

# Determinants of cash conversion cycle in MENA countries

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## Abstract

**Purpose** – This study investigates the determinants of the cash conversion cycle (CCC in the Middle East and North Africa (MENA) countries).

**Design/methodology/approach** – Using the data of 395 companies from 10 countries in the MENA region for six years (2013–2018), the authors run dynamic panel regressions. The authors developed several models to examine the determinants of CCC and its components. The models included several control variables: firm, industry and country characteristics.

**Findings** – The results reveal that firm characteristics (e.g. operating cash flow, sales growth rate, operating profit margin, firm size and tangibility) affect CCC. The model in which CCC is a dependent variable produced more significant results than those which the components of CCC were dependent variables.

**Practical implications** – The findings suggest that corporate managers when making their working capital management decisions should pay equal attention to the components of CCC and develop a comprehensive working capital management policy.

**Originality/value** – To the best of the authors' knowledge, this is the first study to examine determinants of CCC in the MENA context in both country and industry details.

**Keywords** Cash conversion cycle, Working capital management, Profitability

**Paper type** Research paper

## 1. Introduction

Working capital management (WCM) is critical in firms' short-term financial management. The WCM covers the management of operating current accounts and includes many trade-offs. A firm may increase its sales by extending higher amounts of trade credit to its customers, which in turn increases accounts receivables; however, there might be a risk of collection problems. A firm may increase its profitability by maintaining minimum levels of inventory, which may help avoid storage and ordering costs; however, there might be a risk of operational problems in case of unexpected shortages of inventory items. A firm may improve its profitability by delaying the payments of the accounts payables and making use of trade credits from the suppliers; however, there might be a risk of deterioration in the credibility of the firm, which may cause bigger problems in the long term. We may consider the opposite of all these cases, and there will be different risks and benefits. In addition to the operating dimension, a shortage of cash generated from operations may force the company to use external financing, which, in turn, causes increases in interest expenses, resulting in lower profitability. Liquidity is an important concern for a firm's survival, and profitability is equally important for the wealth maximization objective of financial management. However, trade-offs exist among different objectives. Policies that may improve profitability may harm liquidity or vice versa.

Several factors affect a firm's working capital policies and practices, including firm-specific and macroeconomic factors. This study explored the determinants of WCM. An understanding of the determining factors and would have important implications and enable corporate managers to design better short-term financial management policies.



This study contributes to the literature by presenting new evidence on the topic in a multi-country context covering the Middle East and North Africa (MENA) region.

This study's results revealed that firm characteristics such as operating cash flow, sales growth rate, operating profit margin, firm size and tangibility have significant effects on cash conversion cycle (CCC), whereas the market-to-book value ratio and gearing are insignificant.

The remainder of the article proceeds as follows. [Section 2](#) reviews the related literature. [Section 3](#) provides details on the data, sample and methodology used in the analyses. [Section 4](#) reports and discusses the results of the analysis. The final section concludes and discusses the implications, limitations and suggestions for future research.

## 2. Literature review

Short-term financial management decisions and practices are as important as those related to long-term financial management and both are affected by each other. The policies adopted in one have implications for the other. Working capital management is one of the most important and strategic topics in short-term financial management ([Preve and Sarria-Allende, 2010](#)). The day-to-day management of current assets plays an important role in firms' successful operations ([Jose et al., 1996](#)), and the components of working capital are part of firms' shareholder wealth maximization objectives ([Jensen and Meckling, 1976](#)). Working capital is defined as the difference between current assets and current liabilities, which is also known as net working capital. It is used as a measure of liquidity among other ratios ([Ding et al., 2013](#)). Working capital management deals with the management of operating cycle accounts, namely, receivables, inventories and payables. Working capital management is important because of its effects on the profitability and riskiness of the firm and, consequently, on valuation ([Smith, 1980](#)). Firms may adopt a conservative policy in which a higher level of investment in current assets is financed by a lower level of short-term sources of finance, or an aggressive policy in which a lower level of investment in current assets is financed by a higher level of short-term sources. Each of these policies has its own risks and rewards. For instance, using a greater portion of short-term finance may mitigate agency problems. However, it may have some negative impacts such as difficulties in the renewal of credits, interest rate risk and liquidity costs ([Baños-Caballero et al., 2016](#); [Panda and Nanda, 2018](#)). [Altaf and Shah \(2018\)](#) describe an aggressive policy as a high-risk, high-return approach associated with low investment in working capital and a conservative policy as a low-risk, low-return approach associated with high investment in working capital.

The CCC is a basic and the most used measure of working capital ([Richards and Laughlin, 1980](#)) and focuses on the period from payment for materials to collections from sales ([Hayajneh and Yassine, 2011](#)). It is also a commonly used measure of the effectiveness of working capital management and evaluation of external financing needs ([Braun and Raddatz, 2008](#); [Tong and Wei, 2011](#)). Management of cash collections and cash payments is important, and firms search for ways for it ([Bowman, 2001](#)), and they should manage the components simultaneously to improve profitability ([Viskari et al., 2012](#)).

### 2.1 The determinants of cash conversion cycle

Several factors affect the working capital management practices of firms, including firm-, industry- and other country-specific factors. In the literature on the determinants of working capital management, various measures have been used as proxies for working capital. Some studies have used the working capital requirement (WCR), which is calculated as net working capital divided by total assets ([Cuong and Nhung, 2017](#); [Moussa, 2019](#); [Salawu and Alao, 2014](#); [Wiguna and Wasistha, 2017](#)). Other studies used the CCC. In this study, we use CCC; therefore, we focus on the literature that uses CCC as a proxy for working capital management.

[Kieschnick et al. \(2006\)](#) investigated the determinants of the CCC for a large sample of 3,155 non-financial firms in the USA and found that firm size, growth opportunities, and corporate governance have a significant effect on CCC.

[Goel and Sharma \(2015\)](#) analyzed the trends in working capital efficiency of Indian manufacturing companies using a sample of 1200 firms for ten years from 2004 to 2013, also covering the effect of the 2008 financial crisis. They examine the effects of firm-specific and macroeconomic factors on the CCC, which is a proxy for WCM efficiency. Their results reveal that macroeconomic indicators have no significant effect, whereas firm-specific factors such as leverage, tangibility, profitability, growth, size and age have a significant influence.

Other studies investigated the determinants of working capital management by using the CCC as a proxy in different countries and found the effects of several factors, such as [Valipour et al. \(2012\)](#) in Iran, [Baños-Caballero et al. \(2013\)](#) in Spain, [Mutua Mathuva \(2014\)](#) in Kenya, [Haron and Nomran \(2016\)](#) in Malaysia, [Chauhan and Banerjee \(2018\)](#) and [Dash \(2020\)](#) in India [Kolias et al. \(2020\)](#) in Greece.

