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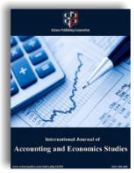

How Capital Structure Shapes Firm Performance: Testing The Trade-Off Industrial Jordanian Firms Listed on The ASE

Hilal Rabayah *

PhD Student Arab American University: Ramallah, Palestine., Department of Administrative and Financial Sciences
**Corresponding author E-mail: H.rabayah1@student.aaup.edu*

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Abstract

This study aims to examine the impact of capital structure on the financial performance of Jordanian industrial companies listed on the Amman Stock Exchange (ASE). A descriptive analytical approach was employed, using a sample of 33 Jordanian industrial companies listed on the ASE. The Statistical Package for the Social Sciences (SPSS) was used to test the effects of the independent variables on financial performance.

The results reveal a statistically significant negative relationship between total assets (TA) and financial performance (FP) at the 1% level. Conversely, a statistically significant positive relationship at the 1% level was found between interest rate protection (IRP), asset turnover ratio (ATOR), current ratio (CR), earnings per share (EPS), and financial performance (FP). However, there was no statistically significant relationship between market-to-book value (MBV) and financial performance (FP) when measured by the return on assets (ROA). Furthermore, a statistically significant negative relationship at the 1% level was observed between MBV and FP. On the other hand, no statistically significant differences were identified between TA, IRP, ATOR, CR, EPS, and FP when ROA measured FP.

Keywords: *Capital Structure; Financial Performance; Amman Stock Exchange (ASE).*

1. Introduction

In today's economic landscape, where financial resources rarely keep pace with expanding demands, evaluating institutional financial health has emerged as a fundamental concern across diverse economic frameworks and cultural contexts. Institutional managers face mounting pressure to optimize their use of available capital—a challenge that Al Omari (2021) identifies as among their most urgent priorities. For stakeholders to accurately assess organizational strengths and vulnerabilities, financial data must be transparent and readily analyzable (Riaz, 2015). The urgency of such evaluations has intensified following repeated financial upheavals worldwide, especially considering established connections between these crises and weakened or irresponsible financial practices observed in numerous institutions (Mutegi, 2016). A thorough grasp of how companies are structured and how they perform becomes crucial for preventing dangerous behaviors and inadequately supervised risk exposure, both of which can destabilize entire economies (Mukumbi, Eugine, & Jinghong, 2021).

Decisions regarding capital structure emerge from both macroeconomic conditions and company-specific characteristics. The national environment where a firm conducts business plays a considerable role in shaping both its capital composition and performance outcomes (Nassar, 2016). At its core, capital structure describes how an organization funds its asset base, operational activities, and expansion plans—usually drawing on some combination of borrowed capital and ownership stakes (Vătavu, 2015). When firms achieve an optimal mix between debt and equity, they can lower their overall capital costs, strengthen their stock valuations and market standing, and sharpen their competitive edge. Strategic decisions about capital composition can boost both company worth and market position (Mukumbi, Eugine, & Jinghong, 2021).

How a firm obtains its funding—whether through borrowing, issuing shares, or some blend of the two—defines its capital structure (Myers, 2001). All businesses need capital to sustain operations and cover both permanent assets and day-to-day working requirements. This makes capital structure decisions absolutely central, given their influence on profit margins and organizational endurance. Selecting an appropriate financing mix proves essential for driving shareholder wealth upward and strengthening overall effectiveness (Mwangi, Makau, & Kosimbei, 2014). Yet despite extensive theoretical work and empirical investigation, no single universally agreed-upon formula for optimal capital structure has emerged. Whether firms issue debt securities or equity shares hinges on multiple considerations: the scale and timing of financial requirements, credit accessibility, and the particular characteristics of domestic financial markets. Cultural factors within a nation can even sway whether companies lean more heavily toward debt or equity (Al Omari, 2021).

Academic debate surrounding the link between capital structure and firm valuation dates back to Modigliani and Miller (1963), who proposed that in theoretical environments lacking taxes, transaction costs, and information asymmetries, financing choices bear no consequence for market value. Real-world markets, however, feature taxation, and here debt financing offers tax advantages by lowering taxable income (Al-Nsour & Jresat, 2018). Subsequently, frameworks such as Trade-Off Theory, Pecking Order Theory, and Agency Cost Theory emerged to explain corporate financing behavior (Shamsuddin, Al Majali, Daud, & Sallha, 2020).

