Jordan Journal of Business Administration, Volume **21**, No. **6**, **2025**
DOI: https://doi.org/10.35516/jjba.v22i2.1009

The Impact of Business Cycle on the Relationship between Working Capital Management and Profitability: A Moderation Analysis

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ABSTRACT

The present study aims to examine the impact of the business cycle on the relationship between working capital management (WCM) and profitability in Jordanian manufacturing firms listed in the Amman Stock Exchange (ASE). The present research endeavors to analyze the effect of the business cycle on the association between WCM and the profitability of 38 manufacturing companies listed in the Amman Stock Exchange (ASE) during the period from 2009 to 2020. The dependent variable, return on Assets (ROA), is examined in conjunction with the independent variable, working capital management (WCM), while controlling for the variables of Firm Size and Leverage. Descriptive statistics, correlation analysis, and multiple regression are employed to test the hypotheses.

The findings indicate that the Cash Conversion Cycle (CCC) has a significant and negative impact on firm profitability, implying that reducing the cycle size can enhance profitability. Moreover, the results suggest that the business cycle has a slightly moderate, but statistically significant, relationship with the Cash Conversion Cycle and profitability. The results further reveal that Leverage has a detrimental effect on profitability, whereas Firm Size has a positive impact. This study provides valuable insights for stakeholders, such as creditors, investors, and managers, to make informed investment decisions and efficiently manage working capital.

Keywords: Working capital management, Cash conversion cycle, Return on assets, Business cycle, Manufacturing companies, Jordan.

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Received on 12/3/2023 and Accepted for Publication on 25/7/2023.

أثر دورة الأعمال على العلاقة بين إدارة رأس المال العامل والربحية: تحليل التعديل

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ملخص

تهدف هذه الدراسة إلى فحص أثر دورة الأعمال على العلاقة بين إدارة رأس المال العامل والربحية في الشركات الصناعية الأردنية المدرجة في بورصة عمان. وتسعى هذه الدراسة إلى تحليل أثر دورة الأعمال على الارتباط بين إدارة رأس المال العامل والربحية لـ 38 شركة صناعية مدرجة في بورصة عمان خلال الفترة من 2009 إلى 2020. يتم فحص المتغير التابع، العائد على الأصول (ROA)، بالتزامن مع المتغير المستقل، إدارة رأس المال العامل، مع السيطرة على متغيرات حجم الشركة والرافعة المالية. ويتم استخدام الإحصاءات الوصفية وتحليل الارتباط والانحدار المتعدد لاختبار الفرضيات.

تشير النتائج إلى أن دورة تحويل النقد (CCC) لها تأثير كبير وسلبي على ربحية الشركة، مما يعني أن تقليل حجم الدورة يمكن أن يعزز الربحية. علاوة على ذلك، تشير النتائج إلى أن دورة الأعمال لها علاقة معتدلة إلى حد ما وذات دلالة إحصائية مع دورة تحويل النقد والربحية. كذلك تكشف النتائج أن الرافعة المالية لها تأثير سلبي على الربحية، في حين أن حجم الشركة له تأثير إيجابي. وتوفر هذه الدراسة نظرة قيمة لأصحاب المصلحة مثل الدائنين والمستثمرين والمديرين لاتخاذ قرارات استثمارية مدروسة وممارسة إدارة فعالة لرأس المال العامل.

الكلمات الدالة: دورة الأعمال، إدارة رأس المال العامل، الربحية، الرافعة المالية، العائد على الأصول، حجم الشركة، الشركات الصناعية، الأردن.

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تاريخ استلام البحث 2023/3/12 وتاريخ قبوله 2023/7/25.

1. INTRODUCTION

The manufacturing industry is an essential sector of the Jordanian economy, contributing 28% to the country's Gross Domestic Product (GDP) in 2021, according to the Jordan Chamber of Industry (JCI). Working capital management (WCM) is a vital aspect of organizational management, which involves maintaining a balance between current assets and current liabilities to ensure timely fulfillment of financial obligations (Nguyen, 2020). Effective WCM is critical for a company's survival and serves as a vital source of funding (Deloof, 2003)**.** Previous research has provided conflicting evidence on the relationship between WCM and profitability. While some studies found a negative correlation (Al-Debi'e, 2011; Shubita, 2013; Mahato, 2016; Nwude, 2018), others found an insignificant relationship (Jakpar et al., 2017; Oladimeji & Aladejebi, 2020). The COVID-19 pandemic has caused a decline in profits, working capital, liquidity, and credit availability, like the aftermath of the 2007 financial crisis (Satoto et al., 2022). As a result, WCM has become increasingly important for manufacturing companies to ensure their continued survival and profitability (Agha, 2014).

The business cycle also plays a crucial role in firms' operating and short-term financing decisions, and effective WCM during business cycles is essential for a firm's success (Shah, 2016). The business cycle consists of two stages, the economic boom period, which refers to the periods of real GDP growth, and the recession period, which refers to the periods of real GDP decline (Pakdel & Ashrafi, 2019)**.** Given the lack of research on the impact of the business cycle on the relationship between WCM and profitability in Jordan, this study aims to examine the effect of WCM on firm profitability during different stages of the business cycle in Jordanian manufacturing firms listed in the Amman Stock Exchange (ASE). The expected results of this study will have significant implications for policymakers, as they can provide a better understanding of the relationship between WCM and profitability and how it is affected by the different stages of the business cycle. The results will provide valuable information that can be used to support the growth and stability of the manufacturing sector in Jordan.