3. Methodology and models

3.1 Sample and data

The sample comprises 395 non-financial companies from ten countries in the MENA region. The data is obtained from Refinitiv database (previously known as Thomson Reuters). The breakdown of samples by country and industry is given in the following tables. Some firms and countries were excluded from the sample due to missing data. The dataset was winsorized at 5% to eliminate the outliers (see [Table 1](#)).

The firms in the sample are from nine sectors, and the details of the sectoral breakdown are listed in [Table 2](#).

3.2 Variables and Measurement

In this section, we explain the variables used in the models, why they were included, and how a relationship is expected. [Table 3](#) lists these variables and their measurements.

The CCC is one of the most commonly used measures of working capital management. It is calculated as receivable days plus inventory days minus payable days. CCC and its components were used as dependent variables.

The operating profit margin is used as a measure of firm performance because it reflects performance in the main operating activities. Return on assets (ROA) is an alternative, but is based on net profit, which reflects the result of all operating and non-operating performance. In this study, we aim to examine the relationship in two ways, with profitability being the independent variable in the first group and the dependent variable in the second group.

| Identifier | Country              | No. of firms |
|------------|----------------------|--------------|
| 1          | Bahrain              | 6            |
| 2          | Egypt                | 74           |
| 3          | Jordan               | 66           |
| 4          | Kuwait               | 17           |
| 5          | Morocco              | 44           |
| 6          | Oman                 | 37           |
| 7          | Qatar                | 11           |
| 8          | Saudi Arabia         | 71           |
| 9          | Tunisia              | 41           |
| 10         | United Arab Emirates | 28           |
|            | <i>Total</i>         | <i>395</i>   |

Table 1.  
Sample per country

| Identifier | Sector name                 | No. of firms | Cash conversion cycle                                            |
|------------|-----------------------------|--------------|------------------------------------------------------------------|
| 1          | Basic Materials             | 110          | <div>1151</div> <div>Table 2.</div> <div>Sample per sector</div> |
| 2          | Consumer Cyclical           | 75           |                                                                  |
| 3          | Consumer Non-Cyclicals      | 79           |                                                                  |
| 4          | Energy                      | 18           |                                                                  |
| 5          | Healthcare                  | 30           |                                                                  |
| 6          | Industrials                 | 57           |                                                                  |
| 7          | Technology                  | 10           |                                                                  |
| 8          | Telecommunications Services | 9            |                                                                  |
| 9          | Utilities                   | 7            |                                                                  |
|            | <i>Total</i>                | 395          |                                                                  |

| Abbreviation | Variable name             | Measurement                                         |                                                                 |
|--------------|---------------------------|-----------------------------------------------------|-----------------------------------------------------------------|
| CCC          | Cash Conversion Cycle     | $ARD + INVD - APD$                                  | <div>Table 3.</div> <div>Variables and their measurements</div> |
| ARD          | Accounts Receivables Days | $360/(\text{Net Sales}/\text{Average Receivables})$ |                                                                 |
| INVD         | Inventory Days            | $360/(\text{COGS}/\text{Average Inventory})$        |                                                                 |
| APD          | Accounts Payables Days    | $360/(\text{COGS}/\text{Average Payables})$         |                                                                 |
| OPM          | Firm Performance          | Operating Profit/Net Sales                          |                                                                 |
| MV/BV        | Firm Value                | Share price*outstanding shares/book value of equity |                                                                 |
| LNTA         | Firms Size                | Natural logarithm of Total Assets                   |                                                                 |
| SG           | Sales Growth              | $(\text{Sales}_t/\text{Sales}_{t-1}) - 1$           |                                                                 |
| GEAR         | Gearing (leverage) ratio  | Total Debt/Total Assets                             |                                                                 |
| GDPGR        | Macroeconomic Conditions  | % Change in GDP                                     |                                                                 |
| OCF/TA       | Operating Cash Flows      | Operating Cash Flow/Total Assets                    |                                                                 |
| TANG         | Tangibility               | Net Property, Plant, Equipment/Total Assets         |                                                                 |
| COUN         | Country                   | Dummy variable per country                          |                                                                 |
| IND          | Industry                  | Dummy variable per industry                         |                                                                 |

Profitability is expected to affect CCC because a firm's credit policies for customers and suppliers affect CCC. An endogenous relationship exists between these two variables. Although prior literature reports mixed results, we expect that higher profitability is associated with a shorter CCC.

Firm value, measured as the market value/book value ratio, is expected to impact CCC. There are two closely related explanations for this association. First, firm value is based on long-term profitability and assumes that profitability has an impact. Then, firm value also impacts CCC. Second, firm value reflects stock market valuation. A shorter CCC indicates better WCM; hence, firms with shorter CCC are expected to have a higher market value.

Firm size, measured by the natural logarithm of total assets, is expected to impact CCC. The main underlying reason for this is that larger firms are more likely to have a shorter CCC because of their higher bargaining power against customers and suppliers (Baños-Caballero *et al.*, 2010). Moreover, regarding accessing external finance, larger firms have important advantages over smaller firms, which positively affect their working capital management.

Sales growth, measured as the year-over-year change in sales, affects CCC. Previous studies have reported that higher sales growth rates are associated with shorter CCC (e.g. Baños-Caballero *et al.*, 2013; Chauhan and Banerjee, 2018; Haron and Nomran, 2016). However, there might be an opposite view that firms may increase sales by allowing longer credit periods to customers, in this case, the sales growth rate is expected to have a positive relationship with CCC.

Leverage (gearing), measured as total debt divided by total assets, affects CCC. Previous studies have reported a negative relationship between leverage and CCC (Baños-Caballero

*et al.*, 2013; Chauhan and Banerjee, 2018; Zariyawati *et al.*, 2016). The reason for this finding is that firms facing higher costs of leverage need funds from CCC and tend to have earlier collections and delayed payments, which results in shorter CCC.

The GDP growth rate is used as a proxy for macroeconomic conditions in the countries. Firm performance is affected by booms and recessions in an economy. In economic boom periods, firms are not more likely to face liquidity problems and can follow more flexible working capital policies, whereas, in economic recession periods, firms tend to shorten their CCC (Ali and Khan, 2011; Wasiuzzaman and Arumugam, 2013; Salawu and Alao, 2014). Hence, a positive association is expected between the GDP growth rate and CCC.

Operating cash flow is expected to have a negative relationship with CCC because as firms tend to shorten their CCC, they have higher amounts of operating cash. This would be the result of effective working capital management, with shorter receivable collection and inventory periods and longer payable deferral periods (Zariyawati *et al.*, 2016).

Tangibility, measured as the ratio of net property, plant and equipment (PPE) to total assets, is expected to have a negative relationship with CCC. There are opposite views about the relationship. One is that PPE competes with working capital accounts for the funds available, which results in a negative relationship (Goel and Sharma, 2015; Moussawi *et al.*, 2006; Mutua Mathuva, 2014). The other is that firms with higher amounts of PPE incur lower borrowing costs in financing current assets, which then results in a longer CCC (Baños-Caballero *et al.*, 2010; Tesfay and Batra, 2018).

