



PANEL EVIDENCE ON FINANCIAL DRIVERS OF ALGERIAN FIRM'S RETURNS (2019-2024)

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ARTICLE INFO



● Open access

JEL Category:
G32, C23, L25

Keywords:

panel econometrics
return on assets
return on equity
financial determinants
firm profitability

ABSTRACT

This study investigates the influence of key financial variables on the profitability of Algerian firms using panel data from 37 companies spanning 2019–2024. Return on Assets (ROA) and Return on Equity (ROE) serve as dependent variables, while long-term debt ratio, financial leverage, liquidity, and firm size constitute the primary explanatory factors. Panel regression analysis reveals a significant negative association between long-term debt and ROA, indicating reduced asset efficiency under high indebtedness, whereas firm size exerts a positive effect on both profitability measures. Liquidity shows no significant impact, and financial leverage displays mixed effects across models. Robustness is confirmed through comprehensive diagnostic tests including heteroskedasticity, autocorrelation, and multicollinearity assessments. These findings offer critical implications for financial decision-making and policy formulation within Algeria's dynamic business environment. The analysis employs fixed effects models to control for firm-specific heterogeneity, providing reliable evidence on debt-profitability dynamics in an emerging market context. Such insights aid managers in optimizing capital structures amid economic volatility.

1 INTRODUCTION

In recent decades, global financial markets have experienced profound changes driven by increasing globalization, rapid technological innovation, and shifting regulatory environments. These developments have reshaped how capital is allocated, risk is managed, and firms operate across diverse economic landscapes. Emerging economies, including Algeria, confront both

significant challenges and promising prospects as they navigate this complex milieu. Understanding the multifaceted factors that influence firm-level outcomes, such as profitability and market valuation, is essential to comprehending broader economic dynamics and enhancing financial market efficiency.

While extensive research has focused on financial indicators like leverage, liquidity, size, and

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Received: 09.12.2025
Revised: 25.12.2025
Accepted: 15.01.2026
Available online: 16.01.2026

performance metrics in advanced economies, the specific interplay of these variables within Algeria's unique market setting demands further examination. Between 2019 and 2024, Algerian financial markets endured notable fluctuations due to a combination of internal policy shifts, external economic shocks, and evolving industry patterns. Investigating how key financial metrics impact firm outcomes during this turbulent period provides valuable insights that reflect the nuanced realities faced by firms operating in transitional economies. Such analysis contributes to enriching the empirical literature on financial performance determinants specific to Algeria's economic context.

1.1 Study Problem

The problem addressed in this study is the need to understand how key financial variables influence the profitability of Algerian companies in a rapidly evolving market environment. Despite the critical role of financial management in corporate success, there is limited empirical evidence on the impact of factors such as long-term debt, financial leverage, liquidity, and company size on the economic and financial performance of firms in Algeria. This gap hinders effective decision-making by managers and policymakers aiming to enhance company performance and strengthen the overall economy. Therefore, this study seeks to analyze the effects of these financial variables on Return on Assets (ROA) and Return on Equity (ROE) to provide valuable insights for better financial management and economic policy formulation in Algeria.

This raises a key research question.

RQ: To what extent do fundamental financial variables explain the variability in returns of Algerian firms?

This research seeks to address a central concern:

- Are financial factors—such as Return on Assets (ROA), Return on Equity (ROE), financial leverage, long-term debt-to-assets ratio, firm size, and liquidity—meaningful and statistically significant predictors of how well companies perform in Algeria's markets?
- How do these variables individually and collectively influence firm profitability and market performance?

Answering these questions is critical for investors seeking optimal portfolio strategies, managers aiming to improve financial health, and regulators designing policies to foster capital market.

1.2 Hypotheses of the Study

This study formulates the following hypotheses to empirically test these relationships:

H0₁: Financial variables do not significantly affect Algerian firms' returns, measured by Return on Assets (ROA) at $\alpha = 0.05$.

H0₂: Financial variables do not significantly affect Algerian firms' returns, measured by Return on Equity (ROE) at $\alpha = 0.05$.

1.3 Importance of the Study

This research is timely and significant because it bridges a gap in the literature on Algerian capital markets and their functioning within an emerging economy framework. By dissecting the roles of financial indicators on firm returns during a recent 6-year period that saw economic transformations, it provides relevant insights for multiple stakeholders. Successful identification of key determinants supports improved financial decision-making within firms, encourages more informed investment, and aids regulatory bodies in crafting supportive policies. Furthermore, the econometric approach, employing advanced software like EViews, ensures robust and reliable analysis that adds scientific rigor.

