THE IMPACT OF CAPITAL STRUCTURE ON THE PERFORMANCE OF ALGERIAN COMPANIES: ECONOMETRIC STUDY ON INDUSTRIAL COMPANIES DURING THE PERIOD (2013-2018)

العلاقة بين الهيكل المالي والأداء المالي للمؤسسات الجزائرية : دراسة قياسية على المؤسسات الصناعية خلال الفترة (2013-2018)

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ملخص:

هدفت هذه الدراسة إلى بيان العلاقة بين الهيكل المالي و الأداء المالي للمؤسسات؛ ولتحقيق هذا الهدف؛ أجريت الدراسة على عينة مكونة من (72) مؤسسة صناعية جزائرية وذلك خلال الفترة الممتدة ما بين (2013-2018).

وقد استخدمت الدراسة الانحدار المتعدد و بيانات السلاسل الزمنية المقطعية، لاختبار العلاقة بين المتغير التابع مُمثلاً بالأداء المالي مُعبراً عنه بمعدل العائد على الأصول، والمتغيرات المستقلة التالية الذكر؛ معدل الديون طويلة الأجل، معدل الديون قصيرة الأجل، الرافعة المالية ومعدل إجمالي الديون.

أظهرت نتائج الدراسة أنه توجد علاقة ذات دلالة احصائية بين العائد على الأصول و مؤشرات الهيكل المالي ككل، كما بينت النتائج اعتماد المؤسسات الجزائرية على الديون قصيرة الأجل لتمويل نشاطها.

الكلمات المفاتيح: الهيكل المالي، الأداء المالي، نظرية أوليات التمويل، بيانات السلاسل الزمنية المقطعية .

التصنيف: **L25, G32, C23 .**

Abstract:

This study aimed to investigate the relationship between capital structure and firm's financial performance. For this purpose, a sample of (72) Algerian firms over the time span of 2013-2018 was chosen for this study.

The study used multiple regression, panel data method as a technique to examine the relationship between financial performance; the dependent variable, measured as the return on asset (ROA), and the following independent variables; long-term debt ratio (LTDR), short-term debt ratio (STDR), financial leverage (FR), total debt ratio (TDR).

The results showed significant relationship between return on asset (ROA) and capital structure measures as group. The results also showed that Algerian firms rely on short term debt to finance their activities.

Key words: Capital Structure, Financial Performance, the Pecking Order theory, Panel Data.

Jel Classification Codes : L25, G32, C23

Introduction:

Corporate finance boils down to the investment and financing decisions made by corporations. Financial managers in corporations work with other managers to identify investment opportunities, to analyze and value opportunities, and to decide whether and how much to invest. Financial managers also have to raise the money to finance the corporation's investments. Therefore, financing and investment decisions (both long- and short-term) are of course interconnected. The amount of investment determines the amount of financing that has to be raised, and the investors who contribute financing today expect a return on that investment in the future.

A firm's basic financial resource is the stream of cash flows produced by its assets and operations. When a firm financed entirely by common stock, all those cash flow belongs to the stockholders. When it issues both debt and equity, the firm splits the cash flows into two streams, a relatively safe stream that goes to the debt holders and more risky one that goes to the stockholders.

The firm's mix of securities is known as its capital structure which is not immutable. Firms change their capital structure, sometimes almost overnight. Stockholders want management to choose the mix of securities that maximizes firm value. But is there optimal capital structure? We must consider the possibility that no combination has any greater appeal that any other. Perhaps the really important decisions concern the company's assets and decisions about capital structure are mere details-matters to be attended to but not worried about.

The goal of the capital structure decision is to maximize the overall market value of all the securities issued by the firm. Therefore, the financial manager must try to find the particular combination that maximizes the market value of the firm. If firm value increases, common will stockholders benefit.

The industrial private segment dominating the industrial sector of Algeria with a contribution output of 55.9% draws attention to bid whether the capital structure being enjoyed by this sector currently is optimal or not.

With this state of private sector, it becomes important to study whether the firms in this segment will survive in the Algerian market; which beset by major economic difficulties at the present phase of their transition towards a market economy.

Furthermore, the present study poses a question that should be addressed by it: **Is there any relationship between Capital structure and financial performance of firms in Algeria?**

- **Hypothesis**

In our study, we assume that the capital structure, in all its aspects (components) plays an important role in firm's performance.

By virtue of the goals and also the issue to be tested in this study following hypothesis are proposed:

H0: There is no significant relationship between capital structure and financial performance of Algerian companies.

H1: There is significant relationship between capital structure and financial performance of Algerian companies.

- **Objectives of the Study**

The major objective of the study is to examine the relationship between capital structure and firm performance. To achieve the main objective, the following specific objectives were used:

- To study the company's capital structure;
- To identify the components of optimal capital structure;
- To analyze of impact of capital structure on financial performance of selected firms.

The current study in addition to introduction will be organized as follows: Part I will discuss the background literature. Part II will present the data, variables and will review the

hypotheses and the econometric model of study. Part III will focus on the empirical analysis. Panel regressions will adopt to identify the relationship between capital structure and firm performance and final part will demonstrate the study conclusion.