### 3.3 Models

*3.3.1 Determinants of cash conversion cycle and its components.* There are four models in which the dependent variable is CCC or its components, namely, ARD, INVD and APD. The independent variables include the one-year lag of the dependent variable, operating cash flow divided by total assets, sales growth rate, operating profit margin, firm's market value divided by its book value, natural logarithm of total assets, gearing ratio, tangibility, country's GDP growth rate, country dummies and industry dummies.

- (1)  $CCC_{i,t} = \beta_0 + \beta_1 CCC_{i,t-1} + \beta_2 OCF_{i,t} + \beta_3 SG_{i,t} + \beta_4 OPM_{i,t} + \beta_5 MVBV_{i,t} + \beta_6 LNTA_{i,t} + \beta_7 GEAR_{i,t} + \beta_8 TANG_{i,t} + \beta_9 GDPGR_{i,t} + \beta_{10} COUN_i + \beta_{11} IND_i + \varepsilon_{i,t}$
- (2)  $ARD_{i,t} = \beta_0 + \beta_1 ARD_{i,t-1} + \beta_2 OCF_{i,t} + \beta_3 SG_{i,t} + \beta_4 OPM_{i,t} + \beta_5 MVBV_{i,t} + \beta_6 LNTA_{i,t} + \beta_7 GEAR_{i,t} + \beta_8 TANG_{i,t} + \beta_9 GDPGR_{i,t} + \beta_{10} COUN_i + \beta_{11} IND_i + \varepsilon_{i,t}$
- (3)  $ICD_{i,t} = \beta_0 + \beta_1 ICD_{i,t-1} + \beta_2 OCF_{i,t} + \beta_3 SG_{i,t} + \beta_4 OPM_{i,t} + \beta_5 MVBV_{i,t} + \beta_6 LNTA_{i,t} + \beta_7 GEAR_{i,t} + \beta_8 TANG_{i,t} + \beta_9 GDPGR_{i,t} + \beta_{10} COUN_i + \beta_{11} IND_i + \varepsilon_{i,t}$
- (4)  $APD_{i,t} = \beta_0 + \beta_1 APD_{i,t-1} + \beta_2 OCF_{i,t} + \beta_3 SG_{i,t} + \beta_4 OPM_{i,t} + \beta_5 MVBV_{i,t} + \beta_6 LNTA_{i,t} + \beta_7 GEAR_{i,t} + \beta_8 TANG_{i,t} + \beta_9 GDPGR_{i,t} + \beta_{10} COUN_i + \beta_{11} IND_i + \varepsilon_{i,t}$

## 4. The analyses

### 4.1 Descriptive statistics

Tables 4 and 5 show descriptive statistics for the dependent and independent variables, respectively. Table 4 reports the mean, standard deviation and minimum and maximum values for the entire sample and by industry. The industry numbers are identifiers listed in Table 2. Table 5 reports the same statistical values for each country; the country numbers are the identifiers in Table 1.

In the initial dataset, CCC and its components had outlier values, and to eliminate the effect of outliers, the data were winsorized at the 5% level. The mean CCC was 172 days with a standard deviation of 145. In terms of industry details, the longest mean value of CCC is in

|     | CCC     | ARD    | INVD   | APD    | OCF    | SG   | OPM  | MVBV  | LNTA  | GEAR | GDPR | TANG | OBS  |
|-----|---------|--------|--------|--------|--------|------|------|-------|-------|------|------|------|------|
| All | Mean    | 172.14 | 120.13 | 121.99 | 78.18  | 0.08 | 0.09 | 1.99  | 18.91 | 0.17 | 2.83 | 0.38 | 2370 |
|     | Std.Dev | 145.38 | 86.01  | 100.93 | 66.77  | 0.12 | 0.13 | 9.60  | 1.75  | 0.17 | 1.60 | 0.23 |      |
| 1   | Mean    | 204.66 | 109.62 | 153.28 | 61.29  | 0.07 | 0.10 | 1.41  | 19.25 | 0.18 | 2.75 | 0.45 | 660  |
|     | Std.Dev | 132.14 | 67.25  | 101.32 | 51.32  | 0.09 | 0.14 | 3.83  | 1.77  | 0.17 | 1.66 | 0.20 |      |
| 2   | Mean    | 174.79 | 100.04 | 135.93 | 76.99  | 0.07 | 0.09 | 3.31  | 18.44 | 0.16 | 2.80 | 0.39 | 450  |
|     | Std.Dev | 167.48 | 85.83  | 114.39 | 65.51  | 0.10 | 0.13 | 19.22 | 1.38  | 0.17 | 1.47 | 0.26 |      |
| 3   | Mean    | 113.87 | 90.75  | 86.38  | 64.93  | 0.08 | 0.08 | 2.48  | 18.50 | 0.14 | 2.96 | 0.39 | 474  |
|     | Std.Dev | 98.85  | 68.13  | 67.30  | 48.31  | 0.12 | 0.12 | 5.84  | 1.35  | 0.15 | 1.54 | 0.20 |      |
| 4   | Mean    | 73.51  | 108.56 | 46.18  | 80.87  | 0.11 | 0.02 | 1.94  | 20.43 | 0.23 | 2.81 | 0.45 | 108  |
|     | Std.Dev | 109.50 | 79.06  | 64.49  | 81.33  | 0.09 | 0.13 | 1.61  | 1.50  | 0.20 | 1.83 | 0.23 |      |
| 5   | Mean    | 224.41 | 153.04 | 150.90 | 85.04  | 0.10 | 0.02 | 1.91  | 18.25 | 0.13 | 2.95 | 0.36 | 180  |
|     | Std.Dev | 137.17 | 87.14  | 99.27  | 59.34  | 0.26 | 0.12 | 1.44  | 1.51  | 0.11 | 1.51 | 0.20 |      |
| 6   | Mean    | 230.15 | 183.51 | 125.84 | 94.14  | 0.06 | 0.08 | 0.83  | 18.91 | 0.17 | 2.91 | 0.24 | 342  |
|     | Std.Dev | 153.88 | 101.18 | 104.94 | 78.71  | 0.09 | 0.13 | 8.41  | 1.62  | 0.16 | 1.63 | 0.19 |      |
| 7   | Mean    | 168.54 | 211.46 | 85.62  | 144.50 | 0.03 | 0.05 | 1.58  | 17.29 | 0.14 | 2.81 | 0.08 | 60   |
|     | Std.Dev | 128.63 | 81.80  | 70.73  | 76.60  | 0.09 | 0.11 | 1.24  | 0.89  | 0.12 | 1.16 | 0.07 |      |
| 8   | Mean    | 20.52  | 104.21 | 65.23  | 195.24 | 0.11 | 0.03 | 1.46  | 21.17 | 0.14 | 2.08 | 0.32 | 54   |
|     | Std.Dev | 105.31 | 56.46  | 90.68  | 69.51  | 0.07 | 0.12 | 0.57  | 2.58  | 0.12 | 2.16 | 0.15 |      |
| 9   | Mean    | 47.52  | 94.77  | 47.52  | 94.42  | 0.09 | 0.19 | 2.85  | 21.62 | 0.47 | 2.97 | 0.72 | 42   |
|     | Std.Dev | 62.75  | 64.78  | 37.62  | 93.45  | 0.04 | 0.14 | 2.20  | 2.09  | 0.22 | 1.66 | 0.21 |      |