Furthermore, studying this relationship in the Jordanian context is worthwhile for several reasons. First, Jordan's economy is heavily dependent on the manufacturing sector, making up a significant portion of the country's exports (Hammad & Al-Obaidat, 2018). Second, the country has experienced economic and political instability, which may have affected firms' WCM practices and profitability (Abu Khalaf & Al-Tarawneh, 2019; Bakkar & Hilal, 2021). Third, the Jordanian manufacturing sector has unique characteristics that may affect the relationship between WCM and profitability, such as the dominance of family-owned firms (Al-Shoubaki & Obeidat, 2021). Thus, studying this relationship in the Jordanian context can provide valuable insights into the factors that affect WCM and profitability in manufacturing firms in emerging markets**.**

2. Literature Review and the Development of Hypotheses

This section discusses previous research results and the development of hypotheses.

(1) The Relationship between Working Capital Management and Profitability

Previous studies within the fields of accounting and finance have explored the relationship between working capital management (WCM) and profitability. Al-Debi'e (2011) sought to investigate this relationship by analyzing a sample of 86 firms listed in the Amman Stock Exchange in Jordan over a span of ten years (2001-2010). The findings indicated that profitability is negatively affected by the duration of product sales, accounts receivable collection, and accounts payable payment, with leverage being a confounding variable.

Conversely, the size of the firm and annual Gross Domestic Product growth were found to have positive impacts on profitability. Shubita (2013) conducted another study which focused on the relationship between WCM and profitability among industrial companies listed in the Amman Stock Exchange in Jordan. The sample size consisted of 39 firms during the period of 2004-2011 and the return on assets (ROA) was used as the dependent variable, while net trade cycle, inventory turnover in days, average payment period, and average collection period were used as independent variables. The study concluded that there is a negative relationship between profitability and these independent variables and that companies should efficiently manage their current assets and liabilities to enhance their profitability**.** In addition, Sharaf and Haddad (2015) examined the the impact of different components of WCM on the level of profitability. The study employed on a sample of 43 industrial companies listed in the ASE in Jordan, over the period spanning from 2000 to 2012. The findings derived from regression analysis demonstrate a statistically significant inverse relationship between the CCC and profitability. These findings suggest that a reduction in the CCC positively affects company profitability. Additionally, by shortening the collection payment period and inventory-conversion period, managers have the potential to generate value for shareholders. Moreover, the results indicate a positive correlation between the payables deferral period and return on equity, serving as a measure of profitability. Furthermore, profitability exhibits an upward trend with firm size and sales growth, while it demonstrates a downward trend with leverage.

Tauringana and Afrifa (2013) examined the correlation between working capital management (WCM) and profitability of Small and Medium-sized Enterprises (SMEs) in a sample of 133 firms between 2005 and 2009. They utilized a questionnaire and regression analysis to determine the relationship between WCM and Return on Assets (ROA). The independent variables in the analysis included Cash Conversion Cycle (CCC), Accounts Payable, Inventory, and Accounts Receivable, with ROA serving as the dependent variable. Size, Leverage, and Quick Ratio were employed as control variables. The results revealed that Accounts Receivable and Accounts Payable had a significant impact on profitability, while the relationships between CCC and inventory with profitability were not significant. The authors concluded that for SMEs to increase profitability, they should concentrate their limited resources on managing Accounts Payable and Accounts Receivable**.** In another study, Akoto et al. (2013) investigated the relationship between working capital management practices and profitability in a sample of 13 manufacturing firms listed in the stock exchange in Ghana, using panel data from 2005 to 2009. The study found a statistically significant negative relationship between Accounts Receivable Days and ROA, while a significant positive relationship was observed between Cash Conversion Cycle and ROA. Furthermore, a significant positive relationship was established between the control variables, Size, Current Asset Turnover, Current Asset Ratio, and ROA. The authors recommended that managers should enhance profitability by maintaining an appropriate Cash Conversion Cycle level and reducing Accounts Receivable Days.

In a study conducted by Ponsian et al. (2014), the relationship between working capital management and profitability was analyzed using a sample of 30 manufacturing companies listed in the Dar as Salaam Stock Exchange during the period from 2002 to 2012. The researchers used regression analysis and Pearson's correlation to determine the relationship between Gross Operating Income (the dependent variable) and independent variables, including Inventory Conversion Period, Cash Conversion Cycle, Average Collection Period, and Average Payment Period. Leverage, size, and current ratio were utilized as control variables. The results of the study indicated a

significant negative relationship between Gross Operating Income and the average collection period, inventory conversion period, and size, while a significant positive relationship was established between Gross Operating Income, cash conversion cycle, average payment period, current ratio, and leverage. In another study, Mahato et al. (2016) investigated the effect of working capital management on profitability in the Indian telecom industry. The sample consisted of 8 companies listed in the Indian Stock Exchange over the period from 2010 to 2015. Return on Assets was used as the dependent variable and was analyzed in relation to the independent variables, including Cash Conversion Cycle, Average Payment Period, Inventory Conversion Period, and Average Collection Period. The study also utilized firm size, debt ratio, sales growth, and current ratio as control variables. The researchers employed correlation analysis, descriptive statistics, and ordinary least square regression analysis to determine the relationship between WCM and profitability. The results indicated a negative relationship between Return on Assets and Cash Conversion Cycle, Average Collection Period, and Inventory Conversion Period, while a positive relationship was found between Return on Assets, Average Payment Period, firm size, and debt ratio.

