

Leverage And Profitability Dynamics: An Empirical Study of Energy Sector Companies Listed on Tadawul in Saudi Arabia

Mona Ahmed Basali¹, Ruby Khan Mohammed²
^{1,2}Department of Accounting and Finance, College of Business,
Jazan University, Kingdom of Saudi Arabia

ديناميكيات الرافعة المالية والربحية: دراسة تجريبية لشركات قطاع الطاقة المدرجة في تداول في المملكة العربية السعودية

منى أحمد بصلي¹، روبي خان محمد²
^{1,2}قسم المحاسبة والمالية، كلية الأعمال، جامعة جازان، المملكة العربية السعودية

	DOI https://doi.org/10.37575/h/edu/22002	RECEIVED الاستلام 2024/11/06	Edit التعديل 2025/01/17	ACCEPTED القبول 2025/01/27
	NO. OF PAGES عدد الصفحات 16	YEAR سنة العدد 2025	VOLUME رقم المجلد 3	ISSUE رقم العدد 13

Abstract:

This study examines the impact of leverage on the profitability of energy sector companies listed on the Tadawul Stock Exchange in Saudi Arabia from 2019 to 2023. Using quarterly data and panel regression analysis, the study focuses on Return on Assets (ROA) and Return on Equity (ROE) as profitability measures, with leverage as the independent variable, and firm size and GDP growth as control variables. The findings show that while leverage does not significantly affect ROA, it has a significant negative impact on ROE, suggesting higher debt levels strain equity returns. The study also finds that GDP growth positively impacts ROA but not ROE, while firm size has no significant effect on profitability. This is one of the few studies that looks at how leverage affects the profitable energy business in Saudi Arabia.

Keywords: Leverage, Profitability, ROA (Return on Assets), ROE (Return on Equity), Energy sector.

الملخص:

تبحث هذه الدراسة تأثير الرافعة المالية على ربحية شركات قطاع الطاقة المدرجة في سوق تداول في المملكة العربية السعودية خلال الفترة من 2019 إلى 2023. باستخدام بيانات ربع سنوية وتحليل الانحدار، تركز الدراسة على العائد على الأصول (ROA) والعائد على حقوق الملكية (ROE) كمقاييس للربحية، مع اعتبار الرافعة المالية كمتغير مستقل، وحجم الشركة ونمو الناتج المحلي الإجمالي كمتغيرات ضابطة. تظهر النتائج أن الرافعة المالية لا تؤثر بشكل كبير على العائد على الأصول، ولكنها تؤثر بشكل سلبي كبير على العائد على حقوق الملكية، مما يشير إلى أن مستويات الدين العالية تؤثر سلباً على عوائد حقوق الملكية. كما تكشف الدراسة أن نمو الناتج المحلي الإجمالي يؤثر إيجابياً على العائد على الأصول لكنه لا يؤثر على العائد على حقوق الملكية، بينما لا يؤثر حجم الشركة بشكل كبير على الربحية. تُعد هذه الدراسة من بين الدراسات القليلة التي تبحث في كيفية تأثير الرافعة المالية على ربحية قطاع الطاقة في المملكة العربية السعودية.

الكلمات المفتاحية: الرافعة المالية، الربحية، العائد على الأصول، العائد على حقوق الملكية، قطاع الطاقة.

1. Introduction

The energy sector of Saudi Arabia, especially its petroleum and natural gas industries, is crucial to the global energy market and greatly impacts the nation's economic performance (Waheed et al., 2023). The oil and gas sector in Saudi Arabia, represented by firms listed on Tadawul, is pivotal to the country's economic framework, generating a significant portion of government revenue and contributing to the overall GDP (Al Rasasi et al., 2019). Due to the capital-intensive characteristics of the energy sector, companies in this area frequently depend significantly on leverage to fund their operations and expansions (Huynh et al., 2022).

Leverage, characterized as the utilization of debt to obtain assets, can significantly impact a company's profitability (Modigliani & Miller, 1958). When executed well, this technique can enhance capital returns and stimulate growth objectives. Excessive leverage can elevate financial risk, augment interest payments, and constrain profitability, consequently jeopardizing long-term sustainability and shareholder value. The correlation between leverage and profitability is a critical element of study in corporate finance, offering insights into how companies might enhance their capital structure to maximize shareholder returns (Al-Tally, 2014). Profitability ratios, including return on assets (ROA) and return on equity (ROE), are frequently employed to evaluate the financial performance of companies (Ali & Faisal, 2020).

Financial leverage, often measured as the ratio of total debt to equity or total assets, indicates the extent to which a company uses borrowed funds to finance its operations. Greater leverage may increase potential shareholder returns, but also increase financial risk. The seminal work of Modigliani and Miller established the basic principle that the value of a company, under certain market conditions, is not affected by its capital structure. However, when market imperfections, such as taxes, bankruptcy costs, and agency costs,

are taken into account, the relationship between leverage and profitability becomes more complex. (Modigliani & Miller, 1958).

This study seeks to examine the influence of leverage on the profitability of energy sector firms listed on Tadawul in Saudi Arabia. Specifically, the study aims to analyze the impact of leverage, as measured by the debt-to-equity ratio, on profitability ratios such as ROA and ROE. It investigates quarterly fluctuations in leverage and profitability from 2019 to 2023 and finally identifies trends and patterns in leverage and profitability ratios, providing insights into the financial health and operational efficiency of the energy sector. The emphasis on the energy industry is particularly pertinent due to its strategic significance to the Saudi economy and its susceptibility to global oil price volatility, which can substantially impact the financial performance of companies within the sector (Almutairi et al., 2024).