**Table 4.**  
Descriptive statistics  
for whole sample and  
by industry

Table 5.  
Descriptive statistics  
by country

|    |         | CCC    | ARD    | INVD   | APD    | OCF  | SG    | OPM  | MBV   | LNTA  | GEAR | GDPR | TANG | OBS |
|----|---------|--------|--------|--------|--------|------|-------|------|-------|-------|------|------|------|-----|
| 1  | Mean    | 101.49 | 104.89 | 48.59  | 55.04  | 0.06 | 0.05  | 0.10 | 1.04  | 18.55 | 0.04 | 3.65 | 0.17 | 36  |
|    | Std.Dev | 71.97  | 73.51  | 28.57  | 45.50  | 0.06 | 0.20  | 0.11 | 0.77  | 0.68  | 0.06 | 1.23 | 0.09 |     |
| 2  | Mean    | 177.89 | 109.33 | 121.90 | 64.40  | 0.08 | 0.02  | 0.10 | 1.75  | 18.51 | 0.15 | 3.89 | 0.39 | 444 |
|    | Std.Dev | 151.13 | 93.93  | 99.29  | 64.90  | 0.19 | 0.42  | 0.12 | 7.06  | 1.44  | 0.17 | 1.03 | 0.21 |     |
| 3  | Mean    | 210.96 | 143.20 | 121.56 | 67.25  | 0.06 | -0.02 | 0.05 | 1.19  | 17.79 | 0.14 | 2.42 | 0.40 | 396 |
|    | Std.Dev | 166.49 | 90.45  | 112.65 | 62.17  | 0.10 | 0.21  | 0.13 | 1.59  | 1.32  | 0.14 | 0.50 | 0.24 |     |
| 4  | Mean    | 164.75 | 126.15 | 116.52 | 83.75  | 0.08 | 0.03  | 0.16 | 1.42  | 20.25 | 0.14 | 0.28 | 0.21 | 102 |
|    | Std.Dev | 166.35 | 74.83  | 111.08 | 63.08  | 0.09 | 0.18  | 0.14 | 1.22  | 1.50  | 0.17 | 2.38 | 0.17 |     |
| 5  | Mean    | 171.49 | 175.14 | 119.07 | 127.93 | 0.08 | 0.00  | 0.11 | 2.55  | 18.81 | 0.17 | 3.37 | 0.26 | 264 |
|    | Std.Dev | 137.31 | 94.62  | 79.79  | 63.25  | 0.10 | 0.18  | 0.12 | 3.41  | 1.33  | 0.17 | 1.25 | 0.18 |     |
| 6  | Mean    | 112.62 | 93.97  | 79.66  | 69.17  | 0.09 | 0.03  | 0.09 | 1.53  | 18.42 | 0.21 | 3.07 | 0.50 | 222 |
|    | Std.Dev | 86.77  | 67.82  | 59.28  | 62.52  | 0.11 | 0.23  | 0.13 | 1.52  | 1.62  | 0.20 | 1.94 | 0.24 |     |
| 7  | Mean    | 103.48 | 101.70 | 69.02  | 74.04  | 0.11 | 0.05  | 0.18 | 2.02  | 20.86 | 0.18 | 3.07 | 0.38 | 66  |
|    | Std.Dev | 116.87 | 57.45  | 78.91  | 47.67  | 0.09 | 0.17  | 0.13 | 0.90  | 1.30  | 0.16 | 2.55 | 0.24 |     |
| 8  | Mean    | 180.82 | 87.11  | 142.51 | 54.47  | 0.09 | -0.01 | 0.11 | 2.25  | 20.29 | 0.21 | 2.30 | 0.49 | 426 |
|    | Std.Dev | 139.98 | 63.32  | 106.72 | 52.24  | 0.09 | 0.19  | 0.14 | 1.80  | 1.61  | 0.17 | 1.58 | 0.21 |     |
| 9  | Mean    | 146.22 | 109.00 | 166.91 | 133.12 | 0.06 | -0.04 | 0.08 | 4.78  | 17.68 | 0.17 | 2.13 | 0.29 | 246 |
|    | Std.Dev | 131.70 | 66.67  | 109.63 | 72.10  | 0.10 | 0.19  | 0.11 | 25.83 | 1.22  | 0.15 | 0.76 | 0.16 |     |
| 10 | Mean    | 207.59 | 149.34 | 105.80 | 57.02  | 0.05 | 0.00  | 0.07 | 0.09  | 20.21 | 0.13 | 3.51 | 0.37 | 168 |
|    | Std.Dev | 147.55 | 90.49  | 89.37  | 43.27  | 0.07 | 0.20  | 0.13 | 11.87 | 1.17  | 0.15 | 1.44 | 0.24 |     |

Industrials with 230 days, and the shortest is in Telecommunications Services with 21 days. This is an expected case, as industrial deferred payments and receipts are more common in sectors such as telecommunications, where customers are mostly individuals, and they make immediate payments; a similar pattern can also be observed in the components of CCC, namely in ARD, INVD and APD. Of the CCC components, INVD has a greater maximum value than ARD and APD, which indicates that companies face a longer period to cycle their inventories. The mean of operating cash flow is 0.08, which indicates that operating cash flow is, on average, 8% of the firm's total assets. On average, all industries have positive operating cash flows. The sales growth rate ranges from 76% percent to 474%. The firm performance which is measured by OPM has a mean value of 9%, with a standard deviation of 0.13, indicating significant variations among the firms in the sample, which can be attributed to the difference in industries and countries. The firm value measured by MV/BV has a mean value of 1.99 and a standard deviation of 9.60, indicating a wide variation in the sample. Leverage (GEAR) which is measured as the division of total debt by total assets, ranges from 0% to 87%, indicating that some firms are all equity financed, whereas some others have high leverage levels. Regarding industry details, utilities have the highest mean value of leverage with 47.3%. Tangibility, which is measured by the ratio of net PPE to total assets, has a mean value of 38%, ranging from 0% to 99%, indicating that some firms have almost zero tangible assets, whereas some others have highly tangible asset-intensive balance sheets. Regarding industry details, utilities have the highest mean value of tangibility with 72%.

In terms of country details, the highest mean value of CCC is in Jordan at 211 days, and the lowest mean value of CCC is in Bahrain at 102 days. The highest mean value of GDP growth rate is in Egypt at 3.89%, and the lowest mean value of GDP growth rate is in Kuwait at 0.28%.