The relationship between working capital management and profitability was the focus of several studies. Jakpar et al. (2017) analyzed the impact of WCM on profitability in 164 manufacturing firms listed in the Main Board of Bursa Malaysia between 2007 and 2011. Return on assets was the dependent variable and the independent variables included the Cash Conversion Cycle (CCC), Average Collection Period (ACP), Inventory Conversion Period (ICP), and Average Payment Period (APP), with firm size and leverage controlled. Results showed a positive correlation between ACP, APP, firm size, and profitability, while a negative correlation was found between leverage and profitability. The CCC showed no relationship with profitability. Oseifuah (2018) studied the relationship between WCM and profitability in 75 non-financial firms listed in the Johannesburg Stock Exchange from 2003 to 2012. Results revealed that the Receivable Conversion Period had a negative, significant effect on profitability during crisis periods, while the Cash Conversion Cycle and Inventory Conversion Period had a negative, insignificant impact on profitability. The Payables Deferral Period showed a positive, insignificant impact on profitability.

Nwude et al. (2018) evaluated the effect of the Cash Conversion Cycle on profitability in Nigeria using 20 insurance companies listed in the Nigerian Stock Exchange between 2000 and 2011. Return on Assets (ROA) was used as the dependent variable and the Current Ratio, growth, and firm size served as control variables. Results indicated a negative, significant impact of the CCC on ROA. Munir (2019) examined the impact of WCM on profitability in 10 Indonesian dairy food companies listed in the Indonesian Stock Exchange between 2003 and 2012. Return on Equity (ROE) was the dependent variable and the independent variables included current ratio, day payables outstanding, and average collection period. Results showed a positive, significant impact of current ratio and day payables outstanding on ROE, while average collection period had a negative, insignificant impact on ROE.

Aryawan and Indrian (2020) conducted a study to examine the relationship between WCM and profitability in 72 manufacturing companies listed in the Indonesia Stock Exchange between 2013 and 2017. The independent variables included the Cash Conversion Cycle, Inventory Conversion Period, Average Collection Period, and Average Payment Period, while return on assets served as the dependent variable. Leverage, liquidity, and firm size were used as control variables. Results showed a negative, significant impact of average collection period on profitability and a positive, significant impact of average payment period on profitability. The CCC and

Inventory Conversion Period showed a negative, insignificant effect on profitability, while leverage had a negative effect, and liquidity and firm size had positive effects on profitability.

A study conducted by Oladimeji and Aladejebi (2020) aimed to assess the relationship between working capital management and profitability in small businesses in Nigeria over the period of 2014-2018. The researchers used regression analysis as a method to examine the impact of working capital management and its components on profitability, which was measured using the return on assets. The independent variables in the study included Average Payment Period (APP), Inventory Conversion Period (ICP), Account Collection Period (ACP), Cash Debt Ratio (DR), Quick Ratio (QR), and Debt Ratio (DR). The results indicated that there was no significant impact of working capital management on profitability. The authors recommended that small and medium enterprises should prioritize working capital management and implement appropriate policies and measures to enhance their financial health. Similarly, a study conducted by Sawarni et al. (2020) sought to investigate the impact of the efficiency of working capital management on performance. The sample consisted of 414 non-financial firms listed in the Bombay Stock Exchange over the period of 2012-2018. Tobin's Q and return on equity (ROE) were used to measure the dependent variable, while net-trade cycle (NTC) and its components were used as the independent variables. Additionally, the researchers controlled for firm size, age, growth, and leverage. The results showed that working capital management had a significant and negative effect on performance. The authors suggested that Indian firms could improve their financial performance by reducing their NTC, which could be achieved by reducing the amount of capital tied up in working capital per unit of sales.

Thenuwara and Ekanayake (2021) conducted a study to evaluate the impact of Working Capital Management (WCM) on profitability using a sample of 46 consumer staple companies listed in the Colombo Stock Exchange during the period 2014-2019. The research employed panel data analysis, descriptive statistics, and multiple regression analysis to test this relationship. The findings revealed that the Payables Settlement Period had a positive, but insignificant, impact on profitability, while the Current Assets Ratio had a positive and significant impact. On the other hand, the Receivables Collection Period had a significant and negative effect on profitability, but the Inventory Conversion Period had a negative and insignificant, impact. The authors emphasized the importance of WCM for companies and suggested that they should pay more attention to it for a smooth operation of their businesses. Meanwhile, Sensini and Vazquez (2021) explored the impact of WCM on profitability in Argentine agro-industrial firms, using a sample of 326 firms over the period 2012-2018. The independent variables in the study were Days Sales Outstanding, Days Sales Inventory, and Days Payable Outstanding, while the dependent variable was measured by earnings before interest, taxes, and amortization and leverage was used as the control variable. Dynamic panel data analysis was applied in this study and the results indicated that DSO, DSI, and DPO had negative impacts on profitability. Based on the findings of these studies, the following hypothesis can be suggested:

H_1: There is no significant effect of working capital management (WCM) on profitability (ROA).