The present study examines how capital structure relates to financial performance among industrial firms listed on the ASE in Jordan. For corporate managers, few responsibilities carry more weight than determining capital structure, since getting it right can markedly improve financial outcomes. This research offers industrial companies a clearer understanding of how their financing arrangements influence performance, potentially guiding them toward sounder financial strategies. Our analysis employs six capital structure indicators (TA, MBV, ICR, ATO, CR, and EPS) that represent both internal and external financing channels, and measures financial performance through ROE and ROA. What follows includes a literature review, an explanation of our methodology, an analysis of the findings, and concluding observations.

2. Literature Review

2.1. Capital structure

Capital structure stands among the most consequential financial considerations for any enterprise, given its direct bearing on how well companies can satisfy the diverse expectations of stakeholders—from workforce members and investors to the communities they serve. Most commonly, scholars define it as the particular blend of borrowed funds and ownership capital that organizations deploy to support their asset base (IQBAL, 2022). This financing architecture can be represented through metrics like the debt-to-equity ratio and aggregate capital measures (Boshnak, 2023), or alternatively via financial leverage ratios that capture a firm's strategic approach to financing. Such strategic orientation shapes choices about assembling the most suitable and economically efficient mix of funding channels, ultimately allowing companies to boost profit generation and pursue their primary goal: maximizing what shareholders own or, put differently, elevating the market worth of company shares (Olusola, Mengze, Chimezie, & Chinedum, 2022). Another perspective views capital structure as encompassing an organization's enduring funding sources—equity holdings, preferred stock, and borrowing arrangements extending beyond the near term (Mutegi, 2016).

Determining financial architecture represents one of management's weightiest fiscal duties. Companies cannot avoid making these decisions, as striking the right capital balance proves fundamental to sustaining operations while delivering optimal returns to everyone with a stake in organizational success (Opoku-Asante, Winful, Sharifzadeh, & Neubert, 2022). The process demands thoughtful consideration of what debt and equity each bring to the table, along with their respective drawbacks. Yet achieving that ideal equilibrium often poses significant difficulties for enterprises (Vătavu, 2015). How firms resolve this question profoundly influences their capacity to maintain competitive standing within their financial landscape, underscoring why pinpointing capital needs and matching them with suitable funding channels matters so much (Wanke, Skully, Wijesiri, Walker, & Dalla Pellegrina, 2022).

Multiple theoretical frameworks inform our understanding of capital structure. One line of thinking maintains that the structure of capital and its associated costs cannot be separated, suggesting firms can optimize both simultaneously through judicious selection of their financing portfolio (Mirie, 2015). The fixed assets perspective posits that enterprises holding substantial tangible property—manufacturing facilities, heavy machinery, and similar items—naturally gravitate toward longer-term borrowing arrangements. By contrast, businesses lacking such physical infrastructure, technology firms being a prime example, might depend more substantially on financing with shorter horizons (Olusola, Mengze, Chimezie, & Chinedum, 2022). Expectations theory places weight on how investors' outlooks regarding a company's prospective results shape its financing choices (Perri & Cela, 2022). Uncertainty theory, for its part, acknowledges the inherently unpredictable character of commercial environments and contends that a well-calibrated capital structure serves as a buffer against risks that arise from such unpredictability (Wilson, Idachaba, & Shallangwa, 2022).

Recent empirical evidence from emerging markets reinforces the relevance of capital structure decisions in developing economies. Boshnak (2023) examined Saudi-listed firms and found that optimal capital structure significantly enhances firm performance, with debt ratios demonstrating nonlinear effects on profitability. Similarly, Dodoo, Kumi, and Mangudhla (2023) investigated the impact of capital structure on performance in Ghana's emerging economy, documenting that leverage negatively affects performance beyond certain thresholds, particularly during periods of economic uncertainty. These contemporary studies from MENA and African markets confirm that capital structure remains a critical determinant of financial performance in contexts characterized by institutional constraints, information asymmetries, and volatile economic conditions—circumstances directly applicable to Jordan's industrial sector.

