

# Working capital and financial performance in MENA region

Financial  
performance

Osama EL-Ansary and Heba Al-Gazzar

*Department of Business Administration, Cairo University, Giza, Egypt*

257

## Abstract

**Purpose** – This paper aims to investigate the possible non-linear effect of net working capital (NWC) level on profitability for Middle East and North Africa (MENA) region listed companies. Furthermore, the study tests the possible interactive effect of cash levels on the relationship between NWC and profitability.

**Design/methodology/approach** – NWC level is the independent variable and profitability is the dependent variable using two proxies, return on assets (ROA) and returns on equity (ROE). Control variables are size, leverage, gross domestic product growth and sales revenue growth. The generalized method of moments was used to analyze the data of 134 consumer-goods listed firms in 12 MENA countries for the period 2013–2019.

**Findings** – The results demonstrate that NWC levels had a non-linear effect on profitability using ROA as a profitability proxy while results were insignificant using ROE as a profitability proxy. Furthermore, results show the absence of interactive effects between NWC, cash levels and both profitability proxies.

**Originality/value** – The study fills a gap in the working capital management (WCM) literature by providing new evidence on WCM's non-linear effect of corporate performance in the MENA region emerging markets using the consumer-goods industry sample. The study contributes to the financial managers' working capital optimization efforts in the MENA region by providing evidence on the usefulness of WC optimization efforts in the region from a financial performance point of view. According to the researchers' knowledge, a few studies attempted to investigate this non-linear relationship for neither MENA region countries nor the consumer-goods industry.

**Keywords** GMM, Working capital management, MENA, Cash holdings, Consumer goods firms

**Paper type** Research paper

## 1. Introduction

Many of the emerging markets in the Middle East and North Africa (MENA) region, which comprises 19 developing countries, are still recovering from the 2008 crisis and the region's extreme political instability, according to the World Bank Publications (2017). The markets are yet suffering from slow growth, with fiscal deficits expected to widen and investments expected to decline.

This region's general economic condition has many implications, necessitating effective working capital management (WCM). According to the World Bank Publications (2017), while most countries in the region have equity markets and a sophisticated banking system,

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access to finance by the private sector is limited. Indeed, according to [The Organization for Economic Co-operation and Development \(OECD\) \(2008\)](#), internal funds represented the main source of funds to firms in the MENA region. The reasons pull back to high-interest rates, high economic uncertainty and higher overall collateral required by banks, which makes short-term funds more accessible and longer-term funding less available. The higher importance of efficient WCM in developing countries is even more vital for production-oriented firms whose current assets (C/A) comprise a large proportion of its total assets such as inventory ([Horne and Wachowitz, 1998](#)).

Many studies have investigated the linear effect of efficient WCM on corporate performance. Only recently, [Baños-Caballero \*et al.\* \(2014\)](#) revealed for the first time the existence of a non-linear relation between working capital and corporate performance, implying the existence of an optimal working capital investment level that can maximize corporate returns. With the daily remarkable effort that financial managers exert to manage and optimize their working capital levels, these results have important practical implications.

Being recently proposed and confirmed by several later studies ([Mun and Jang, 2015](#)), a wide literature gap exists in confirming the existence of this effect in different industries and under different market structures. Specifically, to the researchers' knowledge, no study attempted to investigate this non-linear relationship for neither developing countries nor the consumer-goods industry.

This paper aims to fill this gap in the literature by answering the following question: considering a possible non-linear relationship, what is the effect of net working capital rate (NWCR) level on profitability (return on assets (ROA)/returns on equity (ROE))? Furthermore, the study tests the possible interactive effect of cash levels on the relationship between net working capital (NWC) and profitability. To test the validity of the study hypotheses for listed consumer-goods firms in the MENA region for the period 2013 to 2019, the generalized method of moments (GMM) was used.

The paper is divided into seven sections, starting with the introduction and followed by WCM strategies and policies in Section 2 and the literature review in Section 3. In Section 4, hypotheses are developed. Section 5 presents the followed methodology and Section 6 reports the empirical evidence. Section 7 concludes the paper and spotlights practical implications, study limitations and future research.

## 2. Working capital strategies and policies

WCM is an increasingly vital area in firm finance. In this section, we will shed light on the strategies, concepts, policies and decisions that were introduced in the literature. We found the following five directions in the academic research, namely, working capital investment (WCI) and working capital finance (WCF), conservative and aggressive, maturity matching, speed adjustment for financial crises and cash holding decision and permanent versus seasonal cash flows.

The first direction explains how WC could be managed to finance C/A as a short-term investment WCI, simultaneously, selecting the appropriate current liabilities (C/L) as short-term sources of finance WCF. Achieving the required balance between short-term sources of finance and short-term investments in C/A is a real challenge facing professional financial managers to avoid solvency/deficit and to increase profitability. Besides, achieving wealth maximization for shareholders. Most of the previous studies confirmed the fact that WCM selected policy has an impact on its financial performance ([Altaf and Ahmad, 2019](#); [Baños-Caballero \*et al.\*, 2019](#)).

If the financial manager achieves the balance between allocating investments in C/A and financing WC this decision is known as a WC policy (Altaf and Ahmad, 2019). Successful selection of WCM policy will directly lower/affect the firm's cost, risk, sustainability and increase profitability as pointed out by many authors (Peng and Zhou, 2019; Salehi, Mahdavi, Dari, and Tarighi, 2019; Laghari and Chengang, 2019).

Second, the WCM policy could be conservative or aggressive. Conservative policy focus on allocating large funds in C/A financed by low short-term sources of C/L or aggressive policy where allocating small funds in C/A, which are financed by a large volume of short-term sources of finance, as pointed out by Altaf and Ahmad (2019) and Kayani, De Silva, and Gan (2019). The trade-off between using the conservative or aggressive strategies for WCM may result in a non-linear relationship (inverted U-Shape) between WC finance and firm financial performance as found by Baños-Caballero *et al.* (2012); Mun and Jang (2015), Singhania and Mehta (2017); Altaf and Shah (2017), Laghari and Chengang (2019); Altaf and Ahmad (2019). They reported a concave relation between corporate profits and WCM. The simple definition for the inverted U-Shape (concave) relationship between corporate profits and WCM was explained by Altaf and Ahmad (2019, p. 473) "[...] when firms finance working capital with lower levels of short-term debt, firm performance improves while with the higher level of short-term debt used to finance working capital, firm performance decreases."

The third direction emphasizes the maturity structure for C/A and C/L. Many firms in the emerging market do not achieve the appropriate matching between C/A and C/L maturities. WCM theory focused on financing working capital through short-term sources of finance but empirically it is not observed as pointed out by Chauhan (2019).

The fourth direction relates to the speed adjustment of firm WC during a crisis that is very significant to achieve or at least to sustain their performance. Tsuruta (2019, p. 206) examined the effect of the financial crises on WCM and stated that "[...] to finance any access working capital, firms borrow from banks and reduce their internal cash both during and outside the period of crisis."