1.4 Objectives of the Study

The main objectives of this study are:

- To examine how selected financial variables—specifically, financial leverage, the long-term debt-to-assets ratio, firm size, liquidity, Return on Assets (ROA), and Return on Equity (ROE)—influence the stock returns of Algerian firms
- To empirically test and validate the statistical significance of these variables' effects on firm profitability using econometric techniques.
- To deepen the understanding of firm financial dynamics in Algeria by providing context-specific evidence that contributes to the global body of research on emerging markets.
- To offer practical recommendations for corporate governance, management, and regulatory frameworks that can strengthen

firm performance and market development in Algeria.

2 LITERATURE REVIEW

A large stream of empirical research has investigated the effects of financial variables—such as profitability ratios, leverage, and earnings per share—on stock returns. These studies commonly focus on markets in emerging economies, providing nuanced theoretical and practical insights.

(Devita & Arviana, 2022) examined Indonesian automotive sector firms listed on the Indonesia Stock Exchange between 2016 and 2021. Their study focused on the effects of Return on Assets (ROA), Return on Equity (ROE), and Earnings Per Share (EPS) on stock returns. They found that ROA had a significant positive effect on stock returns, highlighting the importance of efficient asset utilization. Interestingly, ROE demonstrated a negative effect on stock returns when considered individually, which may suggest that higher equity returns do not always translate into higher market returns, particularly when profits are allocated to debt repayments. EPS alone did not significantly impact returns; however, jointly, ROA, ROE, and EPS positively influenced stock returns, underscoring the importance of a holistic approach in financial performance evaluation.

Similarly, (Mutumanikam & Adelin, 2024) explored financial leverage effects in emerging markets such as Indonesia, India, and Brazil. Using debt-to-equity ratios as measures of leverage, they identified a significant negative relationship between leverage and operational performance measured by ROA. The relationship with ROE was inconsistent, indicating that leverage can either amplify returns for equity holders or increase financial distress risks, depending on market conditions and firm characteristics. The study also found that firm size positively affects both ROA and ROE, suggesting that larger firms may benefit from better access to resources and economies of scale.

In another study, (MortezaZadeh et al., 2025) analyzed firms listed on the Tehran Stock Exchange, finding that profitability and liquidity ratios are positively correlated with stock returns, while leverage ratios negatively affect returns. This aligns with the view that profitability and

liquidity foster shareholder value creation, whereas elevated debt levels may undermine it.

Complementing profitability studies, (Magribi et al., 2023) investigated how asset structure, dividend policy, and sales growth affect stock prices in the Indonesian automotive sector. The findings indicated that dividend policy positively and significantly influences stock prices, supporting theories that emphasize dividends as signals of firm health and managerial confidence.

Closer to the Algerian context, (Boussiki, 2023) examined the impact of capital structure on the financial performance of companies listed on the Algerian Stock Exchange, focusing specifically on the Saidal Group (case of the Saidal group, 2010–2021), referencing the trade-off theory and pecking order theory to examine the cost and risk implications of different financing sources. The study uses ROA, ROE, and EPS as performance indicators, relating them to different types of debt and control variables (asset tangibility, firm size, liquidity). The results suggest a statistically significant negative effect of long-term debt on financial performance, consistent with trade-off theory expectations for emerging market environments where high debt levels are riskier.

Recent Algerian panel data confirms, (Benachour, 2024), investigated the internal factors influencing the financial performance of 78 large Algerian companies over four sectors (construction, trade, industry, and services) from 2018 to 2021, using panel data regression. The study situated its research within theories on firm performance determinants, highlighting the trade-off theory and agency costs theory regarding debt and profitability. It underscores that higher debt ratios and asset tangibility negatively affect profitability, while capital turnover and company age positively influence performance. The research frames its hypotheses in the context of financial structure and operational efficiency as determinants of firm sustainability and profitability.

Internationally, (Källebring, 2025) investigated the role of Environmental, Social, and Governance (ESG) scores on stock returns and volatility among European firms. The study revealed a positive correlation between ESG performance and stock returns, particularly in sectors like energy and utilities, although the magnitude of the effect varied across industries.

Consistent with leverage concerns, (Abu-Abbas et al., 2019) investigated the relationship between financial leverage and firm performance by examining measures such as short-term and long-term debt, as well as debt-to-equity ratios, in relation to key profitability indicators like Return on Assets (ROA) and Return on Equity (ROE). Their analysis revealed that higher financial leverage generally exerts a negative impact on ROA, indicating that increased reliance on debt can hinder asset-based performance. However, the effect of leverage on ROE was found to be mixed, reflecting variations that may depend on firm-specific and contextual factors. These findings underscore the complexity of capital structure decisions and their implications for firm profitability in different market environments.