Table 6 reports the correlations between the variables. Most of the independent variables are significantly correlated with CCC. Specifically, operating cash flow to total assets ratio, operating profit margin, firm size, tangibility and sales growth are negatively correlated with CCC.

## 4.2 Regression results

**4.2.1 The determinants of cash conversion cycle.** The first group of models aims to determine the determinants of CCC. Tables 7–14 show the results of the regressions run for CCC and its components, ARD, INVD and APD, respectively. All models included the one-year lag of the dependent variable as an independent variable to control for the effects of potential serial correlation. Each table is composed of two parts: the first shows the results for the whole sample and industry details, and the second shows the results in country details.

|       | CCC       | OCFTA     | GDPGR     | OPM       | MVBV    | LNTA     | GEAR     | TANG  | SG |
|-------|-----------|-----------|-----------|-----------|---------|----------|----------|-------|----|
| CCC   | 1         |           |           |           |         |          |          |       |    |
| OCFTA | -0.212*** | 1         |           |           |         |          |          |       |    |
| GDPGR | -0.034*   | 0.020     | 1         |           |         |          |          |       |    |
| OPM   | -0.101*** | 0.269***  | 0.038*    | 1         |         |          |          |       |    |
| MVBV  | -0.012    | 0.018     | -0.021    | 0.031     | 1       |          |          |       |    |
| LNTA  | -0.165*** | 0.067***  | -0.059*** | 0.194***  | -0.009  | 1        |          |       |    |
| GEAR  | 0.068***  | -0.210*** | -0.013    | -0.115*** | 0.041** | 0.251*** | 1        |       |    |
| TANG  | -0.238*** | 0.092***  | 0.012     | 0.062***  | -0.006  | 0.198*** | 0.139*** | 1     |    |
| SG    | -0.117*** | 0.032     | 0.069***  | 0.202***  | 0.013   | 0.063*** | 0.013    | 0.002 | 1  |

**Note(s):** \*, \*\*, \*\*\* Significant at 0.10, 0.05 and 0.01 levels, respectively

**Table 6.**  
Correlations matrix

**Table 7.**  
Determinants of CCC  
for whole sample and  
by industry

|   | CCC | Lagged CCC | OCF        | SG          | OPM        | MVBV      | LNTA      | GEAR    | TANG        | GDPR       | Constant    | OBS  |
|---|-----|------------|------------|-------------|------------|-----------|-----------|---------|-------------|------------|-------------|------|
|   | All | 0.596***   | -111.343** | -74.443***  | 65.53*     | 0.100     | 34.004*** | 28.216  | -170.625*** | -1.165     | -505.759*** | 1975 |
| 1 | 1   | 0.672***   | -315.973*  | -94.364***  | 238.445*** | -0.238    | 22.317    | 62.447  | -20.250     | -0.832     | -358.142    | 550  |
| 2 | 2   | 0.474***   | -155.535*  | -64.842***  | 18.678     | 0.205     | 25.001    | -58.375 | -140.294    | -1.537     | -287.613    | 375  |
| 3 | 3   | 0.608***   | -150.263** | -36.747*    | 182.012**  | 0.179     | 19.561    | 10.414  | -98.889     | -1.531     | -280.579    | 395  |
| 4 | 4   | 0.216      | -29.169*   | -43.856***  | 36.751     | 10.446**  | 22.341    | -22.810 | -179.573    | 4.191      | -311.968    | 90   |
| 5 | 5   | 0.46***    | -24.715    | -91.372***  | 18.921     | 1.311     | 48.405*** | 63.915  | -164.075    | 12.611***  | -746.555    | 150  |
| 6 | 6   | 0.514***   | -185.13*   | -72.977***  | -30.358    | 0.077     | -10.146   | -67.490 | -367.827*** | -3.254     | 427.581     | 285  |
| 7 | 7   | 0.788***   | -211.00*   | -123.193*** | 217.561*   | 22.598*** | -24.396   | 35.011* | -469.340    | -12.315*** | 459.637     | 50   |
| 8 | 8   | 0.824***   | -570.784*  | -13.787     | -250.304   | -25.586   | 3.300     | 25.045  | 486.499     | 0.225      | -90.616     | 45   |
| 9 | 9   | 1.026***   | -537.476   | -51.094***  | -8.982     | -2.511    | 13.929    | -84.445 | 131.900     | -0.101     | -294.353    | 35   |

**Notes:** \* Significant at 90% confidence level, \*\*significant at 95% confidence level, \*\*\* significant at 99% confidence level

| CCC | Lagged CCC | OCF         | SG          | OPM        | MBV       | LNTA      | GEAR       | TANG       | GDPCR      | Constant    | OBS |
|-----|------------|-------------|-------------|------------|-----------|-----------|------------|------------|------------|-------------|-----|
| 1   | 0.774***   | -502.906*** | -63.449***  | 45.884*    | 13.945    | 11.903    | -298.964** | 118.317**  | 0.027      | -191.232    | 30  |
| 2   | 0.267***   | -51.225**   | -43.846***  | -29.401    | -0.026    | 28.836    | 109.413    | -316.108** | -12.984*** | -238.274    | 370 |
| 3   | 0.838***   | -300.532*** | -182.981*** | 174.786**  | -2.148    | 21.833    | -39.089    | -86.421    | 8.166      | -320.164    | 330 |
| 4   | 0.655***   | -401.993*** | -260.873*** | 470.915*** | 2.427     | -93.357   | -47.107    | -100.289   | -3.676***  | 1944.618*   | 85  |
| 5   | 0.3010     | -266.311*** | -85.024*    | 276.264*   | -1.743*** | -63.184   | 180.243    | -208.692** | 0.001      | 1324.837    | 220 |
| 6   | 0.765***   | -36.214     | -44.439**   | 100.158    | -13.58*   | -4.623    | -124.78*   | -56.404    | -1.669     | 187.194     | 185 |
| 7   | 0.614      | 122.820     | 7.187       | 322.811    | -31.452   | 103.162** | 78.365     | -362.225   | -2.476     | -1986.614** | 55  |
| 8   | 0.837***   | -356.726*** | -119.598*** | 162.32***  | -2.169    | 5.366     | -18.565    | -9.172     | 1.849      | -47.261     | 355 |
| 9   | 0.336*     | -281.78***  | -76.171***  | 88.841     | 0.191     | 77.133*   | -133.732   | -119.962   | -6.429*    | -1188.615*  | 205 |
| 10  | 0.944***   | -528.485*** | -124.127*** | -18.240    | -0.533*** | 28.527    | -30.633    | -85.487    | 7.725**    | -527.885    | 140 |

**Note(s):** \* Significant at 90% confidence level, \*\*significant at 95% confidence level, \*\*\* significant at 99% confidence level