This paper examines not only the direct correlation between leverage and profitability but also the impact of external factors, including economic growth (as indicated by GDP growth) and firm-specific attributes (such as firm size), that may affect this relationship. The incorporation of these control variables facilitates a more rigorous analysis, enabling a deeper comprehension of the impact of leverage on profitability within the Saudi oil sector. This study explores the relationship between leverage and profitability and structures the paper as follows: The next section reviews prior literature and identifies key research gaps. The methodology section describes the data collection process, defines variables, and explains analytical techniques. The results and discussion section analyzes the findings in light of the study's hypotheses. Finally, the conclusion highlights the study's contributions, practical implications, and future research directions.

By the outcome of this study, we expect to find out if increased leverage contributes to enhanced

profitability by increasing returns on equity or if it induces financial distress, thus diminishing overall profitability. This analysis will yield significant insights for business managers, investors, and regulators engaged with or susceptible to the financial decisions of the energy sector in Saudi Arabia (Bagais & Aljaaidi, 2020).

2. Scientific and Practical Importance of the Research

This study addresses a significant gap in comprehending the distinct financial dynamics between leverage and profitability within Saudi Arabia's energy sector. It enhances the literature by exploring a capital-intensive industry of strategic economic significance. The findings provide important support for governments, financial managers, and investors to make rational choices that increase profitability while reducing financial risks, in accordance with the nation's sustainable development objectives.

3. Literature Review and Hypothesis Development

This study builds on the growing body of empirical research investigating the relationship between leverage and profitability, particularly in capital-intensive industries such as the energy sector. The relationship between leverage and profitability remains complex, influenced by factors like market conditions, regulatory frameworks, and industry-specific risks. Previous studies have employed diverse methodologies, including panel data regression, logistic regression, and dynamic models, to explore this connection.

Rajan and Zingales (1995) provided a foundational analysis of capital structure, highlighting the adverse impact of leverage on profitability in capital-intensive industries. Similarly, Abor (2005) explored this relationship in Ghana, revealing that while short-term debt positively impacts ROE, long-term debt has a negative effect, emphasizing

the nuanced role of leverage in financial performance. These findings are echoed by Zaitoun and Alqudah (2020), who observed that financial leverage negatively impacts profitability (ROA) in Jordanian industrial firms.

Several studies have examined sector-specific dynamics. Wieczorek-Kosmala et al. (2021) focused on Central European energy firms, finding an inverse relationship between leverage and profitability. Ali and Shaik (2022) analyzed Saudi Arabian oil companies, demonstrating the negative impact of debt financing on ROA and ROE, even when controlling for business size. Similarly, Salsabilla et al. (2024) investigated energy firms in Indonesia, identifying significant effects of leverage moderated by investment opportunities (Salsabilla et al., 2024). These studies underline the unique challenges faced by capital-intensive sectors like energy, where high leverage often correlates with heightened financial risks.

Expanding the scope, Jihadi et al. (2021) linked leverage, liquidity, and profitability to firm value, with CSR (corporate social responsibility) acting as a moderating variable, emphasizing the broader implications of financial ratios on business performance. Senan et al. (2021) analyzed Indian firms, showing that financial leverage significantly interacts with profitability metrics like ROA and ROE. Additionally, Shaika and Sharma (2021) examined Saudi banks, finding a positive correlation between leverage (measured by TDR and Tier 1 Capital Ratio) and profitability metrics like ROA and ROE, but an insignificant impact on EPS.

Leverage also plays a critical role in financial distress and earnings management. Dwiantari and Artini (2021) observed that leverage increases financial distress in Indonesian real estate firms, while profitability reduces it. Kalbuana et al. (2022) explored leverage's influence on earnings management, finding no significant effect, while profitability positively impacted earnings

management, reflecting divergent dynamics across industries.

Markonah et al. (2020) evaluated the effects of profitability (ROA), leverage, and liquidity on corporate value within food and beverage manufacturing firms listed on the Jakarta Stock Exchange. The study utilized panel data regression analysis with a fixed effects model. The F test results demonstrate that ROA, leverage, and liquidity significantly affect company value. ROA and leverage strongly impact corporate value, although liquidity does not (Markonah et al., 2020). Despite the extensive literature, most studies focus on general industries or developed markets, with limited attention to capital-intensive sectors like energy, particularly in emerging markets such as Saudi Arabia. Additionally, many studies fail to distinguish between key profitability parameters like ROA (asset efficiency) and ROE (shareholder returns), which can yield divergent results under varying leverage conditions. This study addresses these gaps by examining the unique impacts of leverage on ROA and ROE in Saudi Arabia's energy sector, providing sector-specific insights for an emerging market context.

H1: Leverage Negatively Affects Profitability:

Prior studies (e.g., Rajan & Zingales, 1995; Ali & Shaik, 2022) have consistently shown that leverage negatively impacts profitability, particularly in capital-intensive sectors, due to increased financial risk and higher interest obligations. However, these findings often generalize across industries, overlooking the unique dynamics of energy companies in emerging markets. To address this gap, the first hypothesis examines the relationship between leverage and profitability in Saudi Arabia's energy sector.

H2: Leverage Affects ROA and ROE Differently:

Existing research highlights distinct roles for ROA and ROE as profitability metrics, with ROA reflecting asset efficiency and ROE indicating

shareholder returns (Abor, 2005; Senan et al., 2021). However, the differential impact of leverage on these metrics has not been adequately explored, particularly in energy firms with high capital intensity. The second hypothesis investigates this relationship to provide sector-specific insights.

4. Research Design

4.1. Sample and Data Collection

The sample of this research focuses on the energy sector in Saudi Arabia from 2019 to 2023 (see Appendices 1-6). The energy industry was selected because it is essential to Saudi Arabia's economy. Understanding the association between financial performance, leverage, and economic factors in this sector will enable us to understand how these companies are adapting to a changing macroeconomic landscape.

