary to the general direction and the theory of WCM. The results suggest that WCM has an optimal investment level that balances the benefits and costs to maximise firm performance. Similarly, Simon, Sawandi, and Abdul-Hamid (2017) found a quadratic relationship between WCM and firm performance. They evaluated 75 non-financial firms listed on the Nigerian stock exchange between 2007 and 2015 and found that the relationship between WCM and firm performance was quadratic or non-linear, suggesting that investment in working capital has an optimal level that maximises firm performance. Further analysis showed that a deviation from such a level is significant and has a detrimental effect on firm performance.

The literature has produced a large body of evidence on WCM. However, the conclusions drawn from the literature are mixed and inconsistent and are concentrated on the impact of WCM on firm performance. This paper fills a gap that exists in the literature. Unlike previous studies, which attempt to establish the relationship between WCM and firm performance, this research attempts to resolve WCM issues holistically by linking measures of WCM directly to IAQ. Hence, we seek to determine the moderating effect of IAQ on the relationship between WCM and firm performance.

Hypotheses Development

The conflicting results in the literature and lack of research on the relationship between WCM and firm performance in the UAE motived the first hypothesis. First, the relationship between WCM and firm performance has received a high level of attention both in developing and developed countries especially during and after the financial crisis of 2007/2008 to discern how cash flow and funding options can be provided in surplus to reduce the financing constraint of firms (see Deloof 2003; Lazaridis and Tryfonidis 2006; Abuzayed 2012; Tauringana and Afrifa 2013; Afrifa and Padachi 2016). Despite the importance of WCM, only a few studies have been conducted in the UAE. Therefore, the first hypothesis of this paper

will contribute to the WCM literature by providing evidence of WCM from the UAE perspective by re-examining the relationship between WCM and firm performance. This line of reasoning motivates us to state the first hypothesis as follows:

H1: There is a significant relationship between WCM (days sales outstanding, days purchasing outstanding, days inventory outstanding, cash conversion cycles and cash conversion efficiency) and firm performance.

The second hypothesis examines whether the linkage between IAQ and WCM has any association with firm performance. Recent studies by Tsagem et al. (2015) and Narwal and Jindal (2019) that examine WCM within the context of corporate governance have emphasised the need to monitor the operational and financial activities of firms. Studies have established that high IAQ may be effective, providing, and enforcing monitoring in an organisation. Following this viewpoint, the second hypothesis is based on two theoretical perspectives. From an agency theory perspective, it is argued that the audit monitoring role in the financial reporting and auditing processes can enhance firm performance (Jensen 1986). This means auditing induces a higher level of monitoring of the activities of managers. The theoretical framework of this hypothesis is also guided by the Contingency Theory (Donaldson 2001). The Contingency Theory's framework is built on three elements, which are 1) that an association exists between the contingency and the organisational structure, 2) that contingencies impact organisational structure, and 3) that a fit level of the organisational structure variable exists for each level of contingency, which leads to high performance.

Conversely, a misfit leads to lower performance (Donaldson 2001). The theory's assumption holds that the relationship between WCM and firm performance is dependent on contingency factors such as internal audit quality. Taken together, this study theorises that the interaction between high IAQ and WCM will have a significant effect on firm performance.

Therefore, the second hypothesis is posited as follows:

H2: IAQ moderates the relationship between WCM (days sales outstanding, days purchasing outstanding, days inventory outstanding, cash conversion cycles and cash conversion efficiency) and firm performance.

As noted in the literature review section, the finding between WCM and firm performance is mixed and inconsistent. Conversely, the mixed findings could be associated with the perception of too much or inadequate investment in working capital. For example, a cost is associated with either a high or low investment in working capital. This means that the mixed findings are indications of non-linear or concave relationships between WCM and the profitability of firms (Banos-Caballero 2013; Nha and Loan 2015; Afrifa and Padachi 2016). In other words, a non-linear or concave or quadratic relationship describes the type of investment in WCM that is non-sequential and harbours the propensity to deviate. This concave level determines the optimal working capital level at which firm profitability is maximised, and a deviation from this level affects the profitability of firms (Banos-Caballero 2013; Nha and Loan 2015; Afrifa and Padachi 2016). Despite the importance of this, evidence on the quadratic nature of WCM in UAE is lacking. Based on the above reasoning, this research contributes to the literature by providing evidence from the UAE perspective. Hence, the following hypothesis is posited

H3: There is a quadratic relationship between WCM (days sales outstanding, days purchasing outstanding, days inventory outstanding, cash conversion cycles and cash conversion efficiency) and firm performance.

