Effect of Working Capital Management on Profitability of SMEs – Evidence from Algeria-

أثر إدارة رأس المال العامل على ربحية المؤسسات الصغيرة والمتوسطة

–دراسة حالة عينة من المؤسسات الصغيرة والمتوسطة الجزائرية –

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Abstract

This study aims to analyze the effect of working capital management on profitability of 45 small and medium enterprises in Algeria along the period starting from 2012 to 2019, using the panel data model. The independent variable was measured using cash conversion cycle, operating cycle, investment in working capital ratio, and working capital turnover.

The results revealed that both cash conversion cycle and operating cycle have a positive significant effect on ROS, where working capital turnover and investment in working capital ratio have non-significant effects on ROS. Therefore, firms should be aware of the importance of achieving their optimal cash conversion cycle that can maximize their value.

Keywords: working capital management, profitability, small and medium enterprises, panel data model, Algeria.

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ملخص

يهدف هذا البحث لدراسة أثر إدارة رأس المال العامل على ربحية 45 مؤسسة صغيرة ومتوسطة بالجزائر خلال الفترة 2012–2019، بالاعتماد على منهج بيانات بانل. حيث ركز البحث على دراسة أثر كل من: دورة تحويل النقدية، الدورة التشغيلية، نسبة الاستثمار في رأس المال العامل، ومعدل دوران رأس المال العامل على الربحية التجارية للمؤسسة.

خلصت الدراسة إلى أن لكل من دورة تحويل النقدية والدورة التشغيلية أثر موجب ذو دلالة إحصائية على ربحية المؤسسة، الأمر الذي يدعو بالمؤسسة للعمل على الوصول إلى المستوى الأمثل لدورة تحويل النقدية التي يزيد من ربحيتها ويعظم قيمتها.

الكلمات المفتاحية: إدارة رأس المال العامل، الربحية، المؤسسات الصغيرة والمتوسطة، بيانات بانل، الجزائر.

1. INTRODUCTION

Firms' capital consists mainly of two categories; long term and short-term capital. In the long-term, capital is reflected in the long-term fixed assets, representing shareholder's equity. However, in the short-term, capital is reflected in working capital which consists mainly in operating items such as receivables, inventory and payables.

Therefore, management efficiently these elements affects directly firm's profitability. Many researches focused on the firm's long-term decisions and their impact on profitability, while short-term decisions are given less importance, especially decisions related to working capital management.

Working capital management has a big importance in determining the firm's ability to meet its short-term liabilities and to control its short-term needs. Accordingly, working capital management includes the amount of investments in firm's current assets and their funding sources in a way that can guarantee a high level of liquidity.

Planning and controlling current assets and liabilities are considered as requirements of efficient working capital management. This helps to eliminate the risk of failing to meet short-term commitments as well as avoids excessive investment in these assets.

Various issues with working capital management have been identified as major causes of small and medium-sized enterprises failure. Therefore, compared to large enterprises, SMEs have a higher proportion of short-term assets and less liquidity, making them more reliant on short-term debts to finance their needs. However, lenders and investors consider SMEs as a risky investment. As a result, SMEs face many constraints in their attempts to get external funds. This increases the importance of cash flow management in SMEs through effective working capital management.

The Algerian government pays a great attention to small and medium enterprises, in attempt to engage a strategic transformation in national economic policy. Consequently, various resolutions and legislations that encourage this transformation are directly related to SMEs. However, despite all efforts, SMEs sector in Algeria still suffers from basic issues. This study will attempt to understand how working capital management affects the profitability of 45 small and medium enterprises in Algeria along the period starting from 2012 to 2019.

2. Literature review :

2.1. Cash Conversion Cycle:

Many researches in the field of working capital management tried to clarify the impact of working capital management on firm's profitability, by determining the impact of liquidity on profitability. Working capital management requires a trade-off between profitability and risk, where balancing between both factors is very critical, through which firms are trying to reach a positive net working capital. Therefore, firms may have an optimal level of working capital that maximizes their value. Meanwhile, decisions that can increase profitability can also increase risk; conversely, decisions that focus on risk reduction may conduct to potential profitability reduction too (Chong-CHuo, 2018, p. 2). In order to increase firm's profitability, it has been mandatory for managers to focus on how to manage efficiently their working capital.