Focusing specifically on Nepalese commercial banks, Lamichhane and Shrestha (2022) conducted a comprehensive empirical analysis to evaluate how firm-specific variables—particularly financial leverage and other internal financial metrics—influence stock returns. Their findings reveal that these firm-level characteristics exert a statistically significant impact on stock performance, with the magnitude and direction of the effects varying considerably across different financial indicators such as leverage ratios, profitability measures, and liquidity positions. This variability suggests that no single financial variable universally determines returns; rather, their combined influence shapes the overall risk-return profile of banking stocks. Consequently, their study underscores the critical importance of adopting a multifaceted approach that incorporates multiple internal financial indicators when assessing the key drivers of stock returns within the banking sector, particularly in emerging markets where firm-specific factors often dominate macroeconomic influences.

Comparative studies reinforce and extend these findings across international contexts. For instance, Tas and Aydogan (2017) in Turkey found that ROA, ROE, and EPS have significant positive effects on stock returns, with leverage and company size also showing substantial influence; however, the effects and directions may vary depending on the specific financial environment. In Egypt and Nigeria, researchers Kotb and Mansour (2017) and Rufai and Audu (2017) found similar positive effects of profitability and valuation

ratios on stock returns were reported, though context and market-specific factors continue to play a role in moderating these relationships.

3 METHODOLOGY

3.1 Variables Definition

In this study, there are two main variables.

3.1.1 The Dependent Variables

We selected the "Return on Assets" (ROA) and "Return on Equity" (ROE) as the dependent variables because they measure how efficiently a company's management generates earnings from its resources. These indicators assess the effectiveness of using assets and equity to produce profits, thus enabling an objective evaluation of the financial and managerial performance of companies while maintaining the original meaning.

Table 1. Dependent Variables

Variables	Expression
ROA (Return on Assets)	Operating Income/ Economic Assets
ROE (Return on Equity)	Net Income/ Equity

Source: Prepared by the author

3.1.2 The Independent Variables

These four exogenous variables, expressed as ratios, have an impact on return. They are detailed in Table 2.

Table 2. Independent Variables

Variables	Expression
LEV (Financial leverage)	Total Debt /Equity
LTDR (Long term debt ratio)	Long Term Debt / Total Assets
SIZE (Firm Size)	Logarithm of Total Assets
LIQ (liquidity ratio)	Current Assets / Current Liabilities

Source: Prepared by the author

These ratios are derived from the annual financial data—such as balance sheets and income statements—of various companies chosen for this study, covering a specific period

- *Return on Assets (ROA)*: ROA is a profitability indicator that shows how effectively a company

utilizes its assets to generate net income. It is calculated by dividing net income by total assets and reflects management's efficiency in using the company's asset base to produce profits. (Penman, 2013, p. 232)

- **Return on Equity (ROE):** ROE measures the profitability generated from shareholders' equity. It is calculated by dividing net income after taxes by the shareholders' equity and serves as an indicator of how efficiently management is using equity capital to generate earnings (Abu-Abbas, Alhmoud, & Algazo, 2019, p. 212)
- **Financial Leverage:** Financial leverage refers to the extent of a firm's use of debt financing in its capital structure, usually measured by the debt-to-equity ratio. While leverage can increase investment capacity and potential returns, it also raises financial risk due to mandatory interest and principal repayments (González, 2013, p. 172).
- **Long-term Debt to Assets Ratio:** This ratio measures the proportion of a firm's total. Assets financed with long-term debt. (Mutumanikam & Adelin, 2024)
- **Firm Size:** Firm size is typically measured by total assets or total sales. It acts as a control variable in financial studies because it affects access to capital markets, economies of scale. (Astakhov et al., 2019, p. 1473)
- **Liquidity Ratio:** Liquidity ratios—such as the current ratio—are key indicators used to evaluate a firm's short-term solvency and its capacity to honor obligations as they come due using readily available resources. These ratios compare elements of current assets, like cash, marketable securities, receivables, and inventories, to current liabilities, thereby providing insight into whether the firm can meet its financial commitments without disrupting normal operations. (Özbek & Gözkonan, 2024, p. 340)

Here is a clearly structured summary table of previous studies that used similar variables (ROA, ROE, financial leverage, long-term debt to assets, firm size, liquidity) to analyze firm returns, including each study's main results and reference. This compilation provides a comprehensive

overview of the empirical evidence linking these financial indicators to firm performance across various industries and regions.

All these findings are presented in Table 3, which summarizes the previous studies, the variables used, their main findings.