Methodology

Sample Selection and Data

The sample for this study starts with the entire population of 165 companies listed on the UAE Stock Exchange from 2007 to 2017. The sample period started in 2007 to enable the capture of the effects of the global financial crisis of 2007-2008. The data were sourced from the statements of financial position and statements of comprehensive income. To enhance the reliability of the sample data and consistent with prior studies on WCM such as Deloof (2003), Lazaridis and Trifornidis (2006), Mathuva (2010) and Simon et al. (2017), financial firms such as banks and insurance (57 companies) were excluded. The deletion reduced the initial sample of this study to 108 companies. Three specification criteria were set for inclusion in this study to obtain a broadly homogenous sample, and companies that did not meet them were excluded.

First, companies whose statement of financial position and income statements did not fall within the periods under consideration (1st January 2007 to 31st December 2017) were excluded making the study lose 16 companies due to the limited number of matching periods. Second, 10 newly registered companies and those companies delisted within the period of this study were excluded. Finally, companies with missing substantial variables or values required for the derivation of variables in this study were excluded. These exclusions reduced the sample of this study to 31 companies. Table 1 summarises the sample selection construction.

Table 1 Sample Construction

Criteria		**Sample Size**
Total of companies listed		165
Less:		
Banks	29	
Insurance	28	-57
Total of number of nonfinancial firms		108
Less:		
Companies whose balance sheets was not available between 2007-2017	16	
Newly registered companies	10	
Companies with missing data	51	-77
Final sample		31

3.2 Variable Measurements

The variables in this study were classified into four types: 1) the dependent variables, 2) the independent variables, 3) the moderator variable, and 4) control variables. These variables were measured, as shown in Table 2.

Table 2 Summary of Variable Calculations

Variable	Abbreviation	Computation/Measurement
Panel A: Dependent variables		
Return on Assets	ROA	Net Income After Tax / Book Value of Assets
Return on Equity	ROE	Equity Market Value + Liability Book Value / Equity Book Value + Liability book value
Panel B: Independent Variables		
Days sales outstanding	DSO	[Accounts Receivable x 365 days] /Cost of Sales
Days purchasing outstanding	DPO	[Accounts Payable x 365 days] / Purchases
Days inventory outstanding	DIO	[Inventories x 365 days] / Cost of Sales
Cash conversion cycles	CCC	DSO + DIO - DPO
Cash conversion efficiency	CCE	Cash Flow from Operations / Sales
Panel C: Moderator		
Internal Audit Quality	IAQ	Internal audit quality, a composite score measuring the quality of internal audit function ranging from between 0 and 5 with 0 indicating lowest quality and 5 highest quality. The score is formed by aggregating the composite scores obtained from five broad constructs; audit internal function independence, experience, internal audit investment, financial focus and internal audit quality control assurance.
Panel D: Control variables		
Leverage	LV	The ratio of total debt to total assets
Current Ratio	CR	Current assets divided by current liabilities
Firm size	FS	Natural log of sales

Regression Models

Model 1: The relationship between WCM and firm performance

To test the first hypothesis, which examines the relationship between WCM and firm performance, the following models were used:

$$ROA_{it} = \beta_0 + \beta_1 DSO_{it} + \beta_2 DPO_{it} + \beta_3 DIO_{it} + \beta_4 CCC_{it} + \beta_5 CCE_{it} + \beta_6 LV_{it} + \beta_7 CR_{it} + \beta_8 FS_{it} + e_{it} \quad (1)$$

$$ROE_{it} = \beta_0 + \beta_1 DSO_{it} + \beta_2 DPO_{it} + \beta_3 DIO_{it} + \beta_4 CCC_{it} + \beta_5 CCE_{it} + \beta_6 LV_{it} + \beta_7 CR_{it} + \beta_8 FS_{it} + e_{it} \quad (2)$$

Where firm performance is measured by ROA in model 1 and by ROE in model 2. Subscript $_{it}$ represents the panel data notation: $_i$ denotes the numbers of companies (i= 1, … 31) while $_t$ denotes the nth year (t = 1, … 11). β is the intercept, and e is the error term that is factored to satisfy the linear regression model's assumption. Table 2 provides the definitions and descriptions of all the variables.

Model 2: The moderating effect of IAQ on the relationship between WCM and firm performance.

To test the second hypothesis regarding the moderating effect moderating effect of IAQ on the relationship between WCM and firm performance, the following panel data regression models are estimated:

$$ROA_{it} = \beta_0 + \beta_1 DSO_{it} + \beta_2 DPO_{it} + \beta_3 DIO_{it} + \beta_4 CCC_{it} + \beta_5 CCE_{it} + \beta_6 IAQ_{it} + \beta_7 IAQ_{it}*DSO_{it} + \beta_8 IAQ_{it}*DPO_{it} + \beta_9 IAQ_{it}*DIO_{it} + \beta_{10} IAQ_{it}*CCC_{it} + \beta_{11} IAQ_{it}*CCE_{it} + \beta_{12} LV_{it} + \beta_{13} CR_{it} + \beta_{14} FS_{it} + e_{it} \quad (3)$$