The fifth direction is concerned with the cash holding decision. Mun and Jang (2015) examined the interaction relationship between cash holding and WCM policy impact on a firm's profitability. They found that the corporate's optimal cash level is one of the important factors for profitability. Their results stated that: "[...] interactive effects exist among working capital, cash levels and profitability" (Mun and Jang, 2015, p. 1). Thus, for one of our research hypotheses, we used the assumption related to the interaction between WCM, cash Levels and profitability developed by Mun and Jang (2015) to test the inter-relationship between WCM and profitability. Studies extended this direction according to whether a firm faces permanent versus seasonal cash flow. As stated by Ismail (2017), firms' WC needs will increase during special seasons because of high sales and then decline as the collection from clients for accounts receivables (A/R) is more than sales.

### 3. Literature review

The objective of this section is to cast light on recent research related to the relation between WCM and firm performance. This section is divided into three parts. Part one is devoted to illustrate the relationship between WCM and profitability and part two addresses profitability proxies and finally, part three explains the interrelationship between investment in working capital and cash holding levels.

#### 3.1 Working capital management and profitability

WCM is a vital element of corporate finance that requires considerable time in its day-to-day decisions. According to Ernst and Young (2018) report on working capital practices in the

MENA region, \$32.7bn worth of cash opportunity has been identified in 2017. [Pirttilä et al. \(2020\)](#) have found that firms operating with efficient WCM policies are usually their supply chains' leaders and are usually considered powerful actors. WCM is important for investors as well. [Dhole et al. \(2019\)](#) showed that analysts seem to consider WCM of firms when setting the one year ahead of target price.

WCM is concerned with managing a firm's short-term capital, as per [Chiou et al. \(2006\)](#) definition. Short-term capital comprises C/A and C/L that companies use to run their daily business and operations. One measure that managers use to keep track of their working capital levels is the cash conversion cycle (CCC), which mirrors the period amid the corporate cash payments to its suppliers and the time it collects its receivables from customers.

Many studies tested the relationship between working capital and the firm's performance. The results fall into two competing views.

Under one point of view, further investments in working capital are expected to have upside effects on a firm's financial performance especially for firms with a low level of NWC. The rationale is intuitive. According to [Blinder and Maccini \(1991\)](#), [Fazzari and Petersen \(1993\)](#); [Corsten and Gruen \(2004\)](#), holding larger levels of inventories can decrease costs of supply, hedge against input price uncertainty and prevent operational disruptions and loss of business opportunities due to stock-outs. Granting trade credit also positively affects the sales of the firm because it can act as an effective price-cut, serve as a pledge for product quality and nurtures long-term customer relationships ([Wilson and Summers, 2002](#); [Brennan et al., 1988](#); [Long et al., 1993](#)).

Another strong explanation for the incentive of firms to hold positive NWC is that it may act as a source of internal funds that secures precautionary liquidity ([Fazzari and Petersen, 1993](#)). Furthermore, maintaining positive NWC levels allows a firm to receive a supplier's early payment discounts and enhances the firm's stakeholder relationships ([Wilner, 2000](#); [Ng et al., 1999](#)). [Pestonji, and Wichitsathian \(2019\)](#)'s study also revealed a statistically significant positive relationship between working capital investment policy and profitability when they examined a sample of 68 companies listed in the Stock Exchange of Thailand covering the production sector.

Despite all these tempting reasons to raise NWC levels, there are adverse effects on firm value as the working capital level rises beyond a certain point. Many studies have revealed such a negative relationship between a corporation's profitability and working capital levels such as [Wang \(2002\)](#); [Jose, Lancaster, and Stevens \(1996\)](#); [García-Teruel and Martínez-Solano \(2007\)](#); [Dong and Su \(2010\)](#); [Baños-Caballero et al. \(2014\)](#). Likewise, applying his study on the real estate and construction sector of UAE, [Mehta \(2014\)](#) found that the longer the CCC, the lesser will be the profitability.

The analogous results root from different intuitive reasons such as that holding inventory stock requires bearing additional costs as warehouse and insurance that increases as inventory levels rise, according to [Kim and Chung \(1990\)](#). Raising working capital levels also entails higher financing and opportunity costs, which, in turn, increases credit risk ([Kieschnick et al., 2013](#)). Firms and practitioners are, therefore, aware that increasing working capital levels beyond a certain point put them under higher risk of financial distress and bankruptcy besides locking up more cash ([Deloof, 2003](#)).

Recently in literature, combining these potential benefits and costs has produced several studies confirming a non-linear effect of working capital levels on firms' financial performance, with the expectations of a negative relation at a high level of working capital (i.e. overinvestment in NWC) and a positive relation at a low level of working capital (i.e. underinvestment in NWC). Using a sample of small and medium-sized

enterprises (SMEs), [Baños-Caballero et al. \(2012\)](#) also found a non-monotonic relationship between working capital level and firm profitability.

[Baños-Caballero et al. \(2014\)](#) later raised an argument in 2014 that there is an inverted U-shaped relationship between a firm's net trading cycle (a proxy used for WCM) and its performance, measured as the sum of the market value of equity and the book value of debt to the book value of assets. They suggested that a firm should increase investments in working capital to increase the firm's sales and early payment supplier's discounts. This should be limited, however, to a certain point where longer net trading cycles result in lower firm performance. Implications of this new evidence in working capital literature suggest that managers should maintain an optimal level of working capital that balances the tradeoffs and maximizes the firm's performance.

In 2015, [Mun and Jang \(2015\)](#) have criticized [Baños-Caballero et al. \(2014\)](#)'s approach in measuring WCM using CCC because it fails to capture the whole picture of WCM by ignoring the role of cash level. They argued that the effect of working capital investments on profitability would differ according to the cash level held by the firm. They also added to their criticism that a firm's value is affected by other aspects, beyond just operational ones, in their WCM measure.

Accordingly, [Mun and Jang \(2015\)](#) tested for non-linearity in the relationship between WCM using the traditional NWC measure and firm's profitability (using operating return on assets (OROA) as a proxy). Their results revealed a significant inverted-U shaped relationship between WCM and profitability, consistent with [Baños-Caballero et al. \(2014\)](#). The cash levels showed a significant interactive effect on the relationship between working capital and the firm's profitability only when working capital levels were positive. Similarly, in 2015, [Aktas et al. \(2015\)](#) reached similar conclusions for a comprehensive US sample over 30 years.

Evidence in the literature showed that the relationship between working capital and corporate performance is not static. [Baños-Caballero et al. \(2016\)](#)'s study reports that working capital requirement financing-performance relation changes during a financial crisis. As he studied a sample of 6,926 non-financial UK SME's for the period from 2004–2013, [Afrifa \(2016\)](#) recorded similar findings. Similarly, [Dalci and Ozyapici \(2018\)](#)'s study reveals a non-linear relationship between working capital and profitability with different leverage levels as a moderating variable. More similar results were reported ([Altaf and Ahmad, 2019](#); [Altaf and Shah, 2018](#)).