The manual data collection was obtained from the quarterly financial statements of energy companies that were listed on the Tadawul stock exchange. Using the given financial data, financial ratios were computed, including leverage, profitability metrics both ROA and ROE. Furthermore, GDP growth rates were obtained from Trading Economics to function as a macro-control variable.

Six energy businesses registered on the Tadawul stock exchange made up the first dataset, which included 120 observations in total. However, 84 observations were kept for the study after adjustments were applied and the exclusion of missing data.

4.2. Measurement of Variables

Table 1 below outlines the operational definitions of the key variables used in the analysis. ROA is measured as net income divided by total assets, and ROE is calculated as net income divided by shareholders' equity (Mollah & Zaman, 2015). Leverage is measured by the Debt-to-Equity ratio (Modigliani and Miller, 1958). If this ratio is high, it is expected to have negative effects on profitability. Firm size is calculated using the

natural logarithm of total assets (Mollah & Zaman, 2015), and GDP growth rate reflects macroeconomic conditions influencing firm profitability (Banna & Alam, 2020). These variables were chosen to take into consideration macroeconomic and specific factors that could affect the relationship between profitability and leverage.

Table 1: Operational Definitions of Model Variables

Variable	Label	Measurement
Dependent Variables		
Return on assets	ROA	Net Income / Total Assets
Return on equity	ROE	Net Income / Shareholders' Equity
Independent Variable		
Leverage	Leverage	Total liabilities / Total Equity
Control Variable		
Firm Size	Size	Natural log of the total assets.
GDP Growth rate	GDP	Extracted from Trading Economics
Source: Authors' construction		

4.3. Model Specification

This study used fixed-effects regression model. It is based on the methodology used by Ali and Shaik (2022), who found that leverage had a negative impact on both ROA and ROE in the Saudi energy industry. Adding to their research, the current study looks at quarterly data from 2019 to 2023 and offers a more comprehensive examination of the relationship between GDP growth, leverage, and business size and performance. Using the following fixed-effects regression models, the impact of leverage on profitability (ROA and ROE) is estimated:

$$ROA_{it} = \alpha + \beta_1 \text{Leverage}_{it} + \gamma_1 \text{Size}_{it} + \gamma_2 \text{GDP Growth}_{it} + \epsilon_{it}$$

$$ROE_{it} = \alpha + \beta_1 \text{Leverage}_{it} + \gamma_1 \text{Size}_{it} + \gamma_2 \text{GDP Growth}_{it} + \epsilon_{it}$$

Where ROA and ROE serve as the dependent variables, representing the metrics of profitability. Leverage serves as the independent variable. Firm size and GDP growth are used as control variables. α indicates the intercept, β_1 signifies the coefficient for leverage, γ_1 and γ_2 indicate the coefficients for

firm size and GDP growth rate, respectively, and ϵ_{it} represents the error term.

5. Analytical Approach

A fixed-effects regression model was used in STATA to address unobserved heterogeneity and concentrate on within-firm change over time. We adjusted a few variables to ensure statistical reliability. We addressed non-stationarity by differencing leverage, GDP growth rate, and firm size. This step was essential for reliable regression results, especially with panel and time series data. Initial results from the Im-Pesaran-Shin (IPS) unit root test showed non-stationarity for these variables, prompting the calculation of their initial differences. The variables were labelled as *d_leverage*, *d_GDP*, and *d_firm size*. This procedure eliminates patterns or cycles, guaranteeing a rigorous analysis.

After that, we reran the IPS unit root test and confirmed that the differenced variables were now stationary. This outcome allows additional statistical analysis without contravening assumptions. The transformed variables were then included in our regression models for robustness and validity. The next section will present descriptive statistics, followed by correlation analysis, panel data regression results, and major findings and implications.

6. Empirical Results and Discussion

6.1. Descriptive Statistics

In Table 2 below, the descriptive statistics offer a first insight into the variability and central patterns of the financial variables among the sample. The mean of ROA is 0.0121, with a standard deviation of 0.0344, indicating that, on average, companies in the sample have a small positive return on assets, though there is some variability. ROE exhibits a higher mean of 0.0539 and a standard deviation of 0.1611, indicating that equity returns demonstrate greater variability than ROA. *d_leverage* indicates a mean of -0.0445, with considerable variance

spanning from -4.6312 to 1.6674, demonstrating notable fluctuates in leverage across companies during the time. *d_GDP* reveals an average mean value of 0.0027, with variations ranging from -0.214 to 0.2000. *d_firm size* has moderate variability, with a mean of 0.0118 and a standard deviation of 0.0769, with values spanning from -0.3191 to 0.2320.

Table 2: Descriptive Statistics of Variables

Variable	Obs.	Mean	Std. Dev.	Min	Max
ROA	89	0.0121	0.0344	-0.0202	0.2667
ROE	89	0.0539	0.1611	-0.6028	0.6920
<i>d_leverage</i>	89	-0.0445	0.7101	-4.6312	1.6674
<i>d_GDP</i>	84	-0.0027	0.0627	-0.2140	0.2000
<i>d_firmsize</i>	84	0.0118	0.0769	-0.3191	0.2320

Source: STATA results

6.2. Correlation Analysis

Table 3 shows estimated test variable correlation coefficients. Correlation coefficients show the strength and direction of two variables' correlations. They also detect multicollinearity issues in test variables that might affect regression coefficient estimates. This research measures correlation between variables using Pearson correlation coefficients. The parametric Pearson test measures the association between linearly linked variables (Greene, 2012). In Table 4, Pearson test coefficient strengths and directions show no multicollinearity or significant connections. Thus, the regression models in this research incorporated all independent variables.

