

The Effect of Working Capital Management on Firms' Performance: Evidence from Algerian Listed Firms

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Abstract:

The present study was designed to investigate the effect of working capital management on the performance of Algerian firms listed on the Algiers Stock Exchange over the 2015-2019 period, we collected their annual financial statements from the COSOB's database in order to determine the different variables needed for our study. Pearson's correlation and pooled ordinary least square regression models were used for the analysis. The results indicate a significant positive relationship between the independent (cash conversion cycle) and the dependent variable (firms' performance), the same result was found for the number of days of inventory, whereas the number of days of accounts receivable and number of days of accounts payable showed a negative relationship with firms' performance. These results will allow Algerian listed firms to improve their performance by efficiently managing their working capital.

Keywords: Working capital management; Firm performance; Cash conversion cycle; Algiers stock exchange; Financial statement.

JEL classification codes: G31; G32.

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أثر إدارة الاحتياج في رأس المال العامل على أداء الشركات: دليل من الشركات الجزائرية المدرجة في البورصة

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الملخص:

هدف هذه الدراسة هو دراسة تأثير إدارة الاحتياج في رأس المال العامل على أداء الشركات الجزائرية المدرجة في بورصة الجزائر خلال الفترة 2015-2019، وقد جمعنا قوائمها المالية من قاعدة بيانات COSOB من أجل تحديد المتغيرات المختلفة اللازمة. تم استخدام نماذج الانحدار بطريقة المربعات الصغرى الاعتيادية وارتباط بيرسون للتحليل. تشير النتائج إلى وجود علاقة إيجابية ذات دلالة بين دورة التحويل النقدي وأداء الشركات، حيث تم العثور على نفس النتيجة لعدد أيام المخزون، بينما أظهر عدد أيام الذمم المدينة وعدد أيام الذمم الدائنة علاقة سلبية مع أداء الشركات. ستسمح هذه النتائج للشركات الجزائرية المدرجة في البورصة بتحسين أدائها من خلال إدارة احتياج رأس مالها العامل بكفاءة.

الكلمات المفتاحية: إدارة رأس المال العامل ; أداء الشركة ; دورة التحويل النقدي ; بورصة الجزائر ; القوائم المالية.

رموز تصنيف JEL: G31 ; G32.

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Introduction

Corporate finance is essentially concerned with aspects related to three fundamental issues which are capital budgeting, capital structure and working capital management (Appuhami, 2008). Working capital management deals with the planning and management of a firm's current assets and liabilities, and is a very important component of corporate finance because it directly affects the liquidity and profitability of the company. Managing a firm's working capital is a day-to-day activity. It aims to ensure that the company has sufficient resources to maintain ongoing operations and avoid costly interruptions (Ross et al., 2016; Van Horne & Wachowicz, 2008). Efficient working capital management implies planning and controlling current assets and current liabilities in such a way that, on one hand, the risk of the inability to meet due short-term obligations is eliminated and, on the other hand, excessive investment in these assets is avoided (Eljelly, 2004).

Working capital management is important for all firms operating in both developed and developing countries, but it is particularly important for firms operating in developing countries. Firms operating in developing countries, such as Algeria, are generally small and have limited access to long-term capital markets (Abuzayed, 2012). Thus, an efficient working capital management is mandatory for these firms, as it will enable them to avoid bankruptcy.

As a popular measure of working capital management, the cash conversion cycle refers to the time lag between spending on raw material purchases and receiving sales of finished goods. A longer time lag means a large investment in working capital. The longer the cash conversion cycle, the more profitable it can be because it leads to increased sales. However, firms' profitability may also decrease with the cash conversion cycle if the costs of a larger investment in working capital increase faster than the benefits of holding larger inventories and/or extending more trade credit to customers (Deloof, 2003).

Profit maximization is the ultimate goal of any business. However, preserving the firm's liquidity is also an important objective. This is because an increase in profits at the expense of liquidity can lead to serious problems for the firm. A trade-off must therefore be found between these two corporate objectives. One objective should not be to the detriment of the other, because both are important. If we don't care about profit, we cannot survive for a long period. On the other hand, if we do not care about liquidity, we may face the problem of insolvency or bankruptcy. For these reasons, careful consideration must be given to the management of working capital, which will ultimately affect the profitability of the firm (Raheman & Nasr, 2007). Furthermore, Smith (1980, as cited in Napompech, 2012) emphasized the trade-off between liquidity and profitability when he argued that working capital management can play an essential role not only in a firm's profitability and risk, but also in its value. Smith (1980, as cited in Elbadry, 2018) also argued for the existence of two types of working capital management policies which are aggressive and conservative policies. Under the aggressive policy, firms are expected to hold a low level of working capital, resulting in high returns and a high degree of risk. Conversely, a conservative working capital policy means that firms have a high level of working capital, resulting in low returns and a low degree of risk.