I. Literature review:

Capital structure has been considered as one of the most important factors in firm financing policy due to its crucial role in corporate performance (Oyedokun, et al, 2018, p54), in financial term capital structure means the way firms finance their assets through the mixture of equity, debt, or hybrid securities (Akinyomi,et al, 2013, p469). Also, Nirajini and Priya (2013) define it as the technique an establishment applies for financing based on a blend of long-term capital (ordinary and preference shares, debentures, loans, loan stock, etc.) in addition to short-term obligations like overdraft and other payables (Ajibola, et al, 2018, p82), in a nutshell, Capital structure has been defined as "that combination of debt and equity that attains the stated managerial goals (i.e.) the maximization of the firm's market value". The optimal CS is also defined as that "combination of debt and equity that minimizes the firm's overall cost of capital".

Foremost contemporary theory of Capital structure started with the article of Modigliani and Miller (M&M, 1958) .since, then; various studies have been carried out to investigate the optimal Capital structure in the absence of Modigliani and miller's assumption (Akinyomi, 2013, p 470)

The Modigliani and Miller (1958), in their known capital structure irrelevance theory, claims that in an efficient market which has no tax, no transaction cost, no information asymmetry , the value of a firm is unaffected by how that firm is financed. M&M theory predicts that there is no relationship between a firm's capital structure and its performance. The M&M theory makes the core stone of the modern corporate finance.(Guangchen,2012,p02)

In their correction paper on 1963, Modigliani and Miller had identified that as the level of gearing increases by replacing equity with cheap debt, the level of the Weighted Average Cost of Capital (WACC) (Shinta, et al, 2014, p2). Modigliani and Miller(1963) presented new proof that cost of capital affect on capital structure, and therefore affect on value of the firm with relaxing unrealistic assumptions that there are existing taxes, which indicate that borrowing give tax advantage, where the interest deducted from the tax and it will result tax shields ,which in turn reduce the cost of borrowing and then maximize the firm performance (Miller,1977) and this require from the firm to make tradeoff between the cost of debt from side and the benefits of using debt from another side (Soumadi & Hayajneh, 2008, p175)

The trade off theory of capital structure (1973) discusses the various corporate finance choices that a corporation experiences.

The theory is an important one while studying the financial economics concepts. The theory describes that the companies or firms are generally financed by both equities and debts. The theory primarily deals with the two concepts. Cost of finance distress and agency cost.

The purpose of the trade –off theory of capital structure is to explain the strategy of the firms to finance their investments sometimes by debt. The theory also studies the corresponding advantages and disadvantages of the financing either by equity or bound. The trade-off theory actually allows the cost of bankruptcy to exist (Nirajini and Priya, 2013, p03) Myers and Majluf (1984) developed a "pecking order" theory of capital structure, according to which firms initially use internal funds, then debt, and, if a project requires more funding, equity.

Therefore, firms which are very profitable and generate sufficient cash flows will use less debt. Further studies of the relationship between leverage and firm performance can be divided into two groups. The first one is based on the information asymmetries and signaling. Ross (1977) came up with a model that explained the choice of debt-to-equity ratio by a

willingness of a firm to send signals about its quality. The core idea of Ross (1977) is that it is too costly for a low-quality firm to abuse the market and signal about its high quality by issuing more debt. As a result, low quality firms have low amount of debt, and the leverage increases with the value of a firm. A similar model was developed by Leland and Pyle (1977): the higher is the quality of the project manager wants to invest in; the higher is the willingness of the manager to attract financing. That is why a risky firm will end up with lower debt.

The second group of studies explains the relationship between capital structure and firm performance through the agency costs theory, developed by Jensen and Meckling (1976) and Myers (1977). Agency costs are related to conflicts of interest between different groups of agents (managers, creditors, stockholders). There could be two types of agency problems (Iavorskyi, 2013, p07).

The market timing theory (Baker and Wurgler, 2002) suggests that the financing decisions of any firm depend on market conditions. In this theory, Baker and Wurgler (2002) state that the circumstances of investors' sentiments and financial distress can create for mangers an opportunity and lead them to modify the leverage ratio and equity level. Based on this theory, firms will prefer to issue equity to avoid bankruptcy risk during financial distress. Alternatively, mangers will prefer to use debt when stock prices are over-evaluated to prevent any opposite signal of equity issues. Accordingly, the variation of market value of a firm is the result of managers' perception of over evaluation (El-Chaarani and El-Abiad, 2019, p03).

Based on the above theories, many empirical studies have been conducted to analyze the impact of capital structure on the performance of firms.

Soumadi & Hayajneh (2008), conducted a similar study to determine the relationship between capital structure and the performance of the public Jordanian firms listed in Amman stock market. The study concluded that capital structure associated negatively and statistically with firm performance on the study sample generally.