(2) The Impact of the Business Cycle on the Relationship between Working Capital Management and Profitability

The impact of the business cycle on the relationship between Working Capital Management (WCM) and profitability has been studied by several researchers in different countries. One such study was conducted by Enqvist et al. (2014), who focused on investigating this relationship in Finland. The sample for this study was selected from the Helsinki Stock Exchange and

consisted of 1136 firms over the period spanning from 1990 to 2008. The dependent variables, Return on Assets (ROA) and Gross Operating Income (GOI), were measured and the study controlled for factors, such as sales, debt, current ratio, and size. The business cycle was measured using a dummy variable with a value of 1 assigned during economic recessions and 0 otherwise. The results showed that during economic downturns, there was a negative relationship between the Cash Conversion Cycle (CCC), Accounts Receivable (AR), Accounts Payable (AP), Inventory (INV), and profitability. Conversely, during economic booms, the CCC and its components had a positive relationship with profitability. Additionally, the study found that the current ratio had positive relationships with profitability, while the control variables debt and firm size had negative relationships with profitability. In another study, Shah (2016) examined the relationship between working capital management and profitability in different business cycles in Pakistan. The sample consisted of 65 non-financial firms listed in the Karachi Stock Exchange over the period from 2004 to 2013. The dependent variable was measured using Return on Assets (ROA) and the control variables were current ratio and sales. The results indicated a negative correlation of Cash Conversion Cycle (CCC) and its components with profitability. The study also found that Accounts Receivable (AR) had a negative impact on profitability during economic recessions, but a positive impact during economic booms. On the other hand, Accounts Payable (AP) had a negative effect on profitability during economic booms, but a positive effect during economic recessions. The author suggested that firms could enhance their profitability by efficiently managing their working capital and by hiring financial experts for assistance.

Tas and Atac (2018) investigated the correlation between Working Capital Management (WCM) and corporate performance in the context of different business cycles in Turkey. The sample consisted of energy firms listed in the Istanbul Stock Exchange from 2012 to 2018, with Gross Operating Income (GOI) serving as the dependent variable and Gross Domestic Product (GDP) being used to measure the business cycle. The results demonstrated a negative relationship between the Cash Conversion Cycle (CCC) and profitability during the economic boom, but a positive relationship during the recession period. The study also found that the size of a firm had a positive impact on profitability in both economic periods, while debt had a negative impact during the boom period and a positive impact during the recession period. The authors recommended that WCM should be integrated into financial planning, especially during times of economic downturn. In a similar vein, Gonçalves et al. (2018) evaluated the impact of WCM on profitability across different business cycles in the United Kingdom. The sample comprised of 400 firms with 29380 observations, not listed in stock exchanges, for the period 2006-2014. Return on Assets (ROA) and Gross Operating Income (GOI) were used as the dependent variables, while the Cash Conversion Cycle, the number of days for Accounts Payable, Accounts Receivable, and Inventory were the independent variables. The business cycle was measured using the change in GDP during economic downturns and booms, with current ratio, firm size, and financial debt ratio serving as the control variables. The findings showed a positive relationship between WCM and profitability during economic downturns. The authors advised that companies could improve their profitability by managing their WCM more efficiently.

In recent years, a number of studies have analyzed the effect of working capital management (WCM) on firm performance in diverse business cycles. Nguyen (2020) conducted a study in Vietnam, where he selected a sample of 38 economic groups listed in the Vietnamese stock market between 2009 and 2019. The dependent variables were gauged through the rate of return on operating assets (GOP) and return on assets

(ROA), with leverage, firm size, and growth serving as control variables. The business cycle was evaluated as a dummy variable, with 1 representing a recession and 0 otherwise. The results displayed a negative correlation between the cash conversion cycle (CCC) and profitability during economic crises. Similarly, Göransson et al. (2020) examined the relationship in Sweden, selecting a sample of 449 firms listed in Nasdaq Stockholm for the period from 2008 to 2018. The dependent variable was measured by Tobin's Q, with leverage and size acting as control variables. The findings showed a significant positive impact of WCM on performance. However, no relationship between WCM and performance was identified during both economic boom and recession. Ameer and Othman (2021) investigated the impact of WCM on financial performance in New Zealand, utilizing a sample of 76 firms for the period 2005-2017. The dependent variable was measured by return on assets (ROA) and Tobin's Q-ratio, with debt ratio, firm size, sales growth, and current ratio serving as control variables. The business cycle was evaluated as a dummy variable, with 1 indicating contraction in economic growth and 0 otherwise. The results depicted a non-linear relationship between WCM and financial performance. Based on these studies, it is possible to propose the following two hypotheses:

H_2: There is no significant effect of the business cycle on profitability (ROA).

H_3: There is no significant effect of working capital management (CCC) on profitability (ROA) with the business cycle as a moderator.

3. Methodology

This study utilized a quantitative approach and relied on secondary data collected from the Amman Stock Exchange (ASE) and the Central Bank of Jordan (CBJ). Descriptive statistics, such as the mean and standard deviation, were used to summarize the data and make descriptive observations. The relationship between the variables was analyzed using bivariate Pearson correlation, while the effect of working capital management on profitability, with the business cycle serving as a moderator, was investigated using multiple linear regression analysis. The population of this study was comprised of all manufacturing firms listed in the Amman Stock Exchange over a 12-year period from 2009 to 2020. The period from 2009 to 2019 was categorized as an expansion period, while the year 2020 was classified as a recession period, owing to the COVID-19 pandemic. The final sample for this study consisted of 38 firms and 456 observations, selected based on the availability of financial information and annual reports of the companies listed in the Amman Stock Exchange during the study period. The data used in this study was collected from the annual reports of the selected manufacturing firms, which were obtained from the Amman Stock Exchange, and the business cycle data was obtained from the Central Bank of Jordan. The manufacturing firms were chosen due to the importance of this sector to the Jordanian economy. In addition, working capital management is more important to the manufacturing firms compared with service firms and financial firms.

The research aimed to explore the impact of the business cycle on the relationship between working capital management (WCM) and profitability. To accomplish this aim, the study employed a quantitative methodology, where profitability was the dependent variable, which was measured by the return on assets (ROA) ratio, and working capital management was the independent variable, which was evaluated through the cash conversion cycle (CCC). To account for other influencing factors, firm size and leverage were considered as control variables, and the business cycle was incorporated as the moderating variable.