Regarding this matter, most empirical evidence related to working capital management and profitability supports the fact that aggressive working capital policies improve profitability. This implies that reducing investment in working capital, i.e., reducing the cash conversion cycle, is likely to lead to an increase in profits (Juan García-Teruel & Martínez-Solano, 2007). In this context, the objective of our research is to provide empirical evidence about the effect of working capital management on the performance of Algerian listed firms. To do so, we used a sample of

4 firms listed on the Algiers Stock Exchange over the 2015-2019 period, we collected their annual financial statements from the COSOB's database in order to determine the different variables needed for our study. Pearson's correlation and pooled ordinary least square regression models were used for the analysis. The results of this study should encourage Algerian listed firms to prioritize efficient working capital management, which will enable them to improve their performance.

The remaining of this study will be as follows. The rest of this first section presents the relevant theoretical framework of working capital management, and the literature review regarding its effect on firms' performance. The second section describes the methods and materials which include the research design, data and sample, variables and measurement and the model specification used in our empirical analysis. In the third section, the findings of the study are presented and discussed. The last section deals with the main conclusions of the study.

Theoretical Framework

Working capital management involves the financing and management of the short-term resources of a firm to sustain its ongoing activities, mobilize funds, and optimize liquidity. To do so, the firm needs to utilize efficiently its current assets and liabilities throughout each phase of the business operating cycle, by effectively managing its receivables, payables and inventory to minimize the investment in idle resources (Sagner, 2010). Furthermore, efficient working capital management implies planning and controlling current assets and current liabilities in such a way that, on one hand, the risk of the inability to meet due short-term obligations is eliminated and, on the other hand, excessive investment in these assets is avoided (Eljelly, 2004). Thus, working capital management is concerned with the problems that arise in attempting to manage the current assets, the current liabilities and the interrelationship that exists between them (Abuzayed, 2012).

The management of working capital is important for several reasons. For one thing, the current assets of a typical manufacturing firm account for over half of its total assets. For a distribution company, they account for even more (Van Horne & Wachowicz, 2008). Moreover, firms usually invest large amount of cash in inventory and accounts receivable, and regularly rely on short-term payable as a source of financing (Deloof, 2003). Thus, the administration of working capital may have an important impact on the profitability and liquidity of the firm (Shin and Soenen, 1998, as cited in Juan García-Teruel and Martínez-Solano, 2007). However, a firm needs to find the right balance between profitability and liquidity while managing their daily activities. This requires that business must be run both efficiently and profitably. An asset-liability mismatch may occur which may increase firm profitability in the short run but at the risk of its insolvency. On the other hand, too much focus on liquidity will be at the expense of profitability. Thus, the manager of a business entity is in a dilemma of achieving desired tradeoff between liquidity and profitability in order to maximize the value of a firm (Padachi, 2006). Therefore, the efficient managing of working capital is the main task of day-to-day management and requires careful consideration (Jose et al., 1996).

Working capital management could be measured by different proxies, such as the cash conversion cycle, the net-trade cycle, the liquidity ratios or the weighed cash conversion cycle. However, the most common measure for working capital management is the cash conversion cycle (Knauer & Wöhrmann, 2013).

Cash Conversion Cycle

Introduced for the first time by Gitman (1974) as the total cash cycle, and defined as the period of days between the payment for the purchases associated with production and the collection of cash of the finished product. It was subsequently improved by Richards and Laughlin (1980) by reflecting the net time interval between actual cash expenditures on a firm's purchase of productive resources and the ultimate recovery of cash receipts from product sales. Thus, they concluded that the cash conversion cycle is an essential tool to assess the efficiency of working capital management (Aminu & Zainudin, 2015).

Since the cash conversion cycle originates from the operating cycle, it thereby reflects the three working capital components, which are the receivable, inventory and payables (Knauer & Wöhrmann, 2013). The cash conversion cycle, which is presented graphically in Figure 1, is an additive measure of the period of these three components, and it is calculated by adding the number of days accounts receivable to the number of days of inventory and the subtracting the number of days accounts payable. Thus, this indicates that a shorter cash conversion cycle is desirable since the larger the cash conversion cycle the greater the need for external financing and the greater the financing costs (Eljelly, 2004).