2.2. Financial performance

Assessing how well organizations perform financially has taken on greater significance lately, driven largely by how businesses have grown larger, broadened their operational scope, and diversified their investment approaches (Okafor, 2021). Grasping the fiscal condition of institutions proves vital for sound decision-making, particularly considering what's at stake for various parties—shareholders, those who provide capital, the general public, and society more broadly (Mutegi, 2016). Maharani, Reniati, and Saputra (2023) characterize financial performance as how effectively an organization deploys its resources to create value and deliver returns. Otieno and Ngwenya (2015) offered a related perspective, viewing it as relying on financial metrics to gauge whether objectives are being met, resources are available when needed, and worthwhile investment opportunities exist.

When organizations succeed financially, it typically shows up through strong growth patterns and solid returns once the costs of capital and tax obligations are factored in. Riaz (2015) framed financial performance as essentially an evaluative exercise—measuring what's been accomplished recently against targets set earlier, using systematic approaches to see how actual results stack up against what was anticipated.

Across the spectrum of financial institutions, evaluating performance stands as an indispensable function. Such assessments bring to light shortcomings in how financial plans unfold, point toward remedial steps that might be taken, keep tabs on how operations are running, and size up how effectively different departments are functioning (Luo & Jiang, 2022). These evaluations also furnish those making decisions with direction and supervisory insight as they handle diverse organizational activities, while supporting progress toward strategic aims (Mukumbi, Eugine, & Jinghong, 2021). Beyond this, financial performance evaluation forms a key element within internal control

frameworks, giving organizations the means to examine actual fiscal results, measure them against forecasts, and introduce modifications when circumstances warrant (Boshnak, 2023).

2.3. Amman stock exchange

Jordan's Amman Stock Exchange came into being in 1999, taking shape as an autonomous, not-for-profit entity run by private sector interests and granted authority to operate as the kingdom's official venue for securities trading under regulatory oversight (Al-Tal, 2014). Governance rests with a seven-member board of directors, while an executive director handles the exchange's day-to-day management and administrative responsibilities.

Fairness, transparency, operational efficiency, and market liquidity form the bedrock principles guiding the ASE's operations. These commitments aim to safeguard those participating in capital markets, create a secure and sound setting where securities change hands, and lay the groundwork for business conduct that's both ethical and evenhanded (Shaban, Al-Zubi, & AlGhusin, 2017). In pursuit of these standards, the exchange has put together educational initiatives that align with internationally recognized financial practices and norms.

The ASE has also invested in contemporary electronic trading infrastructure, sophisticated communication channels, and facilities featuring cutting-edge technological capabilities. Market activity receives ongoing surveillance, and the exchange works alongside pertinent regulatory authorities to oversee trading conduct and look into questionable behavior when necessary (Khasawneh & Staytieh, 2017). Particular importance is placed on making sure precise and current information reaches all interested parties at the same time, and professional conduct guidelines have been put in place to guarantee that fair trading rules are followed (Al-Othman & Al-Zoubi, 2019).

Beyond its domestic operations, the ASE pursues strategic alliances and cooperative arrangements with international bodies, other stock exchanges, and regulatory agencies worldwide. The exchange routinely enters into collaborative agreements and takes part in conferences and forums across the region and around the globe. Its membership portfolio includes several prestigious organizations: the Eurasian Federation of Stock Exchanges, the International Federation of Stock Exchanges, the International Organization of Securities Commissions, and the Arab Capital Markets Union (Al Omush, Masadeh, & Zahran, 2019).

3. Theoretical Frameworks and Hypotheses Development

3.1. Total assets and financial performance

For management teams, enhancing business performance sits at the top of their priority list. When companies build robust organizational infrastructure, they position themselves to flourish and reach their targets, though today's interconnected global marketplace brings fiercer rivalry that makes this increasingly difficult (Dodoo, Kumi, & Mangudhla, 2023). How well an organization performs financially signals its broader viability and staying power. Put simply, financial results can be understood as a telling measure of whether a company has what it takes to expand and evolve going forward (IQBAL, 2022).

The worth embedded in a company's asset holdings—be it property, manufacturing equipment, or other capital goods, regardless of whether they're owned outright or leased—can substantially shape how that company performs. Beyond merely keeping operations running, these assets can add to the business's total value (Maharani, Reniati, & Saputra, 2023). Smart handling of the asset base can yield financial efficiencies; leasing vehicles or equipment rather than buying them might prove more economical under certain conditions (Purba & Bimantara, 2019). Proper upkeep of production machinery also cuts down on workplace hazards, operational bottlenecks, and periods of forced idleness, helping to avoid setbacks that could otherwise throw operations off track (Rochim & Ghoniyah, 2017).