$$ROE_{it} = \beta_0 + \beta_1 DSO_{it} + \beta_2 DPO_{it} + \beta_3 DIO_{it} + \beta_4 CCC_{it} + \beta_5 CCE_{it} + \beta_6 IAQ_{it} + \beta_7 IAQ_{it}*DSO_{it} + \beta_8 IAQ_{it}*DPO_{it} + \beta_9 IAQ_{it}*DIO_{it} + \beta_{10} IAQ_{it}*CCC_{it} + \beta_{11} IAQ_{it}*CCE_{it} + \beta_{12} LV_{it} + \beta_{13} CR_{it} + \beta_{14} FS_{it} + e_{it} \quad (4)$$

Where: the definitions and description of all variables in models 3 and 4 are provided in Table 2. Further, the interaction term measures the combined effect of IAQ and WCM on each of the proxies of firm performance. Hence, the models test the moderating effect of IAQ on the relationship between WCM variables and firm performance. Hence, audit quality was interacted with WCM variables on ROA and ROE, respectively.

Models 3: for the quadratic relationship between WCM and firm performance.

The following models were estimated to test hypothesis three, which examines the quadratic or non-linear relationship between WCM variables and firm performance. In the models, the squared values for the independent variables were included in addition to the original models.

$$ROA_{it} = \beta_0 + \beta_1 DSO_{it} + \beta_2 DSO^2_{it} + \beta_3 DPO_{it} + \beta_4 DPO^2_{it} + \beta_5 DIO_{it} + \beta_6 DIO^2_{it} + \beta_7 CCC_{it} + \beta_8 CCC^2_{it} + \beta_9 CCE_{it} + \beta_{10} CCE^2_{it} + \beta_{11} LV_{it} + \beta_{12} CR_{it} + \beta_{13} FS_{it} + e_{it} \ldots \quad (5)$$

$$ROE_{it} = \beta_0 + \beta_1 DSO_{it} + \beta_2 DSO^2_{it} + \beta_3 DPO_{it} + \beta_4 DPO^2_{it} + \beta_5 DIO_{it} + \beta_6 DIO^2_{it} + \beta_7 CCC_{it} + \beta_8 CCC^2_{it} + \beta_9 CCE_{it} + \beta_{10} CCE^2_{it} + \beta_{11} LV_{it} + \beta_{12} CR_{it} + \beta_{13} FS_{it} + e_{it} \ldots \quad (6)$$

Where subscript $_{it}$ represents the panel data notation: $_i$ denotes the numbers of companies (i= 1 … 31) while $_t$ denotes the nth year (t = 1, … 11). β is the intercept, and e is the error term that is factored to satisfy the linear regression model's assumption. The definitions of all the variables are provided in Table 2.

Empirical Results

Descriptive statistics

Table 3 presents the results of the descriptive statistics. The mean ROA is 0.0486%, while ROE is 0.0631%. The mean values suggest that most of the listed companies reported a high profit. The mean of DSO is 7.1261 days, indicating that it took on average more than 7 days for companies in the sample to collect the monies owed by their customers. The mean of DPO is 256 days. The mean suggests that the companies, on average, took about 8 months and a half to pay their suppliers. Further, the mean of DIO is 216 days, indicating that the firms take more than 7 months to turn over their inventory. The mean of CCC is 140 days, while CCE has a mean of 0.1786%. Internal Audit quality (IAQ) has a mean of 0.8152%. The control variables in this study were LV, CR, and FS. LV is a measure of a company's solvency and has a mean of 0.4589, indicating that 45.89% of the companies' funds were financed using borrowed money. The minimum and maximum values were 0.0697% and 0.8910%, respectively. The CR has a mean value of 1.8986%, while the FS has a mean of 6.8940%.

Table 4 presents the correlations for all the variables included in the models. The study finds that ROA is negatively correlated with DSO, DPO, DIO, CCC, CCE, and LV but positively correlated with AQ, CR, and FS. Meanwhile, ROE is found to be positively correlated with DIO, CCC, CCE, and FS but negatively correlated with DSO, DPO, IAQ, and LV. DIO and CCC have the highest correlation, which is 0.8794. This value is below the threshold of the 0.90 rule of thumb (Pallant 2011) and, therefore, suggests no evidence of multicollinearity.

Besides, the study further computed the variance inflation factor (VIF), as Shieh (2010) suggested. The results (untabulated) are below the threshold value of 10 and suggest no presence of multicollinearity (Kennedy 1992; Pallant 2011; Eshleman and Guo 2014).