Receivables Management

Accounts receivable are "the amounts of money owed to a firm by customers who have bought goods or services on credit." (Van Horne & Wachowicz, 2008, p. 250). Most companies, with the exception of certain retailers such as supermarkets, give customers a specified number of days to pay their invoices, and it is these credits that generate accounts receivable. In doing so, they provide a financial service as well as products or other services. Thus, goods or services sold on credit to customers will increase the balance of receivables. Conversely, payments subsequently received from customers will decrease this balance. These credit terms are desired by customers because they may be short of cash at the time, or they believe they can make good use of the cash held during the credit period (Firth, 1976; Preve & Sarria-Allende, 2010).

The level of accounts receivable depends on the level of sales, the credit terms, the riskiness of the individual customers given credit, and any seasonal influences. While the overall figure of accounts receivable can be reasonably stable over time, its individual component items are constantly changing, so careful recording and monitoring is required (Firth, 1976). Moreover, accounts receivable represent approximately more than a quarter of a company's total balance sheet and therefore often constitute the majority of working capital (Cabane & Weil, 2008).

Inventory Management

Inventories are "all goods or services that are part of the operating cycle to be consumed at first use, used in a production process or sold as is" (Cabane & Weil, 2008, p. 21). A firm's inventory can take different forms depending on its activity. For instance, the inventory of a production company is generally composed of raw materials, work-in-process and finished products. Whereas retailers generally only have inventories of goods, because they sell their products as is without adding value through a manufacturing process. Service companies generally have no goods to stock (Preve & Sarria-Allende, 2010).

The investment made in inventory is the main operating investment of many companies. This investment is important because it can help companies respond to changes in demand, as well as changes in the supply of raw materials. It can also allow flexibility in the production schedule, and it can allow the company to take advantage of savings related to the size of orders. However, by their nature, not all types of inventory are easy to convert into cash. Thus, cash invested in

inventory can be tied up for a considerable period of time (Preve & Sarria-Allende, 2010). In addition, the necessity of forecasting sales before establishing target inventory levels makes inventory management a difficult task. Also, because error in setting inventory levels can easily lead to poor profits or excessive carrying costs, inventory control is as crucial as it is challenging (Agyemang Badu & Kwame Asiedu, 2013).

Payable Management

In the same way that a company sells its products on credit rather than requiring immediate payment, the company generally has a certain amount of time to pay its suppliers. Thus, purchases of goods and services generate trade credit for both the seller, in the form of accounts receivable, and the buyer, in the form of accounts payable (Preve & Sarria-Allende, 2010).

It is in the firm's best interest to use trade credit to avoid using working capital too quickly. This form of financing is certainly the least expensive for the company, since there is no charge for the sums to be paid (Brien et al., 2017). Consequently, accounts payable generally represent a large portion of corporate liabilities and can be a significant source of financing for firms if properly managed (St-Pierre, 1999, as cited in Therrien, 2003). Trade credit can also be used as a marketing tool to facilitate the selling process and to compete in the market (Aminu & Zainudin, 2015).

Literature Review

The relationship between working capital management and firms' performance has been analyzed in several academic studies and research papers. These studies were carried out using different variables, in different environments and with different methodologies. Although the results are mixed due to the differences in the way these studies were conducted, the majority of them concluded that there is a significant negative relationship between working capital management and firms' performance. The subsequent studies were the most helpful for our research; they are presented chronologically as follows:

Deloof (2003) examined the relationship between working capital management and firm profitability for a sample of 1009 Large Belgian non-financial firms over the 1992-1996 period. He used the cash conversion cycle and its component, the number of days accounts receivable, account payable and inventory as a measure of working capital management. The firm profitability was measured by the net operating income and the gross operating income. The size, sales growth, financial debt ratio and the ratio of fixed financial assets to total assets were used as control variables. The results of the regression models revealed that a significant negative relationship between gross operating income and the number of days accounts receivable, account payable and inventory. Therefore, he comes to the conclusion that the managers can create value for their shareholders by reducing the number of days accounts receivable and inventories to a reasonable minimum.