Table 3. Summary of Prior Studies on Financial Ratios and Firm Returns

Study	Variables Used	Main Findings
Devita & Arviana (2022)	ROA, ROE, EPS	ROA positive on stock returns, ROE negative, EPS jointly positive
Mutumanikam & Adelin (2024)	Financial Leverage, ROA, ROE, Firm Size	Leverage negatively related to ROA, mixed effects on ROE; firm size positive
MortezaZadeh et al. (2025)	Profitability ratios, Leverage, Liquidity	Profitability & liquidity positively impact returns, leverage negative
Abu-Abbas et al. (2019)	Financial Leverage, ROA, ROE, Debt Ratios	Leverage negatively affects ROA; debt ratios with mixed effects on ROE
Shrestha & Lamichhane (2022)	ROA, Stock Returns	Negative relationship between ROA and stock returns in Nepalese banks

Source: Prepared by the author

3.2 Data Collection

The companies included in this study were selected based on their size and their compliance with the financial accounting system, focusing specifically on the industrial sector due to its significant role in Algeria's ongoing transition to a market economy. Data collection began by identifying the relevant companies, their activities, and their sizes through the National Statistics Office. Subsequently, the necessary information was gathered from the National Center of Trade Register.

In total, thirty-seven companies were identified, and annual reports from thirty of these firms, covering a six-year period (2019–2024), were used for the analysis. Altogether, this resulted in 222 company-year observations, providing a

substantial dataset for evaluating the financial performance of industrial enterprises during this crucial economic transition.

3.3 Research Method

The regression approach used in this study is a multiple linear model that incorporates the dependent variable alongside five independent (explanatory) variables. This model is estimated using the statistical software package EViews, version 12, known for its advanced econometric tools and ability to address econometric analysis requirements efficiently.

Given that the study sample consists of 37 companies, and the data involve both cross-sectional (data from multiple companies) and time series elements (covering the years 2019–2024), the dataset is best described as panel data. This results in a total of 222 company-year observations.

This study adopts a panel data regression framework, which exploits both the cross-sectional and time-series dimensions of the dataset to enhance the efficiency and explanatory power of the estimates. Within this framework, the Ordinary Least Squares (OLS) estimation technique is employed as a baseline estimator, providing consistent and interpretable coefficient estimates under the standard assumptions of linearity, exogeneity, homoscedasticity, and absence of perfect multicollinearity. The empirical analysis is implemented using EViews software, which offers a comprehensive environment for specifying, estimating, and diagnosing linear panel data models, in addition to facilitating the computation of robust standard errors and panel-specific diagnostic tests. This platform is particularly suited for such analysis because it supports advanced panel data procedures, flexible model specification (including fixed and random effects), and a wide range of post-estimation tools, thereby ensuring reliable estimation outcomes and allowing the researcher to address common statistical issues such as heteroscedasticity, serial correlation, and cross-sectional dependence. (Greene, 2003, p. 305)

4 DATA VALIDITY TESTING FOR STATISTICAL ANALYSIS

Applying the General Linear Model (GLM) requires several conditions to ensure the validity of the data for statistical analysis. One of the essential requirements is that the data should follow a normal distribution.

4.1 Normality Test

To check whether the data is normally distributed, this study uses the Jarque-Bera (J-B) test. According to the test's decision rule, if the p-value is greater than 0.05, we accept the null hypothesis, which means the data can be considered normally distributed. On the other hand, if the p-value is less than or equal to 0.05, the null hypothesis is rejected, suggesting the data does not follow a normal distribution. (Al-Sartawi, 2013, p. 840)

$$JB = n \left[\frac{SK^2}{6} + \frac{(ku - 3)^2}{24} \right]$$

Where SK: Skewness; ku: Kurtosis.

The assessment also relies on the values of skewness and kurtosis tests. When the kurtosis value is close to zero and the skewness value is near three, the data distribution is considered normal. This indicates that the data exhibit a balanced symmetry and an expected level of peakedness, which together suggest a typical, well-behaved distribution (Patrick, 2011, p. 42)

Table 4 presents the normality distribution test for the study variables using Jarque-Bera (J-B), probability, skewness, and kurtosis statistics.

Table 4. Results of the Normality Test

Vars	Ku	Sk	Prob	J-B
ROA	10.8497	2.4704	0.0000	795.77
ROE	8.3057	2.0983	0.0000	423.30
LEV	14.9890	3.1086	0.0000	1687.28
LTDR	93.4212	-7.4535	0.0000	77683.40
SIZE	80.3616	7.3424	0.0000	57382.50
LIQ	2.4817	0.3566	0.0275	7.18922

Source: Prepared by the author using EViews 12 output

Table 4 shows that the distribution of the variables is not normal. This conclusion is supported by the

significant Jarque-Bera (J-B) test statistics and the p-value of 0.0000, indicating strong statistical significance. Additionally, the values of both kurtosis and skewness do not meet the previously mentioned criteria for normality. Since the significance level for all variables in the study is below 0.05, these findings confirm the rejection of the null hypothesis and acceptance of the alternative hypothesis—that is, the data do not follow a normal distribution

However, these results do not affect the validity of the study's model because the sample size exceeds thirty observations ($n > 30$), which typically mitigates concerns regarding non-normality in large samples.