(1) **The Dependent Variable:** Profitability: The study employed the return on assets (ROA) ratio to assess the efficiency of a company in generating profit from its assets. ROA has been widely used in prior

research on WCM and has been cited in several studies (such as Enqvist et al., 2014; Gonçalves et al., 2018; Tas & Atac, 2018; Pakdel & Ashrafi, 2019; Nguyen, 2020). The ROA was calculated as the ratio of net income to total assets.

(2) **The Independent Variable**: Working Capital Management: CCC was employed as a measure of WCM and liquidity in companies. It represents the time span between spending money on resources and receiving money from product sales. In line with previous studies on working capital management (e.g. Enqvist et al., 2014; Shah, 2016; Gonçalves et al., 2018; Tas & Atac, 2018; Pakdel & Ashrafi, 2019; Aryawan & Indriani, 2020; Nguyen, 2020; Ameer & Othman, 2021), CCC was defined as the sum of the number of days of accounts receivable, inventory, and accounts payable, with accounts payable subtracted from the sum**.** The three components of CCC were estimated as follows**:** (1) Number of days accounts receivable = (Accounts receivable/sales) x 365; reflecting the average number of days it takes a company to collect payment from its customers**.**(2) Number of days inventory = (Inventory / cost of goods sold) x 365; representing the average number of days of stock held by the firm and (3) Number of days accounts payable = (Accounts payable/cost of goods sold) x 365; reflecting the average number of days that it takes a firm to pay its suppliers.

(3) **The Moderating Variable:** In this research endeavor, the business cycle is employed as a moderating variable. This term pertains to the fluctuations in economic activity that are measured by the quarter-on-quarter growth of the Gross Domestic Product (GDP). However, instead of utilizing the quarterly data, this study employs yearly GDP data to achieve its objectives. According to Schumpeter (1939), the business cycle encompasses four phases; namely, expansion, recession, contraction, and recovery. In this study, however, the business cycle is divided into two phases, economic expansion and economic recession, following the methodology adopted in previous studies (Enqvist et al., 2014; Shah, 2016; Gonçalves et al., 2018; Tas & Atac, 2018; Pakdel & Ashrafi, 2019). The business cycle is typified by periods of recession and expansion. A recession commences after the economy reaches its peak and terminates when the economy reaches its trough. The expansion phase, on the other hand, is characterized by above-average economic growth. To determine the periods of peaks and troughs, the study employs the same algorithm utilized by Claessens et al. (2012), which identifies maxima and minima in the series over a specified time period. In addition, a peak is indicated by two consecutive periods of GDP growth followed by two periods of reduction (Paulo & Mota, 2019), while a trough is marked by two consecutive periods of declining GDP accompanied by two periods of continuous growth (Paulo & Mota, 2019). The phases were identified using dummy variables, as depicted in Figure (1), which displays the GDP data from the Central Bank of Jordan (CBJ) for the period (2009-2021) and the percentage change in GDP computed by the researchers. In this study, the business cycle was based on the two phases of recession (represented by the lowest GDP growth) and expansion (represented by the highest GDP growth). Binary valued dummy variables were incorporated into the regression model to indicate the shifts between the two economic states. These dummy variables were employed to compare the significance of the working capital components during the two different economic states and to reach the study's overall findings.

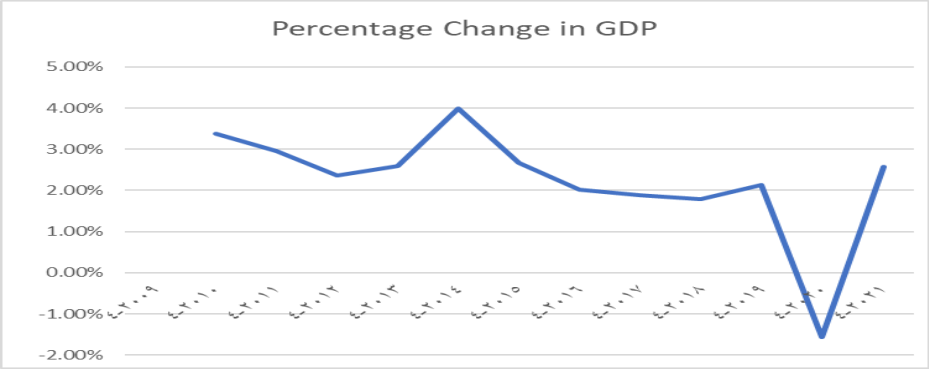

Figure (1)
Percentage change in GDP.

Source: Central Bank of Jordan.

In this research, three regression models were implemented to assess the association between Return on Assets (ROA) and Cash Conversion Cycle (CCC), as well as the moderating effect of the business cycle. The models were designed based on similar models utilized in previous studies (Shubita, 2013; Enqvist et al., 2014; Pakdel & Ashrafi, 2019). The models were also adjusted to incorporate control variables, including firm size (SIZE) and leverage (LEV).