In order to provide empirical evidence about the effect of working capital management on the profitability of firms, Juan García-Teruel and Martínez-Solano (2007) conducted a study on 8872 Spanish SMEs over the 1996-2002 period. The dependent variable used was the return on assets; the independent variables were the cash conversion cycle and its components. The results of the regression models revealed a negative and significant relationship between the profitability and all working capital management measures. These results, which are robust to the presence of endogeneity, ensure that the relationship found in the analysis is due to the effects of the cash conversion cycle on firms' profitability and not vice versa.

Sharma and Kumar (2011) examined the effect of working capital management on profitability of 263 Indian non-financial firms listed on the Bombay Stock Exchange over the 2000-2008 period. The results of the OLS regression revealed that the number of days of inventory and the number of days accounts payable are negatively correlated with a firm's profitability, whereas the number of days accounts receivables and cash conversion cycle exhibit a positive relationship with corporate profitability.

The effect of working capital management on firms' performance was examined by Abuzayed (2012) for a sample of 52 non-financial firms listed on the Amman Stock Exchange over the 2000-2008 period. Cash conversion cycle and its components were used as measures of working capital management. Using robust estimation techniques (panel data analysis, fixed and random effects, and generalized methods of moments) the results showed that profitability is affected positively with the cash conversion cycle. This indicates that more profitable firms are less motivated to manage their working capital. In addition, financial markets failed to penalize managers for inefficient working capital management in emerging markets.

Aktas et al. (2015) investigated the relationship between working capital management and firm performance using an exhaustive sample of US firms over a 30-year period between 1982 and 2011. Their results indicate the existence of an optimal level of working capital policy. Firms that converge to that optimal level, either by increasing or decreasing their investment in working capital, improve their stock and operating performance over the subsequent period. Their study also implies that efficient working capital management is highly valuable, particularly in periods of expanding investment opportunity set.

The impact of working capital management on the profitability of eighteen quoted agricultural and agro-allied Nigerian companies was examined by Otekunrin et al. (2021) for the 2012-2016 period. Descriptive research design and regression analysis were used. Working capital management was measured using the trade receivables collection period, trade payables, payment period, inventory turnover period, and cash conversion cycle, while profit before interest and tax measured profitability. The result shows the trade receivables collection period and profitability are negatively related. The result also shows the trade payables payment period and the cash conversion cycle are positively related with profitability. Their conclusion is that if the management of firms takes efficient and effective decisions in managing the company's working capital, all things being equal, the maximization of the firm's profitability, value, and shareholders' wealth can be guaranteed.

Basyith et al. (2021) examined the impact of working capital management on profitability of 135 listed firms on the Indonesia Stock Exchange (IDX) from 2000 to 2019. The variables employed in this study are working capital investment strategy (WCIS), working capital financing strategy (WCFS), cash conversion cycle (CCC), days sales outstanding (DSO), days inventory outstanding (DIO), days payable outstanding (DPO), debt ratio (DR), size, age, and current ratio (CR). Ordinary least squares (OLS) was employed to analyze the data. The results revealed that the working capital investment approach has a positive and significant effect on return on assets (ROA) in all regression models used; the working capital financing approach has a negative effect on ROA but not significant; the working capital investment approach to the gross profit margin in all models shows a negative and significant coefficient; and the working capital financing approach shows a negative and significant sign for all capital used.

Hypothesis

In order to examine the relationship between the working capital management and firms' performance, we proposed the following hypothesis:

H₁: There is a significant negative relationship between the number of days accounts receivable and return on assets.

H₂: There is a significant negative relationship between the number of days of inventory and return on assets.

H₃: There is a significant positive relationship between the number of days payable and return on assets.

H₄: There is a significant negative relationship between the cash conversion cycle and return on assets.

Methods and Materials

Research design

The purpose of this study is to investigate the effect of working capital management on the performance of firms listed on the Algiers stock exchange (ASE) using panel data. Pearson's correlation and Ordinary Least Square (OLS) regression models were utilized to examine the relationship between the variables used in this research.

Data and Sample

The data set used in our study was obtained from the 'Commission d'Organisation et de Surveillance des Opérations de Bourse' (COSOB) website – Which is the regulator of capital markets in Algeria –. The database of the website includes audited annual financial statements of all the companies listed on the ASE. We used those financial statements to calculate the different variables needed for our study. The sample consisted of all the firms indexed on the ASE over the 2015-2019 period, we then excluded financial firms due to their specificity, and also firms with incomplete data from the sample. We ended up with a final sample of 4 firms over a 5 year period (2015-2019) for a total of 20 firm-year panel data observations. As for the GDP growth rate data, they were gathered from the World Bank national accounts database.