Literature has extended the testing of this possible nonlinearity in working capital-corporate performance relationship to emerging markets. [Altaf and Shah \(2017\)](#)'s study on 437 non-financial Indian companies confirmed the inverted U-shape relationship between WCM and firm performance. In 2019, [Laghari and Chengang \(2019\)](#)'s study using a large sample of Chinese listed corporations over the period 2005 to 2015, their study revealed a significant reverse U-shaped relationship between WC and corporate profitability. [Singhania and Mehta \(2017\)](#) also found similar results using financial data of listed firms in 11 economies of the Asia Pacific region. Also, despite finding that the relationship between working capital and corporate performance is negative, [Wang, Akbar, and Akbar \(2020\)](#) reported that this relationship is not static across different stages of a firm's life cycle ([Laghari and Chengang, 2019](#)).

In his study, [Abuzayed \(2012\)](#) found that the CCC has a positive effect on the firm's profits. This designates that more profitable firms have weaker motives for managing their working capital levels. Moreover, financial markets failed to punish managers for inefficient WCM in emerging markets suggesting that policymakers in emerging markets need to

encourage managers and shareholders to care more about managing their working capital through enhancing investors' awareness and improving information transparency.

On the contrary, to examine the impact of WCM on corporate performance and value using a sample of Egyptian firms, [Moussa \(2018\)](#)'s study demonstrated a positively associated with CCC length, failing to achieve optimum efficiency of WCM performance.

### *3.2 Profitability proxies*

Authors in working capital literature used either ROA, OROA and/or ROE as measures of firm profitability. [García-Teruel and Martínez-Solano \(2007\)](#) examined the effects of WCM on profitability. Their sample covered small and medium enterprises in Spain, and they used ROA as a profitability proxy. [Wang \(2002\)](#) on 1,555 Japanese companies and 379 Taiwanese companies for a period from 1985 to 1996, used OROA and pre-tax ROE as operating performance proxies. A similar study context was conducted earlier by [Jose et al. \(1996\)](#) using both OROA and pre-tax ROE on a big sample of 2,718 corporations from 1974 to 1993. Besides, [Prasad et al. \(2019\)](#) have developed a multiplier of working capital efficiency that directly measures the WCM's profitability and is a product of three elements, namely, a ratio of the sum of trade receivables and inventories to trade payables, the ratio of NWC to net sales and weighted average cost of capital.

Another widely cited study investigating the relationship between the efficiency of WCM and its profitability was published by [Shin and Soenen \(1998\)](#), who investigated 58,985 samples in 8 industries for the period 1975–1994. ROA and the return on sales were used to measure profitability.

Based on these studies, we adopt two measures of profitability. First, because we are interested in the effect of NWCR levels on operating performance, we used net operating ROA as a profitability proxy measured as earnings before interest and taxes (EBIT) divided by total assets.

Second, while ROA measures the efficiency of the firm's management and is of great importance to a manager's performance evaluation, ROE on the other side is of more interest to another stakeholder; that is stockholders. According to [Hagel et al. \(2010\)](#), in their Harvard business review article, "most analysts and investors tend to focus on ROE as their primary measure of company performance [. . .], which focuses on return to the shareholders of the company." Although the former authors have preferred ROA as a more accurate financial performance metric, nonetheless, the management of liquidity affects a firm's debt structure because it involves mutually the management of assets and liabilities. Therefore, using both metrics as financial performance proxies allows us to split asset management and financing influences on profitability ([Jose et al., 1996](#)).

### *3.3 Investment in working capital and cash holding levels*

Cash is the most liquid, but least profitable asset. The benefits of holding cash go back to 1934 when [Keynes \(1934\)](#) explained the precautionary and transaction motives of holding cash.

Holding cash, however, does come with drawbacks. As [Kim et al. \(1998\)](#) stated, liquid assets have low returns and lead to higher taxation. Furthermore, high levels of cash holdings create more agency problems, according to [Jensen \(1986\)](#). Firms, should, therefore, target an optimal cash level that balances both marginal returns and costs of holding cash, as per the tradeoff theory.

Four critical factors explain the variance in corporate cash holdings, according to [Bates et al. \(2009\)](#): cash flow volatility, working capital, capital expenditures and R&D expenditures. The researchers examined cash flow uncertainty in American firms

throughout the period 1980 up to 2006. Their study revealed that as cash flows become riskier and account receivables are reduced, a firm will tend to hold higher cash levels, supported by a similar conclusion by [Campbell and Shiller \(2001\)](#), [Irvine and Pontiff \(2008\)](#).

The role of cash in the working capital-corporate performance relationship was indirectly evident in a study by [Tsuruta \(2019\)](#) using quarterly firm-level data of listed firms in Japan, who found that working capital adjustments were weaker during the crisis. Furthermore, the negative relationship between excess working capital and corporate performance became significantly higher during crisis times, specifically for large corporations. Nevertheless, evidence point that this crisis-related working capital–firm performance effect does not continue for prolonged periods because to finance any excess working capital, corporations borrow from banks and lessen their cash throughout periods of crisis and beyond.

Generally, small-sized companies tend to hold more cash because of their higher operating and financial risks, relative to their bigger counterparties ([Fazzari and Petersen, 1993](#); [Opler, Pinkowitz, Stulz, and Williamson, 1999](#); [Kim \*et al.\*, 1998](#)). They debate that high cash flow volatility and strong growth opportunities bring firms to hold higher cash levels than their opposites, while bigger firms with higher credit ratings; and therefore, have a better ability to raise capital from debt and equity markets, hold less cash.

According to this review on cash holdings literature, “[. . .] the relationship between a firm’s capability to generate cash from operations and the level of actual cash holdings is important to understanding a firm’s WCM” ([Mun and Jang, 2015](#), p. 3). Specifically, if a firm can generate cash from operations and/or able to turn working capital to cash smoothly and timely, then one might expect it to hold less cash on hand. A firm holding simultaneously positive NWC and positive cash holding positions imply that working capital is mainly driven to positive values by cash assets rather than non-cash assets (inventories, accounts receivables and accounts payable). This might be the reason for the inability to turn non-cash working capital assets to cash quickly or because of higher business risks. For either reason, the firm incurs opportunity costs, which negatively affect its profitability. While holding positive levels of working capital may have negative effects on a firm’s financial performance as hypothesized in the previous section, it can be expected that holding positive cash levels will increase the steepness of the negative relation between positive WC and financial performance.

On the contrary, a firm with a positive NWC level and a negative cash holding level signals the dominance of the non-cash assets in generating positive NWC values. This implies a good ability of a firm to generate internal cash easily, and thus, holding negative cash levels, which are rather invested in accounts receivables, inventory or paying off accounts payable to enhance the performance of its operations. In other words, a firm that aims to increase working capital targets non-cash asset increases rather than cash holdings. One would expect that the negative relationship between NWCR and profitability will be enhanced by holding negative cash levels. Therefore, the researchers propose that the level of cash has an interactive effect on the effect of NWCR on profitability (using ROA and ROE).

A firm, on the other side that holds negative NWCR levels, but a positive cash level might imply insufficient cash generated internally. With the motives of holding cash reviewed earlier, we expect such firms with weak cash-generating abilities to hold positive cash levels. Thus, these firms are likely to increase their NWC levels by rather increasing cash levels than non-cash assets, which imply higher opportunity costs. Consequently, the positive effect of NWCR and profitability is expected to worsen by holding positive cash levels.