(Hassan Subhi, 2017) has stated that the two different and distinct ways of analyzing firm's working capital management are static and dynamic approaches. The static perspective, which is usually employed, is current and quick ratios of liquidity are calculated from the balance sheet figures, which measure liquidity at a given point of time. However, the dynamic view measures working capital management from the firm's operations, which measures the time it takes a company to go from cash outflow to cash inflow that is known also as the cash conversion cycle (CCC).

Serious researches that dealt with the impact of working capital management on profitability have relied on the static perspective of liquidity to determine the effectiveness of working capital management. However, (Gitman, 1974) believed that static indicators of liquidity are ineffective in measuring working capital management. Conversely, he stated that all firm's sales and purchases are assumed to be on a credit basis, which means each purchase is originally recorded by establishing a new accounts payable and each sale is recorded by creating a new accounts receivable. Therefore, the way firms are managing these elements is the fundamental determinant of the firm's liquidity. In order to achieve an effective working capital management, firms should be aware of the time that takes them to convert their goods and services into cash, and this length of time is known as the cash conversion cycle, which was developed by Richards and Laughlin

(1980) (Zakari & Saidu, 2016, p. 343). Cash conversion cycle measures the time it takes to convert cash into cash again from the moment inventory is bought until the moment inventory is sold and the bills are recovered (Muscettola, 2014), which gives a better understanding of the institution's liquidity than the fixed liquidity indicators.

Gitman believes that the good management of working capital lays under accelerating the collection of money from sales, increasing inventory turnover and minimizing cash expenditure (Rizky & Mayasari, 2018, p. 74). This means that the lower cash conversion cycle is, the best it is. In such case, the firm is able to recover its funds expended in the initial investment quickly, resulting in high amounts of liquidity and thus increasing its value. In addition, a company with a long operating cycle will have less cash available to meet any short-term needs, which can result in increased borrowing and interest expenses. However, a company with long cash conversion cycle might have higher sales because of long credit term given to trade credit customers (Zakari & Saidu, 2016, p. 344). A longer CCC may increase a firm's sales and profitability for numerous reasons (Chong-CHuo, 2018, p. 3):

− A firm may increase its sales by extending a higher trade credit that helps the firm to strengthen its relationships with its customers.

− Larger stocks can prevent interruptions in the production process and minimize the scarcity risks.

− Companies may be able to take advantage of important discounts for early payments in accounts payables.

Size and age of the company also have an important role in determining its ability to manage working capital. Companies with a larger size are more likely to take on debt or credit, therefore, the age of a company is considered important because it signifies the company's ability to survive and develop their business (Rizky & Mayasari, 2018, p. 74).

Besides, researches by OECD show that small and medium enterprises are more affected from resource cost and financial insufficiency than large-scale firms (Cam & Oebek, 2015, p. 68).

(Desai, Foley, & Hines, 2016) had highlighted the importance of taxation in interpreting the use of trade credit. By examining the extent to

which taxation influences trade credit practices, the study revealed that the U.S. owned affiliates in low-tax countries use trade credit to lend, whereas those in high-tax countries use trade credit to borrow. The results also indicated that tax heaven affiliates have significantly larger net working capital positions than do affiliates located elsewhere. Therefore, high tax rates encourage borrowing through trade accounts just as high tax rates encourage more conventional forms of borrowing, such as bank loans and debt issuance. Several studies have also confirmed that firms in high-tax countries have smaller net working capital positions, which is due to the fact that high tax rates are associated with greater borrowing through trade accounts. (Brick & Fung, 1984) also examined the importance of taxes in motivating the flow of trade credit, where the study focused on how tax liabilities on cash transactions are computed and its effect on the choice between cash versus credit. Accordingly, when the generating fact of taxes is cash collection, it will motive the flow of trade credit from high-taxed firms to low-taxed firms in order to postpone the cash collection and thus postponing the taxation of these funds. However, this increases the importance of invoice issuance as the tax generating fact, which will lead firms to speed up cash collection and reduce the trade credit periods.