The first regression model (Model 1) is represented as follows:

$$ROAit = \alpha + \beta1CCCit + \beta2SIZEit + \beta3LEVit + eit$$

In Model 2, the business cycle was introduced as an additional independent variable: $ROAit = \alpha + \beta1CCCit + \beta2SIZEit + \beta3LEVit + \beta4Business\ cycleit + eit$

Finally, Model 3 included the interaction term between CCC and the business cycle: $ROAit = \alpha + \beta1CCCit + \beta2SIZEit + \beta3LEVit + \beta4Business\ cycleit + \beta5CCC \times Business\ cycleit + eit$

In these equations:

- ROAit represents the Return on Assets of firm (i) in year (t).
- CCCit represents the Cash Conversion Cycle of firm (i) in year (t).
- SIZEit represents the firm size, which is calculated as the natural logarithm of the total assets of firm (i) in year (t).
- LEVit represents the leverage, which is measured as the total debt to total assets ratio for firm (i) in year (t).
- Business cycleit represents the business cycle for firm (i) in year (t) with a binary value of 1 if it is an expansion (boom) and 0 otherwise,
- β represents the coefficients of variables,
- α represents the constant.
- e represents the random error of the variables.
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4. Data Analysis and Empirical Results

(1) **Descriptive Statistics:** This section presents the results of descriptive statistics for the study variables for the whole sample, which consists of 456 observations. The minimum, maximum, mean, median, and standard deviation for each variable are presented in Table 1.

Table 1
Descriptive statistics for the study variables

Variable	N	Min.	Max.	Mean	S.D.	Median
Working capital management						
CCC	456	-705	3,550	219	439	142
DAR	456	2	2,065	157	271	82
DAP	456	4	5,304	185	585	80
DI	456	0	1,216	187	189	141
Profitability measure						
ROA	456	-0.301	0.289	0.050	0.092	0.011
Control variables						
LEV	456	0.034	0.907	0.370	0.218	0.331
SIZE	456	14	21	17	1	17
Moderating variable						
Business Cycle	456	0	1	0.923	0.267	1

Description of study main variables:
CCC: Cash Conversion Cycle, **DAR**: Number of days accounts receivable, **DAP**: Number of days accounts payable, **DI**: Number of days inventories, **ROA**: Return on Assets ratio, **LEV**: The leverage ratio, **SIZE**: The size of the company.

In this study, a sample of 456 observations was analyzed to determine the descriptive statistics of the variables. Table 1 presents the results, including the minimum, maximum, mean, median, and standard deviation values. The mean value of the cash conversion cycle (CCC) was 219 days, which indicates the efficiency of working capital management, although it is higher compared to the mean CCC of 195 days reported by Al-Debi'e (2011) for industrial companies listed in the Amman Stock Exchange over the period from 2001 to 2010. The standard deviation of CCC was 439 days, with the minimum and maximum values being -705 days and 3550 days, respectively. The median value of CCC was 142 days, which is lower than the median value of 159 days reported by Al-Debi'e (2011), but higher than the median value of 100 days reported by Enqvist et al. (2014). Additionally, the average time taken by Jordanian manufacturing firms to receive payment after sales was 157 days (median of 82 days) with a standard deviation of 271 days and a range from the minimum value of 2 days to the maximum value of 2065 days.

The conversion of inventory to sales products was found to have an average duration of 187 days, with a median of 141 days and a standard deviation of 189 days. This data indicates a higher period for inventory conversion compared to the mean of 182 days and standard deviation of 152 days reported by Abuzayed in 2012. The range of the inventory conversion period was observed to be from 0 to 1216 days. Additionally, the average time required for payment of purchases was 185 days, with a median of 80 days and a standard deviation of 585 days, which represents a shorter period compared to the mean of 253 days and median

of 195 days reported by Tas and Atac in 2018. The accounts payable period was observed to range from a minimum of 4 days to a maximum of 5304 days.

The findings also showed that the average return on assets (ROA) was 5% higher than the mean of 1.7% reported by Tas and Atac in 2018, with a standard deviation of 9.2% and a median of 1.1%. The range for ROA was from -30.1% to 28.9%. The average leverage (LEV) was 0.37, indicating that approximately 37% of the firm's assets were financed through debt, with a median of 33.1% and a standard deviation of 21.8%. This mean value was higher than that reported by Al-Debi'e in 2011, who reported a mean of 32.2%, but lower than the mean value reported by Enqvist et al. in 2014, who reported a mean of 55.3%. The range for LEV was from 0.034 to 0.907. Firm size (SIZE) was determined as the natural logarithm of total assets and had an average value of 17, with a standard deviation of 1 and a median of 17. This indicates that most of the company sizes were around the mean, which was higher than the mean values reported by previous studies, such as Al-Debi'e (2011), Abuzayed (2012), and Pakdel and Ashrafi (2019), who reported mean values of 7.133, 15.605, and 12.735, respectively. The range for SIZE was from a minimum value of 14 to a maximum value of 21.

(2) Correlation Analysis: The Pearson product moment correlation method was utilized to analyze the relationship between the variables of interest and the results at a significance level of 0.1. The correlation matrix revealed that there was a weak and negative significant correlation between the number of days accounts receivable (DAR) and return on assets (ROA) (r = -0.173) at the 0.1 significance level. This correlation indicates that a longer period of time required to collect payments from customers is associated with lower profitability for the firm. Similarly, a weak and negative significant correlation was found between the number of days accounts payable (DAP) and the number of days inventories (DI) with ROA (r = -0.148 and r = -0.194) at the 0.1 significance level, indicating that a longer period spent paying creditors and holding inventory levels leads to lower profitability for the firm. Regarding the cash conversion cycle (CCC), Pearson correlation analysis revealed a weak and negative significant correlation between ROA and CCC (r = -0.089), indicating that a shorter CCC is associated with higher profitability. A strong and positive significant correlation was found between DAR and CCC (r = 0.720), suggesting that a longer period spent in collecting payments leads to a longer working capital cycle. There was also a weak and negative significant correlation between DAP and CCC (r = -0.160), indicating that if the time taken to pay for purchases is longer than the time for collection and selling inventory, the CCC will be reduced. A moderate and positive significant correlation was found between DI and CCC (r = 0.475), meaning that if the time spent in selling inventory is longer, the CCC will increase. Regarding the control variables, there was no significant negative correlation between leverage (LEV) and CCC or DI (r = -0.002 and r = -0.056, respectively). However, there was a significant negative correlation between LEV and ROA (r = -0.407), suggesting that more profitable companies have lower levels of leverage. Additionally, there were significant positive correlations between LEV and DAR and DAP (r = 0.245 and r = 0.265, respectively), implying that companies with higher levels of leverage have longer times spent collecting payments and paying for purchases. The results of the Pearson correlation analysis indicated that there was no significant negative relationship between company size (SIZE) and the cash conversion cycle (CCC) or days payable (DAP) (r = -0.019 and r = -0.042, respectively). However, a significant positive correlation was observed between SIZE and return on assets (ROA) (r = 0.285), suggesting that larger companies tend to be more profitable, which is consistent with previous research on working capital