Table 3 Descriptive Statistics

Variable	Mean	Std. Dev	Min	Max	Skewness	Kurtosis
ROA	0.0486	0.0666	-0.0982	0.2836	1.3044	7.3129
ROE	0.0631	0.1172	-0.3523	0.2584	-1.7091	7.1261
DSO	7.1261	126.9509	38.2697	596.9430	2.0025	6.6625
DPO	255.6055	312.5605	26.4051	1400.5080	2.3443	8.1038
DIO	216.4213	438.0759	4.6259	1719.8910	2.7558	9.1482
CCC	140.4799	435.6571	-605.4173	1560.9820	1.6664	6.4996
CCE	0.1786	0.2174	-0.1998	0.7894	0.7188	3.6084
IAQ	0.8152	0.3887	0.0000	1.0000	-1.6246	3.6393
LV	0.4589	0.2172	0.0697	0.8910	0.1743	2.3189
CR	1.8986	1.1604	0.3874	5.3621	1.3570	4.3269
FS	6.8940	1.2370	4.8743	9.2434	0.3168	1.9985

Notes: Variables definitions are presented in Table 2. All continuous variables were winsorised at the 3% and 97% levels.

Table 4 Pearson Correlation

Variable	ROA	ROE	DSO	DPO	DIO	CCC	CCE	AQ	LV	CR	FS
ROA	1.0000										
ROE	0.6237***	1.0000									
DSO	-0.2046***	-0.0859	1.0000								
DPO	-0.1209**	-0.0158	0.4208***	1.0000							
DIO	-0.0592	0.0097	0.0431	0.4076***	1.0000						
CCC	-0.0400	0.0102	0.0852	0.0368	0.8794***	1.0000					
CCE	-0.0736	0.0825	-0.0633	0.1830***	0.2468***	0.1527***	1.0000				
IAQ	0.0625	-0.0029	-0.1197**	-0.0657	-0.2049***	-0.2082***	-0.0091	1.0000			
LV	-0.2542***	-0.1905***	0.2052***	0.2526***	-0.1528***	-0.2818***	-0.1439***	0.0015	1.0000		
CR	0.1593***	0.0934*	-0.1092**	-0.1459***	0.2420***	0.3375***	0.1153**	0.0943*	-0.6777***	1.0000	
FS	0.1227**	0.0681	-0.2611***	-0.3232***	0.2420***	-0.1590***	-0.1136*	-0.0411	0.1097**	-0.0569	1.0000

Notes: Variables definitions are presented in Table 2. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

Regression Results

The Relationship between WCM and Firm Performance

The first hypothesis investigated the relationship between WCM and firm performance. The study employed the fixed effects model, consistent with Yang (2019). Next, the issue of serial/autocorrelation and heteroskedasticity was addressed by employing the Adjusted Driscoll and Kraay Standard Error to all models. The results are presented in Table 5, wherein columns (1) and (2) report the results for the dependent variable proxied by ROA and ROE, respectively.

Table 5 shows that coefficient of DSO is positive and insignificant in both ROA (β = 0.0495403, *p*-value>0.10) and ROE (β = 0.0909428, *p*-value>0.10) in columns (1) and (2) respectively. The results imply a positive relationship between DSO and firm performance. The positive relationships indicate that an increase in DSO by one day will result in a 0.0495403 increase in ROA and a 0.0909428 increase in ROE, respectively. However, the result cannot be substantiated because the *p*-value is insignificant. Thus, H1a is not supported. The results also are not in line with the finding and arguments of Deloof (2003), Lazaridis and Tryfonidis (2006), and Garcia and Martinez-Solano (2007). The coefficients of DPO are negative and significantly associated with ROA (β = -0.0011064, *p*-value<0.10) in column 1, implying a negative relationship between DPO and ROA. The negative relationship means that delaying payment to suppliers can be a source of free cash that can be used or committed to operations to enhance firm performance. In other words, this finding suggests that a decrease (delay) in DPO by one day will increase ROA by 0.0011064. The results are significant at 5% and support H1b.

Furthermore, this result is in line with the findings of Deloof (2003), Lazaridis and Tryfonidis (2006), Falope and Ajilore (2009), Banos-Cabaleno (2012) and Enqvist et al. (2014). In column 2, the coefficient of DPO negative but insignificantly associated with ROE (β = -0.0005458, *p*-value>0.10). The coefficient suggests that a one-day decrease in DPO will increase ROE by 0.0005458. However, the established relationship is insignificant, as such, H2b, which predicted a significant relationship between DPO and ROE, is not supported.