In the case of both negative NWCR and cash holding levels, implications are mixed. First, a negative cash holding level might signify a good cash generation capability where firms would rather increase the non-cash assets portion of the working capital to achieve operational benefits than increasing cash levels. Accordingly, the positive relationship between negative NWCR and profitability is expected to improve. If this situation, however, implies a bad cash-generating ability, the probability of the firm to survive is doubtful and should not be considered in the analysis.

#### 4. Hypotheses development

##### 4.1 Net working capital level and profitability

Controversial results on the effect of NWC levels on profitability go back for decades in the literature as presented in the previous section. These competing views about the effect of NWC investments on profitability have produced recent studies suggesting an inverted U-shaped relationship between NWC and firm's profitability such as [Baños-Caballero et al. \(2014\)](#); [Mun and Jang \(2015\)](#).

To test this possible non-linear relationship, this paper divided the sample into two groups according to their WCR levels (positive and negative) and hypothesized the following:

- H1. "There is a statistically non-linear effect of NWC on profitability."
- H2. "If a firm's NWC is positive, there is a statistically negative effect of NWC on profitability."
- H3. "If a firm's NWC is negative, there is a statistically positive effect of NWC on profitability."

The independent variable is NWCR measured as the NWC divided by sales to provide a relative measure across different countries and currencies. NWC is the difference between C/A and C/L; both classified into cash and non-cash items.

To measure profitability, the study uses two proxies, one at a time, to explore the effect of NWC on different proxies for profitability, namely, OROA and ROE. OROA measures the effect of NWC levels on operating performance, measured as EBIT divided by total assets. ROE, on the other hand, is of more interest to stockholders. Testing both metrics as profitability proxies allow us to separate asset management and financing influences on profitability ([Jose et al., 1996](#)).

##### 4.2 Cash holding level

"The relationship between a firm's capability to generate cash from operations and the level of actual cash holdings is important to understanding a firm's WCM" ([Mun and Jang, 2015](#)). Their study showed a significant interactive impact of cash holding levels on the relation between working capital and the firm's profitability only when working capital levels were positive.

To test for the presence of the interaction effect of cash level, this paper further divided the firms into two sub-groups according to their cash holding levels (positive and negative, using a dummy variable for cash levels; (1) for positive and (0) for negative, hypothesizing the following:

- H4. "If a firm's NWC is positive, the negative effect of its NWC on profitability will significantly differ based on its cash level (positive or negative)."

*H5.* “If a firm’s NWC is negative, the positive effect of NWC on profitability will significantly differ based on its cash level (positive or negative).”

Cash level is measured using the cash level rate (CASHR) calculated as cash and cash equivalents minus current debts.

## 5. Methodology

### 5.1 Samples and data

The sample analyzed covers 134 listed consumer goods corporations in the MENA region from the period 2013 to 2019. A specific industry has been analyzed because the WCM practices differ between industries suggesting the non-homogenous effects of WCM on different corporate performance metrics (Boisjoly *et al.*, 2020). Therefore, our study focuses on a certain sector because of the different practices and norms across different industries (Chauhan, 2019).

The financial data in this paper comes from the annual financial statements on the Decypha database ([www.decypha.com](http://www.decypha.com)). To include the economic cycle effects on working capital investment levels, the researchers gathered the annual gross domestic product (GDP) growth data for the MENA region countries from the World Bank database ([www.worldbank.org](http://www.worldbank.org)).

The study follows the industry classification standards of FTSE Russell Industry classification standard (2018). According to FTSE Russell Industry classification standard (2018), the consumer goods industry includes the following super-sectors, namely, automobiles and parts, food and beverages, personal and household goods, which are further divided into sectors and sub-sectors. Table 1 below illustrates the sample details.

### 5.2 Model specification and methodology

To test *H1* of a possible concave relationship between working capital and firm profitability, we estimate the following quadratic model using two profitability proxies interchangeably, namely, ROA and ROE. Table 2 follows with variables description.

*Model (1):*

#	Country	No. of listed corporations analyzed	Country's share from total sample "Rounded figures" (%)
1	Egypt	37	27
2	United Arab of Emirates	9	6
3	Morocco	8	5
4	Saudi Arabia	16	12
5	Kuwait	4	3
6	Qatar	4	3
7	Oman	16	12
8	Palestine	6	4
9	Tunisia	14	10
10	Iraq	12	9
11	Bahrain	2	1
12	Jordan	6	4
	Total	134	100%

**Notes:** According to the World Bank, the MENA region comprises 19 countries. Our sample only covered 12 countries excluding Yemen, Djibouti, Algeria, Iran, Lebanon, Libya and Syria due to data unavailability or firms listed had mixed lines of business besides consumer goods

**Table 1.**  
Study sample

**Table 2.**  
Variables description  
table

Variable	Acronym	Formula	Description and citation
<i>Dependent variable/s</i>			
Return on assets	ROA	$\frac{\text{Earnings before interest and tax (EBIT)}}{\text{EBIT/total assets}}$	<p>Following <a href="#">Jose et al., 1996</a>; <a href="#">Wang, 2002</a> we apply both ROA and ROE to separate asset management and financing influences on profitability</p> <ul style="list-style-type: none"> <li>- ROA, used as a profitability proxy, is calculated using EBIT to reflect the net operating profits of the firm and avoid non-homogenous interest and tax rates across countries</li> <li>- Authors who used ROA as a profitability proxy (<a href="#">Wang, 2002</a>; <a href="#">Falope and Ajilore, 2009</a>; <a href="#">Şen et al., 2009</a>; <a href="#">Alaymasab and Davoudi, 2013</a>; <a href="#">Erasmus, 2010</a>; <a href="#">Pirttilä et al., 2020</a>; <a href="#">Singhania and Mehta, 2017</a>; <a href="#">Laghari and Chengang, 2019</a>; <a href="#">Baños-Caballero et al., 2012</a>)</li> </ul>
Return on equity	ROE	$\frac{\text{Net income divided by total shareholders' equity}}{\text{income/Shareholder's equity}}$	<p>ROE, used as another profitability proxy that reflects a more investor-oriented profitability proxy and reflects firms' financing strategies</p> <ul style="list-style-type: none"> <li>- Authors who used ROA as a profitability proxy (<a href="#">Wang, 2002</a>; <a href="#">Samiloglu and Akgün, 2016</a>; <a href="#">Sharma and Kumar, 2011</a>; <a href="#">Jose et al., 1996</a>)</li> </ul>
<i>Independent variables</i>			
Net working capital rate	NWCR	$\frac{\text{Inventories} + \text{Trade Receivables} - \text{Trade Payables}}{\text{Sales}}$	Working capital level neutralized across firms by dividing net working capital by sales ( <a href="#">Tsuruta, 2019</a> ; <a href="#">Hill et al., 2010</a> ; <a href="#">Aktas et al., 2015</a> ; <a href="#">Afrifa, 2016</a> )
Control variables	Firm size	Natural logarithm of total assets	Size is controlled because of the economies of scale concept that directly affect firms' profitability ( <a href="#">Laghari and Chengang, 2019</a> ; <a href="#">Baños-Caballero et al., 2012</a> ; <a href="#">Wang et al., 2020</a> ; <a href="#">Moussa, 2019</a> ; <a href="#">Şen, et al., 2009</a> )
Leverage	LEV	Total liabilities divided by total assets	Leverage affects working capital management practices and is controlled for in this study ( <a href="#">Laghari and Chengang, 2019</a> ; <a href="#">Baños-Caballero et al., 2012</a> ; <a href="#">Wang et al., 2020</a> ; <a href="#">Moussa, 2019</a> )
Sales growth	Growth	Sales growth rate calculated as = $\frac{(\text{Sales}_n - \text{Sales}_{n-1})}{\text{Sales}_{n-1}}$	Sales growth is used as a proxy for firm growth that directly affects working capital management practices