**Table 8.**  
Determinants of CCC  
by country

**Table 9.**  
Determinants of ARD  
for whole sample and  
by industry

|     | ARD      | Lagged ARD | OCF         | SG         | OPM      | MVBV   | LNTA      | GEAR        | TANG        | GDPCR     | Constant  | OBS  |
|-----|----------|------------|-------------|------------|----------|--------|-----------|-------------|-------------|-----------|-----------|------|
| All | 0.412*** |            | -52.216**   | -41.287*** | 6.896    | 0.000  | 19.728*** | -2.366      | -115.889*** | -1.862*** | -247.503* | 1975 |
| 1   | 0.277    |            | -118.761*** | -42.266*** | 54.287   | -0.083 | 21.553    | 13.768      | 16.107      | -2.122    | -334.812  | 550  |
| 2   | 0.226    |            | -89.337**   | -32.753*** | -49.135  | -0.094 | 16.294    | -18.376     | -117.700    | -3.028    | -154.462  | 375  |
| 3   | 0.467*** |            | -52.146     | -43.965*** | 21.490   | 0.296  | 26.443**  | -13.481     | -75.472     | -1.380    | -401.62*  | 395  |
| 4   | 0.509*** |            | -166.267    | -10.714    | 67.291** | 5.73   | 4.058     | -42.727     | -70.075     | 2.223     | 13.155    | 90   |
| 5   | 0.598*** |            | -15.466     | -51.291*** | -13.373  | 4.459  | 40.868**  | -48.968     | -143.335*** | 0.203     | -617.603* | 150  |
| 6   | 0.49***  |            | -93.739***  | -37.069*** | -3.620   | 0.134  | -8.070    | 21.190      | -86.021     | -1.445    | 275.616   | 285  |
| 7   | 0.351    |            | -47.417     | -64.660    | -35.250  | 1.950  | 37.473    | 15.844      | -562.968    | -2.346    | -455.019  | 50   |
| 8   | 0.128    |            | -72.615     | -30.699*** | -154.350 | -6.544 | 5.090     | 67.932      | -276.442    | -1.286    | 314.789*  | 45   |
| 9   | 0.422*** |            | -305.949**  | 3.877      | -9.730   | 4.322  | 20.384*** | -176.529*** | -205.628*** | -1.521    | -130.222  | 35   |

**Note(s):** \* Significant at 90% confidence level, \*\*significant at 95% confidence level, \*\*\* significant at 99% confidence level

| ARD | Lagged ARD | OCF         | SG          | OPM      | MVBV      | LNTA    | GEAR      | TANG        | GDPGR     | Constant  | OBS |
|-----|------------|-------------|-------------|----------|-----------|---------|-----------|-------------|-----------|-----------|-----|
| 1   | 0.664***   | -329.349    | -19.215     | 3.991    | -12.050   | 1.990   | 110.961   | 95.881      | 0.003     | 11.376    | 30  |
| 2   | 0.332***   | -24.061     | -32.754***  | -1.039   | -0.155    | 10.947  | 105.846*  | -161.928*** | -2.814    | -68.844   | 370 |
| 3   | 0.609***   | -125.465**  | -82.367***  | 23.134   | 1.157     | 10.627  | 52.692    | -119.125    | -3.570    | -77.368   | 330 |
| 4   | 0.101      | -128.871    | -108.554*** | 132.292  | -11.452** | 17.186  | -39.087   | -172.604*** | -4.233*** | -180.960  | 85  |
| 5   | 0.459***   | -120.079*** | -14.912     | -5.454   | -0.020    | -3.279  | 61.344    | -180.244*** | -0.780    | 204.539   | 220 |
| 6   | 0.353      | -15.015     | -37.971*    | 3.610    | -2.410    | 13.719  | 16.380    | -156.65**   | -0.269    | -108.467  | 185 |
| 7   | 0.342      | 143.309     | 39.315      | -175.992 | 10.077    | 83.687  | -264.278* | -196.427    | -4.696    | -1548.582 | 55  |
| 8   | 0.762***   | -190.848*** | -50.574***  | -9.788   | -3.085    | 15.643  | -92.625** | -14.401     | -0.338    | -239.745  | 355 |
| 9   | 0.711***   | -115.647*   | -73.455***  | -12.224  | -0.074    | 16.862* | -83.885   | -96.010     | 1.601     | -219.594  | 205 |
| 10  | 0.549***   | -109.126*   | -52.254***  | -18.077  | 0.171**   | -12.901 | 77.9**    | -117.254*   | 2.266     | 361.925*  | 140 |

Note(s): \*, \*\*, \*\*\* Significant at 0.10, 0.05 and 0.01 levels, respectively

Table 10.  
Determinants of ARD  
by country

**Table 11.**  
Determinants of INVD  
for whole sample and  
by industry

| INVD | Lagged INVD | OCF        | SG          | OPM        | MBV     | LNTA      | GEAR       | TANG     | GDPR    | Constant    | OBS  |
|------|-------------|------------|-------------|------------|---------|-----------|------------|----------|---------|-------------|------|
| All  | 0.618***    | -55.77*    | -46.531***  | 80.519***  | -0.025  | 22.433*** | 5.450      | -46.073  | -1.238  | -359.245*** | 1975 |
| 1    | 0.695***    | -150.15*** | -81.14***   | 195.246*** | -0.786  | 28.012*   | 4.742      | -12.957  | -0.510  | -489.392*   | 550  |
| 2    | 0.699***    | -85.228**  | -25.951***  | 53.284*    | 0.037   | -39.46    | -44.596    | -45.813  | -0.252  | 141.882     | 375  |
| 3    | 0.583***    | -93.389*** | 34.645***   | 172.419*** | 0.085   | 8.239     | -63.145    | 34.278   | -0.847  | -124.957    | 395  |
| 4    | 0.763***    | -86.280    | -13.306     | 0.767      | 1.781   | -6.845    | 2.276      | 43.504   | 0.139   | 136.864     | 90   |
| 5    | 0.20        | 4.689      | -39.989*    | 9.023*     | -56.484 | 11.205    | -28.436    | -21.420  | 5.879   | -102.758    | 150  |
| 6    | 0.523***    | -82.561*   | -30.184***  | 32.533     | -0.112  | -8.858    | 31.391     | -119.405 | -3.557  | 262.672     | 285  |
| 7    | 0.433*      | 143.835    | -102.241*** | -112.098   | 6.703   | 15.659    | 122.047*** | 49.377   | -6.419* | -277.653    | 50   |
| 8    | 0.268       | -900.082   | -23.327     | 9.916      | -2.663  | 10.46***  | -44.2753   | 64.534   | 1.432   | 370.618***  | 45   |
| 9    | 0.65***     | -15.770    | -16.043**   | 2.240      | -1.752  | -6.095    | 59.424     | -56.955  | -0.474  | 169.424     | 35   |