We found a positive and significant link between ROA and *d_GDP* at 1%. This indicates that changes in *d_GDP* may slightly influence firm profitability. However, *d_leverage* and *d_firm size* had no significant relationship with ROA. On the other hand, *d_leverage* and ROE had a weak and negative link at the 5% significance level while *d_GDP* and *d_firm size* had no significant association with ROE.

Table 3: Correlation Analysis of Variables

Variable	ROA	ROE	<i>d_leverage</i>	<i>d_GDP</i>	<i>d_firmsize</i>
ROA	1.0000				
ROE	0.5006	1.0000			
<i>d_leverage</i>	0.0360	-0.2106	1.0000		
<i>d_GDP</i>	0.3103	0.1009	-0.0607	1.0000	
<i>d_firmsize</i>	-0.0266	0.1220	0.0717	0.2296	1.0000

Source: STATA Results

6.3. Panel Regression Results

To determine which regression model is more appropriate for our data, we ran both fixed-effects and random-effects models, along with a Hausman test (Wooldridge, 2010). The Hausman test showed significant p-values (less than 0.05) for both ROA and ROE, indicating that the fixed-effects model is preferable (Hausman, 1978). This makes the fixed-effects model better since it accounts for unobserved heterogeneity across businesses by giving each company its own intercept (Wooldridge, 2010). ROA and ROE fixed-effects regression findings are shown in Table 4. The findings indicate the key variable significant levels and Hausman test-based model selection reasoning.

6.3.1. Return on Assets (ROA)

The fixed-effects model explains 14.44% of the variation in ROA within firms ($R\text{-squared} = 0.144$). The F-statistic ($F(4, 76) = 4.62, p = 0.0022$) indicates that the model is statistically significant, meaning that at least one of the predictors (leverage, GDP, or firm size) significantly influences ROA. The regression analysis indicates that leverage (*d_leverage*) does not have a statistically significant effect on ROA. The coefficient is 0.00279 ($p = 0.560$), which means variations in leverage do not significantly impact the asset efficiency of energy firms, as measured by ROA. In contrast, GDP growth rate (*d_GDP*) has a significant positive impact on ROA. The coefficient for GDP is 0.197 ($p = 0.001$), indicating that increases in GDP are associated with higher asset efficiency in energy firms, reflecting the strong influence of macroeconomic conditions on firm performance. The relationship between firm size (*d_firmsize*) and ROA is negative, with a coefficient of -0.0764. However, this effect is not statistically significant ($p = 0.114$), suggesting that while larger firms may see a reduction in ROA, the impact is not strong enough to be conclusive.

6.3.2. Return on Equity (ROE)

The model explains 8.93% of the within-firm variation in ROE ($R\text{-squared} = 0.0893$). The F-statistic ($F(4, 76) = 2.48, p = 0.067$) indicates marginal statistical significance at the 10% level, meaning that the predictors may have some influence on ROE. The analysis shows that leverage ($d_leverage$) has a statistically significant negative effect on ROE, with a coefficient of -0.0482 ($p = 0.017$). This suggests that higher leverage reduces returns to shareholders, reflecting the increased financial risk associated with higher debt levels. GDP growth rate (d_GDP) does not have a significant effect on ROE in this model, with a coefficient of 0.230 and a p-value of 0.327 . This implies that broader macroeconomic conditions do not strongly influence returns on equity in the energy sector. The relationship between firm size ($d_firm\ size$) and ROE is also negative but not statistically significant, with a coefficient of -0.0371 and a p-value of 0.851 , suggesting no clear influence of firm size on ROE.

Table 4: Panel Data Regression Analysis with Fixed Effect Estimation

Variable	ROA		ROE	
	Coefficient	Std. err.	Coefficient	Std. err.
$d_leverage$	0.00279	(0.00476)	-0.0482**	(0.0197)
d_GDP	0.19701***	(0.05647)	0.230	(0.233)
$d_firm\ size$	-0.07643	(0.04777)	-0.0371	(0.197)
Constant	0.0140***	(0.00347)	0.0536***	(0.0144)
R-squared	0.1444		0.089	
Adj. R- squared	0.0656		0.0055	
F-statistic	4.62 (Prob > F = 0.0022)		12.81 (Prob > F = 0.0000)	
Haus. Test χ^2	9.55		32.22	
Haus. Test p-value	0.0228		0.0000	
Number of groups	5		5	
Obs.	84		84	

Note: Standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: STATA Results

The findings support the research hypothesis and fulfil the study's objectives. The main objective of this study is to examine the relationship between leverage and profitability. We found that $d_leverage$ has a significant and negative effect on ROE. This supports Hypothesis 1, which predicts leverage

reduces profitability due to financial risk and interest commitments. These findings are consistent with Ali and Shaik (2022), who also found a negative impact of leverage on ROA and ROE in Saudi Arabia's energy sector. Nonetheless, whereas Ali and Shaik identified a negative impact on ROA, there was not a significant relationship between leverage and ROA in the current study. This variation may result from the utilization of quarterly data, which captures more transient variations in performance.

Another goal was to examine the impact of leverage on the performance of listed companies in the energy sector over time. The quarterly data reveals that leverage has a considerable and sustained negative impact on ROE but not ROA. This shows how capital-intensive energy is. Since ROE appears to decrease with time, energy businesses should carefully manage their debt to prevent diminishing shareholder value. These results align with earlier research by Bagais and Aljaaidi (2020), Nazir et al. (2021), and Ali and Shaik (2022), but disagree with Shaik and Sharma (2021) and Zhang et al. (2018), who reported positive associations.