The coefficients of DIO are positive and significantly associated with both ROA (β = 0.0014634, p-value<0.10) and ROE (β = 0.0010269, p-value<0.10) in columns (1) and (2) respectively. The results imply a positive relationship between DIO and firm performance. Thus, an increase in the DIO by one day will increase ROA by 0.0014634 and ROE by 0.0010269, respectively. The results are statistically significant and support H1c. Further, they imply that the firms under investigation are more inclined to avoid a stock-out situation with considerable inventory if the possibility of increasing profit is greater (Blazenko and Vandezande 2002). These results are consistent with the findings of Mathuva (2000) but contradict the findings of Deloof (2003). As shown in Table 5, the coefficients of CCC are negative and significant related to both ROA (β = -0.0016416, p-value<0.10) and (β = -0.0011823; p-value<0.10) in columns (1) and (2) respectively. The negative relationships suggest that the lower the CCC, the higher the firm performance, which means that when CCC reduces by one day, ROA and ROE will increase by 0.0016416 and 0.0011823, respectively. These findings confirm that H1d is consistent with the findings of Deloof (2003), Nobanee et al. (2011), Murugesu (2013), and El-Maude and Shuaib (2016).

The coefficient of CCE is positive and significantly associated with both ROA (β = 0.6573459, p-value<0.10) and ROE (β = 0.6804594; p-value<0.10) in columns (1) and (2) respectively. The results suggest a positive and significant relationship between CCE and firm performance and thus support H1e. This result is consistent with the findings of Simon et al. (2018). The control variables (LV, CR, and FS) are consistent with prior literature. The results in column one (1) reveal that LV was negative and insignificantly related to ROA (β = -0.8693293, p-value>0.10). The results also showed that CR was positive but insignificantly associated with ROA (β = 0.075077, p-value>0.10). Similarly, FS was positive but insignificantly associated with ROA (β = 0.2308911, p-value>0.10). In column two (2), the results reveal that LV was positive but insignificantly related to ROE (β = 0.2623617, p-value>0.10). The results also showed that CR was negative but insignificantly associated with ROE (β = -0.021928, p-value>0.10). Consistent with this study's prediction, FS was positive and significantly associated with ROE (β = 0.8706429, p-value<0.10).

Table 5

Regression Results between WCM and Firm Performance using Driscoll-Kraay Standard Errors

	Model (1)		Model (2)	
Variables	**Coefficient**	***P*-value**	**Coefficient**	***P*-value**
DSO	0.0495403	0.883	0.0909428	0.681
DPO	-0.0011064	0.021**	-0.0005458	0.162
DIO	0.0014634	0.030**	0.0010269	0.069*
CCC	-0.0016416	0.028**	-0.0011823	0.040**
CCE	0.6573459	0.087*	0.6804594	0.007***
LV	-0.8693293	0.316	0.2623617	0.438
CR	0.075077	0.399	-0.021928	0.483
FS	0.2308911	0.583	0.8706429	0.033**
CONST.	-4.843154	0.276	-9.099457	0.021**
R-squared	6%		13%	
F-Value	16.200		25.81	
Prob>F	0.0001		0.0000	
Observation	341		341	

Notes: Table 10 presents the results of the models one and two. The dependent variables are ROA (Model 1) and ROE (Model 2), respectively. The independent variable is WCM measured by DSO, DPO, DIO, CCC, and CCE. The control variables are LV, CR, and FS. All variables are defined and described in Table 2 and are winsorised at the 3% and 97% levels. *, **, and *** indicate significance levels at the 0.10 level, 0.05 level, and 0.01 level, respectively.

The Moderating Effect of IAQ on the Relationship between WCM and Firm Performance

This section examines hypothesis two, which determines the moderating effect of IAQ on the relationship between WCM and firm performance. The study employed the fixed effects model. Next, we address the issue of serial/autocorrelation and heteroskedasticity by employing the Adjusted Driscoll and Kraay Standard Error to all models. The results are presented in Table 6, wherein columns (3) and (4) report the results for the dependent variable proxied by ROA and ROE, respectively. The results in column 3 show that the coefficient of AQ*DSO on ROA is negative and significant (β = -0.0056154; *p*-value<0.10), providing the first evidence in support of the prediction that IAQ moderates the relationship between DSO and firm performance (i.e., Hypothesis H2a.). In column 4, the results further show that, after replacing the proxy for the dependent variable, the

coefficient of AQ*DSO on ROE remains negative but statistically insignificant (β = -0.0004623; *p*-value>0.10). The results of ROE are inconsistent with Hypothesis H3a.

The results in Columns 3 and 4 show that the coefficients of the relationships between AQ*DPO and ROA (β = 0.0029718; *p*-value<0.10) and AQ*DPO and ROE (β = 0.001794; *p*-value<0.10) are positive and significant, respectively. Overall, the results of our analysis using the two proxies of firm performance (ROA and ROE) are statistically significant, suggesting that IAQ significantly moderates the relationship between DPO and firm performance. This finding lends further support to the main inference of this research and Hypothesis H2b. In other words, the findings support the thesis of the contingency theory and posit that high IAQ guides firms in optimising their payables in order to enhance their performance. Furthermore, the coefficients on the interaction term IAQ*DIO are significantly negative for both measures of firm performance, ROA (β = -0.0036652; *p*-value<0.10) and ROE (β = -0.0027349; *p*-value<0.10). This finding is consistent with the prediction that IAQ moderates the relationship DIO and firm performance and supports Hypothesis H2c. The evidence is also in line with the Contingency Theory's thesis, which implies that the impact of DIO on firm performance is contingent on the monitoring role of high IAQ.