(continued)

Variable	Acronym	Formula	Description and citation
Cash level	Cash	(Cash and cash equivalents)/sales	(Laghari and Chengang, 2019; Baños-Caballero <i>et al.</i> , 2012; Wang <i>et al.</i> , 2020; Afrifa, 2016; Hill <i>et al.</i> , 2010) To test whether cash levels play a moderating role in the relationship between working capital and profitability, cash level was used as a dummy variable and an interaction term “cash level * NWCR” is added to the model. For authors who used cash as a control variable (Afrifa, 2016; Laghari and Chengang, 2019)
Economic growth	GDP	Real GDP growth rate calculated as = $(GDP_n - GDP_{n-1})/GDP_{n-1}$	Because this study applies cross-country analysis, it controls for different gross domestic growth rates and different inflation levels. According to Baños-Caballero <i>et al.</i> (2019), the value of net working capital varies across countries and that it depends on both investor protection and a country's financial and economic development (Wang <i>et al.</i> , 2020; Altaf and Shah, 2018; Tsuruta, 2019; Moussa, 2019)

Table 2.

$$\text{Profitability} = \beta_0 + \beta_1 * \text{ROA} / \text{ROE}_{i,t-1} + \beta_2 * \text{NWCR}_{i,t} + \beta_3 * \text{NWCR}_{i,t}^2 + \beta_4 * \text{Size}_{i,t} + \beta_5 * \text{GROWTH}_{i,t} + \beta_6 * \text{LEV}_{i,t} + \beta_7 * \text{GDP}_{kt} + a_i + \varepsilon_{i,t}$$

where:

$\text{ROA}_{i,t}$ : Operating Return on Assets using EBIT as a proxy for operating income for companies  $i$  at time  $t$ .

$\text{ROA}_{i,t-1}$ : ROA one-year lag.

$\text{ROE}_{i,t}$ : Return on Equity for firm  $i$  at time  $t$ .

$\text{ROE}_{i,t-1}$ : ROE one-year lag.

$\beta_0$ : Constant.

$\text{NWCR}_{i,t}$ : Net Working Capital divided by Sales for firm  $i$  at time  $t$ .

$\text{NWCR}_{i,t}^2$ : Net Working Capital divided by Sales all squared for firm  $i$  at time  $t$ .

$\text{Size}_{i,t}$ : The natural logarithm of total assets for firm  $i$  at time  $t$ .

$\text{GROWTH}_{i,t}$ : Sales growth rate for company  $i$  at time  $t$ .

$\text{LEV}_{i,t}$ : Leverage as the ratio of total liabilities to total assets for firm  $i$  at time  $t$ .

$\text{GDP}_t$ : Gross domestic product growth rate for country  $k$  at time  $t$ .

$\varepsilon_{i,t}$ : Error term.

$i$ : 134 Company in 12 MENA region countries (Consumer Goods Industry).

$t$ : From 2013 to 2019.

$k$ : 12 countries in the MENA region.

To further test the linear relationship between working capital and profitability “H2 and H3,” we estimate the following linear model:

*Model (2):*

$$\text{Profitability} = \beta_0 + \beta_1 * \text{OROA} / \text{ROE}_{i,t-1} + \beta_2 * \text{NWCR}_{i,t} + \beta_3 * \text{Size}_{i,t} + \beta_4 * \text{GROWTH}_{i,t} + \beta_5 * \text{LEV}_{i,t} + \beta_6 * \text{GDP}_t + a_i + \varepsilon_{i,t}$$

Upon testing the possible non-linear relationship between working capital and profitability, suggesting a possible optimal working capital level, we attempt to explore the impact of cash level on this optimal level. We estimate the following model to test this possible interaction effect as follows testing *H4* and *H5*:

*Model (3):*

$$\begin{aligned} \text{Profitability} = & \beta_0 + \beta_1 * \text{NWCR}_{i,t} + \beta_2 * \text{CASH}_{i,t}(\text{Dummy}) \\ & + \beta_3 * [\text{NWCR}_{i,t} * \text{CASH}_{i,t}(\text{Dummy})] + \beta_4 * \text{GROWTH}_{i,t} \\ & + \beta_5 * \text{Size}_{i,t} + \beta_6 * \text{LEV}_{i,t} + \beta_7 * \text{GDP}_t + a_i + \varepsilon_{i,t} \end{aligned}$$

To test whether the independent variables can explain the profitability’s variance significantly, this study applied regression analysis. Diagnostic tests were applied to test normality, multi-collinearity, heteroskedasticity, autocorrelation and heterogeneity to confirm whether the ordinary least squares (OLS) assumptions have been met or not.

Normality was tested using Jarque-Bera, which confirmed that none of the variables is distributed normally, but because of the large sample of the study (Field, 2009, p. 134) and the use of the GMM as a statistical tool of regression analysis, this will not cause major problems.

Besides, we used the variance inflation factor (VIF) to test the absence of multi-collinearity in our independent variables. A common cutoff value/point is a tolerance value of 0.10, which corresponds to a VIF of 10. As the largest VIF value was 1.8, we conclude the absence of multi-collinearity if the value is less than 10 as stated by [Sekaran and Bougie \(2009, p. 316\)](#).

The Hausman test was conducted to detect the endogeneity of unobserved errors and consequently select among fixed-effects and random-effects models. Because the data is unbalanced, we favored a random-effects model over a fixed-effects model as per [Bell and Jones \(2015\)](#) because it is more capable of controlling unobserved heterogeneity, and, hence, mitigate the risk of attaining inclined results stemming from this heterogeneity ([Hsiao, 1985](#)).

With these diagnostic tests' results, it is evident that the OLS assumptions are not met. One of the effective approaches to solve autocorrelation and heterogeneity is using a panel data methodology, specifically; the research's models were estimated using the GMM estimator depend on [Arellano and Bond \(1991\)](#). This methodology offers several benefits. According to [Himmelberg \*et al.\* \(1999\)](#), firms are heterogeneous and it is almost unavoidable to find characteristics that are difficult to measure or obtain and that could affect their value.

The dynamic panel data methodology allows us to control for unobservable heterogeneity ([Hsiao, 1985](#)). Besides, it solves the problem of possible endogeneity by using a lagged regressor as an instrument to avoid endogeneity issues ([Arellano and Bond, 1991](#)). In our models, ROA and ROE were lagged twice and used as instruments for differenced variables. Therefore, the (GMM) using random effects was used to test for the study's hypotheses.

### 5.3 Descriptive statistics

[Table 3](#) presents descriptive statistics for the variables under study, using several NWCR sample classifications.