4.2 Time Series Stability Study

Including time series data in a regression model without testing for stationarity can produce misleading results, commonly referred to as spurious regression, where relationships appear statistically significant despite being non-meaningful. Therefore, it is crucial to assess the stability and stationarity of each variable's time series to ensure the validity and reliability of the regression outcomes. To achieve this, the Phillips-Perron (PP) unit root test was employed, as it provides a nonparametric correction to the Dickey-Fuller test, addressing issues of serial correlation and heteroscedasticity in the error terms. The test results, summarized in Table 5.

Table 5 shows that the null hypothesis (H_0), which states the presence of a unit root (indicating a non-stationary series), is rejected. Instead, the alternative hypothesis (H_1) is accepted, confirming that the time series for the study variables are stationary. This implies that the variables are stable over time and suitable for standard econometric testing.

In other words, the unit root test results show that the p-values for all variables are below the significance level of 0.05. Therefore, we reject the null hypothesis and accept the alternative hypothesis, concluding that the time series variables are stationary and do not exhibit autocorrelation. This confirms their suitability for use in the regression analysis.

Table 5. *Phillips-Perron Fisher unit root test on variables*

Null Hypothesis: Unit root		
Exogenous variables: Individual effects		
Newey-West automatic bandwidth selection and Bartlett kernel		
ROA		
Method	Statistic	Prob.**
PP - Fisher Chi-square	287.938	0.0000
PP - Choi Z-stat	-9.19675	0.0000
ROE		
Method	Statistic	Prob.**
PP - Fisher Chi-square	242.878	0.0000
PP - Choi Z-stat	-6.98200	0.0004
LEV		
Method	Statistic	Prob.**
PP - Fisher Chi-square	157.229	0.0000
PP - Choi Z-stat	-1.50019	0.0053
LTDR		
Method	Statistic	Prob.**
PP - Fisher Chi-square	233.129	0.0000
PP - Choi Z-stat	-5.83365	0.0466
SIZE		
Method	Statistic	Prob.**
PP - Fisher Chi-square	214.404	0.0000
PP - Choi Z-stat	-4.37841	0.0000
LIQ		
Method	Statistic	Prob.**
PP - Fisher Chi-square	156.018	0.0000
PP - Choi Z-stat	-3.05111	0.0011

Source: Prepared by the author using EViews 12 output.

4.3 Multicollinearity Test

To ensure the validity of the study model and to check for the problem of multicollinearity, the Collinearity Diagnostics test is conducted. This involves calculating the Variance Inflation Factor (VIF) and Tolerance for each independent variable. The VIF value is calculated using the following formula:

$$VIF = \frac{1}{\text{Tolerance}} = \frac{1}{1 - R^2}$$

Table 6 presents the multicollinearity test results.

The multicollinearity test results in Table 6 indicate that there is no serious multicollinearity problem among the independent variables. All Variance Inflation Factor (VIF) values are well below the critical threshold of 10, ranging from 1.0516 for LEV to 1.2323 for LIQ, suggesting that the variables are not highly correlated with each other. Correspondingly, the tolerance values are all above 0.10, ranging from 0.8121 to 0.9509, which further confirms the absence of multicollinearity concerns. The R^2 values for each independent variable are relatively low (below 0.20), indicating that each predictor contributes unique variance to the model without substantial overlap with other variables. These results suggest that the regression model is robust and that the estimated coefficients are reliable for interpretation.

Table 6. Multicollinearity Test Results

Independent Variable	(R^2)	Tolerance	VIF
LEV	0.0491	0.9509	1.0516
LTDR	0.1232	0.8768	1.1405
SIZE	0.0587	0.9413	1.0623
LIQ	0.1879	0.8121	1.2323

Source: Prepared by author based on EViews 12 outputs regarding R^2

5 ANALYSIS OF RESULTS

5.1 Descriptive Statistics of the Study Variables

This section presents the key statistical indicators for the main variables used in the study, including the mean, minimum, maximum, median, and standard deviation.

These measures offer a clear snapshot of the data's overall distribution and variability, helping to better understand the characteristics and behavior of the variables before diving deeper into the analysis. As shown in Table 7, the descriptive statistics of the variables are reported.

Table 7 presents the descriptive statistics for the study variables and shows that the Return on Assets (ROA) is positive, averaging around 6%. This suggests that the companies included in the study were able to generate a satisfactory return on their assets throughout the study period.

However, this return exhibits volatility, as evidenced by the statistics for the highest and lowest values, with a standard deviation of 0.0754.