The results presented in Table 6 reveal that the coefficients on the interaction term AQ*CCC are positive and significant for both measures of firm performance, ROA (β = 0.0040387; *p*-value<0.10) and ROE (β = 0.0018184; *p*-value<0.10). Taken together, the results obtained are consistent with the two measures of firm performance and provides additional support for Hypothesis H2d, which states that IAQ significantly moderates the relationships between CCC and firm performance. The results similarly support the argument of this paper and the thesis of the Contingency Theory. The results in Columns 3 and 4 of Table 6 also show that coefficients on the interaction of AQ*CCE are positive and significantly associated with both measures of firm performance, ROA (β = 1.160209; *p*-value<0.10) and ROE (β = 1.309171; *p*-value<0.10), suggesting that IAQ significantly moderates the relationships between CCE and firm performance. The results concerning the control variables are generally consistent with prior studies. In Column 3, the coefficient of Leverage (LV) was negative but insignificantly related to ROA. The CR was

positive and significantly associated with ROA, while FS was negative but insignificantly associated with ROA. In Column 4, the coefficient of LV is positive but insignificant. The coefficient of CR was negative and insignificant, while FS was positive and significant.

Table 6
Regression Results for the Moderating Effect of IAQ on the Relationship between WCM and Firm Performance using Driscoll-Kraay Standard Errors

	Model (3)		**Model (4)**	
Variables	**Coefficient**	***P*-value**	**Coefficient**	***P*-value**
DSO	0.6008009	0.261	0.0304895	0.890
DPO	-0.0025131	0.012**	-0.0016762	0.050**
DIO	0.0026111	0.004***	0.0022484	0.006***
CCC	-0.0030341	0.002***	-0.001934	0.002***
CCE	-0.4413164	0.024**	-0.2748251	0.168
IAQ	-0.1865352	0.237	-0.1368693	0.598
IAQ*DSO	-0.0056154	0.028**	-0.0004623	0.587
IAQ*DPO	0.0029718	0.004***	0.001794	0.046**
IAQ*DIO	-0.0036652	0.000***	-0.0027349	0.003***
IAQ*CCC	0.0040387	0.003***	0.0018184	0.001***
IAQ*CCE	1.160209	0.084*	1.309171	0.019**
LV	-0.0495195	0.935	0.4576703	0.188
CR	0.1917809	0.057**	-0.0095437	0.762
FS	-0.061981	0.842	0.6294212	0.040**
CONST.	-5.268279	0.174	-7.118181	0.028**
R-squared	13%		17%	
F-Value	101.90		49.93	
Prob>F	0.0000		0.0000	
Observations	341		341	

Notes: Table 6 presents the results of models three and four. The dependent variables are ROA (Model 3) and ROE (Model 4), and the independent variable is WCM measured by DSO, DPO, DIO, CCC, and CCE. The control variables are LV, CR, and FS. IAQ denotes internal audit quality while "*" represents the interaction sign. IAQ*DSO, IAQ*DPO, IAQ*DIO, IAQ*CCC, and IAQ*CCE indicate the interaction of IAQ with DSO, DPO, DIO, CCC, and CCE, respectively. All variables are defined and described in Table 2 and are winsorised at the 3% and 97% levels. *, **, and *** indicate significance levels at the 0.10 level, 0.05 level, and 0.01 level, respectively.

The Quadratic Relationship between WCM and Firm Performance

Table 7 presents the regression results of the quadratic relationship between WCM and firm performance. As discussed in the previous sections, two effects of WCM investment levels were created, and the results are presented in two columns of Table 7. The results of ROA are reported in Column 5, while the results of ROE are reported in Column 6. The regression results presented in Table 7 show that the R^2 for ROA is 14.93%. Consistent with expectation, DSO is positive and significantly associated with ROA at the 5% level (β = 3.713831; *p*-value<0.10) while DSO^2 was negative and significantly associated with ROA at the 5% level (β = -0.5361592; *p*-value<0.10). These results show that the relationship between DSO and ROA is quadratic, implying that an increase in DSO improves the performance to a point, after which further increase in DSO will reduce the performance of firms. This finding provides the first evidence in support of Hypothesis H3a.