In addition, the study found out that there was no significant difference to the impact of the financial leverage between high financial leverage firms and low financial leverage firms on their performance. The relationship between capital structure and firm performance was negative and statistically significant

Al-Taani (2013) examined there are relationship between capital structure and firm performance across different industries using a sample of Jordanian manufacturing firms in Jordan.The study used a linear regression to examine 45 manufacturing companies listed on the Amman Stock Exchange from 2005-2009 .The result show that there is a negative and insignificant relationship between Short-term debt to Total assets and Long term debt to Total assets, and Return on Asset and Profit Margin; while Total debt to Equity is positively related with Return on Asset and negatively related with Profit Margin. Short-term debt to Total assets is significant using Return on Asset while Long term debt to Total assets is significant using Profit Margin. The study concludes that statistically, capital structure is not a major determinant of firm performance. It recommends that managers of manufacturing companies should exercise caution while choosing the amount of debt to use in their capital structure as it affects their performance negatively.

Khan (2012) examined the relationship between capital structure decision and the performance of the firms in the developing market economies like Pakistan (36) engineering sector firms in Pakistani market listed on the Karachi Stock Exchange (KSE) during the period 2003-2009. The study models were estimated using the regression based framework Pooled ordinary least squares). The results showed that financial leverage measured by short term debt to total assets (STDTA) and total debt to total assets (TDTA) has a significantly negative relationship with the firm performance measured by Return on Assets (ROA), Gross Profit Margin (GM) and Tobin's Q. The relationship between financial leverage and firm performance measured by the return on equity (ROE) is negative but insignificant. Asset size

has an insignificant relationship with the firm performance measured by ROA and GM but negative and significant relationship exists with Tobin's Q.

Mwangi and Makau (2014), analyzed the relationship between capital structure and the performance of non-financial companies listed in the Nairobi Securities Exchange (NSE), Kenya. The authors employed an explanatory non- experimental research design. A census of 42 non-financial companies listed in the Nairobi Securities Exchange, Kenya was taken. The data were extracted from the Nairobi Securities Exchange hand books for the period 2006-2012.their results indicate that financial leverage had a statistically significant negative association with performance as measured by return on assets (ROA) and return on equity (ROE). In addition, their results suggest that managers of listed non-financial companies should reduce the reliance on long term debt as a source of finance

Nwude and Anyalechi **,**(2018), used a sample of 10 banks for a period of 2000-2013. They used correlation analysis, pooled OLS regression analysis, fixed effect panel analysis, random effect panel analysis, granger causality analysis, as well as post estimation test such as restricted f-test of heterogeneity and Hausman test.

The findings show that while debt finance exert negative and significant impact on return on asset, the debt-equity ratio has positive and significant influence on return on equity. There was neither unidirectional nor bidirectional relationship between capital structure and performance of commercial banks in Nigeria.

Dang and Bui (2019), discovered positive relationship between debt ratios and ROE (return on equity) and EPS (earning per share), but negative relationship with ROA (return on asset). When they investigated capital structure and performance of 61 listed companies between 2000-2017 using DA (debt ratio), STA (short term debt ratio), and LTA (long term debt ratio), as surrogates of capital structure, and ROA (return on asset), ROE (return on equity) and EPS (earning per share) as measure of firms' performance using panel data regression model.

In the contrast to the above, Zeitun and Tian (2007), examined the impact of capital structure on the performance of firms using a panel data sample representing of 167 Jordanian companies during 1989-2003, Their research results indicate that there is significant a negative relationship between the capital structure and firm performance, also The result shows a significant positive relationship between the short-term debt to total assets and market performance measure (Tobin's Q).

Moreover, Nirajini and Priya, (2013), investigated that the effect Capital structure and the Financial performance of the listed trading companies in Sri LANKA during 2006 to 2010.Correlation and multiple regression analysis are used for analysis, The result shows a positive relationship between the capital structure and financial performance

In another study, Norfhadzilahwati and Noriza (2014), studied the relationship between Sustainable growth, capital structure and firm performance of Public Listed Companies in ASEAN countries. This study was conducted during 2001 to 2012 using panel data and multivariate regression with the sample size of 229 companies. The results of this study indicate that sustainable growth in Malaysia and Singapore is association with all independent variables for capital structure. And, sustainable growth is association with ROA in all ASEAN countries. Sustainable growth is not differ across ASEAN countries. But, capital structure and performance of companies is differ across ASEAN countries.

Shinta ,et al, (2014), attempt to expand the knowledge of capital structure, profitability, and firm value during 2010 to 2012. The key research question is that whether the effect of Capital Structure on the profitability and firm value is positive or negative. Results indicate that there is a negative relationship between the capital structure, and the firm value. The higher the debts that firms employed, the lower its values.. In addition, it reflects the view that there is a positive relationship between the profitability and the firm value.

Singh,S. and Singh,A, (2018), investigated capital structure and firm's financial performance, with Panel data on a sample of (172) listed firms on Taiwan exchange for a period of 05 years 2011-2016. The findings at overall market as well as sector levels were unspectacular but remarkably consistent. Capital structure and various financial parameters exhibit correlation coefficients that were mixed in signs with relatively weak correlation strength. Further the results suggest that t-test statistics registered statistical insignificance for the three research objectives.

The results of Oyedokun et al, (2018), confirmed the impact of capital structure on the corporate performance of (10) listed companies in Nigerian Stock Exchange, over the period of 2007-2016. However, the authors found that the capital structure was inversely related to the corporate performance. They suggest that manufacturing companies should adopt balanced capital structure strategy that will optimise company's performance and corporate value.