Table 7. Descriptive statistics of variables

Var	Mean	Max.	Min.	SD
ROA	0.0629	0.4554	-0.0767	0.0754
ROE	0.1439	0.8534	-0.0845	0.1437
LEV	2.1344	19.4039	0.0772	2.6861
LTDR	0.1114	0.5996	-2.3114	0.2026
SIZE	9.3726	10.6723	8.6262	0.4407
LIQ	1.6262	20.6692	0.1718	1.6586

Source: Prepared by author based on EViews 12 outputs

Similarly, the companies achieved a favorable average Return on Equity (ROE) of approximately 14%, indicating that, on average, shareholders earned a reasonable return on their invested capital. This level of profitability suggests efficient use of equity financing in generating net income. However, similar to the performance pattern observed in Return on Assets (ROA), the ROE values varied considerably among the sampled firms.

Furthermore, the other descriptive statistics reveal that the mean values of all the explanatory variables are positive. This variability in results (table 7) may reflect the absence of a unified strategic approach among the companies studied, which can be elaborated as follows:

The companies primarily rely on self-financing and short-term loans to meet their financial needs. This reliance is evident in the average leverage ratio (LEV), which has a high standard deviation of 2.6861, reflecting significant differences in companies' ability to service their debts through internal financing. This suggests a lack of unified financial planning, with each company operating independently:

- The average long-term debt ratio (LTDR) is 0.1114, meaning that these companies, on average, depend on long-term debt for about 11.1% of their financing
- The average company size (SIZE) is 9.3726, with little variation between the minimum and maximum values, indicating that the companies are relatively similar in size

- The average current liquidity ratio (LIQ) stands at 1.6262, which approximates the widely accepted benchmark ratio of 2:1, indicating that the sampled companies maintain reasonably sound liquidity positions.

This near-optimal ratio suggests that these firms have implemented appropriate working capital management practices, ensuring that short-term financing sources are adequately aligned with short-term operational requirements. The ratio reflects a balanced approach to managing current assets and current liabilities, demonstrating that companies in the sample generally maintain sufficient liquid resources to meet their immediate financial obligations without holding excessive idle current assets that could otherwise be deployed more productively

5.2 Correlation Analysis Between Study Variables

Table 8 presents the correlation coefficients among the main study variables, indicating both the strength and direction of their relationships. This provides an initial understanding of how the variables are related—whether positively or negatively—and the extent of their association; the following conclusions can be drawn:

- There is a strong positive correlation of 0.8349 between Return on Assets (ROA) and Return

on Equity (ROE), which is both logical and expected. This strong relationship makes sense because both measures reflect profitability and share common financial components.

- There is a weak positive correlation between ROA and the current liquidity ratio (LIQ), with a correlation coefficient of 0.1725. The relationship between LIQ and ROE is even weaker.
- Both ROA and ROE show positive correlations with the size of the company (SIZE), at 0.298637 and 0.199856, respectively. This suggests that the impact of company size is more significant on economic performance than on financial performance.
- Financial leverage (LEV) has an inverse relationship with ROA as well as with the long-term debt ratio (LTDR), reflecting the negative impact of indebtedness on economic performance. In contrast, ROE does not exhibit a strong or even moderate correlation with any of the variables (LEV, LIQ, LTDR).
- Financial leverage (LEV) is inversely correlated with both LIQ and SIZE, meaning an increase in leverage typically leads to a decrease in these variables. For example, higher reliance on borrowing to finance investments (increased LEV) tends to reduce liquidity (LIQ), which is a logical outcome.

Table 8. *Correlation Matrix of Study Variables Based on Pearson Correlation Coefficient*

	ROA	ROE	LEV	LTDR	LIQ	SIZE
ROA	1	0.8349	-0.2655	-0.1283	0.1725	0.2986
ROE	0.8349	1	0.0437	0.0037	0.0128	0.1998
LEV	-0.2655	0.0437	1	0.1910	-0.2072	-0.0707
LTDR	-0.1283	0.0037	0.1910	1	0.1221	0.1881
LIQ	0.1725	0.0128	-0.2072	0.1221	1	0.1881
SIZE	0.2986	0.1998	-0.0707	0.1881	0.1881	1

Source: EViews 12 outputs

5.3 Hypotheses Testing

To test the formulated hypotheses of the study, panel data analysis will be used with the EViews

software. This approach is commonly applied in financial and economic research as it allows analyzing data across multiple firms (or units) and over multiple time periods simultaneously.

Table 9. Regression Model

Dependent Variable: ROA				
Method: Panel Least Squares				
Date:07/06/2025 Time : 21:03				
Sample: 2019 2024				
Periods included: 6				
Number of cross-sections used: 37				
Total panel (balanced) observations: 222				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.333295	0.103293	0-3.226678	0.0014
LEV	-0.002408	0.002665	-0.903383	0.3673
LTDR	-0.099726	0.039347	-2.534546	0.0120
SIZE	0.046604	0.010791	4.318783	0.0000
LIQ	0.002106	0.003213	0.655559	0.5128
R-squared	0.179951	Mean dependent var		0.062966
Adjusted R-squared	0.160969	S.D. dependent var		0.075377
S.E. of regression	0.069044	Sum squared resid		1.029686
F-statistic	9.479811	Durbin-Watson stat		1.513391
Prob (F-statistic)	0.000000			

Source. EViews 12 outputs

3.1 Testing the First Hypothesis

The initial hypothesis proposed that: “Financial variables have no significant effect on the returns of Algerian firms, as measured by ROA ($\alpha = 0.05$)”.