management and firm performance (Al-Debi'e, 2013; Akoto et al., 2013; Mahato et al., 2016; Aryawan & Indrian, 2020). The correlation between SIZE and days receivable (DAR) or leverage (LEV) was found to be insignificant (r = 0.029 and r = -0.069, respectively). The analysis also revealed that the correlation between the business cycle and CCC was positive, but insignificant (r=0.003), as was the correlation between the business cycle and ROA (r=0.075). Meanwhile, the business cycle had negative, but insignificant, correlations with DAR, DAP, and inventory (DI) (r=0.003), (r=0.004), (r=0.012), respectively. There was also a positive, but insignificant, correlation between the business cycle and SIZE (r=0.032), and a negative, but insignificant, relationship with LEV (r=-0.034). However, the interaction between the CCC and the business cycle was found to have a significant inverse correlation with ROA (r=-0.091) and significant positive correlations with CCC, DAR, DAP, DI, and the business cycle itself (r=0.909), (r=0.730), (r=0.180), (r=0.386), and (r=0.144), respectively. On the other hand, the interaction showed a positive, but insignificant, correlation with SIZE (r=0.022) and LEV (r=0.012).

Table 2

Pearson correlations matrix coefficients between the main study variables

	CCC	**ROA**	**DAR**	**DAP**	**DI**	**LEV**	**SIZE**	**BUSINESS CYCLE**	**CCC*BUSINESS CYCLE**
CCC	1								
ROA	-0.089*	1							
DAR	0.720*	-0.173*	1						
DAP	-0.160*	-0.148*	0.566*	1					
DI	0.475*	-0.194*	0.415*	0.273*	1				
LEV	-0.002	-0.407*	0.245*	0.265*	-0.056	1			
SIZE	-0.019	0.285*	0.029	-0.042	-0.249*	0.069	1		
BUSINESS CYCLE	0.003	0.075	-0.003	-0.004	-0.012	-0.034	0.032	1	
CCC*BUSINESS CYCLE	0.909*	-0.0914*	0.730*	0.180*	0.386*	0.012	0.022	0.144*	1
* Correlation is significant at the 0.1 level (2-tailed).									

(3) Regression Analysis: To demonstrate the correlation between working capital management and profitability throughout various business cycles, a regression analysis has been employed to assess the null hypothesis. The results of the regression analysis for the entire sample, consisting of manufacturing firms, are displayed in Table 3.

Table 3
The regression results for the relationship between CCC and ROA in different business cycles for the whole sample

VARIABLES	(1) **ROA**	(2) **ROA**	(3) **ROA**
CCC	-0.000*	-0.000*	0.000
	[-1.835]	[-1.798]	[1.206]
LEV	-0.181***	-0.181***	-0.180***
	[-6.520]	[-6.432]	[-6.404]
SIZE	0.022***	0.022***	0.022***
	[3.441]	[3.438]	[3.468]
Business Cycle		0.017	0.025
		[1.226]	[1.611]
Interaction Term (CCC*Business Cycle)			-0.000**
			[-2.333]
Constant	-0.298***	-0.312***	-0.325***
	[-2.782]	[-2.892]	[-2.950]
Observations	456	456	456
R-squared	0.271	0.274	0.278
Time Effect	NO	NO	NO
Adj. R-squared	0.266	0.267	0.270

Description of study main variables:
ROA: Return on Assets, CCC: Cash Conversion Cycle, **Business cycle**: measured as a dummy variable, which takes on a value of 1 if the economy is in expansion, and 0 if the economy is in recession, **LEV**: The leverage ratio, **SIZE**: The size of the company, **Interaction term**: CCC*Business cycle.
The numbers in brackets are t-values, ***, **, * coefficient significant at the 0.01, 0.05, 0.1 levels, respectively (2-tailed).
Note: The table presents results for the following models:
(1) $ROA_{it} = \alpha + \beta_1 CCC_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + e_{it}$
(2) $ROA_{it} = \alpha + \beta_1 CCC_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 \text{Business cycle}_{it} + e_{it}$
(3) $ROA_{it} = \alpha + \beta_1 CCC_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 \text{Business cycle}_{it} + \beta_5 CCC \times \text{Business cycle}_{it} + e_{it}$

The regression analysis was conducted to examine the relationship between CCC (Cash Conversion Cycle) and ROA (Return on Assets) in different business cycles. The analysis controlled for the impact of two other variables, LEV (Leverage) and SIZE (Firm Size). The first model showed that CCC and ROA had a significant negative relationship, with an adjusted R-squared value of 26.6%. This suggests that reducing CCC can lead to increased profits, which is in line with prior research conducted by Deloof (2003) and Enqvist et al. (2014). The second model introduced the business cycle as a variable but did not show a significant impact on ROA.