The study also aimed to identify trends and patterns in leverage and profitability. The results indicate that d_GDP rate significantly affects ROA, highlighting the importance of macroeconomic conditions in shaping the operational efficiency of energy companies. As d_GDP increases, firm profitability improves, aligning with economic theory that suggests companies benefit from stronger demand, productivity, and favorable business conditions during periods of economic growth. This finding emphasizes the critical role of macroeconomic stability in the energy sector, where companies are highly sensitive to broader economic cycles (Ali and Shaik, 2022). However, d_GDP does not significantly impact ROE, suggesting that the operational benefits of economic growth may not always lead to higher returns for shareholders.

Interestingly, d_firm size had no significant effect on either ROA or ROE. This contrasts some prior studies that highlighted the advantages of economies of scale (Barney, 1991). This may be attributed to the specific characteristics of the energy sector in Saudi Arabia, where larger firms often incur significant infrastructure and technological costs that offset the benefits of scale. Finally, the study supports Hypothesis 2, which proposes that leverage affects ROA and ROE differently. The results show that $d_leverage$ has a considerable negative effect on ROE but not ROA. This finding supports the idea that ROA, reflecting asset utilization, is less sensitive to leverage, whereas ROE, which directly measures financial risk borne by shareholders, is more vulnerable to high debt levels (Brigham and Ehrhardt, 2013). The contrasting effects of leverage on these two profitability measures highlight the differing sensitivities of operational efficiency versus shareholder returns to debt levels, further underscoring the complexity of managing leverage in capital-intensive industries like energy.

In summary, the fixed-effects model provided a clearer view of the factors influencing firm performance in Saudi Arabia's energy sector within emerging markets. The significant impact of d_GDP on ROA underscores the role of macroeconomic conditions in profitability, while the negative effect of leverage on ROE highlights the risks of excessive debt.

7. Conclusion

This study looked into the influence of leverage on the profitability of Saudi energy companies from 2019 to 2023, using ROA and ROE as key measures. The findings show that leverage influences profitability, especially on ROE. This shows that, while leverage may not considerably reduce operational efficiency, it does have a considerable negative impact on shareholder returns due to the increased financial risks associated with higher debt levels. The findings

also underscore the importance of macroeconomic conditions, particularly d_GDP Growth, which positively impacts firm performance as measured by ROA.

8. Recommendation

The study's suggestions are for policymakers, corporate managers, and investors. Credit levels should be carefully managed by corporate managers, especially in industries that need a lot of capital, like energy, where too much of debt can hurt shareholder returns greatly. Companies should prioritize a balanced capital structure to mitigate financial risks and protect earnings. Investors should recognize that high leverage ratio firms carry more risk whilst offering more profits. Government should regulate corporate debt because leverage hurts profitability, particularly in vital sector like energy. Macroeconomic stability will boost financial health and help firms overcome severe borrowing. This study has several key implications. First, it highlights the importance of careful debt management in maintaining profitability, particularly for firms in capital-intensive industries like energy. Second, it underscores the role of macroeconomic factors in shaping firm performance, suggesting that broader economic conditions, such as GDP growth rate, significantly affect profitability.

The study contributes to the literature by providing a nuanced understanding of how leverage affects firm profitability in the context of Saudi Arabia's energy sector. It adds to the ongoing debate about the optimal capital structure by distinguishing between the effects of leverage on ROA and ROE, offering insights specific to emerging markets. Furthermore, this research highlights the critical role of macroeconomic conditions in shaping profitability outcomes in the energy sector.

The study's primary limitation is its reliance on data from a limited period (2019 to 2023) and its focus on a single sector (energy). This restricts the generalizability of the findings to other sectors.

Additionally, the study does not account for other external variables, such as interest rates and oil price volatility. Future research should expand the analysis to include longer time periods, a broader range of industries, and additional macroeconomic factors to provide a more comprehensive understanding of the impact of leverage on firm performance.