Alamgir et al, (2019), studied the effects of selected capital structure and firm's financial performance of all companies listed on Dhaka Stock Exchange over the period 2013-2017. They ran descriptive statistics, correlation, pooled ordinary least square analysis, fixed effect and Random effect model to test the relationship between financial performance; the dependent variable, measured as the return on equity, return on asset, and earnings per share and the following independent variables; the debt ratio (DR), equity ratio(ER), long-term debt ratio (LTDR), short-term debt ratio (STDR).

The results showed significant and positive relationships between return on asset (ROA) and all capital structure measures. Furthermore, other two dependent variable ROE and EPS as financial performance didn't have significant impact from capital structure significant and negative sign with profitability.

Siregar (2019), analyzed sample of (16) agribusiness companies from 2012 to 2016. They used Panel regression and found that capital structure (DER) and firm financial performance (ROA & ROE) have a positive and significant effect to agribusiness firm value.

II. Research Methodology:

The empirical study on the association between capital structure and performance in the Algerian private companies is fundamental to understand the logic of financial decisions and its consequences in order to establish a genuine development policy of these companies, as part of the transition to a market economy.

It aims to explore the performance of industrial sector and try to explain it, to have a clearer understanding. It is a search that is both exploratory and explanatory correlation -explicative.

II-1- Data Collection:

Companies are chosen for their size; they are subject to the application of financial accounting system, and the industrial sector for its role and importance in the current stage of the transition of the national economy to a market economy.

Data were collected from **the National Center of Trade Register**, after identification of enterprises, their business, their size, with the National Statistics Office.

The statistical sample of the research has been gained through applying following conditions:

- Due to their having a nature of operation different from other corporate, investment and financial corporate have been omitted from sample of research.
- The company should not have operating loss during these years and consequently, the dividend should be distributed in cash.
- Required information such as financial statements and notes to financial statements, summary of decisions.

Finally, a total of seventy two companies (72) distributed across the national soil out of total population are obtained, and the annual reports of seventy two selected companies for six year- period of (2013-2018) were used for the study, these amounts to 432 company-year observations.

The list of industrial enterprises is shown in the next table.

Table n° 1: List of Companies

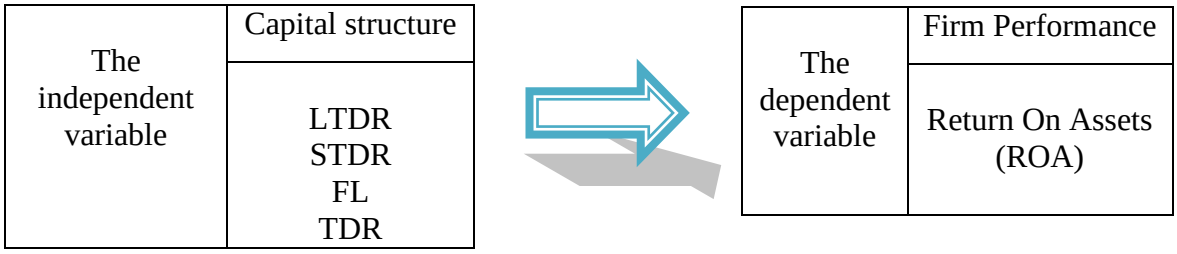
N°	COPMPANIES	N°	COPMPANIES
1	Sarl Haal	37	Spa Conserverie N'gaous
2	Sarl Raja Food Industrie	38	Sarl Set Toudja
3	Sarl Pâturages d'Algérie	39	Spa Fruital
4	Spa-Mami	40	Spa Trefl
5	Sarl Laiterie Soummam	41	Spa Danoune
6	Sarl Ifri	42	Chocolaterie Le Regale
7	Sarl Ramdy	43	Sarl Hodna Lait
8	SPA Hamoud Boualem	44	Eurl Groupe Amara Thtph
9	Sarl Vitajus	45	Sarl Tchin Lait
10	Spa Semoulerie Industrielle De La Mitidja Sim Agro	46	Laiterie De Draa Ben Khedda Spa
11	Spa Cevital Aagro	47	Spa Cogral
12	Spa Fromagerie Bel Algerie	48	Laiterie Fromagerie De Boudouaou Lfb
13	Spa Fruital	49	Spa Margarinerie La Belle
14	Spa Gig Groupe Indistruel Goumidi	50	Nca-Rouiba
15	Spa Hamoud Boualem	51	Les Moulins Seybouse Annaba
16	Knauf Plâtres Sarl	52	Eurl Briqueterie Amouri
17	Sarl Metal Soude	53	Eurl Briqueterie Ouled Nail
18	Sarl Marbre Et Granit Cheurfa	54	Sarl Céramiques Hippocampe
19	Sarl Céramique El Hidab	55	Sarl Argilex
20	Sarl Lotfi Electronics	56	Sarl Molino Grani
21	Simaf Sarl	57	Sarl Essalem Electronics
22	Amimer Energie	58	Sarl Biolux
23	Sarl Tirsam	59	SPL Metal Sarl
24	Snc Meheleb	60	Sarl Toufik
25	Eurl Aures Emballages	61	Spa Rouiba Eclairage
26	Sarl General Emballage	62	Spa Elsecom Automobiles
27	Leader Meuble Taboukert Spa	63	Spa Condor Electronics
28	Spa Btph Hasnaoui	64	Spa Samha Home Appliance
29	Sarl AGREGAL	65	Spa Bya Electronic
30	Saidal Spa	66	Arcelor Mittal Annaba
31	Fertial Annaba	67	Alzinc
32	Spa SMPCA	68	Sarl Meriplast
34	Unilab Pharmaceuticals Sarl	69	Sarl Sapharm
35	Papierosa	70	Spa Faderco
36	Nover	71	El Kendi Industrie Du Medicament
37	Spa Biopharm	72	Spa Les Laboratoires Inpha-Medis