A study done by (Ukaegbu, 2014) has investigated the association between working capital management and corporate profitability of 102 large size and industrial firms across developing economies in Africa (South Africa, Nigeria, Egypt, and Kenya), from 2005 to 2009. The study has revealed that there is a strong negative relationship between profitability measured by net operating profit and cash conversion cycles. This negative association implies that if the cash conversion cycle increases then profitability of the firm declines. For Managers, this means they can create positive value to shareholders by reducing the number of days customers settle their accounts, ensuring that they sell off their inventories as quickly as possible and delaying the payments to their suppliers, as long as this does not affect their credit rating.

(Yunos, Nazaruddin, Chapar, Ahmad, & Zakaria, 2015) also examined the influence of working capital management on the financial performance of 58 government-linked companies listed in Bursa Malaysia covering the period from 2003 to 2014. The results showed that the return on assets is not affected by the firm's working capital management,

regardless of whether firms have much or less investment in its inventory, receivables or payables. The results also showed that the days payable outstanding (DPO) has positive influence on the gross operating income and if a firm needs to increase its gross operating income then it should delay payment to its payable and use cash for other needs.

The study done by (Dhole, Mishra, & Pal, 2019) examined the association between efficient working capital management and financial constraints based on a sample of firms listed on the Australian stock exchange during the period 2000-2016, using a text-based measure of financial constraints. The study showed that efficient working capital management is associated with lower financial constraints in firms in the next two to three years. It also showed that there is a negative association between financial constraints and future share price that is significantly weakened for firms with efficient working capital management.

2.2. Small and Medium Enterprises:

One of the first studies done on the case of small and medium-sized enterprises is the study done by (Garcia-Teruel & Martinez-Solano, 2007). The object of the research was to provide empirical evidence on the effect of working capital management on profitability measured by return on assets, of a sample of 8872 Spanish small to medium-sized enterprises covering the period 1996-2002. The results have demonstrated that managers can create value by reducing their inventories and the number of days for which their accounts are outstanding. Moreover, shortening the cash conversion cycle also improves the firm's profitability.

(Tsagem, Aripin, & Ishak, 2015) examined the impact of working capital management, ownership structure, and board size on the profitability of a 47 registered small and medium enterprises in Nigeria for the period 2008-2012, where the dependent variable was measured by gross operating profit. The study found a statistically significant relationship between account receivable period, accounts payable period, cash conversion efficiency and board size with SMEs' profitability. Further, a positive relationship between inventory holding periods, cash conversion cycle and cash ration with profitability were established. The study suggests that SMEs owners/managers need to give more emphasis to efficient management of their limited resources by managing their account

receivables, accounts payable, inventories and cash effectively to improve profitability.

The study done by (Bellouma, 2011) investigated the impact of working capital management on profitability of 386 small and medium-sized export companies in Tunisia observed from 2001 to 2008, where the corporate profitability was measured by the gross operating profit. The results of fixed and random effects models show a negative relationship between corporate profitability and the different working capital components. This reveals that Tunisian export SMEs should shorten their cash conversion cycle by reducing the number of days of accounts receivable and inventories to increase their profitability. In contrast to previous findings, which indicate that the lower the investment in working capital is, the more profitability we get.

Another study done by (Banos-Caballero, Garcia-Teruel, & Martinez-Solano, 2012) utilized a data panel of 1008 non-financial Spanish small and medium-sized enterprises for the period 2002-2007, in an attempt to analyze the relation between working capital management and profitability for SMEs, where the cash conversion cycle was used as a measure of working capital management. The results showed that there is a concave relationship between working capital level and profitability. This means that firms have an optimal working capital level that balances costs and benefits and maximizes their profitability. The later decreases as firms move away from their optimal level.