In column 5, DPO is positive but insignificantly associated with ROA (β = 0.0027388; *p*-value>0.10) while DPO^2 was negative and significantly associated with ROA (β = -0.1140347; *p*-value<0.10). These results show that the relationship between DPO and ROA is quadratic, suggesting that an increase in DPO improves the performance to a point, after which a further increase in DPO will reduce the performance of firms. While the results obtained between DPO and ROA were insignificant, the relationship between DPO^2 and ROA was marginally significant at the 10% level. However, it provides the first evidence in supports of H3b, which predicts a quadratic relationship DPO and ROA.

The results presented in column 5 of Table 7 shows that DIO and DIO^2 are consistent with expectations. DIO is negative and significantly associated with ROA (β = -0.0016353; *p*-value<0.10) while DIO^2 is positive and significantly associated with ROA (β = 0.1543782; *p*-value<0.10). These results show that the relationship between DIO and ROA is quadratic, implying that an increase in DIO will improve the performance up to a point at which a further increase in DIO will begin to decrease firm performance. The quadratic relationship between DIO and ROA is consistent with expectations and thus supports H3c. The results in Column 5 also show that CCC is negatively and insignificantly associated with ROA (β = -0.0013977; *p*-value>0.10) while the CCC^2 is positive but insignificantly associated with

ROA (β = 0.0030104; *p*-value>0.10). Consistently, the negative relationship between CCC and ROA suggests that an investment in WCM increases firm performance to a "point" at which a further (higher) investment in WCM (denoted by CCC^2) will begin to reduce firm performance. Though the results were insignificant on both sides, their coefficients have the expected directions and thus provide initial evidence to support H3d, which predicted a quadratic relationship between CCC and ROA.

The last relationship examined in Table 7, Column 5, is between CCE and ROA. The results show that the CCE is negative but insignificantly associated with ROA (β = -3.161355; *p*-value>0.10), whereas CCE^2 is positive and insignificantly associated with ROA (β = 1.939313; *p*-value>0.10). Like the results between CCC and ROA, the relationship between CCE and ROA suggests that an increase in the efficiency with which working capital is managed will enhance firm performance to a "point" at which a further (higher) increase in the efficiency with which working capital is managed (denoted by CCE^2) will begin to decrease firm performance. Meanwhile, the results established were insignificant on both sides, but their coefficients have the expected directions and thus provide the first evidence to support H3e, which predicted a quadratic relationship between CCE and ROA. The results in Table 7, Column 5, also show that the control variable LV was significantly associated with ROA while CR and FS were insignificantly associated with ROA.

Table 7
Regression Results for the Quadratic Relationship between WCM and Firm Performance

Variable	Column 5 (ROA)	Column 6 (ROE)
DSO	3.713831(3.00)**	0.8680618(2.64)**
DSO^2	-0.5361592(-2.64)**	-0.090923(-2.35)**
DPO	0.0027388(1.79)	0.0014069(2.15)*
DPO^2	-0.1140347(-1.88)*	-0.0733316(-3.64)***
DIO	-0.0016353(-2.06)*	0.0002956(0.40)
DIO^2	0.1543782(2.55)**	-0.0322103(-1.32)
CCC	-0.0013977(-1.01)	-0.0001465(-.22)
CCC^2	0.0030104(0.06)	0.0495678(2.15)*
CCE	-3.161355(-108)	0.3498024(0.32)
CCE^2	1.939313(1.46)	-0.3830165(-0.45)
LV	2.348848(3.30)***	0.8705977(3.05)**
CR	0.2759939(1.56)	-0.0577087(-1.36)
FS	0.2285265(0.20)	1.395699(4.54)***
CONST.	-18.53313(-2.03)*	-14.61792(-4.70)***
R-squared	0.1493	0.2055
F-Value	143.17	2885.32
Prob>F	0.0000	0.0000
Observations	341	341

Notes: Table 7 presents the result of model 3, which determined the quadratic relationship between WCM and firm performance measured by ROA and ROE. The result of ROA is reported in column 1, while the result of ROE is reported in column 2. All variables are defined and described in Table 2 and are winsorised at the 3% and 97% levels. The results begin with their coefficients, t-statistics are in parentheses while *, **, and *** indicate significance at the 0.10 level, 0.05 level, and 0.01 level, respectively.

To further confirm the quadratic relationship between WCM and firm performance, the proxy for the dependent variable was replaced to confirm the consistency of the results. Thus, Column 6 of Table 7 presents the results of the quadratic relationship between WCM and ROE. The R^2 of the ROE model was 20.55%. The coefficient of DSO is positive and significantly associated with ROA (β = 0.8680618; p-value<0.10) while DSO^2 is negative and significantly associated with ROA (β = -0.090923; p-value<0.10). The results are significant at 5%, which is consistent with Hypothesis H3a. Consistent with expectations, the coefficient of DPO is positive and significantly associated with ROE β = 0.0014069; p-value<0.10), while DPO^2 is negative and significantly associated with ROE (β = -

0.0733316; *p*-value<0.10). These results show that DPO has a quadratic relationship with ROA. Importantly, the coefficients between DPO and ROE and DPO^2 and ROE were significant at the 10% level and 1% level respectively and lend support for Hypothesis H3b reported earlier.