That said, earlier research hasn't arrived at consistent conclusions. Murtadlo, Imam, and Wahono (2014), for instance, discovered that asset totals bore no meaningful connection to financial outcomes. Yet Gladys and Omagwa (2017) identified a statistically notable link between total assets and financial success.

Drawing from this background, we put forward the following hypothesis:

H1: A positive association exists between total assets and financial performance among Jordanian industrial firms trading on the ASE.

3.2. Market value to book value and financial performance

The market-to-book value ratio operates as an externally observable indicator for gauging and anticipating how a firm might perform down the road. When companies demonstrate solid financial results, they strengthen their position to maintain funding access, support expansion efforts, and secure their continued existence—outcomes that matter to management certainly, but equally to those investing capital, extending credit, and providing regulatory oversight (Fatoki & Nasieku, 2017). Through an investor's lens, this ratio captures the gap between what the market believes a company is worth and what its books show (Tilehnouei & Shivaraj, 2014).

Within the framework of costly external financing theory, which shapes how firms think about their capital structures, this ratio holds a prominent place. The theory suggests that when companies show elevated market-to-book ratios, they tend to favor issuing equity since they see external capital as less expensive under those circumstances (Otieno & Ngwenya, 2015). Businesses sporting higher ratios usually possess promising growth trajectories and lean less heavily on borrowed funds. On the flip side, weakening financial performance can restrict a firm's capacity to grow, obtain necessary financing, and keep operations running smoothly (Odat & Bsoul, 2022).

Keeping financial performance at satisfactory levels, therefore, becomes imperative, not just for informing strategic choices but also for helping firms maneuver through competitive landscapes with greater success (Fatoki & Nasieku, 2017).

These considerations lead us to propose:

H2: Positive relationships exist between market value and book value, and between financial performance and market value, for industrial firms in Jordan listed on the ASE.

3.3. Interest coverage ratio and financial performance

How well a company can handle its debt interest payments is captured by the interest coverage ratio. The calculation divides what a firm earns before accounting for interest and taxes by the interest charges it faces during a particular timeframe (Bonazzi & Ilotti, 2014). Sometimes referred to as the "times interest earned" metric, this ratio finds frequent use among those lending money, providing capital, or extending credit as they evaluate the risk profile associated with a firm's existing debt burden and its prospects for taking on additional borrowing (Noghondari, Zeinali, & Beytollahi, 2022).

The ratio provides a valuable perspective on whether a company can stay solvent and honor its debt commitments, making it a significant consideration when judging financial well-being. When the ratio runs low, it may signal that earnings aren't sufficient to cover interest obligations, potentially putting the firm at risk of failing to meet its commitments (Wilson, Idachaba, & Shallangwa, 2022). In strategic financial planning, the ratio helps companies figure out whether they should focus on increasing revenues, trimming operating expenses, or reorganizing their debt arrangements (Al Omari, 2021). Such examinations inform the creation of longer-term approaches aimed at strengthening both financial performance and organizational durability (Shaban, Al-Zubi, & AlGhusin, 2017).
From this discussion, we advance the following hypothesis:
H3: The interest coverage ratio exerts a positive influence on financial performance among Jordanian industrial companies trading on the ASE.

3.4. Asset turnover and financial performance

Asset turnover—sometimes called total asset turnover—gauges how effectively a company transforms its asset base into sales revenue. This financial indicator reveals how much revenue is generated for each unit of assets deployed and speaks to whether resources are being put to good use (Nurlaela, Mursito, Kustiyah, & Hartono, 2019). To calculate it, you divide sales figures by the average value of total assets across a given timeframe (Sitanggang, 2013).
The connection between asset turnover and financial outcomes appears substantial. Research backs this up: work by Pramesti, Wijayanti, and Nurlaela (2016) alongside Al Ani (2014) identified a positive and meaningful association between these variables, pointing to how putting assets to efficient use can boost profitability. Murtadlo, Imam, and Wahono (2014) similarly documented a noteworthy relationship between the two.
Given this evidence, we hypothesize:
H4: Asset turnover positively influences the financial performance of industrial companies in Jordan listed on the ASE.