Using the overall study sample, the mean of ROA was 3.5% and ROE was 8%. These figures differed substantially when the sample was divided into positive and negative NWCR. ROA mean was 4% under the positive NWCR sample, and only averaged 1.9% under the negative NWCR sample. ROE was also 6% and 1.7% under positive and negative NWCR samples, respectively.

With an average NWCR of approximately 30% across the overall study sample, the table displays an NWCR mean of 38.3% under the positive NWCR sample and scores a negative 25.6% rate under the negative NWCR sample. Firms within the negative NWCR sample had a bigger size value on average than firms in the positive NWCR sample.

It can also be noticed that larger firms had higher leverage than smaller ones across all sample groups. This conclusion matches literature that smaller firms face higher financing constraints, and therefore, hold more cash than their larger counterparties ([Fazzari and Petersen, 1993](#); [Kim \*et al.\*, 1998](#); [Opler \*et al.\*, 1999](#)). Practically, this result confirms the fact that a large firm's ability to source external funds and loans is easier than small firms.

[Table 4](#) Follows and displays the Pearson correlation matrix among the variables and supports our previous section's VIF diagnostic test, confirming the absence of multi-collinearity.

## 6. Empirical evidence

### 6.1 Working capital effects on profitability

The objective of this section is to cast light on data analysis and testing research hypotheses.

**Table 3.**  
Descriptive statistics

Sample	Statistic	ROE	ROA	NWCR	SIZE	LEV	GROWTH	CASH	GDP
Overall-obs. (938)	Mean	0.080298	0.035789	0.30174	2.508914	0.451264	0.017799	0.335115	0.030061
	Std. dev.	0.248341	0.130878	0.46132	1.047824	0.273893	0.256944	0.680599	0.023329
	Min.	1.534063	-0.90019	-2.68993	0.016302	0.003998	-0.97671	0.000116	-0.04712
	Max.	2.02158	0.847223	4.176276	9.300226	1.826955	0.9998	4.86534	0.152125
Positive NWCR-obs. (756)	Mean	0.065506	0.044904	0.383643	2.409263	0.432476	0.029789	0.268529	0.029359
	Std. dev.	0.245848	0.108958	0.407437	1.028798	0.260387	0.234903	0.551989	0.020438
	Min.	-2.02158	-0.73953	0.000584	0.208431	0.020354	-0.7999	0.000116	-0.04712
	Max.	1.534063	0.847223	4.176276	7.813039	1.464309	0.9998	4.821313	0.152125
Negative NWCR-Obs. (111)	Mean	0.175727	0.019666	-0.25682	3.186721	0.58651	-0.00003	0.403656	0.035891
	Std. dev.	0.243728	0.218984	0.418908	0.891756	0.248272	0.327684	0.731173	0.029543
	Min.	-1.05078	-0.90019	-2.68993	1.646528	0.126193	-0.83668	0.005066	-0.02495
	Max.	0.7064	0.357554	-0.00011	9.300226	1.826955	0.967	4.286249	0.152125

**Notes:** ROA = return on assets = EBIT/total assets; ROE = return on equity = net income/total equity; NWCR = (trade receivables + inventory - trade payables)/sales; size = logarithm of total assets; GROWTH = sales growth rate ( $Sales_t - Sales_{t-1}$ )/ $Sales_{t-1}$ ; LEV = total liabilities/total assets; GDP = real GDP growth rate calculated as  $(GDP_t - GDP_{t-1})/GDP_{t-1}$ ; cash = (cash and cash equivalents)/sales; Obs. = number of observations

Table 4.

Pearson correlation matrix

Sample	ROA	ROE	NWCR	Growth	Leverage	Size	GDP	Cash
ROA	1							
ROE	0.390809 ***	1						
NWCR	-0.12462 ***	-0.16386 ***	1					
Growth	0.171633 ***	0.137923 ***	-0.13761 ***	1				
Leverage	-0.1431 ***	0.050838	-0.20168 ***	0.078221 **	1			
Size	0.138977 ***	0.102365 ***	-0.14412 ***	0.082705 ***	0.065163 *	1		
GDP	0.131512 ***	0.070265 **	-0.04776	0.06733 *	0.044262	0.142652 ***	1	
Cash	-0.10136 ***	-0.01562	0.032457	-0.23565 ***	-0.24056 ***	0.047614	-0.01486	1

Notes: \*Significant @ 10%; \*\*Significant @ 5%; and \*\*\*Significant @ 1%

Table 4 below refers to the GMM regression analysis results to test the relationship between working capital and profitability using Models (1) and (2).

To conclude a concave relation between working capital and profitability, we expect to observe a statistically significant positive *NWCR* coefficient and a negative *NWCR*<sup>2</sup> coefficient in the quadratic Model (1). Under ROA, the results are as expected and *H1* is accepted, implying the presence of a non-linear relationship between working capital and ROA. This result is consistent with the literature (Baños-Caballero *et al.*, 2014; Afrifa, 2016; Mun and Jang, 2015; Singhania and Mehta, 2017; Altaf and Shah, 2017; Laghari and Chengang, 2019; Wang *et al.*, 2020) suggesting the possibility of working capital level optimization.

Conversely, using ROE as a profitability proxy, *H1* was rejected. While many studies tested the linear relationship between ROE and working capital (Jose *et al.*, 1996; Wang, 2002; Sharma and Kumar, 2011; Samiloglu and Akgün, 2016), none to our knowledge has tested the possible quadratic relationship between working capital and ROE.

The reason for ROE model insignificance could be interpreted as MENA region financial managers focus on profit maximization objective to empower their success on the account of achieving wealth maximization when they practice and select their WCM policies and decisions. This strategy will create a serious problem for shareholders and may affect their shares prices in the stock exchange as all the sample firms are listed.

To further investigate the breakdown of these quadratic model results, Model (2) is estimated to examine the linear relationship between working capital and the different profitability proxies using a positive and negative *NWCR* sample classification (*H2* and *H3*).

*H2* states that if a firm's *NWCR* is positive, there is a statistically negative effect of *NWCR* on profitability. As shown in the table, *H2* is accepted with a significant negative *NWCR* coefficient with ROA (-0.02835) and ROE (-0.07012). These results confirm one side of the literature that resulted in a significantly negative relationship between WCM and profitability (Wang, 2002; García-Teruel and Martínez-Solano, 2007; Dong and Su, 2010).

On the other hand, *H3* expects that if a firm's *NWCR* is negative, its WC will have a positive effect on profitability, is accepted using ROA as a proxy, with a significant positive *NWCR* coefficient of (0.141723). This result is consistent with many studies in the literature

(Corsten and Gruen, 2004; Fazzari and Petersen, 1993; Blinder and Maccini, 1991). In contrast, the same hypothesis using ROE is rejected due to an insignificant positive coefficient of NWCR. For more comprehensive literature review results regarding the sign direction (+ or -) of the relationship between WCM components and firm performance (Kayani *et al.*, 2019, Table 3, page 356).