The results in Column 6 of Table 7 also show that the coefficient of DIO is positive and insignificantly associated with ROE (β = 0.0002956; *p*-value>0.10) while DIO^2 is negative and insignificantly associated with ROE (β = -.0322103; *p*-value>0.10). The directions of the coefficients suggest that a quadratic relationship exists between DIO and ROE. The coefficients for DIO and DIO^2 are statistically insignificant but consistent with the prediction. Specifically, the result is inconsistent with Hypothesis H3c but supports the argument that the relationship between DIO and ROE is not linear. Regarding CCC, Column 6 show that the CCC is negative and insignificantly associated with ROE (β = -0.0001465; *p*-value>0.10) while the CCC^2 is positive and significantly associated with ROE (β = 0.0495678; *p*-value<0.10). Consistently, the negative relationship between CCC and ROE suggests that an investment in WCM increases firm performance to a "point" at which a further (higher) investment in WCM (denoted by CCC^2) will begin to reduce firm performance. This finding is consistent with Hypothesis H3d and therefore confirms the quadratic relationship between CCC and firm performance.

Finally, the coefficient of CCE is positive but insignificantly associated with ROE (β = 0.3498024; p-value>0.10), while the coefficient of CCE^2 is negative and insignificantly associated with ROE (β = -0.3830165; p-value>0.10). The relationship between CCE and ROE is quadratic and consistent with Hypothesis H3e. Regarding the control variables, the results in Column 6 of Table 7 show that the LV and FS were significantly associated with ROE while CR was insignificantly associated with ROE.

CONCLUSION

This study examines the moderating effect of IAQ on the relationship between WCM and firm performance. This research moves beyond impact-based and descriptive studies, which are typical in the WCM literature, and present an empirical work that attempts to

link WCM to IAQ. The direct relationship between WCM and firm performance in the UAE was first re-examined to test this conjecture. Some evidence was found that WCM matters to firms in the UAE. Specifically, a positive relationship was found between firm performance and DSO, DIO, and CCE. While DPO and CCC were negatively associated with firm performance, these results are consistent and robust concerning multiply measures of firm performance, including ROA and ROE.

Next, the study investigates whether the relationship between WCM and firm performance is conditional on IAQ drawing insights from Contingency Theory (Donaldson 2001) and Baron and Kenny (1986). The findings indicate that IAQ significantly moderates the relationship between WCM and firm performance. In other words, the finding indicates the impact of WCM on firm performance enhances with higher IAQ. This evidence is consistent with the argument that the monitoring role IAQ provides through their skills, expertise, and experiences serves as a useful tool to curb operational and financial mismanagement and ineptitude, which in turn enhances their financial performance.

For a comprehensive working capital policy, the study considered objective three, which examined the quadratic relationship between WCM and firm performance in the UAE. The findings revealed that the relationship between WCM (i.e., DSO, DPO, DIO, CCC, and CCE) and firm performance is quadratic and not linear. This implies that the level of investment in WCM, either excess or inadequate, has implications that are undesirable for a firm. Thus, firms should maintain an optimal level of investment in WCM for performance to ensue. This finding is consistent with the previous studies of Banos-Cabellero et al. (2014), Nha and Loan (2015), Pais and Gama (2015), Afrifa and Padachi (2016), Lyngstadaas and Berg (2016) and Simon et al. (2018).

Overall, this study complements a growing body of research on working capital. The research adds to a greater understanding of working capital literature by providing the first novel evidence that high IAQ has a significant effect on the relationship between WCM and firm performance. In addition, the study contributes to the literature by providing the first evidence on the quadratic nature of the relationship between WCM and firm performance from the UAE context. Collectively, these results are expected to inform

managers and regulators on the incremental role of internal auditors (IAQ) in a firm. This is in terms of supervision and monitoring mechanism which enhances their understanding of control activities that can address the primary WCM variables, which in turn can enhance firm performance and help to drive development.

Limitations and implications for future research

The findings of this study come with several caveats, which nevertheless provide an avenue for future research. First, this study was conducted in a single country context, with a small sample size. This means that our empirical analysis relies on only UAE data. Thus, the findings may not be generalised to countries within the same region. Future studies could consider other countries in the region and make a comparison with our findings. Second, the study is limited to internal auditors. Thus, further studies could use other proxies that measure IAQ, such as audit fees. Nevertheless, the results of this study provide sufficient evidence to spur the argument on the moderating effect of IAQ on the relationship between WCM and firm performance in the UAE.

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