3.5. Current ratio and financial performance

The current ratio tells us whether a company has enough liquid assets on hand to cover what it owes in the near term. When this ratio sits too low, firms may struggle to capitalize on early payment discounts, settle obligations when due, or weather unexpected cash crunches. Yet having the ratio climb too high suggests that considerable working capital sits idle in cash, savings accounts, or conservative investments—an arrangement that might drag down operational effectiveness (Brigham & Houston, 2016).
Stakeholders pay close attention to the current ratio as it sheds light on short-term financial stability and liquidity standing. While what counts as adequate varies across industries, a reading under 1.0 typically means liabilities outweigh readily available assets, raising questions about whether debt can be repaid. Conversely, when the ratio reaches excessive levels, it may point to short-term financial resources not being deployed optimally (Wilson, Idachaba, & Shallangwa, 2022; IQBAL, 2022).
This reasoning supports our hypothesis:
H5: The current ratio exerts a positive effect on financial performance for Jordanian industrial firms trading on the ASE.

3.6. Earnings per share and financial performance

Earnings per share represent a profitability measure showing how much of a company's profit is attributed to each share in circulation. Investors frequently turn to EPS when sizing up whether management is delivering returns to shareholders. Weak EPS numbers hint that leadership hasn't maximized returns effectively, whereas robust EPS figures point to growing shareholder wealth (Kiboi, 2015; Jasman & Kasran, 2017).
Because it directly measures profitability from a shareholder perspective, EPS draws considerable interest from current investors and those contemplating investments alike. Beyond revealing how well management performs, it allows for meaningful comparisons between different firms and across various periods (Olusola, Mengze, Chimezie, & Chinedum, 2022). Consequently, EPS stands as a dependable gauge for assessing corporate performance and guiding where capital should flow (Murtadlo, Imam, & Wahono, 2014).
These considerations lead to our final hypothesis:
H6: Earnings per share positively influence the financial performance of Jordanian industrial enterprises listed on the ASE.

3.7. Conceptual framework

Figure 1 illustrates the conceptual model guiding this study. Six capital structure indicators serve as independent variables: Total Assets (TA), Market-to-Book Value (MBV), Interest Coverage Ratio (ICR), Asset Turnover (ATO), Current Ratio (CR), and Earnings Per Share (EPS). These variables represent firms' financing decisions and operational efficiency. Financial performance, measured through Return on Assets (ROA) and Return on Equity (ROE), constitutes the dependent variables. The model hypothesizes positive relationships between all independent variables and both performance measures, reflecting theoretical expectations from Trade-Off Theory, Pecking Order Theory, and Agency Cost Theory.

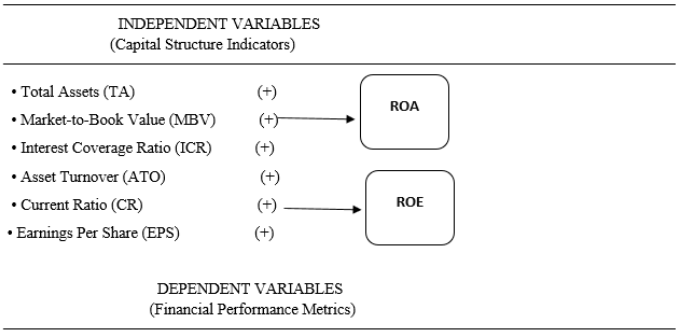

Fig. 1: Conceptual Framework of Capital Structure and Financial Performance Relationship.

4. Methodology

4.1. Firm selection

To accomplish what this study sets out to do, we adopted a descriptive-analytical framework. Our sample encompasses 33 industrial enterprises from Jordan that trade on the ASE, chosen specifically because their complete financial documentation remained accessible throughout the timeframe we examined.

4.2. Data collection

The investigation draws chiefly on quantitative information pulled from financial statements belonging to these Jordanian industrial firms listed on the ASE, spanning 2014 through 2021. We also gathered supplementary material from scholarly and theoretical literature bearing on the variables under consideration. Analysis was conducted using the Statistical Package for the Social Sciences (SPSS), allowing us to explore how the independent variables—Total Assets (TA), Market Value to Book Value (MBV), Interest Coverage Ratio (ICR), Asset Turnover (ATO), Current Ratio (CR), and Earnings Per Share (EPS)—influence the dependent variable, Financial Performance (FP).