However, the relationship between CCC and ROA remained negative and significant, with the adjusted R-squared value slightly increasing to 26.7%. The third model tested the moderating effect of the business cycle by including an interaction term between CCC and the business cycle. The results indicated that the business cycle slightly moderated the relationship between CCC and ROA, with the interaction term being statistically significant. Further analysis showed that the effect of CCC on ROA was weaker in the business cycle. With all variables included, the model explained 27.0% of the variation in ROA. Additionally, the control variable LEV showed a significant and constant inverse relationship with ROA in all three models, indicating that higher leverage results in lower profits. Meanwhile, the control variable SIZE demonstrated a significant and constant positive relationship with ROA in all three models, suggesting that larger firms tend to have higher profits, which is consistent with the findings of Deloof (2003) and Tas and Atac (2018).

(4) Hypothesis Testing Results

H_1: There is no significant effect of working capital management on profitability.

The regression analysis results showed a negative, statistically significant correlation between the Cash Conversion Cycle (CCC) and Return on Assets (ROA), indicating that an increase in CCC is associated with a lower ROA, which aligns with previous research (Shubita, 2013; Enqvist et al., 2014; Agha, 2014; Tas & Atac, 2018). However, in one of the models, the relationship between CCC and ROA was positive, but not statistically significant, at a conventional level (α=0.10), which is consistent with the findings of Arnaldi et al. (2021). The results also showed that the control variables, Leverage (LEV) and Firm Size (SIZE), were statistically significant in their relationships with ROA. The results revealed a negative, statistically significant relationship between LEV and ROA, meaning that firms with higher levels of external financing tend to have lower ROA. In contrast, the results showed a positive, statistically significant relationship between SIZE and ROA, indicating that larger firms tend to have higher ROA. These findings are consistent with the research of Al-Debi'e (2011), who reported a negative relationship between leverage and ROA and a positive relationship between firm size and ROA.

H_2: There is no significant effect of the business cycle on profitability.

The results from Table 3 show that the business cycle has a regression coefficient of 0.017 for study model 2 and 0.025 for study model 3, but these coefficients are not statistically significant in either of the models. This implies that the business cycle does not have a significant impact on return on assets (ROA) in Jordanian manufacturing firms. As a result, the second hypothesis of this study is supported in its null-hypothesis form. This finding aligns with the results of Pakdel and Ashrafi (2019).

H_3: There is no significant effect of working capital management on profitability with the business cycle as a moderator.

The results of study model 3 show that the interaction between CCC and the business cycle (CCC*Business cycle) is statistically significant at the conventional level (α=0.05). This indicates that this interaction has a significant impact on ROA in Jordanian manufacturing firms. This result supports the third hypothesis of the study in its alternative hypothesis form, which suggests that the interaction between CCC and the business cycle has a moderating effect on the relationship between CCC and ROA. This finding is consistent with the results of Enqvist et al. (2014), who concluded that the business cycle has a moderating impact on the relationship between working capital management (WCM) and profitability.

5. Research Conclusions, Practical Implications, Limitations, and Suggestions for Future Studies

In conclusion, this study has provided valuable insights into the impact of working capital management and the business cycle on the profitability of Jordanian manufacturing firms. The results have shown that an improvement in the Cash Conversion Cycle (CCC) has a positive and significant impact on profitability. On the other hand, the business cycle was found to have no significant impact on Return on Assets (ROA) in these firms. However, the interaction between CCC and the business cycle was found to have a slight and statistically significant moderating effect on ROA. The study also found that firm size has a positive relationship with profitability, while leverage has a negative relationship with profitability**.**

The practical implications of the results of this study include**:**

- Importance of Working Capital Management: The findings highlight the importance of working capital management, specifically the CCC, in determining the profitability of Jordanian manufacturing firms. The results show that an improvement in CCC is positively associated with profitability, which underscores the need for firms to focus on their working capital management practices**.**
- Role of Business Cycle: The results indicate that the business cycle does not have a significant impact on the ROA of Jordanian manufacturing firms. However, the interaction between CCC and the business cycle was found to have a slight and statistically significant moderating effect on ROA. This highlights the need for firms to consider the business cycle when making decisions related to working capital management**.**
- Firm Size and Leverage: The study found that firm size has a positive relationship with profitability, while leverage has a negative relationship with profitability. This suggests that larger firms tend to have higher profitability, while firms with higher levels of external financing tend to have lower profitability**.**
- Another practical implication of this study is that managers of Jordanian manufacturing firms should consider firm size and leverage when making strategic decisions related to profitability. For example, larger firms may benefit from economies of scale and stronger bargaining power with suppliers, while firms with higher levels of debt may face higher interest expenses that could negatively impact profitability.

There are several limitations to consider when interpreting the results of this study. Firstly, the study only focused on manufacturing firms in Jordan, which limits the generalizability of the findings to other contexts and industries. Secondly, the study only considered one aspect of working capital management, the CCC, and did not include other components, such as inventory management or accounts payable management. Thirdly, the study used secondary data, which may have limitations in terms of accuracy and completeness.

Based on these findings, the researchers of this study recommend that future research examines the impact of the business cycle on the relationship between working capital management and profitability in different contexts. In addition, Jordanian manufacturing firms are encouraged to focus on improving their working capital management to maximize shareholder wealth and profitability. Furthermore, future studies could also consider using other business cycles and other components of the CCC, using ROE as well as broadening the scope of the research to cover other sectors and multiple countries in the region.

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