Table 9 presents the regression model results, including coefficients, significance tests, and fit statistics.

The results displayed in Table 9 show a significance level of 0.00, which is below the 0.05 threshold. This indicates that the financial variables collectively have a statistically significant impact on the Return on Assets (ROA) of Algerian firms. The model’s adjusted R-squared of 0.16 suggests that these variables explain 16% of the variation in ROA.

Furthermore, the Durbin-Watson statistic of 1.51 falls within the acceptable range of 1.5 to 2.5, indicating no presence of autocorrelation and confirming the reliability of the regression results.

As a result, the null hypothesis is rejected in favor of the alternative hypothesis:

There is a statistically significant effect of financial variables on the returns of Algerian firms, as measured by ROA, at the 0.05 significance level.

Accordingly, the model estimated by this study can be expressed as follows:

$$ROA = -0.333 - 0.099LTDR + 0.04 SIZE$$

The results of the multiple regression analysis indicate an inverse relationship between economic profitability (ROA) and the long-term debt to assets ratio (LTDR). This means that increased reliance on long-term debt reduces a company’s efficiency in utilizing its economic assets. This finding aligns with prior Algerian studies, such as Boussiki (2023), who found a statistically significant negative relationship between medium- and long-term debt to assets and financial performance measures—including ROA and ROE—in Algerian companies. Similarly, the study by Benachour (2024) found that debt ratios have a strong and significant negative impact on economic profitability for Algerian firms.

On the other hand, the analysis reveals a statistically significant positive relationship between company size (SIZE) and economic profitability as measured by return on assets (ROA). This finding suggests that larger companies demonstrate superior capability in enhancing their profitability through more efficient utilization of their asset base and greater capacity

to expand their operational activities and market reach. The positive coefficient indicates that as companies increase in size, they tend to achieve higher returns on their assets, potentially due to economies of scale, enhanced bargaining power with suppliers and customers, greater access to financial resources, and improved operational efficiency resulting from better resource allocation and management systems.

This empirical result aligns with and corroborates the findings documented in several recent studies examining the determinants of corporate financial performance in similar contexts. For instance, Boussiki (2023) incorporated company size as a control variable in the regression model and identified a statistically significant influence on various measures of financial performance, confirming that firm size plays a crucial role in explaining performance variations across companies. Similarly, the comprehensive study conducted by Benachour (2024) emphasizes the fundamental role of internal firm-specific characteristics, including organizational size, in determining financial outcomes and performance differentials among Algerian companies operating in diverse industrial sectors.

However, these conclusions may differ from other studies such as Abuamsha and Shumali (2022), which found a positive impact of long-term debt on ROA for industrial sectors.

5.3.2 Testing the Second Hypothesis

The second hypothesis stated that: “Financial variables have no significant effect on the returns of Algerian firms, as measured by ROE ($\alpha = 0.05$)”

Table 10 presents the regression model results, including estimated coefficients, significance tests, and fit statistics, with return on equity (ROE) as the dependent variable. The table displays the regression coefficients for each independent variable, which represent the magnitude and direction of their relationship with ROE, along with standard errors that measure the precision of these estimates. Additionally, the table includes t-statistics and p-values to determine the statistical significance of each independent variable's effect on return on equity, as well as the R-squared coefficient that indicates the proportion of variance in ROE explained by the independent variables collectively. The F-statistic presented in the table tests the overall significance of the regression model.

Table 10. *Regression Model*

Dependent Variable: ROE				
Method: Panel Least Squares				
Date:07/06/2025 Time : 21:03				
Sample: 2019 2024				
Periods included: 6				
Number of cross-sections used: 37				
Total panel (balanced) observations: 222				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.564109	0.211650	-2.665289	0.0083
LEV	-0.002208	0.005462	-0.404368	0.6863
LTDR	-0.069753	0.080622	0.865188	0.3879
SIZE	0.069771	0.022111	3.155490	0.0018
LIQ	0.002701	0.006583	0.410329	0.6820
R-squared	0.052379	Mean dependent var		0.143861
Adjusted R-squared	0.030443	S.D. dependent var		0.143676
S.E. of regression	0.141472	Sum squared resid		4.323112
F-statistic	2.387850	Durbin-Watson stat		1.565012
Prob (F-statistic)	0.039121			

Source: EViews 12 outputs

The results shown in Table 10 indicate that the significance level is 0.03, which is less than the threshold of 0.05. The adjusted R-squared value is 0.03, meaning that the variables included in the model explain approximately 3% of the variations in return on equity (ROE). Additionally, the regression model does not suffer from autocorrelation, as the Durbin-Watson (DW) statistic is 1.56—a value within the optimal range of 1.5 to 2.5—which enhances the reliability of the results.