3. Research Design:
3.1. Data and Variables:

The study sample is composed of 45 small and medium enterprises from Algeria. The data are drawn from the National Center for Commercial Register, where the study covers an eight-year period from 2012 to 2019, using the EVIEWS version 12. The study variables were calculated using the firms' financial statements as following:

- **Cash Conversion Cycle:**

The cash conversion cycle is the length sum of the supply period or the average age of inventory and average collection period minus debt repayment period or average payment period (Rizky & Mayasari, 2018, p. 74); it measures the time required converting the current assets into cash inflows. The short-term operational activities of the firm include both

operating cycle (OC) and cash conversion cycle (CCC). The OC reflects the time between the entry of goods into stock and the collection of accounts receivable, while the cash conversion cycle begins when the firm pays its debts to suppliers and ends with the collection of its accounts receivable. To summarize (Brealy, Myers, & Marcus, 2001, p. 170):

Cash conversion cycle = operating cycle − accounts payable period

= (inventory period + receivables period) − accounts payable period

Where (Brealy, Myers, & Marcus, 2001, p. 170):

$$\text{Inventory period} = \frac{\text{average inventory}}{\text{annual costs of goods sold}/365}$$

$$\text{Accounts receivable period} = \frac{average\ accounts\ receivable}{annual\ sales/365}$$

$$\text{Accounts payable period} = \frac{average\ accounts\ payable}{annual\ cost\ of\ goods\ sold/365}$$

- **Investment in Working Capital:**

Investment in working capital ratio is an indicator of the firm's investment policy in working capital, where:

Investment in working capital ratio = current assets/total assets

- **Working Capital Turnover:**

Working capital turnover measures a firm's ability to generate sales for every monetary unit of working capital invested:

Working capital turnover = sales / net working capital

- **Financial Performance:**

Firm's financial performance was measured relying on profitability indicator, which is Return On Sales (ROS) that is considered as the best indicator of SMEs' profitability. Where:

ROS = (net income / total sales) * 100

3.2. Descriptive Statistics:

The descriptive statistics are illustrated on the table below, where the model variables are explained in terms of their mean, median, minimum, maximum and standard deviation values:

Table 1. Descriptive Statistics

	ROS	OC	CCC	CATA	WCT
Mean	5.465395	556.9343	156.5401	0.826436	9.538723

Median	4.755840	131.1773	42.05131	0.935728	3.042102
Maximum	100.0000	43543.01	41123.17	5.479913	2206.421
Minimum	-34.68169	0.000000	-17601.36	0.055504	-1001.546
Std. Dev.	8.100494	3136.413	2680.015	0.330306	138.5803
Observations	360	360	360	360	360
Cross sections	45	45	45	45	45

Source: Eviews.12

Based on the results of descriptive statistics in the table, the average value of the dependent variable or mean return on sales (ROS) amounted to 5.465395, which indicates that the average rate of profit that SMEs make from their sales is fairly high. The maximum score showed a very high rate that accounted for 100.0000 and a minimum value, which represents the low ROS, of -34.68169. Standard deviation value of 8.100494 shows the inequality deviation of ROS.

Cash conversion cycle results showed that the average value for the period 2012-2019 of SMEs amounted 156.5401 or for 157 days, which indicates the long time that takes Algerian SMEs to convert cash to cash. Therefore, operating cycle results also showed an average value of 556.9343 or 557 days, which is considered very high. This indicates the large dependency of Algerian SMEs on trade credit policy in their commercial transactions.

Furthermore, Investment in Working Capital results that measures firm's investment policy in working capital shows an average of 0.826436. The maximum score is showing a result of 5.479913. The lowest value of the variable amounted to 0.055504. The results indicated that comparing to large enterprises; SMEs have a higher proportion of short-term assets and less liquidity, making them more reliant on short-term debts to finance their needs.

However, working capital turnover results, that measures a firm's ability to generate sales for every monetary unit of working capital invested, showed an average rate of 9.538723. The maximum score is showing a result of 2206.421. The lowest value of the variable amounted to -1001.546. All previous indicate a low profit coming from working capital, that shows

the inefficient working capital management of Algerian SMEs. Standard deviation value of 138.5803 also shows the inequality deviation of WCT.