Source: (By the Author)

II-2- variables definition:

In this study, there are two main variables, and the proxies that represent the both variables as shown in Figure 1 below:

Figure n° 1: Conceptuel Framework



Source: (By the Author)

II-2-1. The dependent variable: We retained in our study the « Return On Assets» variable (Y) as dependent variable because it measures how efficient a company's management is in generating earnings from their resources. It is measured by the «net income / total assets» report. (e.g., Singh, 2018; Al-Taani, 2013; Nwude & Anyalechi , 2018; Hashim and Hassan ,2017; Siregar, et al, 2019).

II-2-2. The independent variables: Exogenous variables, they are four (04) and presented as ratios (e.g., Alamgir and al, 2019; Al-Taani, 2013; Hashim & Hassan, 2017;Iqbal et al, 2018; Bokhtiar, & Mainul,2014;Varian,et al, 2015). They affect financial performance; they are listed in the following table.

Table n° 2: Independent Variables

Variables		Expression
X_1	LTDR	Long term debt to total assets = long term debt / total assets
X_2	STDR	Short term debt to total assets = short term debt / total assets
X_3	FL	Financial leverage = total debt /equity
X_4	TDR	Total debt to total assets = total debt / total assets

Source: (By the Author)

These ratios are calculated based on annual data (balance sheets, income statements) of different firms selected for this study, for a considered period.

As it is about reporting (ratios), we selected eleven decimal places, for all the dependent variables (Y) and independent (X1 to X4).

II-2-3 The model:

The linear regression equation can be represented as follows:

$$\mathbf{ROA = \alpha + \beta_1(LTDR) + \beta_2\,(STDR) + \beta_3\,(FL) + \beta_4\,(TDR) + e}$$

Where,

ROA: Return on Assets;
LTDR: Long term debt to total assets;
STDR: Short term debt to total assets;
FL: Total debts to equity;
TDR: Total debts to total assets;
α: the intercept of the equation;
β_1, β_2, β_3 and β_4: coefficients of variables;
e: Error term.

II-2-4 Research method:

The regression model obtained is a multiple linear model; it includes the dependent variable (Y) and four other independent or explanatory variables: (X1-X4) .It is obtained by the use of «EVIEWS, version 10».

III. Results and Discussion:

III -1. Descriptive Analysis:

This section shows descriptive statistics of the collected sample. The main statistical characteristics of the variables are presented in the following table.

Table n° 3: Descriptive Statistics

	LTDR	STDR	FL	TDR	ROA
Mean	0.122154	0.448372	2.218530	0.558999	0.054997
Median	0.098050	0.445200	1.253800	0.557100	0.031250
Maximum	2.000000	2.639500	19.40390	0.951000	0.384300
Minimum	-2.311400	0.025800	0.008400	0.071600	-0.076700
Std. Dev.	0.246107	0.252494	2.737484	0.209302	0.064979
Skewness	-2.350537	3.117643	3.022992	-0.191453	1.969491
Kurtosis	62.52028	28.35280	14.31240	2.410061	7.551799
Jarque-Bera	31191.69	5964.380	1439.588	4.328146	317.0514
Probability	0.000000	0.000000	0.000000	0.114856	0.000000
Sum	25.65240	94.15810	465.8913	117.3898	11.54940
Sum Sq. Dev.	12.65881	13.32439	1566.208	9.155746	0.882448
Observations	432	432	432	432	432

Source: (By the Author using Eviews10)

The table shows, some values are missing for some of the variables, especially for the return on assets (ROA). Where it is noted form Table (2) that the average of (ROA) for sample of study 0.056 approximately. And this value is very low with comparing of high return in assets, which is 0.3843. It refers to some firms achieve low profit and this indicate to weakness of firm performance.

With regard to the average of long term debt (LTDR) is 0.1221, which means that a capital structure of companies on average had varied. As well as analysis indicates that the minimum percent of (LTDR) is -2.3114, whereas the maximum value reached it is 2.00.

Furthermore, the companies had an average short term debt (STDR**)** of 0.4484 approximately

Firm financing policies represented by to financial leverage (FL) which the average is 2.2185 and also the results indicates to decline the capital structure with comparing of the maximum value which equal 19.4039, and this value is high, while the standard deviation proves that there is high variation in using financial leverage.