Variables and Measurement

The dependent variable in our study is firms' performance, and to assess it, we used the return on assets (ROA), which is calculated by dividing the net income by the total of assets. (more definition)

As for the independent variables, we used the Cash Conversion Cycle (CCC) and its components which are the number of days accounts receivable (AR), number of days of inventory (INV) and number of days payable (AP) as proxies for the firms' working capital management.

The number of days accounts receivable (AR) represents the average number of days required to convert the firm's receivables into cash after a sale has been made. It is a measure of firms' collection management, and it is calculated as (average accounts receivable/Sales) x365.

The number of days inventory (INV) represents the average number of days a particular stock item will remain in stock before being sold out. It is a measure of firms' inventory management, and it is calculated as (average inventory/Cost of Goods Sold) x365.

The number of days accounts payable (AP) represents the average number of days of short-term credit that a firm obtains from its suppliers. It is a measure of firms' payment management, and it is calculated as (average accounts payable/Cost of Goods Sold) x365.

The cash conversion cycle (CCC) measures the time span between purchase of resources and incoming payments from sales (Richards & Laughlin, 1980). It is a broad measure of firms' working capital management, and it is calculated by adding the number of days accounts receivable to the number of days of inventory, then subtracting the number of days accounts payable.

In addition to these variables, we also included control variables to make our results more valid. These control variables are as follows: The size of the firm (SIZE), calculated as the natural logarithm of total assets. The sales growth of the firm (SGROW), calculated as $(Sales_{N-1} - Sales_N)/Sales_N$. The firm leverage (LEV), calculated as the ratio of financial debt to total assets. And the GDP growth (GDP), calculated as $(GDP_{N-1} - GDP_N)/GDP_N$.

All the variables that we used in this study were mainly led by availability of data and previous empirical studies (Abuzayed, 2012; Almazari, 2014; Deloof, 2003; Juan García-Teruel & Martínez-Solano, 2007; Sharma & Kumar, 2011) that examined the relationship between working capital management and firms' performance.

Model specification

The impact of working capital management on the performance of listed Algerian firms was estimated using four OLS regression models. These models were based on previous empirical framework as used by (Abuzayed, 2012; Juan García-Teruel & Martínez-Solano, 2007; Sharma & Kumar, 2011).

The regression models are as follows:

Model (1) examines the relationship between the number of days receivable and return on assets as a proxy for firms performance. This model will serve us to test the first hypothesis.

$$ROA_{it} = \beta_0 + \beta_1 AR_{it} + \beta_2 SIZE_{it} + \beta_3 SGROW_{it} + \beta_4 LEV_{it} + \beta_5 GDP_{it} + \varepsilon_{it} \quad (1)$$

Model (2) examines the relationship between the number of days of inventory and return on assets as a proxy for firms performance. This model will serve us to test the second hypothesis.

$$ROA_{it} = \beta_0 + \beta_1 INV_{it} + \beta_2 SIZE_{it} + \beta_3 SGROW_{it} + \beta_4 LEV_{it} + \beta_5 GDP_{it} + \varepsilon_{it} \quad (2)$$

Model (3) examines the relationship between the number of days payable and return on assets as a proxy for firms performance. This model will serve us to test the third hypothesis.

$$ROA_{it} = \beta_0 + \beta_1 AP_{it} + \beta_2 SIZE_{it} + \beta_3 SGROW_{it} + \beta_4 LEV_{it} + \beta_5 GDP_{it} + \varepsilon_{it} \quad (3)$$

Model (4) examines the relationship between the cash conversion cycle and return on assets as a proxy for firms performance. This model will serve us to test the fourth hypothesis.

$$ROA_{it} = \beta_0 + \beta_1 CCC_{it} + \beta_2 SIZE_{it} + \beta_3 SGROW_{it} + \beta_4 LEV_{it} + \beta_5 GDP_{it} + \varepsilon_{it} \quad (4)$$

Where ROA is return on assets; CCC is the cash conversion cycle; AR is the number of days accounts receivable; INV is the number of days of inventory; AP is the number of days accounts payable; SIZE is the natural logarithm of total assets; SGROW is sales growth; LEV is financial debt ratio; GDP is annual GDP growth; ε_{it} is error term.