9. References

- Abor, J. (2005). The effect of capital structure on profitability: An empirical analysis of listed firms in Ghana. *The Journal of Risk Finance*, 6(5), 438–445. <https://doi.org/10.1108/15265940510633505>
- Al Rasasi, M. H., Qualls, J. H., & Algamdi, B. K. (2019). Oil revenues and economic growth in Saudi Arabia. *International Journal of Economics and Financial Research*, 53, 49–55. <https://doi.org/10.32861/ijefr.53.49.55>
- Ali, A., & Faisal, S. (2020). Capital structure and financial performance: A case of Saudi petrochemical industry. *The Journal of Asian Finance, Economics and Business*, 7, 105–112. <https://doi.org/10.13106/jafeb.2020.vol7.no7.105>
- Ali, A., & Shaik, A. R. (2022). Effect of debt financing on firm performance: A study on energy sector of Saudi Arabia. *International Journal of Energy Economics and Policy*, 12(6), Article 6. <https://doi.org/10.32479/ijeep.13677>
- Almutairi, H., Galeotti, M., Manzano, B., & Pierru, A. (2024). Resilience of Saudi Arabia's economy to oil shocks: Effects of economic reforms. *The Energy Journal*, 01956574241240279. <https://doi.org/10.1177/01956574241240279>
- Al-Tally, H. A. (2014). An investigation of the effect of financial leverage on firm financial performance in Saudi Arabia's public listed companies, Doctoral dissertation, Victoria University. <https://vuir.vu.edu.au/24843/>
- Bagais, O., & Aljaaidi, K. (2020). Corporate governance attributes and firm performance in Saudi Arabia. *Accounting*, 6(6), 923–930. <https://growingscience.com/beta/ac/4125-corporate-governance-attributes-and-firm-performance-in-saudi-arabia.html>
- Banna, H & Alam, MR. (2020). Islamic banking efficiency and inclusive sustainable growth: The role of financial inclusion. *Journal of Islamic Monetary Economics and Finance*, vol. 6, no. 1, pp. 213–242. <https://www.jimf-bi.org/index.php/JIMF/article/view/1089>
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), pp.99-120. [https://www.emerald.com/insight/content/doi/10.1016/s0742-3322\(00\)17018-4/full/html](https://www.emerald.com/insight/content/doi/10.1016/s0742-3322(00)17018-4/full/html)
- Dwiantari, R. A., & Artini, L. G. S. (2021). The effect of liquidity, leverage, and profitability on financial distress (case study of property and real estate companies on the IDX (2017-2019). *American Journal of Humanities and Social Sciences Research*, 5(1), 367–373. <https://www.ajhssr.com/wp-content/uploads/2021/01/ZT21501367373.pdf>
- Greene, W. (2012). *Econometric analysis*. Pearson.
- Huynh, Q. L., Hoque, M. E., Susanto, P., Watto, W. A., & Ashraf, M. (2022). Does financial leverage mediate corporate governance and firm performance? *Sustainability*, 14(20), 13545. <https://doi.org/10.3390/su142013545>
- Hausman, J.A. (1978). Specification tests in econometrics. *Econometrica*, 46(6), pp.1251–1271. <https://doi.org/10.2307/1913827>
- Jihadi, M., Vilantika, E., Hashemi, S. M., Arifin, Z., Bachtiar, Y., & Sholichah, F. (2021). The effect of liquidity, leverage, and profitability on firm value: Empirical evidence from Indonesia. *The Journal of Asian Finance, Economics and Business*, 8(3), 423–431. <https://doi.org/10.13106/jafeb.2021.vol8.no3.0423>
- Markonah, M., Salim, A., & Franciska, J. (2020). Effect of profitability, leverage, and liquidity on firm value. *Dinasti International Journal of Economics, Finance & Accounting*, 1(1), 83–94. <https://doi.org/10.38035/dijefa.v1i1.225>
- Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. *The American Economic Review*, 48(3), 261–297. <https://www.jstor.org/stable/1809766>

Mollah, S & Zaman, M. (2015). Shari'ah supervision, corporate governance and performance: Conventional vs. Islamic banks. *Journal of Banking & Finance*, vol. 58, pp. 418–435.

<https://doi.org/10.1016/j.jbankfin.2015.04.030>

Kalbuana, N., Suryati, A., & Pertiwi, C. P. A. (2022). Effect of company age, audit quality, leverage, and profitability on earnings management. *International Journal of Economics, Business and Accounting Research*. 6(1), 305-315. <https://jurnal.stie-aas.ac.id/index.php/IJEBAR/article/view/4796>

Nazir, A, Azam, M & Khalid, M. U. (2021). Debt financing and firm performance: empirical evidence from the Pakistan Stock Exchange. *Asian Journal of Accounting Research*, vol. 6, no. 3, pp. 324–334. <https://doi.org/10.1108/ajar-03-2019-0019>

Rajan, R. G., & Zingales, L. (1995). What do we know about capital structure? Some evidence from international data. *The Journal of Finance*, 50(5), 1421–1460. <https://doi.org/10.1111/j.1540-6261.1995.tb05184.x>

Salsabilla, A. H., Fitri, F., & Asrilsyak, S. (2024). The effect of liquidity and leverage on profitability with investment opportunity set as a moderating variable in energy sector companies listed on the Indonesia Stock Exchange 2018-2022. *International Journal of Economic, Business & Applications*, 9(1), <https://doi.org/10.31258/ijeba.94>

Senan, N. A. M., Ahmad, A., Anagreh, S., Tabash, M. I., & Al-Homaidi, E. A. (2021). An empirical analysis of financial leverage and financial performance: Empirical evidence from Indian listed firms. *Investment Management & Financial Innovations*, 18(2), 322. <https://digitallibrary.aau.ac.ae/handle/123456789/273>

Shaik, A. R., & Sharma, R. B. (2021). Leverage, capital and profitability of the banks: Evidence from Saudi Arabia. *Accounting*, 7(6), 1363–1370. <https://doi.org/10.5267/j.ac.2021.4.001>

Waheed, R., Sarwar, S., & Alsaggaf, M. I. (2023). Relevance of energy, green and blue factors to achieve sustainable economic growth: Empirical study of Saudi Arabia. *Technological Forecasting and Social Change*, 187, 122184. <https://doi.org/10.1016/j.techfore.2022.122184>

Wieczorek-Kosmala, M., Błach, J., & Gorzeń-Mitka, I. (2021). Does capital structure drive profitability in the energy sector? *Energies*, 14(16), 4803. <https://doi.org/10.3390/en14164803>

Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data*. MIT press.

Zaitoun, M., & Alqudah, H. (2020). The impact of liquidity and financial leverage on profitability: The case of listed Jordanian industrial firm's. *International Journal of Business and Digital Economy*, 1(4), 29–35. <https://www.researchgate.net/publication/347510749>

Zhang, Q., Saqib, Z. A. & Chen, Q. (2018, July). Determinants of capital structure: An empirical analysis of fuel and energy sector of Pakistan. In *2018 15th International Conference on Service Systems and Service Management (ICSSSM)* (pp. 1-6). IEEE. <https://ieeexplore.ieee.org/abstract/document/8465061>