4.3. Dependent variable

Financial performance, which serves as our dependent variable, was evaluated through two established accounting measures: Return on Assets (ROA) and Return on Equity (ROE). We computed ROA by taking net income after tax and dividing it by average total assets, whereas ROE came from dividing net income after tax by total shareholders' equity. This paired measurement strategy mirrors approaches employed in earlier investigations (Okafor, 2021; Rehman, 2020; Garcia, 2019).

4.4. Independent variables

Our independent variables comprise Total Assets, Market Value to Book Value, Interest Coverage Ratio, Asset Turnover, Current Ratio, and Earnings Per Share. The following table lays out how each variable gets defined and measured:

Table 1: Measurement of Independent Variables

Variable	Symbol	Measurement Description
Total Assets	TA	Measured by taking the natural logarithm of total assets.
Market Value to Book Value	MBV	Calculated by dividing the market value of a company's shares by their book value.
Interest Coverage Ratio	ICR	Calculated as earnings before interest and taxes (EBIT) divided by interest expenses.
Asset Turnover	ATO	Calculated by dividing net sales by the average total assets.
Current Ratio	CR	Calculated by dividing current assets by current liabilities.
Earnings Per Share	EPS	Calculated by dividing net profit (after taxes, interest, and preferred dividends) by the number of common shares outstanding.

Source: Authors' own creation.

4.5. Regression model analysis

To examine the impact of capital structure on the financial performance of Jordanian industrial companies listed on the Amman Stock Exchange (ASE), multiple regression analysis was employed. The general regression model used in this study is expressed as follows:

$$FP_{it} = \beta_0 + \beta_1 TA_{it} + \beta_2 MBV_{it} + \beta_3 ICR_{it} + \beta_4 ATO_{it} + \beta_5 CR_{it} + \beta_6 EPS_{it}$$

Based on this general model, two specific regression models were developed to evaluate financial performance using two distinct metrics:
Model 1 (ROE as Dependent Variable):

$$\text{Model 1 - } ROE_{it} = \beta_0 + \beta_1 TA_{it} + \beta_2 MBV_{it} + \beta_3 ICR_{it} + \beta_4 ATO_{it} + \beta_5 CR_{it} + \beta_6 EPS_{it}$$

Model 2 (ROA as Dependent Variable):

$$\text{Model 2 - } ROA_{it} = \beta_0 + \beta_1 TA_{it} + \beta_2 MBV_{it} + \beta_3 ICR_{it} + \beta_4 ATO_{it} + \beta_5 CR_{it} + \beta_6 EPS_{it}$$

Where:
FP = financial performance includes two measurements (ROA, ROE).
β0 = Regression equation constant.
TA = Total assets
MBV = Market value to book value
ICR = Interest coverage ratio
ATO = Asset turnover
CR = Current ratio
EPS = Earnings per share

5. Results and Discussion

5.1. Descriptive analysis

Table 2 displays the descriptive statistics covering both dependent and independent variables examined in this research. We applied standard statistical measures—mean, standard deviation, minimum, and maximum values—to sketch out the general characteristics of our dataset across the sample.

Table 2: Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
ROA	259	-85.716	38.397	1.73994	10.20504
ROE	259	-5,034.070	51.006	-32.67209	389.04348
TA	259	407,439	1,505,176,000	100,169,229.83	266,636,123.21
MBV	259	0.000	104.784	1.59211	6.53124
ICR	259	-5,863.050	6,450.900	33.32057	567.65454
ATO	259	0.000	3.215	0.59485	0.40285
CR	259	0.021	15.307	2.64783	2.43874
EPS	259	-1.077	4.060	0.11553	0.41734

Table 2 reveals that our analysis rests on 259 observations across all variables. Total Assets (TA) stands out with the largest standard deviation among the variables examined, pointing to considerable differences in company scale throughout the sample. Return on Equity (ROE) likewise shows pronounced variability, as evidenced by its substantial standard deviation. This wide dispersion suggests the presence of extreme values and reflects marked differences in how profitable firms are—patterns that might stem from instances of negative equity positions or unusual financial circumstances affecting certain companies.

5.2. Normality test

Before running a linear regression model properly, we need to satisfy certain conditions, one being that our data follow a reasonably normal distribution. When this requirement gets violated, any apparent relationship between what we're trying to explain and what's doing the explaining might turn out to be misleading, which would undercut the regression's capacity to shed light on the phenomenon we're investigating. For this study, we relied on Skewness and Kurtosis tests to gauge how closely our data distribution matches normality. Kim (2013) indicates that when absolute z-values for skewness and kurtosis stay at or below 3.29, we can reasonably accept the null hypothesis that the data are normally distributed.