4. The study Model:

In the current decade, Panel analytic models have attracted great interest especially in the economic studies. The term "panel data" refers to the pooling of observation on a cross-section of households, countries, firms, etc. over several time periods (Baltagi, 2005, p. 1). The panel analytic models are divided into three main types: Pooled Regression model; Fixed Effects model, Random Effects model.

4.1. The pooled regression model:

Pooled regression model is one type of models that have constant coefficients, referring to both intercepts and slopes, for this model researchers can pool all off the data and run an ordinary least squares regression model (Thomas & Concordia, 2005, p. 44), while the form of pooled regression model equation is as following:

$$y_{it} = \beta_0 + \sum_{i=1}^{K} \beta_j X_{j_{(it)}} + u_{it} \qquad (i = 1,2,\dots,N; t = 1,2,\dots,T)$$

4.2. The fixed effects model:

Fixed effects model, also known as covariance model or least square dummy variable model, allows for differences among individuals by including in the model a separate covariate for each patient, by including in the regression model a covariate unique to each patient. The fixed effects model explicitly accounts for any idiosyncratic association between the particular characteristics of a given individual and the set of outcome measures contributed by that individual (Michael & J. Paul, 1993, p. 648). While the form of fixed effects model equation is as following:

$$Y_{it} = \beta_{0_{(i)}} + \sum_{i=1}^{K} \beta_j X_{j_{(it)}} + u_{it} \qquad (i = 1,2,\dots,N; t = 1,2,\dots,T)$$

4.3. The random effects model:

In contrast to fixed effects model, which specify variation among individuals in different intercept terms, random effects model uses a single intercept term to specify the mean effect of all individuals in the study, and variation among individuals is accommodated through a specific patient-

related error term (Michael & J. Paul, 1993, p. 649). While the form of random effects model equation is as following:

$$Y_{it} = \mu + \sum_{j=1}^{K} \beta_j X_{j_{(it)}} + V_i + \varepsilon_{it} \quad \left(i = 1,2, \dots, N; t = 1,2, \dots, T, \beta_{0_{(it)}} = \mu + V_i\right)$$

4.4. Why Panel Data?:

Panel Data have many advantages over cross-section or time series data that (Baltagi, 2005) has listed as:

− Since panel data relate to individuals, firms, states, countries, etc., over time, there is bound to be heterogeneity in these units, and the techniques of panel data estimation can take such heterogeneity explicitly into account by allowing for individual-specific variables;

− By combining time series of cross-section observations, panel data give "more informative data, more variability, less co-linearity among variables, more degrees of freedom and more efficiency";

− By studying the repeated cross section of observations, panel data are better suited to study the dynamics of change;

− Panel data can better detect and measure effects that simply cannot be observed in pure cross-section or pure time series data.

5. Results:

5.1. Stationary Test:

Using econometric models, spurious regression is considered as the biggest problem facing researchers. A spurious regression is one in which two or more time series, that have the same secular trend (negative or positive), have variables that appear to have a strong causal relationship (R^2 value is close to 1 and t>2) but they don't have any strong causal relationship. It is therefore mandatory to test time series' stationary, where the time series must have a constant arithmetic mean, a constant variance, and a constant covariance. Testing panel data's stationary can be conducted through unit root tests, where we are going to test each variable included in the study using EViews.12. However, since these tests do not differ much from each other, we will conduct the followings:

✓ ADF fisher χ² (ADF).
✓ Phillips Perron fisher χ² (PP).
✓ Im, Pesaran and Shin (IPS).
✓ Levin Lin and Chut (LLC).

These four tests are meant to check the null hypothesis H_0 which states that the time series possess a unit root and is non-stationary, against the alternative hypotheses H_1 which assumes that the time series is stationary.