**Note(s):** \* Significant at 90% confidence level, \*\*significant at 95% confidence level, \*\*\* significant at 99% confidence level

| INVD | Lagged INVD | OCF         | SG          | OPM       | MVBV      | LNTA    | GEAR    | TANG        | GDPGR    | Constant | OBS |
|------|-------------|-------------|-------------|-----------|-----------|---------|---------|-------------|----------|----------|-----|
| 1    | -0.0140     | -27.601     | -36.383***  | -74.644** | -2.319    | -11.491 | -26.405 | 106.360     | 1.686    | 254.418  | 30  |
| 2    | 0.2360      | -20.511     | -25.637***  | 64.001**  | -0.103    | 8.965   | 30.244  | -161.015*** | -6.815** | 9.169    | 370 |
| 3    | 0.955       | -101.307**  | -100.986*** | 117.785   | -1.422    | 20.368  | -19.260 | -43.089     | 6.764    | -351.112 | 330 |
| 4    | 0.3380      | -38.199     | -182.26***  | 267.13**  | 2.635     | -71.097 | 126.315 | -157.397    | -2.513** | 1499.300 | 85  |
| 5    | 0.2450      | -82.137**   | -41.427***  | -38.246   | -1.363*   | -11.770 | 87.325  | 28.064      | -0.517   | 304.921  | 220 |
| 6    | 0.51***     | -40.266     | -48.803**   | 15.445    | -0.349    | 12.601  | 28.591  | -12.100     | -1.333   | -183.802 | 185 |
| 7    | 0.629***    | -14.677     | -43.860     | 418.46*** | -45.607** | -22.902 | 235.599 | -344.716    | 1.229    | 614.853  | 55  |
| 8    | 0.802***    | -204.655*** | -83.868***  | 204.421** | -2.510    | -33.824 | 25.638  | 46.055      | -0.603   | 692.424  | 355 |
| 9    | 0.700***    | -161.183*** | -78.489***  | 90.106    | 0.045     | 23.293  | -69.146 | 226.325     | -0.005   | -414.627 | 205 |
| 10   | 0.82***     | -159.377*** | -34.49*     | 69.726*   | -0.156**  | -34.881 | -16.515 | 90.139      | -1.376   | 699.932  | 140 |

**Note(s):** \* Significant at 90% confidence level, \*\*significant at 95% confidence level, \*\*\* significant at 99% confidence level

**Table 12.**  
Determinants of INVD  
by country

|     | APD      | Lagged APD | OCF       | SG         | OPM      | MBV     | LNTA     | GEAR        | TANG       | GDPR     | Constant   | OBS  |
|-----|----------|------------|-----------|------------|----------|---------|----------|-------------|------------|----------|------------|------|
| All | 0.649*** |            | 9.836     | -27.912*** | 15.640   | 0.027   | 19.754** | -26.525     | -18.431    | -1.522** | -330.165*  | 1975 |
| 1   | 0.486**  |            | 30.209    | -42.007*** | 42.343   | -0.709* | 7.755    | 27.609      | 22.623     | -2.417*  | -130.345   | 550  |
| 2   | 0.268    |            | 13.523    | -19.232*   | -22.262  | -0.106  | 26.797   | 60.510      | -24.685    | -3.307*  | -426.337   | 375  |
| 3   | 0.548**  |            | -12.577   | -30.826**  | -15.852  | 0.316*  | 6.730    | -121.422*** | -82.19     | -0.186   | -72.349    | 395  |
| 4   | 0.141    |            | 74.245**  | 39.058     | 44.697   | -3.388  | -28.401  | -9.348      | 8.833      | 8.011    | 604.062    | 90   |
| 5   | 0.55*    |            | 7.236     | -24.471**  | -46.831  | 8.297*  | -32.160  | -78.597     | -81.377    | -0.811   | 680.486    | 150  |
| 6   | 0.707*** |            | 13.045    | -22.274**  | 20.007   | 0.215   | 32.252*  | -77.660     | 0.047      | -0.286   | -568.386** | 285  |
| 7   | 0.057    |            | 165.568** | -36.859*   | -131.230 | 4.073   | -16.342  | 57.363      | 104.960    | -5.371   | 411.376    | 50   |
| 8   | 0.534**  |            | 220.168*  | -9.124     | 110.739  | -5.602  | 7.769    | -165.158    | -221.929** | 7.063*   | -7.046     | 45   |
| 9   | 0.957**  |            | 21.754    | 37.975     | -28.107  | -3.275  | -12.152  | 216.308     | -287.698   | -3.554   | 395.519    | 35   |

**Note(s):** \* Significant at 90% confidence level, \*\*significant at 95% confidence level, \*\*\*significant at 99% confidence level

| APD                                                                                | Lagged APD | OCF      | SG         | OPM         | MVBV     | LNTA       | GEAR      | TANG      | GDPGR    | Constant     | OBS |
|------------------------------------------------------------------------------------|------------|----------|------------|-------------|----------|------------|-----------|-----------|----------|--------------|-----|
| 1                                                                                  | 0.463      | 253.596  | -50.210    | -166.375*** | -8.779   | 123.735*** | 162.965   | 115.031   | -1.665   | -2273.733*** | 30  |
| 2                                                                                  | 0.663***   | 6.943    | -33.851*** | 97.571**    | 0.154    | 5.555      | 30.215    | -10.749   | 2.837    | -99.020      | 370 |
| 3                                                                                  | 0.798***   | 28.160   | -15.966*   | -80.06**    | 0.132    | 31.499     | -99.756   | -37.515   | 0.382    | -513.887     | 330 |
| 4                                                                                  | 0.464*     | 117.102* | -95.021*   | 122.865*    | -1.247   | 17.180     | -98.767** | -4.100    | -3.303** | -307.871     | 85  |
| 5                                                                                  | 0.138      | 60.491*  | 47.563***  | -11.750     | -0.731   | 15.966     | 60.057    | 13.391    | -2.342** | -196.674     | 220 |
| 6                                                                                  | 0.596**    | 0.362    | -22.206    | -60.826     | 2.415    | 39.457     | -41.058   | 57.044    | -0.392   | -712.057*    | 185 |
| 7                                                                                  | -0.194     | 10.703   | -46.453    | -81.793     | 12.320   | 54.869*    | 8.803     | 53.513    | 2.576    | -1095.085*   | 55  |
| 8                                                                                  | 0.195      | -1.531   | 8.860      | -25.062     | -2.696   | -25.642    | -62.533   | 12.083    | 0.311    | 580.055      | 355 |
| 9                                                                                  | 0.274      | 124.639* | -40.756    | -9.179      | 0.055    | -19.249    | -67.388   | 221.336** | 0.410    | 374.631      | 205 |
| 10                                                                                 | 0.706***   | -5.996   | -16.006    | 37.675      | 0.213*** | 22.042     | -34.228   | -47.173   | -4.1***  | -393.295     | 140 |
| <b>Note(s):</b> *, **, *** Significant at 0.10, 0.05 and 0.01 levels, respectively |            |          |            |             |          |            |           |           |          |              |     |

**Table 14.**  
Determinants of APD  
by country

The results in [Tables 7 and 8](#) reveal a highly significant negative relationship between operating cash flow and CCC for the whole sample and in most industries and countries, except for the healthcare industry, and in country detail, Oman and Qatar. The significant negative relationship is an expected result; as the proportion of operating cash flow to total assets increases, CCC is expected to decrease because such an increase improves the liquidity position of firms, which is consistent with a shorter CCC.