Appendices: Sample of the Study and Data Collection

Appendix 1: Study Sample and Data Collection of Company 1 SARCO

Time	Net Income*	Total Assets*	Total Liabilities*	Shareholders' Equity*	GDP*
2019-Q1	-272160	124141340,5	2671103,2	121470237,3	1,9%
2019-Q2	2727383,733	125372713,1	2712540,8	122660172,3	1,3%
2019-Q3	-154222,6667	117708314,4	2785306,133	114923008,3	0,0%
2019-Q4	4883410,133	124005805,1	2949279,467	121056525,6	20,0%
2020-Q1	-170558,4	90128878,67	2754317,867	87374560,8	-1,4%
2020-Q2	1894258,667	106068063,2	2809760,533	103258302,7	-7,4%
2020-Q3	-9395,2	119104021,1	2784418,133	116319602,9	-4,8%
2020-Q4	3823696,533	138291896	2738755,467	135553140,5	-3,9%
2021-Q1	107861,3333	158836676,8	2335572,8	156501104	-2,1%
2021-Q2	1935516,533	168055294,9	2397986,4	165657308,5	3,5%
2021-Q3	260850,6667	189944918,9	1046655,467	188898263,5	7,2%
2021-Q4	1909108,267	150260732,3	1051447,467	149209284,8	8,7%
2022-Q1	148652,2667	165673518,9	956154,4	164717364,5	7,5%
2022-Q2	5735351,733	144566898,4	1009537,6	143557360,8	9,1%
2022-Q3	-223608	119429830,9	1688935,2	117740895,7	8,0%
2022-Q4	7915893,333	118729116,3	1710222,133	117018894,1	5,6%
2023-Q1	88200,8	130563091,5	1520548,8	129042542,7	3,2%
2023-Q2	-362326,6667	136159690,1	5172294,667	13120728,8	1,7%
2023-Q3	1595656,8	122286019,5	1497121,333	120788898,1	-3,2%
2023-Q4	2501094,4	117657081,1	1920725,867	115736355,2	-4,3%

Note: *All amounts are in US \$

Source: Financial Statements of the Company from Tadawul Stock exchange (Saudi Exchange).

Appendix 2: Study Sample and Data Collection of Company 2 SAUDI ARAMCO

Time	Net Income*	Total Assets*	Total Liabilities*	Shareholders' Equity*	GDP*
2019-Q1	44300,8	398433,6	119437,6	278996	1,9%
2019-Q2	48188,26667	0	0	0	1,3%
2019-Q3	44071,2	0	0	0	0,0%
2019-Q4	177797,6	398433,6	119437,6	278996	20,0%
2020-Q1	34062,66667	393124,8	105247,7333	287877,0667	-1,4%
2020-Q2	13287,46667	495775,7333	193770,4	302005,3333	-7,4%
2020-Q3	24733,6	501410,9333	204414,4	296996,5333	-4,8%
2020-Q4	99313,06667	510469,6	216844,5333	293625,0667	-3,9%
2021-Q1	40368	520397,8667	220795,4667	299602,4	-2,1%
2021-Q2	47646,93333	545818,9333	228647,4667	317171,4667	3,5%
2021-Q3	56575,46667	563371,2	234996,8	328374,4	7,2%
2021-Q4	205205,6	576717,3333	235205,8667	341511,4667	8,7%
2022-Q1	74084,53333	624374,6667	243882,4	380492,2667	7,5%
2022-Q2	87945,06667	636197,3333	227977,8667	408219,4667	9,1%
2022-Q3	80607,73333	655089,0667	223565,8667	431523,2	8,0%
2022-Q4	307456,5333	664779,7333	220473,8667	444305,8667	5,6%
2023-Q1	61129,06667	661642,9333	206490,9333	455152	3,2%
2023-Q2	57981,6	652768,2667	188266,4	464501,8667	1,7%
2023-Q3	63566,13333	670806,1333	202936	467870,1333	-3,2%
2023-Q4	236817,8667	660784	197559,4667	463224,5333	-4,3%

Note: *All amounts are in US \$

Source: Financial Statements of the Company from Tadawul Stock exchange (Saudi Exchange).

Appendix 3: Study Sample and Data Collection of Company 3 PETRO RABIGH

Time	Net Income*	Total Assets*	Total Liabilities*	Shareholders' Equity*	GDP*
2019-Q1	86538,66667	20409102,4	17514947,47	2894154,933	1,9%
2019-Q2	-48263,2	20431046,93	17593171,2	2837875,733	1,3%
2019-Q3	128609,6	20570686,4	17608831,47	2961854,933	0,0%
2019-Q4	85070,93333	19741239,47	17063530,93	2677708,533	20,0%
2020-Q1	-547206,4	18586608,53	16388032,27	2198576,267	-1,4%
2020-Q2	-304222,6667	18379160,8	16563276,27	1815884,533	-7,4%
2020-Q3	-168465,6	19028002,93	17374723,47	1653279,467	-4,8%
2020-Q4	-997184,8	18851735,73	17197473,6	1654262,133	-3,9%
2021-Q1	189731,7333	19299943,2	17470773,6	1829169,6	-2,1%
2021-Q2	208364	19641416,8	17618514,67	2022902,133	3,5%
2021-Q3	72470,13333	19388727,47	17308064,27	2080663,2	7,2%
2021-Q4	613116,2667	19563206,13	17348296,53	2214909,6	8,7%
2022-Q1	216980,8	20194400,8	17776154,4	2418246,4	7,5%
2022-Q2	404360,5333	20200408,27	17394248,53	2806159,733	9,1%
2022-Q3	-399205,3333	18733696,53	14220042,67	4513653,867	8,0%
2022-Q4	-284513,8667	17487661,87	13419698,93	4067962,933	5,6%
2023-Q1	-268467,2	17698890,67	13888030,67	3810860	3,2%
2023-Q2	-332191,7333	17480108	13988194,93	3491913,067	1,7%
2023-Q3	-310694,6667	17467809,6	14281251,47	3186558,133	-3,2%
2023-Q4	-1278127,467	16854101,07	14040586,13	2813514,933	-4,3%