Results and discussion

Descriptive statistics

Table 1 present descriptive statistics about all the variables used in our study. It includes the number of observations, minimum, maximum, average and the standard deviation of each variable. We can see from the table that return on assets is on average 2.52%. And the average cash conversion cycle is 328.7 days, with a standard deviation of 282.2 days which suggest a wide variation in the distribution of this measure. Firms collect credit sales from customers after an average of 106.1 days, and it takes on average 389.9 days to sell their inventories. Firms wait on average 167.3 days to pay for their purchases. It is evident from these results that, on average, firms from the Algiers stock exchange collect credit from customers before paying their credit purchases, which indicate that these firms are managing their working capital efficiently.

Firms in the sample saw their sales shrink by 2.83% on average. The average level of leverage used by the Algerian listed firms is 22.74%, which is a reasonable level. The GDP growth of Algeria has grown on average by 2.83% per year over the 2015-2019 period.

Table N°1
Descriptive statistics of dependent, independent and control variables

	N	Minimum	Maximum	Mean	Std. Deviation
ROA	20	-,3909	,1549	,0252	,11398
CCC	20	-48,70	865,70	328,7350	282,21680
AR	20	48,40	222,80	106,0950	49,47224
INV	20	82,00	899,80	389,9500	289,00521
AP	20	88,10	413,70	167,3100	79,53135
SIZE	20	8,8995	10,8241	9,6900	,69531
SGROW	20	-,3970	,1045	-,0283	,13508
LEV	20	,0046	,4551	,2274	,15323
GDP	20	,0080	,0370	,0208	,01177

Source: SPSS output.

Notes. ROA - return on assets; CCC - cash conversion cycle; AR - number of days accounts receivable; INV - number of days of inventory; AP - number of days accounts payable; SIZE - natural logarithm of total assets; SGROW - sales growth; LEV - financial debt ratio; GDP - annual GDP growth.

Correlation Analysis

Table 2 presents Pearson correlation coefficient for all the variables defined previously. The correlation results between return on assets and the number of days receivable is negatively correlated (-.625**) and is significant at the .01 level, this suggests that shortening the average collection period will increase profitability. Similarly, correlation results between return on assets and the average payment period also shows negative and significant relationship (-.838**). It also means that shortening the average number of days payable will increase profitability. However, surprisingly the correlation between the return on assets, number of days inventory and cash conversion cycle is positive, which indicate that increasing the average number of days of inventory and the cash conversion cycle will improve profitability. This result is somehow

counterintuitive and not consistent with the view that shortening the period between production and sale of products will lead to a higher firm's profitability. Nevertheless, the coefficient results were not statistically significant for both the cash conversion cycle (,189) and the number of days inventory (,061) in relationship with return on assets. As for the control variables, return of assets is positively correlated with the size of the firms (,240), the sales growth (,802**), and the gross domestic product (,271) but negatively correlated with the firm's leverage (-,237).

(Field, 2017) suggests that multicollinearity between two variables exist when their Pearson's correlation coefficient exceeds 0.80. Therefore, we note from table 2 that there is a case of severe multicollinearity between two independent variables, which are, the cash conversion cycle and the number of days inventory (,979**). However, since we are not using these two independent variables in the same regression model this shouldn't cause a problem. As for the other coefficient that exceeds >.80, none of them is between two independent variables. Furthermore, multicollinearity will be tested subsequently using variance inflation factor (VIF).

Having said that, one weakness of Pearson's correlation analysis is that they do not allow to identify causes from consequences (Deloof, 2003). Correlation does not imply causation. For this reason, we will also use regression analysis.

Table N°2
Pearson's correlation coefficients

	ROA	AR	INV	AP	CCC	SIZE	SGROW	LEV	GDP
ROA	1								
AR	-,625**	1							
INV	,061	,091	1						
AP	-,838**	,681**	,215	1					
CCC	,189	,077	,979**	,058	1				
SIZE	,240	-,289	-,846**	-,382	-,809**	1			
SGROW	,802**	-,446*	-,119	-,666**	-,012	,297	1		
LEV	-,237	-,171	,625**	,199	,554*	-,758**	-,309	1	
GDP	,271	-,363	,034	-,383	,079	,007	,381	,080	1

Source: SPSS output.