The table also, shows that the average total debt ratio (LTD) is 0.5590. This denotes that there is variation in using debt.

Last but not least, the result of the skewness and kurtosis indicate that all the variables without exception have skewness and kurtosis different from the one obtainable from a normal curve.

According to Park (2008), a normal distribution should have skewness of zero or very close to zero. Given our results therefore, all the variables: LTDR, STDR, FL, TDR and ROA having values of-2.3505, 3.1176, 3.0229,-0.1914 and 1.9695 respectively are skewed more both to the right and left. This indicates a more positive and negative observations because it is far above the 0.0 normal level of skewness for distributions.

With exception to TDR which shows a kurtosis of 2.41, every variable shows a higher than normal peak and thinner than normal tails. This shows that extreme outliers are more pronounced in these distributions (with high peak).

The eighth row of the table shows the result of Jarque-Bera test that explains whether the sample data follows the normal distribution or not? In our analysis all the variables are normally distributed. (Also the sample is larger than thirty)

III -2. Test for multicollinearity:

We find, that the correlations between the different variables are low, these are, however, not substantial problems. Since the variance inflation factor (VIF) of the different variables are well below 10, also tolerance coefficients (1/VIF) are larger than 0.05. There are no multicollinearity problems.

Table n° 4: Test for multicollinearity

Variable	VIF	1/VIF
LTDR	2.4551	0.4073
STDR	3.6271	0.2757
FL	2.4044	0.4159
TDR	3.6390	0.2748

Source: (By the Author using Eviews10)

III -3. Phillips-Perron fisher unit root test:

The phillips-perron fisher unit root test on the variables is presented in the following table.

Table n° 5: phillips-perron fisher unit root test on variables

Null Hypothesis: Unit root (individual unit root process)		
Exogenous variables: Individual effects		
Newey-West automatic bandwidth selection and Bartlett kernel		
ROA		
Method	Statistic	Prob.**
PP - Fisher Chi-square	259.042	0.0000
PP - Choi Z-stat	-8.35565	0.0000
LTDR		
Method	Statistic	Prob.**
PP - Fisher Chi-square	198.445	0.0000
PP - Choi Z-stat	-4.86262	0.0004
STDR		
Method	Statistic	Prob.**
PP - Fisher Chi-square	130.088	0.0000
PP - Choi Z-stat	-2.55548	0.0053
FL		
Method	Statistic	Prob.**
PP - Fisher Chi-square	153.676	0.0000
PP - Choi Z-stat	-1.93314	0.0466
TDR		
Method	Statistic	Prob.**
PP - Fisher Chi-square	168.974	0.0000
PP - Choi Z-stat	-1.97843	0.0239

Source: (By the Author using Eviews10)

Looking at the findings portrayed from table above, for unit root test results of the set of data used. All variables used in the regression analysis are jointly significant at a level. We can see that the p- value for the variables is less than alpha 0.05; so, we will refuse the null

hypothesis and accept the alternative hypothesis, therefore, the time series variable is stationary (not autocorrelated).

III -4. The correlation matrix:

Pearson correlation co-efficient is calculated in Table (5).

Table n° 6: Correlation matrix

	LTDR	STDR	FL	TDR	ROA
LTDR	1.000000	-0.515608	0.132833	0.161850	-0.122682
STDR	-0.515608	1.000000	0.456332	0.582773	-0.060602
FL	0.132833	0.456332	1.000000	0.737321	-0.256825
TDR	0.161850	0.582773	0.737321	1.000000	-0.323953
ROA	-0.122682	-0.060602	-0.256825	-0.323953	1.000000

Source: (By the Author using Eviews10)

The results reveals that financial leverage (FL) and total debt ratio (TDR) has both negative and significant impact on return on assets (ROA) as coefficient values indicate r=-0.3239 and r=-0.2568. Short term debt ratio (STDR) shows a negative effect on return on assets (ROA), as correlation coefficient value is too week i.e., r= -0.06. Also, long term debt ratio (LTDR) has a negative relationship with return on assets (ROA).

III -5. Regression model:

The regression model obtained is a multiple linear model; it includes the dependent variable (ROA) and four other independent or explanatory variables. Table (6) below is a summary of the regression model used in this study.

Table n° 7: Regression model

Dependent Variable: ROA				
Method: Panel Least Squares				
Date: 12/06/19 Time: 21:58				
Sample: 2013 2018				
Periods included: 6				
Cross-sections included: 72				
Total panel (balanced) observations: 432				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.101683	0.014309	7.106112	0.0000
LTDR	0.032468	0.026840	1.209653	0.2278
STDR	0.079819	0.031800	2.510026	0.0128
FL	-0.001451	0.002291	-0.633163	0.5273
TDR	-0.148877	0.038428	-3.874137	0.0001
R-squared	0.137164	Mean dependent var		0.054997
Adjusted R-squared	0.120328	S.D. dependent var		0.064979
S.E. of regression	0.060944	Akaike info criterion		-2.734197
Sum squared resid	0.761408	Schwarz criterion		-2.654504
Log likelihood	292.0907	Hannan-Quinn criter.		-2.701980
F-statistic	8.147131	Durbin-Watson stat		2.555788
Prob(F-statistic)	0.000004			