Note: *All amounts are in US \$

Source: Financial Statements of the Company from Tadawul Stock exchange (Saudi Exchange)

Appendix 4: Study Sample and Data Collection of Company 4 ARABIAN DRILLING

Time	Net Income*	Total Assets*	Total Liabilities*	Shareholders' Equity*	GDP*
2019-Q1	0	0	0	0	1,9%
2019-Q2	0	0	0	0	1,3%
2019-Q3	0	0	0	0	0,0%
2019-Q4	0	0	0	0	20,0%
2020-Q1	0	0	0	0	-1,4%
2020-Q2	0	0	0	0	-7,4%
2020-Q3	0	0	0	0	-4,8%
2020-Q4	0	0	0	0	-3,9%
2021-Q1	0	0	0	0	-2,1%
2021-Q2	0	0	0	0	3,5%
2021-Q3	0	0	0	0	7,2%
2021-Q4	0	0	0	0	8,7%
2022-Q1	0	0	0	0	7,5%
2022-Q2	0	0	0	0	9,1%
2022-Q3	0	0	0	0	8,0%
2022-Q4	0	0	0	0	5,6%
2023-Q1	42752237,33	2587461023	1059113227	1528347796	3,2%
2023-Q2	43182102,13	2638563751	1072805351	1565758399	1,7%
2023-Q3	44746554,13	2695198491	1092097199	1603101293	-3,2%
2023-Q4	183452515,7	2849726349	1260013975	1589712374	-4,3%

Note: *All amounts are in US \$

Source: Financial Statements of the Company from Tadawul Stock exchange (Saudi Exchange).

Appendix 5: Study Sample and Data Collection of Company 5 BAHRI

Time	Net Income*	Total Assets*	Total Liabilities*	Shareholders' Equity*	GDP*
2019-Q1	57063,73333	5680168,267	3010680,267	2669488	1,9%
2019-Q2	19810,66667	5469340,8	2943769,867	2525570,933	1,3%
2019-Q3	45337,6	5399327,733	2887323,2	2512004,533	0,0%
2019-Q4	73945,86667	5482887,2	2902388,267	2580498,933	20,0%
2020-Q1	120852	5513139,733	2818326,133	2694813,6	-1,4%
2020-Q2	231626,9333	5626505,867	2829062,933	2797442,933	-7,4%
2020-Q3	75234,66667	5585548,533	2806436,8	2779111,733	-4,8%
2020-Q4	28060,26667	5628082,133	2828499,2	2799582,933	-3,9%
2021-Q1	18179,46667	5657142,667	2841737,333	2815405,333	-2,1%
2021-Q2	15911,73333	5629400,8	2905555,467	2723846,667	3,5%
2021-Q3	10634,66667	5799452,533	3175178,4	2624274,133	7,2%
2021-Q4	33045,06667	5779193,6	3123194,4	2655999,2	8,7%
2022-Q1	25278,4	5866449,6	3187374,4	2679075,2	7,5%
2022-Q2	46589,6	5927751,733	3199767,467	2727984,267	9,1%
2022-Q3	85966,13333	5963242,133	3162169,6	2801072,533	8,0%
2022-Q4	176972,2667	6106159,2	3138312,533	2967846,667	5,6%
2023-Q1	150378,4	6225547,2	3116250,133	3109297,067	3,2%
2023-Q2	147215,4667	6341916	3157670,933	3184245,067	1,7%
2023-Q3	75220,8	6268896	3014360,533	3254535,467	-3,2%
2023-Q4	132211,4667	6163100,533	2791837,6	3371262,933	-4,3%

Note: *All amounts are in US \$

Source: Financial Statements of the Company from Tadawul Stock exchange (Saudi Exchange).

Appendix 6: Study Sample and Data Collection of Company 6 ALDREES

Time	Net Income*	Total Assets*	Total Liabilities*	Shareholders' Equity*	GDP*
2019-Q1	8866100,267	0	0	0	1,9%
2019-Q2	4794722,667	0	0	0	1,3%
2019-Q3	4612155,2	0	0	0	0,0%
2019-Q4	82131613,07	956058613,1	722787513,3	233271099,7	20,0%
2020-Q1	8459795,2	1089109037	847761262,1	241347774,7	-1,4%
2020-Q2	4099455,733	1057265201	836955303,7	220309897,1	-7,4%
2020-Q3	10214645,6	1165439721	935291178,1	230148542,7	-4,8%
2020-Q4	33687872,8	1190067395	952072096	237995298,9	-3,9%
2021-Q1	10878822,4	1359588695	1111097241	248491454,7	-2,1%
2021-Q2	9963624,533	1402403324	1160324245	242079079,2	3,5%
2021-Q3	13017259,2	1434268414	1179548075	254720338,4	7,2%
2021-Q4	48715990,93	1449448228	1184074938	265373290,4	8,7%
2022-Q1	17045230,67	1511553588	1259535067	252018521,1	7,5%
2022-Q2	12644507,73	1565881615	1301618587	264263028,8	9,1%
2022-Q3	16855479,2	1643088874	1362370366	280718508	8,0%
2022-Q4	66524835,73	1684155226	1388330072	295825153,6	5,6%
2023-Q1	19249732,27	1776590972	1461956086	314634885,9	3,2%
2023-Q2	19170010,13	2016276950	1722912054	293364896	1,7%
2023-Q3	18494375,47	1911452100	1600072829	311379271,5	-3,2%
2023-Q4	76217192,8	2001634709	167256101,3	329578607,7	-4,3%

Note: *All amounts are in US \$

Source: Financial Statements of the Company from Tadawul Stock exchange (Saudi Exchange).