The results are in the following table:

Table 2. Stationary test

Variables	Tests on the level			
	LLC	**IPS**	**ADF**	**PP**
ROS	-31.6651	-13.7913	260.049	246.603
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
OC	-8.96434	-0.05168	197.763	145.813
	(0.0000)	(0.4794)	(0.0000)	(0.0000)
CCC	-30.3053	-6.91468	184.655	135.066
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
CATA	-19.4090	-8.52185	190.043	221.573
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
WCT	0.56711	-8.17527	236.697	257.152
	(0.7147)	(0.0000)	(0.0000)	(0.0000)

Source: Eviews.12

According to the table, the four tests' results show that the series contain no unit roots. This means that the levels of the series are stationary (on the level) for all variables expect for the IPS test for the OC variable and the LLC test for the WCT variable. As a result, the null hypothesis is rejected which means that the time series are stationary on their level and there is no need to repeat the analysis on the first differences or to run the cointegration test.

5.2. Regression Analysis:

We will apply the three regression models as following:

- **The pooled regression model:**

In this model, we will assume that there is nothing distinguishing between the 45 firms, where the intercepts are the same for each firm and for each year. Therefore, the ordinary least squares method will be conducted i.e. (8*45) = 360 observations. The form of pooled regression model equation is as following:

$$ROS_{it} = \beta_0 + \beta_1 OC_{it} + \beta_2 CCC_{it} + \beta_3 CATA_{it} + \beta_4 WCT_{it} + \mu_{it}$$
$$i=1, 2, 3…45 \quad t=2012…2019.$$

The results are the followings:

Table 3. Pooled regression model

ROS_{it} = 6.85164746366 + 0.000606324395157OC_{it} + 0.000724211997624CCC_{it}
    (6.927410)   (3.946432)   (4.021912)
        - 1.94996754566$CATA_{it}$ - 0.00206847154166 WCT_{it}
           (-1.785718)   (-0.840876)

R^2 = 0.239463	T= 360	F= 27.55021
Adj R^2= 0.230771	DW= 1.823960	Prob = 0.000000

Source: Eviews.12

Where:

R^2: coefficient of determination. T: number of observation. F: Fisher test statistic. Adj R^2: adjusted coefficient of determination. DW: Durbin Waston Statistic. Prob: probability of failure. The values between brackets represent the t-statistics.

The table shows that:

− The results gave the coefficient of determination (R^2) a value of 0.239463, which means that the dependent variables have highly significant explanatory power for the variability of ROS by 23.9463%, where 76.0537% of the variability is due to other variables that this study did not include.

− We can also see that neither the CATA variable nor the WC variable are statistically significant, which is reasoned by the t-statistics values that are less than 2.

− The model is statistically significant at the 5% level and suitable for representing the effect of working capital management on ROS.

- **The fixed effects model:**

According to the fixed effects model, we will assume that the intercepts vary from a firm to another but they are the same for each year.

The form of fixed effects model equation is as following:

$$ROS_{it} = \beta_{0i} + \beta_1 OC_{it} + \beta_2 CCC_{it} + \beta_3 CATA_{it} + \beta_4 WCT_{it} + \mu_{it}$$
$$i=1, 2, 3...45 \quad t=2012...2019.$$

The results are the followings:

Table 4. Fixed effects model:

$ROS_{it}=5.62269362869+0.000510479209686OC_{it}+0.000923995800857CCC_{it}$					
	(4.607335)		(3.211419)		(4.950149)
	$-0.464482367581CATA_{it} - 0.00080649294081WCT_{it}$				
		(-0.332673)			(-0.327473)
EO--C	-3.504904	SNP--C	-0.035563	SRP--C	-3.743032	A firm intercept
EDE--C	-2.709624	SL--C	0.457517	SPCIE--C	0.067877	A firm intercept
SPCBK--C	3.352439	ES--C	-0.833389	SBC--C	2.159014	A firm intercept
EG--C	-3.944409	SSA--C	-0.045735	SC--C	-0.774434	A firm intercept
SOM--C	2.437228	SGA--C	5.159846	SMC--C	-2.887271	A firm intercept
SGRC--C	-0.987335	ET--C	11.93505	SB--C	0.218795	A firm intercept
SSIE--C	-2.315628	EMAL--C	1.871630	SRT--C	-0.395903	A firm intercept
ESMM--C	-3.416161	SEJC--C	-3.942174	STIE--C	0.788883	A firm intercept
SS--C	5.468614	SSO--C	-1.302384	EZC--C	4.641635	A firm intercept
SMT--C	1.705198	SSME--C	-0.826769	EH--C	-0.481605	A firm intercept
EGMM--C	0.350022	SMC--C	-2.887271	EEIE--C	0.719569	A firm intercept
SLHIE--C	-0.865768	SATMQ--C	0.131629	EME--C	-3.751510	A firm intercept
SIAP--C	-1.385091	SCCSR--C	9.794085	SIEZC--C	1.443360	A firm intercept
EZI--C	-5.913599	SSOM--C	0.725938	EGBS--C	3.083252	A firm intercept
ERIE--C	-0.896750	SFI--C	-1.833048	SET--C	-5.588504	A firm intercept