Source: (By the Author using Eviews10)

The result reveals Adjusted R-Square value of 0.1203 meaning that 12.03% of the variation in the dependent variable is explained by the independent variables of the model during the period studied. The 87.97% variation in the dependent variable remains unexplained by the independent variables of the study. The value for F-statistic is 8.1471 and

is significant endorsing the validity and stability of the model relevant for the study. Thus, there is significant linear relationship between ROA and the four independent variables as a group (**The alternative hypothesis is accepted**.).The finding is supported by similar finding for instance, Al- Tani (2013); Khan (2012); Oyedokun et al, (2018); the positive sign of the coefficient of LTDR and STDR shows that there is a direct relationship between the variables and ROA while the negative signs of FL and TDR indicate an inverse relationship.

Moreover, the result was further supported by DW-statistic of 2.555788 indicating the absence of autocorrelation.

From the regression result, the following model was derived:

$$Y = 0.101683 + 0.032467*LTDR + 0.079818*STDR - 0.001450*FL -0.148876*TDR$$

According to the equation obtained, the constant value of the model is 0.101683. Meaning return on asset will be equal to 0.101683 when other factors affecting it are reduced to zero. The coefficient for the return on asset against long term debt ratio (LTDR), Short term debt (STDR), financial leverage (FL) and Total debt ratio (TDR) is 0.032467, 0.079818,-0.00145 and -0.148876. Therefore, a unitary increment in long term debt ratio (LTDR) will augment the return on assets (ROA) of the firm by 0.032467. Hence a potential increase in long term debt ratio will result to a raise in return on assets. The same relationship is exhibited with short term debt ratio (STDR). Also, a unitary raise in short term debt ratio will result to an increase in return on asset by 0.079818. Conversely; the financial leverage (FL) has an inverse relationship with return on asset (ROA). That is in accordance with the Pecking Order theory. Hence to augment return on asset, the financial leverage will need to be reduced by 0.00145 and vice versa. The same relationship is existed with total debt ratio (TDR), a unitary increment in total term debt will reduce the return on assets by 0.148876.

From the regression finding obtained in table (6), the value of long term debt ratio(LTDR) and financial leverage (FL) had an insignificant relationship with financial performance and this due to the p-value were higher than 5% . Confirming our earlier study of Mwangi &Makau (2014) .Contrary, short term debt ratio (STDR) and total debt ratio (TDR) the p-value obtained were lower than 5%, so, showing, the relationship between short term debt ratio (STDR) ,total debt ratio (TDR) and financial performance is significant. Confirming our earlier study of Suhadak & Nuzula, (2014) ; Alamgir et al, (2019)

Conclusion:

The research have used a panel of over (72) Algerian firms over the period (2013-2018) to analyze the impact of capital structure on firm performance. For the purpose analysis, Eviews 10 econometric software was used to analyze the data collected. The author used return on asset representing for firm performance; long term debt ratio, short term ratio, financial leverage and total debt ratio as four measures of capital structure. The results of our research indicated that the variables that explain the performance of the companies in the *industry* sector in Algeria relate more particularly to a certain adequacy of capital structure.

Factors positively affect the financial performance of these companies and others have a rather negative effect on financial performance.

The empirical study showed that short term debt ratio is found to have a statistically significant and positive relation to return on asset; while, total debt ratio showed a significant and negative impact on return on asset. Furthermore, the study explored that long term debt ratio and financial leverage do not have any relation to return on asset.

Based on these results, firm should rely on short-term borrowing to raise its performance. Moreover, the firms in Algeria, are also operating under the optimum level of capital structure and due to this poor selection of capital structure, the financial performance of t is adversely affected.

Therefore, some recommendations are proposed for these companies. Firstly, the financial analysts and managers should emphasize on the optimum level of capital structure and efficient utilization and allocation of resources. Secondly, the firms should finance by debts instead of capital increase when require to financial resources, if, internal resources of firm don't provide financial need. Thirdly, the firms should take advantages of tax shield by choosing the optimal capital structure, which balance between the firm's debt and equity.

Further study can be conducted by adding other independent variables. Data of long time series may also be used for reliability of results. Future research can be conducted by comparing the capital structure and firm performance of small and large firms, Moreover, future research should consider firm performance measured by market indicators besides accounting ones.