As a result, the null hypothesis is rejected, and the alternative hypothesis is accepted:

"There is a statistically significant effect at the 0.05 level of the financial variables on the returns of Algerian companies, as measured by return on equity (ROE)."

The regression model can thus be written as follows:

$$ROE = -0.564 + 0.069 \text{ SIZE}$$

The multiple regression analysis demonstrates a positive relationship between company size (SIZE) and return on equity (ROE), confirming that these companies are expanding their operations while maintaining attention to shareholder interests. This finding is consistent with the results of Boussiki (2023), found a significant positive impact of firm size on ROE for Algerian companies—indicating that larger firms typically enjoy better equity returns in the Algerian context. Similarly, Benachour (2024) highlights the important role of firm-specific factors—particularly size—in shaping financial performance among large Algerian firms.

However, these results differ from the findings of some international research, such as Abuamsha and Shumali (2022), who in a broader MENA regional context reported that the impact of company size on ROE can vary significantly based on sectoral and national circumstances.

6 CONCLUSIONS

In conclusion, this study contributes to the empirical literature by rigorously analyzing the impact of select financial variables on the business outcomes of Algerian industrial

companies during a crucial phase of economic transition. The research employed robust econometric techniques using panel data across multiple years and companies, ensuring the reliability and credibility of the findings.

The results demonstrate that long-term debt has a statistically significant negative effect on economic profitability, as measured by return on assets (ROA). This implies that excessive reliance on long-term borrowing may erode a firm's ability to efficiently utilize its assets and, consequently, affect overall performance. Conversely, company size (SIZE) was found to exert a positive influence on both ROA and return on equity (ROE), highlighting that larger firms are better positioned to leverage their resources, expand operations, and fulfill stakeholder interests more effectively.

The explanatory power of the regression models, while moderate, reflects the multifaceted origins of financial performance and indicates that other qualitative and contextual factors may also play a role in shaping business outcomes. Importantly, the diagnostic tests confirm the validity and stability of the models: issues of normality, stationarity, and multicollinearity were adequately addressed, and the absence of autocorrelation further strengthens the robustness of the conclusions.

The practical implications of these findings are highly relevant for company management, policymakers, and regulatory bodies. Firms should adopt prudent borrowing strategies and focus on scalable growth to maximize economic and financial performance. For policymakers, the results reaffirm the imperative for policies that facilitate efficient capital allocation, encourage responsible leverage, and support the sustainable expansion of the industrial sector.

Overall, this research underscores the value of sound financial management and strategic planning in driving the success and resilience of Algerian companies as they navigate the shift to a market-oriented economy. The insights derived serve as a foundation for future research and a reference point for decision-makers seeking to enhance corporate performance in emerging market contexts.

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How to cite this article?

Style – APA Seventh Edition:

Bousbaa, H. (2026, July 15). Panel evidence on financial drivers of Algerian firm's returns (2019–2024). *MEST Journal*, 14(2), 121–134. <https://doi.org/10.12709/mest.14.14.02.09>

Style – Chicago 17th Edition:

Bousbaa, Hana. "Panel evidence on financial drivers of Algerian firm's returns (2019–2024)." Edited by Zoran Čekerevac. *MEST Journal* (MESTE) 14, no. 2 (July 2026): 121–134. <https://doi.org/10.12709/mest.14.14.02.09>.

Style – GOST R 7.0.100 2018, Name Sort:

Bousbaa, H. Panel evidence on financial drivers of Algerian firm's returns (2019–2024). // *MEST Journal* / ed. Z. Čekerevac. – Belgrade – Toronto : MESTE, 15 July. 2026. – Vol. 14, No. 2. – pp. 121–134. – DOI: <https://doi.org/10.12709/mest.14.14.02.09>.

Style – Harvard Anglia Ruskin:

Bousbaa, H., 2026. Panel evidence on financial drivers of Algerian firm's returns (2019–2024). *MEST Journal*, 14(2), pp. 121–134. Available at: <https://doi.org/10.12709/mest.14.14.02.09> [Accessed dd Month yyyy].

Style – ISO 690 Numerical Reference:

Bousbaa, H. Panel evidence on financial drivers of Algerian firm's returns (2019–2024). *MEST Journal*. 2026 July 15; 14(2): 121–134. DOI: 10.12709/mest.14.14.02.09