R^2 = 0.426346	T= 360	F= 4.737967
Adj R^2= 0.336361	DW= 2.371214	Prob = 0.000000

Source: Eviews.12

The table shows that:

− The results gave the coefficient of determination (R^2) a value of 0.426346, which means that the dependent variables have highly significant explanatory power for the variability of ROS by 42.6346%, where 57.3654% of the variability is due to other variables the study did not include.

− We can also see that neither the CATA variable nor the WC variable are statistically significant, which is reasoned by the t-statistics values that are less than 2.

− The model is statistically significant at the 5% level and suitable for representing the effect of working capital management on ROS.

− The intercepts vary from a firm to another.

• **The random effects model:**

In the random effects model, we will assume that the intercepts vary from a firm to another and from a year to another. The form of random effects model equation is as following:

$$ROS_{it} = \gamma + \beta_1 OC_{it} + \beta_2 CCC_{it} + \beta_3 CATA_{it} + \beta_4 WCT_{it} + \varepsilon_{it} + \mu_{it}$$
$$\beta_{0i} = \gamma + \varepsilon_{it} \qquad i=1, 2, 3...45 \qquad t=2012...2019.$$

The results are the followings:

Table 5. Random effects model

$ROS_{it} = 6.40281647245 + 0.000561660303478OC_{it} + 0.000818144045155CCC_{it}$						
(5.738696)			(3.722769)		(4.633001)	
- 1.39534132438CATA$_{it}$ - 0.00141903181444WCT$_{it}$						
(-1.182746)				(-0.596414)		
EO--C	-1.860584	SNP--C	0.024215	SRP--C	-1.920113	A firm intercept
EDE--C	-1.448068	SL--C	0.341675	SPCIE--C	0.118525	A firm intercept
SPCBK--C	1.768752	ES--C	-0.482508	SBC--C	1.005007	A firm intercept
EG--C	-2.172546	SSA--C	-0.295248	SC--C	-0.426329	A firm intercept
SOM--C	1.429128	SGA--C	2.953301	SMC--C	-1.532159	A firm intercept
SGRC--C	-0.250062	ET--C	6.670629	SB--C	-0.046311	A firm intercept
SSIE--C	-1.228294	EMAL--C	1.057069	SRT--C	-0.140761	A firm intercept
ESMM--C	-1.850471	SEJC--C	-2.221092	STIE--C	0.518302	A firm intercept
SS--C	2.900391	SSO--C	-0.670683	EZC--C	2.433968	A firm intercept
SMT--C	0.863312	SSME--C	-0.661658	EH--C	-0.201341	A firm intercept
EGMM--C	0.223163	SMC--C	-1.532159	EEIE--C	0.595548	A firm intercept
SLHIE--C	-0.391045	SATMQ--C	0.161024	EME--C	-2.104452	A firm intercept
SIAP--C	-0.818472	SCCSR--C	5.243352	SIEZC--C	0.861479	A firm intercept
EZI--C	-3.178597	SSOM--C	-0.010930	EGBS--C	0.987365	A firm intercept
ERIE--C	-0.431594	SFI--C	-0.952181	SET--C	-3.328549	A firm intercept
R^2 = 0.258567		T= 360		F= 30.51466	
Adj R^2= 0.250093		DW= 2.086020		Prob = 0.000000	

Source: Eviews.12

The table shows that:

− The results gave the coefficient of determination (R^2) a value of 0.258567, which means that the dependent variables have highly significant explanatory power for the variability of ROS by 25.8567%, where 74.7433% of the variability is due to other variables the study did not include.