This linear Model (2) breaks down the quadratic results, supporting our earlier findings. ROA is found to have an inverted U-shaped relationship with working capital, while ROE only had a significant negative relationship with working capital, and thus, confirming our earlier rejection of a quadratic ROE-NWCR relationship (Table 5).

### *6.2 Interaction effects of working capital and cash level in the generalized method of moments model*

Researchers such as Baños-Caballero *et al.* (2014) and Hill *et al.* (2010) pinpointed that the level of cash flow available will result in more investments in working capital. Furthermore, a study by Fazzari and Petersen (1993) showed that working capital investments are cashflow-sensitive. Thus, this section investigates the possible influence of cash flow availability measured by CASH on the relationship between NWCR and profitability.

To test whether a firm's cash level (cash level) has an interactive effect on the relationship between NWCR and profitability, an interaction term (cash level \* NWCR) is added to the GMM model. The (cash level) variable is dummy: (1) for cash levels above sector median and (0) for below sector median levels. Table 6 below illustrates the results of these hypotheses (*H4* and *H5*) using the Model (3).

To confirm a significant moderating effect of cash level on the relationship between working capital and profitability, we expect to find a statistically significant interaction term as explained previously. Using both profitability proxies, ROA and ROE, the interaction term coefficients in both models were insignificant.

This result partly agreed with Mun and Jang (2015)'s results as they found a significant moderating effect for cash levels on the relationship between working capital and profitability, only with firms of positive working capital levels. More specifically, they found that when firms have positive working capital levels, and thus, a negative relationship with profitability, the severity of this negative relationship increases when these firms hold positive cash levels because of the increased opportunity costs of holding cash. They did not find this interaction cash effect when firms held negative working capital levels. Accordingly, our results do not suggest that cash plays any moderating role in the working capital-profitability relationship. This result may direct the attention of financial managers in the MENA region to plan a short and medium WCM policy, cash budget, cash inflow and cash outflow and to provide cash at the appropriate time to achieve the interaction relationship between cash and performance. According to Salehi *et al.* (2019), financial managers should pay more attention to keep cash to finance and control WC to achieve profitability and sustainability of their firm's operations.

Contrary as well to our results, another study conducted by Afrifa (2016) indicated a significant cash flow effect on the relationship between NWC and corporate performance that turns from a strong inverted U-shaped relationship in the absence of cash flow to a convex relationship when cash flow is introduced. Their results suggest that managers should look at their firms' cash flow when determining the appropriate investment to be made in working capital, to improve performance.

ROA	Overall NWCR $H1$	Positive NWCR $H2$	Negative NWCR $H3$	ROE	Overall NWCR $H1$	Positive NWCR $H2$	Negative NWCR $H3$
ROA (-1) $Y_{-1}$	0.514841 ***	0.445911 ***	0.530915 ***	ROA (-1) $Y_{-1}$	0.373202 ***	0.352652 ***	0.327809 ***
ROA (-2) $Y_{-2}$	0.232469 ***	0.220483 ***	0.268951 ***	ROA (-2) $Y_{-2}$	0.15322 ***	0.117372 ***	0.467946 ***
NWCR	0.02539 **	-0.02835 ***	0.141723 **	NWCR	-0.06016 *	-0.07012 ***	0.012695
NWCR <sup>2</sup>	-0.02131 ***	-	-	NWCR <sup>2</sup>	-0.00258	-	-
Size	0.007563 **	0.005904 **	0.03308 **	SIZE	0.005886	0.005951	-0.01407
Growth	0.081859 ***	0.067365 ***	0.076458	GROWTH	0.112215 ***	0.087922 **	0.209923 ***
Leverage	-0.02573 **	-0.01942 *	-0.11865 **	LEVERAGE	0.010811	0.001004	0.028632
GDP	0.741988 ***	0.582212 ***	1.177099 ***	GDP	0.22688	0.160313	0.053533
Obs.	577	496	81	Obs.	568	487	81

**Notes:** ROA = return on assets = EBIT/total assets; ROE = return on equity = net income/total equity; NWCR = (trade receivables + inventory - trade payables)/sales; SIZE = logarithm of total assets; Growth = sales growth rate ( $Sales_t - Sales_{t-1}$ )/ $Sales_{t-1}$ ; LEV = total liabilities/total assets; GDP = real GDP growth rate calculated as  $(GDP_t - GDP_{t-1})/GDP_{t-1}$ ; Obs. = number of observations. \*Significant @ 10%; \*\*Significant @ 5%; and \*\*\*Significant @ 1 %

**Table 5.**  
The GMM regression coefficient analysis of the relationship between working capital and profitability (ROA/ROE) testing  $H1$ ,  $H2$  and  $H3$

Sample	ROA		ROE	
	Positive working capital <i>H4</i>	Negative working capital <i>H5</i>	Positive working capital <i>H4</i>	Negative working capital <i>H5</i>
NWCR	-0.03005 ***	0.114142	-0.07231 ***	0.07087
Cash level (dummy)	-0.00406	0.09231 **	0.014925	0.066132
NWCR * cash level (dummy)	0.006473	0.421561 ***	-0.00104	-0.00776
Size	0.005999 **	0.025562	0.005301	-0.01174
Growth	0.067657 ***	0.051947	0.089586	0.225585 ***
Leverage	-0.02149 *	-0.135903 **	0.01237	0.075443
GDP	0.57326 ***	1.802422 ***	0.176366	-0.15096
Observations	496	76	487	76

**Table 6.** Interaction effect of NWCR with cash level in the GMM model using ROA/ROE as the dependent variable testing *H4* and *H5*

**Notes:** ROA = return on assets = EBIT/total assets; ROE = return on equity = net income/total equity; NWCR = (trade receivables + inventory – trade payables)/sales; size = logarithm of total assets; Growth = sales growth rate ( $Sales_n - Sales_{n-1}$ )/  $Sales_{n-1}$ ; LEV = total liabilities/total assets; GDP = real GDP growth rate calculated as  $(GDP_n - GDP_{n-1})/GDP_{n-1}$ ; cash rate is dummy variable (1 for cash rate above sector median and 0 for cash rate below sector median) calculated as (cash and cash equivalents)/sales; NWCR\*Cash rate (dummy) is interaction term; Obs. = number of observations. \*Significant @ 10%; \*\*Significant @ 5%; and \*\*\*Significant @ 1%

## 7. Conclusions

### 7.1 Summary and discussion

This research aims at first to test the effect of working capital levels on different financial performance measures. Specifically, it uses ROA and ROE as two proxies of profitability, trying to explore the possibility of a non-linear relationship between NWCR and the firm's profitability. In this context and using a sample of 134 listed firms in the MENA region emerging markets, our quadratic model GMM model reported different effects of NWCR on both ROA and ROE. The results showed a significant concave relationship between NWCR and ROA, suggesting the presence of an optimal point to maximize ROA. This finding is consistent with [Baños-Caballero et al.'s \(2014\)](#)'s work, as well as [Mun and Jang \(2015\)](#) results; which point out to the presence of a non-linear effect of WC levels on firm value and performance, suggesting an optimal WC level. Moreover, the GMM models allowed us to control potential endogeneity and provide the most robust results. This evidence was not present using ROE.