The results also reported a highly significant negative relationship between sales growth and CCC for the whole sample and most industries and countries, except telecommunications services, and in country detail, only Qatar. This finding implies that higher sales growth is associated with better working capital management, with shorter collection periods and longer payment periods.

One interesting finding of this study is firm performance. We find a positive significant result for operating profit margin for the whole sample; however, a similar finding is not observed in all industry and country details. There are significant coefficients in three industries and in five countries. We found insignificant results for the relationship between CCC and MVBV for the whole sample, indicating that CCC is not related to firm value, even though there are significant results in some industries and countries.

Despite previous studies reporting a negative relationship between firm size and CCC, our findings report a significant positive relationship for the whole sample. However, in terms of industry and country details, we observed conflicting results, with significant negative results in some countries and positive significant results in some industries. This situation implies that industry and country conditions affect this relationship. The positive relationship can be interpreted to imply that larger firms have more flexibility to allow deferred periods for their customers and that they can make earlier payments to their suppliers, resulting in longer CCC.

These results did not reveal a significant relationship between gearing and CCC. In only one industry and only in two countries, we found a significant relationship, but the signs of these are conflicting, not allowing us to draw a conclusion.

We found a significant negative relationship between tangibility and CCC for the whole sample as well as in different country and industry contexts. This negative relationship can be interpreted to mean that firms with higher levels of tangible assets tend to have fewer funds available for working capital management, resulting in longer CCC.

Except for two industries and four countries, we observed an insignificant relationship between GDP growth rate and CCC, and the signs are inclusive, which is an unexpected result because theoretically, there must be an association between general macroeconomic conditions and firms' working capital practices. In times of recession, firms tend to decrease their CCC, whereas in times of economic boom, they tend to increase it. However, we observed negative coefficients in the countries and industries with significant results, except for the UAE.

[Tables 9 and 10](#) reports the results of the model in which ARD is the dependent variable. For the whole sample and most of the industries and countries, lagged receivables days have a significantly positive effect. Operating cash flow, sales growth rate, tangibility and GDP growth rate are the independent variables with a negative significant effect on ARD, whereas firm size has a positive significant effect and gearing is insignificant for the whole sample. In industry and country samples, independent variables do not have the same significance levels as in the whole sample.

[Table 11 and 12](#) reports the results of the model in which INVD is the dependent variable. Like ARD, lagged dependent variable is found to have a positive significant effect in the whole sample as well as in most industry and country samples. For the whole sample, operating cash flow and sales growth have a negative significant effect, and operating profit margin and firm size have a positive significant effect. The negative coefficient of sales

growth implies that as firms reach higher growth levels in sales, they can shorten inventory conversion periods. The negative coefficient of operating cash flow implies that the increased operating cash flow to total assets ratio is associated with shorter inventory holding periods. The positive coefficient of firm size implies that larger firms are more flexible in converting the inventories over longer periods. Other independent variables produced insignificant coefficients, however, in industry and country samples, some independent variables are found to be significant. Specifically, sales growth shows the same pattern in most countries, whereas firm size and operating profit margin produced ambiguous results at the country level.

Tables 13 and 14 reports the results of the model in which APD is the dependent variable. Similar to the other two components, lagged dependent variable is found to have a positive significant effect in the whole sample, mostly industry and country samples. We observe the same pattern and implications for sales growth rate and firm size for account payable days. Larger firms have higher bargaining power, and they can receive longer payment deferral periods from the suppliers. Other control variables produced mixed results in different industry and country contexts. Overall, we can interpret those ambiguous results in the components of CCC as that the relationships among the control variables and the components of CCC are not as strong as in the case of CCC. The components show a more stable pattern collectively.

## 5. Conclusion

Working capital management is crucial for a successful and sound business. Managers face a trade-off between liquidity and profitability when designing short-term financial management policies, and they need to achieve and sustain an optimal working capital level, considering the policies related to receivables, inventories and payables. One of the most commonly used indicators in working capital management is the CCC. This study to search for the determinants of CCC We developed four models to achieve this aim. in which CCC and its three components are the dependent variables. We identified several firm-level characteristics as determinants of CCC in addition to country- and industry-level variables. Sales growth, operating cash flow, firm size, the market value/book value ratio, leverage and tangibility are the firm-level variables used in the models. To reflect the macroeconomic conditions at the country level, we used the GDP growth rate and added country and industry dummies to the models. The sample is composed of 395 non-financial companies from 10 countries in the MENA region, and data were collected for six years (2013–2018).

The results revealed a significant negative relationship between operating cash flow and CCC, implying that as the proportion of operating cash flow to total assets increases, CCC is expected to decrease because such an increase improves the liquidity position, which is consistent with a shorter CCC. We also found a highly significant negative relationship between sales growth and CCC, indicating that higher sales growth is associated with better working capital management, shorter collection periods and longer payment periods. We find a weak significant result for operating profit margin, and the relationship between CCC and MVBV is not significant, indicating that CCC is not related to firm value. We found a positive significant relationship between firm size and CCC, which can be interpreted to imply that larger firms have more flexibility to allow deferred periods for their customers and they can make earlier payments to their suppliers, resulting in longer CCC. We did not find a significant relationship between gearing and CCC, except in a few industries and countries. The results show a significant negative relationship between tangibility and CCC, implying that firms with higher levels of tangible assets tend to have fewer funds available for working capital management, resulting in longer CCC. We found an insignificant relationship between the GDP growth rate and CCC for the whole sample. This result is unexpected because,

theoretically, an association must exist between general macroeconomic conditions and a firm's working capital practices. In times of recession, firms tend to decrease their CCC, whereas, in times of economic boom, they tend to increase their CCC. However, we observed negative coefficients in the countries and industries with significant results, except for the UAE.

This study's findings have important implications for company managers in designing working capital management policies. First, in the model, we used CCC as the dependent variable, and the results were more significant compared with the models in which the components of CCC are dependent variables, implying that managers should pay equal attention to the components of CCC and develop a comprehensive working capital management policy. Second, the results show that many firm characteristics affect CCC, and managers need to consider all of these factors while making investment and financing decisions about the components of working capital. Third, as we reported the results of all models in industry and country breakdown, industry and country conditions affect the determinants of CCC, implying that managers should consider industry characteristics and country-specific conditions.

A limitation of our study is the relatively short sample period of six years. Future studies should conduct similar research over longer periods. Another potential improvement might be the use of quarterly data, because working capital accounts show huge changes during the year. Using quarterly data will show the trends better and will also increase the number of observations, which may further increase the significance level of the results.

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#### Further reading

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