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Regression Analysis

Tables 3 to 6 shows the results of the four regression models as defined earlier in this study. In order to obtain reliable results, we tested the data for multicollinearity using the Variance Inflation Factor (VIF). Commonly, if the variance inflation factor between two variables is greater than 10, then the multicollinearity is considered to be severe (Bowerman et al., 2015). Our results show that there is no sign of severe multicollinearity between all the variables used in this study, as the highest value obtained from our data was 5,571.

Model 1

Table 3 presents the regression results of the first model. The findings indicate that there is a negative ($\beta = -.002$) and a highly significant ($p = .001$) relationship between accounts receivable

and firm performance (measured by return on assets). With regard to control variables, sales growth and leverage have a significant positive and a negative relationship, respectively, with return on assets. These results are the expected signs of these variables. On the other hand, the coefficient of the size of the firm is -.109, and for the GDP growth it's -1.282. And it is not the result expected from these variables. The adjusted R², which is the percentage of the variance in the dependent variable that is collectively explained by the independent variables, is 79.10%.

Table N°3
Results of OLS regression of the model 1

Model		Unstandardized		Standardized		Collinearity		
		Coefficients		Coefficients		Statistics		
		B	Std. Error	Beta	t	Sig.	VIF	Adjusted R ²
1	(Constant)	1,434	,436		3,286	,005		
	AR	-,002	,000	-,771	-4,258	,001	2,976	.791
	SIZE	-,109	,038	-,668	-2,901	,012	4,810	
	SGROW	,411	,123	,487	3,339	,005	1,930	
	LEV	-,531	,181	-,714	-2,938	,011	5,364	
	GDP	-1,282	1,147	-,132	-1,118	,282	1,275	

Source: SPSS output.

Model 2

The results of the regressions analysis for the second model are summarized in the table 4. The coefficient of the number of days of inventory is positive ($\beta = .0002$) and significant at the $p = .05$ level. Concerning the control variables, expected results were noted for the SIZE and SGROW variables, both of them were positive but significant only for the sales growth. As for the rest of the control variables, they didn't show the expected signs, as LEV was positive and GDP was negative and both were statistically nonsignificant. We also note from the adjusted R² that the independent variables explain 64.70% of the dependent variables.

Table N°4
Results of OLS regression of the model 2

Model		Unstandardized		Standardized		Collinearity		
		Coefficients		Coefficients		Statistics		
		B	Std. Error	Beta	t	Sig.	VIF	Adjusted R ²
2	(Constant)	-,937	,554		-1,692	,113		
	INV	,0002	,000	,594	2,243	,042	3,772	.647
	SIZE	,092	,052	,559	1,763	,100	5,409	
	SGROW	,620	,138	,735	4,479	,001	1,446	
	LEV	,034	,160	,045	,211	,836	2,499	
	GDP	-,350	1,469	-,036	-,238	,815	1,238	

Source: SPSS output.

Model 3

Table 5 provides the outcome of regressing the third model. A negative relationship is found between accounts payable and return of assets, this relationship is highly significant at the $p = .001$ level. The adjusted R^2 is 79.40%, the highest of all the models. The sizes of the firm and the GDP growth have a negative nonsignificant relationship with return on assets; these are not the expected results from these variables. On the contrary, leverage and sales growth showed expected signs. Leverage has a negative coefficient, while sales growth has a positive and significant relationship with the dependent variable.

Table N°5
Results of OLS regression of the model 3

Model		Unstandardized		Standardized		Collinearity		
		Coefficients		Coefficients		Statistics		
		B	Std. Error	Beta	t	Sig.	VIF	Adjusted R ²
3	(Constant)	,668	,316		2,116	,053		
	AP	-,001	,000	-,666	-4,326	,001	2,193	,794
	SIZE	-,043	,029	-,263	-1,511	,153	2,807	
	SGROW	,371	,127	,440	2,927	,011	2,089	
	LEV	-,117	,127	-,157	-,922	,372	2,696	
	GDP	-1,329	1,138	-,137	-1,167	,263	1,278	

Source: SPSS output.

Model 4

Table 6 shows the regression between firms' performance and cash conversion cycle, which is a combined effect of the previous three measures. It can be seen from the table that the cash conversion cycle is positive with a coefficient of (.0002), and highly significant with a p-value of (.008). The size of the firm and the sales growth showed expected signs since they are both positive and significant, unlike leverage and GDP growth which did not show expected results. The adjusted R^2 of this model is 73.30%.