To further investigate the relationship between NWCR and the profitability proxies, the overall sample was partitioned according to positive and negative NCWR levels. Using a linear model, the results confirmed our earlier results. More specifically, when the positive NWCR sample was used, a significant negative effect of NWCR on ROA was present. One perceptible finding using ROA, as our profitability measure, is that the coefficient's magnitudes of NWCR in the negative NWCR sample are greater than those in the positive NWCR group. This evidence suggests that WC enhanced corporate profits significantly faster for the negative NWCR group than its worsened profits for the opposite sample. When

using the negative NWC sample, however, a significant negative relationship was evident between positive NWCR and ROE, implying a linear rather than non-linear relationship.

The study was extended to explore the interactive role of cash level (positive and negative) on the previously hypothesized relationships. Model 3 was used to test this interaction effect of NWCR and CASH in the GMM model. With an insignificant interaction term [ $NWCR_{i,t} * CASH_{i,t}$  (Dummy)], the study concluded that the cash level did not significantly affect the relationship between NWCR and firm profitability.

## 7.2 Implications

**7.2.1 Theoretical implications.** This study provides important implications for working capital literature and the roots of cash into this literature, shedding light on the emerging MENA region markets. First, the working capital-corporate performance setting has been heavily tested in the literature. According to our knowledge, prior to [Baños-Caballero et al. \(2014\)](#)'s original paradigm of testing the non-linear functional form of working capital and corporate performance, all studies assumed a linear functional form of the working capital-corporate performance relationship and made conclusions accordingly. [Baños-Caballero et al.'s \(2014\)](#)'s work has been re-tested using samples from developed markets and a few emerging markets. This study's originality stems from testing this non-linear functional form in the emerging MENA region listed firms that, according to our knowledge, has not been investigated previously. An added layer of academic value is achieved as we target a certain sector, namely, the consumer-goods sector, which controls for industry differences and gives a deeper understanding of the working capital effect on corporate performance. This study enhances the working capital investment understanding by using a quadratic model to test the working capital-corporate performance's non-linear relationship.

Second, according to [Hill et al. \(2010\)](#) and [Baños-Caballero et al. \(2014\)](#), working capital investments are partially driven by cash flow availability, stemming from [Fazzari and Petersen \(1993\)](#)'s study, which indicated that investment in working capital is sensitive to cash flow.

This study addresses this line of research by attempting to investigate the interactive effect of cash level on the relationship between NWC and corporate financial performance, which has been rarely tested in developing markets literature and none was found applied to emerging markets.

Third, this study incorporates two profitability proxies and provides comparative results as to the relationship between working capital and profitability. Unlike published studies, this study used ROA and ROE, reflecting management and investor perspectives, respectively. Our results revealed the different effect working capital has on different profitability measures.

**7.2.2 Practical implications.** From a practical point of view, this study provides evidence on the existence of an optimal level of working capital that managers need to maintain to maximize operating ROA. This non-monotonic WCM-corporate performance relationship, which happens because of investments in working capital necessitates some proper policy implications by managers to preserve the optimum level of working capital by balancing costs and benefits in an efficient way that maximizes corporate performance.

On a comparative attempt, the study did not find working capital optimization efforts useful if managers attempt to maximize ROE. The study provides evidence of a significant positive linear relationship between ROE and working capital implying that ROE can be maximized by implementing a conservative working capital approach. Investors should carefully and actively evaluate companies' policies regarding working capital before investing to make sure that management is achieving not only profit maximization but also, wealth maximization.

In addition, the research shows that cash flow availability did not have an interactive effect on the relationship between working capital and profitability proxies. This result is opposite to studies applied to developed countries. This suggests that cash levels in developing countries do not reflect the constraints versus availability of financial resources, and thus, does not affect working capital practices and should not affect managers' attempt to maximize ROA. On the other hand, financial managers should concentrate on achieving wealth maximization when selecting their WCM strategies and policies.

### *7.3 Study limitations and further research*

Even though this study contributes toward a better understanding of WCM for consumer goods firms in emerging markets, it unavoidably has some limitations. First, findings may not apply to other industries or similar industries in more developed countries. Second, management practices may differ across countries. Third, although the study sample is based on the Financial Times Stock Exchange (FTSE) Russell industry classification standards, the consumer goods industry inescapably includes many sub-sectors that may not be completely homogenous in their WCM practices, which might affect results.

Thus, it is recommended for future research to test the hypotheses based on country-by-country analysis or in different contexts such as other industries, longer periods; comparing results before and after political disorder or by categorizing MENA countries into more and less developed or by income levels to control for country variances. The inclusion of more firms and country-specific variables in the model could reveal different empirical results and provide a deeper understanding of the relationship between working capital and the firm's profitability.

Besides, it is recommended to research, study and compare the relationship between WCM and profitability for a selected number of seasonal cash flow firms versus a sample of permanent cash flow firms in emerging countries.

Furthermore, according to [Kayani et al. \(2019\)](#)'s a systematic literature review on WCM, future research needs to investigate behavioral aspects, qualitative studies, survey studies and systematic theory development when studying WCM ([Singh and Kumar, 2014](#)). More attention should be given for investigating the impact of WC on firm value and share market prices to achieve the shareholders' wealth maximization objective.

The international financial crisis and non-financial substantial information have a critical significant effect on WCM practices and short-term cash flow for many emerging capital markets for both listed and unlisted corporations. The current internal financial environment is very volatile and given these circumstances, firms may not be able to fulfill their short-term obligations. [Kayani et al. \(2019\)](#) stated that although the world economy faced a liquidity shortage after the financial Tsunami in 2008, little academic attention was given to WCM.

Furthermore, the same phenomena exist now with Covid-19 (CORONA virus), therefore, more research should be directed toward the WCM speed adjustment/recovery during financial crises or eras of pandemics.

Moreover, researching WCM-specialized corporations worldwide that help firms in managing their working capital in new and innovative ways such as factoring, forfeiting, A/R collection and even securitization for medium-term loans or notes might provide valuable insights to the literature.

New variables should also be added to the WCM-corporate performance model such as liquidity risk, which is neglected by most researchers. More research could also be guided toward the management of working capital using the maturity weighted assets and liabilities management gap (duration gap) models between C/A and C/L or weighted by the cost of finance to achieve the required balance between WCF and WCI.

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#### About the authors

Osama EL-Ansary is a Professor of Finance and Banking at Cairo University. He holds an MSc of Business Administration from Cairo University (1980) and a PhD of Business Finance from the University of Edinburgh (1985). He was Vice Dean of Graduate Studies, Research and International Relations, Faculty of Commerce, Cairo University, regional capital markets expert and an external auditor for accrediting higher education institutions. His main research interests include financial performance and analysis, asset-liability management and capital adequacy of banks, corporate governance, securities market, e-finance and banking, e-commerce and Islamic banking and finance.

Heba Al-Gazzar, CFA is an Assistant Lecturer at Cairo University. She holds an MSc of Business Administration from Cairo University (2017) and is currently a PhD candidate in Finance at Cairo University. Heba is also a Chartered Financial Analyst. Heba Al-Gazzar is the corresponding author and can be contacted at: [heba.gazzar@outlook.com](mailto:heba.gazzar@outlook.com)