− We can also see that neither the CATA variable nor the WC variable are statistically significant, which is reasoned by the t-statistics values that are less than 2.

− The model is statistically significant at the 5% level and suitable for representing the effect of working capital management on ROS.

− The intercepts vary from a firm to another and from a year to another.

5.3. Regression appropriateness:

- **Likelihood Ratio Test for Redundant Fixed Effects:**

The likelihood ratio test was conducted for comparison between pooled regression model and fixed effects model, where the F-test was employed. Where:

- H_0: The pooled regression model is more appropriate
- H_1: The fixed effects model is more appropriate

Table 6. The results for likelihood ratio test

Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.265630	(44,306)	0.0000
Cross-section Chi-square	100.109519	44	0.0000

Source: Eviews.12

Results show p-value for the test is less than 5%, which means the null hypothesis that the pooled regression model is more efficient was rejected, implying that fixed effects model is to be preferred.

- **Hausman test**

In order to test appropriateness of fixed effects model and random effects model, the Hausman test was employed to test the following hypotheses:

- H_0: The random effects model is more appropriate
- H_1: The fixed effects model is more appropriate

Table 7. The results for Hausman test

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	5.081577	4	0.2790

Source: Eviews.12

The p-value for the test is larger than 5%, indicating that the fixed effects model is not appropriate and that the random effects model is to be preferred.

6. Discussion and conclusion:

The study examined the impact of working capital management on profitability of 45 small and medium enterprises in Algeria during the period starting from 2012 to 2019. The regression analysis results showed that the random effects model is more appropriate to determine the effect of working capital management on profitability. The independent variable was measured using cash conversion cycle, operating cycle, investment in working capital ratio, and working capital turnover. The results revealed that both cash conversion cycle and operating cycle have a positive significant effect on ROS, where working capital turnover and investment in working capital ratio have non-significant effects on ROS. The results are as followings:

$$ROS_{it} = 6.40281647245 + 0.000561660303478OC_{it} + 0.000818144045155CCC_{it}$$

Therefore, by adding firm intercepts (Table 5) to the constant we obtain the results of each firm.

The results above indicate a positive effect of both CCC and OC on the profitability of Algerian small and medium enterprises. This means that long cash conversion cycle and operating cycle that includes long inventory period and generous trade credit policy combined by a short payment period of accounts payable, are more beneficial to SMEs. These results can be explained by the fact that large inventories and generous trade credit policy encourage sales and minimize the risk of stock-outs. On the other hand, trade credit and inventory are money locked up in working capital. If a company is undercapitalized, a long time period to convert trade receivables or inventories can be costly. Since, companies must be supplied by a quite number of external sources and can lead to cash inflow difficulties.

Furthermore, short payment period of accounts payable gives the firm a good reputation for being able to meet its short-term obligations.

However, shortening the trade credit period may result in the firm losing some of its customers. On one hand, a good inventory management decreases the risks associated with the depletion of stocks. On the other hand, reducing the length of inventory leads to reducing carrying costs of goods and services.

Therefore, delaying payment for trade payables may provide a financial source for some companies. However, the long payment period of

accounts payable does not give the firm a good reputation for being unable to meet its short-term obligations. In addition to the immediate consequences of working capital management, there may be market opportunities and/or signaling consequences associated with working capital management. By controlling the inflow and outflow of cash, effective working capital management will reduce the company's dependency on outside funding to keep operations running. This allows the company chooses to either invest on long-term or borrow at a lower interest rate. Investors will see such organizations as less risky and would be more willing to work with them. A shorter CCC is the result of reducing the accounts receivable period, as well as reduced inventory and longer supplier credit terms. The benefit of such policy is that operations financed cheaply, as current liabilities, incur little or no interest. This policy carries risk, since low inventory levels associated with a short-term trade, credit might result in increased operation risk and decreased sales (Yazdanfar & Ohman, 2014, p. 443). As a result, firms should be aware of the importance of achieving their optimal cash conversion cycle that can maximize their value.

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