Table N°6
Results of OLS regression of the model 4

Model		Unstandardized		Standardized		Collinearity		
		Coefficients		Coefficients		Statistics		
		B	Std. Error	Beta	t	Sig.	VIF	Adjusted R ²
4	(Constant)	-1,176	,503		-2,338	,035		
	CCC	,0002	,000	,708	3,076	,008	3,515	,713
	SIZE	,115	,048	,702	2,420	,030	5,571	
	SGROW	,552	,130	,654	4,257	,001	1,563	
	LEV	,080	,145	,108	,553	,589	2,529	
	GDP	-,457	1,323	-,047	-,345	,735	1,237	

Source: SPSS output.

Discussion

The present study was designed to determine the effect of working capital management on the performance of non-financial firms listed on the Algiers stock exchange. Concerning the relationship between the accounts receivable and return on assets, the results of this study indicate that they have negative and highly significant relationship; which suggests that Algerian listed firms will improve their profitability by a more restrictive credit policy, thus giving less time to customers to make their payments improve firms' performance. This finding is consistent with that of (Akoto, 2013; Alipour, 2011; Deloof, 2003; Juan García-Teruel & Martínez-Solano, 2007) and confirms our first hypothesis.

Our results also showed that the relationship between days of inventory and return on assets is positive and significant; this means that increasing inventory levels will increase Algerian firm profitability. This finding is contrary to previous studies (Alipour, 2011; Deloof, 2003; Juan García-Teruel & Martínez-Solano, 2007; Sharma & Kumar, 2011) which have found that maintaining a low level of inventory improves profitability. A possible explanation for this might be that Algerian firms keep their inventory levels high to minimize the risk of a stock-out and the loss of sales due to the shortage of products (Deloof, 2003). This result contradicts our second hypothesis.

Another interesting finding was the negative and highly significant relationship between accounts payable and return of assets; this means that lengthening the number of days accounts payable of Algerian listed firms will affect positively their profitability. Although, this finding is consistent with some published studies (Deloof, 2003; Sharma & Kumar, 2011), it differs from most previous research (Abuzayed, 2012; Alipour, 2011; Dong & Su, 2010; Lazaridis & Tryfonidis, 2006). Deloof (2003) justifies a comparable outcome by arguing that less profitable firms prefer to defer the payment of their bills. This result also contradicts our third hypothesis.

The most important finding was that the cash conversion cycle has a positive and highly significant relationship with firms' performance (measured by return on assets), which implies that a longer cash conversion cycle will lead to a higher profitability for Algerian listed firms. However, this finding contradicts previous research including that of (Alipour, 2011; Deloof, 2003; Falope & Ajilore, 2009; Raheman & Nasr, 2007) which suggests that shortening the cash conversion cycle affects positively the firm's performance. Therefore, this finding invalidates our fourth hypothesis.

Conclusion

This study set out to investigate the relationship between working capital management and the performance of 4 listed Algerian firms over the 2015-2019 periods. The results of the OLS regression that was used to assess the effect of working capital management on firms' performance revealed that there is a negative relationship between firms' performance and the number of days accounts receivable and number of days accounts payable. However, the relationship between the firm's performance and the number of days of inventory was positive. These findings contradict most of the previous studies, except the result of the number of days accounts receivable which are in line with those of previous studies. As for the relationship between the cash conversion cycle and firms' performance, the results indicate a positive relationship. This finding suggests that firms' performance will be improved by extending the cash conversion cycle, which is contrary to previous research.

The findings of this study have a number of important implications for Algerian listed firms, it should encourage them to prioritize efficient working capital management, which is most of the time neglected or poorly managed. As we've seen from the results of this study, if managed according to our findings, working capital management will enhance firms' performance. Our research findings also points to the need for a regulation of payment terms between firms, as several countries already adopted such regulation. For instance, in France, payments between firms are regulated by the L.441 articles of the French Commercial Code, and generally can't exceed 60 days from the date of issue of the invoice. Such legislation would greatly benefit Algerian firms since, as we have seen from our results, firms will improve their performance by shortening the average number of days accounts receivable.

One limitation of this study results is that they can't be generalized to all Algerian firms; they can be generalized to only listed or big firms, due to the population studied (i.e., listed firms). Another limitation is the small sample size, which is due to the small number of listed firms in the Algiers stock exchange; this might be the reason why the results of this study diverged from previous studies. Thus, further research should be undertaken to establish the viability of these results to SMEs, which are a more representative population of the Algerian economic fabric.

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