Endnotes:

1- ***Oyedokun, G. E., Job-Olatuji, K. A. and Sanyaolu, W. A. (2018)****,Capital Structure and Firm Financial Performance, Accounting & Taxation Review, Vol. 2, no. 1, pp 56-71.*

2- ***Akinyomi, O .J. (2013)****, Effect of Capital Structure on Firm Performance: Evidence From Nigerian Manufacturing Industry, International journal of innovation research and studies, vol 2 issue 9,pp 458-480.*

3- ***Nirajini,A. and Priya, K. B.(2013)****, The impact of capital structure on financial performance of the listed trading companies in Sri Lanka, International Journal of Scientific and Research Publications, Volume 3, Issue 5, pp 1- 8.*

4- ***Ajibola, A., Wisdom, O. and Qudus, O.L.(2018)****, Capital Structure and Financial Performance of Listed Manufacturing Firms in Nigeria, Journal of Research in International Business and Management, Vol. 5(1),pp. 81-89.*

5- ***Guangchen, S. (2012)****, How Does Capital Structure Affect Firm Performance? Recent Evidence from Europe Countries, Tilburg University. pp 1-8.*

6- ***Shinta, D., Suhadak,M. and Nuzula, N, F.(2014)****, The Influence of Capital Structure on Profitability and Firm Value, Journal Administration Business (JAB), Vol. 7 No. 2, pp. 1-8*

7- ***Iavorskyi, M. (2013)*** *,The Impact of Capital Structure on Firm Performance: Evidence From Ukraine, MA in Financial Economics, Kyiv School of Economics.*

8- ***El-Chaarani, H. and El-Abiad, Z. (2019).*** *Analysis of Capital Structure and Performance of Banking Sector in Middle East Countries. International Journal of Economics and Financial 9(2),pp . 1-11.*

9- ***Soumadi, M. S, Hayajneh, O.S, .(2008)****, Capital Structure and Corporate Performance Empirical Study on The Public Jordanian Shareholdings Firms Listed in The Amman Stock Market, European Scientific Journal, Vol. 8, No.22, pp 173-189.*

10- ***Al-Taani,K.(2013)****,The Relationship between Capital Structure and Firm Performance: Evidence From Jordan. Journal of Finance and Accounting, 1(3), pp.41-45.*

11- ***Khan, A.G. (2012)****. The Relationship of Capital Structure Decisions with Firm Performance: A Study of the Engineering Sector of Pakistan. International Journal of Accounting and Financial Reporting. Vol. 2, No. 1, pp. 245-262.*

12- ***Mwangi,L.W and Makau,M.S, Kosimbei,G.(2014),*** *Relationship between Capital Structure and Performance of Non-Financial Companies Listed In the Nairobi Securities Exchange Kenya, Global Journal of Contemporary Research in Accounting, Auditing and Business Ethics, Volume: 1 Issue 2.pp 72-90.*

13- ***Nwude, E. C, Anyalechi, K.C,(2018),*** *Impact of Capital Structure on Performance of Commercial Banks in Nigeria, International Journal of Economics and Financial, 8(2), pp298-303.*

14- ***Dang,Y.T.H. and Hong Bui, N.T.(2019)****, The Impact of Capital Structure on Firm Performance – Empirical Evidence from Listed Food and Beverage Companies in Vietnam, International Journal of Economics, Commerce and Management, Vol. VII, pp 567-577.*

15- ***Zeitun, R. and Tian,G.(2007),*** *Capital Structure and Corporate Performance: Evidence from Jordan. The Australasian Accounting Business & Finance Journal, Vol. 1, No. 4. pp.40-61.*

16- ***Norfhadzilahwati, R .and Noriza, S, (2014, march)****, Sustainable Growth of Public Listed Companies Using Capital Structure Choices and Firm Performance in an Asian Market, Proceeding of the Global Summit on Education, Kuala Lumpur, MALAYSIA pp 433-444.*

17- ***Singh,S. and Singh,A. (2018),*** *Study on the Relationship of Firm's Performance with Capital Structure-Evidence from Taiwan, International Journal of Economics and Financial Issues, 8(3), pp 307-314.*

18- ***Alamgir,H. ,Khan,A.A .and Saifullah, M. K.(2019)***, *An Empirical Analysis of Capital Structure and Firm's Financial Performance in a Developing Country, Global Journal of Management and Business Research: Finance. Volume 19 Issue 3,pp. 9-16.*

19- ***Hashim, H. and Hassan,H.H ,(2017).*** *«The Impact of Capital Structure on Financial Performance of Malaysian Public Listed Construction Firms». International Journal of Advanced Research and Publications. Volume 1 Issue 3, pp. 194-206.*

20- ***Siregar .R., Diannisa,Y., Lukytawati,A. and Koes ,P.(2019),*** *Impact of Capital Structure and Firm Financial Performance on Firm Value: Evidence of Agribusiness Firms in Indonesia Stock Exchange , RJOAS, 1(85), pp 445-451.*

21- ***Bokhtiar, Md. H. and Mainul, A. F. M. (2014)***, *Influence of Capital Structure on Firm Performance: Evidence from Bangladesh». International Journal of Business and Management, Vol. 9, No. 5, pp 184-194.*

22- ***Varian, F., et al. (2015)***, *Capital Structure and Corporate Performance: Panel Evidence from Oil and Gas Companies in Malaysia». International Journal of Business Management and Economic Research, Vol 6(6),pp 371-379.*

23- ***Iqbal , J.,et Al, .(2018)*** *,The Impact of Capital Structure on The Financial Performance of firms In Pakistan, Pakistan Journal Of Social Sciences , Vol. 38, No. 2,pp 363-374 .*

24- ***Park, H. M. (2008)***, *Univariate Analysis and Normality Test Using SAS, State, and SPSS. Working paper, Indiana University, Bloomington.*