Table 3: Normality Test Results

Variable	Skewness Statistic	Std. Error	Skewness Z-Value	Kurtosis Statistic	Std. Error	Kurtosis Z-Value
ROA	-3.039	0.151	-20.125	25.856	0.302	85.615
ROE	-11.651	0.151	-77.158	137.683	0.302	455.903
TA	3.702	0.151	24.516	12.389	0.302	41.023
MBV	15.414	0.151	102.079	244.191	0.302	808.579
ICR	1.378	0.151	9.125	108.224	0.302	358.357
ATO	2.209	0.151	14.629	10.019	0.302	33.175
CR	2.105	0.151	13.940	5.430	0.302	17.980
EPS	4.904	0.151	32.476	37.344	0.302	123.655

Table 3 makes it clear that several variables pushed past the acceptable ±3.29 threshold in their skewness and kurtosis z-values, signaling notable departures from normality. That said, the Central Limit Theorem (CLT) offers a way forward here. According to the CLT, when your sample grows large enough (typically $n > 30$), the distribution of sample means begins to resemble a normal distribution, even if the underlying population data don't follow that pattern. Since our investigation draws on 259 observations from industrial firms trading on the ASE, we can invoke the CLT to justify treating the data as approximately normal for purposes of regression analysis.

5.3. Multicollinearity test

This diagnostic aims to figure out whether variables in our multiple regression setup show problematic multicollinearity—meaning they're so highly correlated with each other that it becomes difficult to estimate their individual effects reliably. We examined this by running Pearson correlation tests among the independent variables, constructing a correlation matrix to see how they relate to one another. Gujarati (2009) suggests that multicollinearity starts becoming worrisome when correlations between two or more independent variables climb above 0.80, since such strong associations can distort the true relationships and call into question whether our regression results hold up. To check for these patterns, we built the cross-correlation matrix presented in Table 4:

Table 4: Multicollinearity Test Results

Variable	TA	MBV	EPS	IRP	ATOR	CR
TA	1					
MBV	-0.002	1				
EPS	0.590**	-0.046	1			
IRP	-0.006	0.004	0.089	1		
ATOR	-0.052	-0.068	0.113	0.113	1	
CR	0.049	-0.049	0.218**	0.097	0.002	1

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

Looking at Table 4, the strongest correlation we observed appears between Total Assets (TA) and Earnings per Share (EPS), clocking in at 0.590—comfortably beneath the critical 0.80 mark. This finding reassures us that multicollinearity isn't plaguing our independent variables, meaning we can confidently include all of them in the regression without worrying about distorted coefficient estimates.

5.4. VIF and tolerance test

To double-check that multicollinearity wasn't hiding anywhere among our independent variables, we ran both the Variance Inflation Factor (VIF) and Tolerance tests. Standard practice tells us that when VIF stays under 10, and Tolerance remains above 0.10 (or 10%), we can safely conclude that multicollinearity isn't causing problems. Table 5 lays out what we found:

Table 5: VIF and Tolerance Test Results

Variable	Model 1 (ROA)		Model 2 (ROE)	
	Tolerance	VIF	Tolerance	VIF
TA	0.629	1.589	0.629	1.589
MBV	0.991	1.009	0.991	1.009
IRP	0.972	1.029	0.972	1.029
ATOR	0.951	1.051	0.951	1.051
CR	0.934	1.070	0.934	1.070
EPS	0.592	1.689	0.592	1.689

Table 5 shows that every VIF value sits comfortably below the critical 10 mark, while all Tolerance values exceed the 0.10 floor. These results confirm that multicollinearity or problematic overlap among our independent variables simply isn't present. Consequently, our dataset satisfies the necessary assumptions, clearing the way for us to proceed with multiple regression analysis.

5.5. Multiple regression analysis for the first model (ROA)

We examined how capital structure influences financial performance among Jordanian industrial firms listed on the ASE by using Return on Assets (ROA) as our performance measure. The analysis employed a multiple regression framework with least squares estimation. Table 6 captures the results:

Table 6: Regression Analysis Results for ROA

Variable	B	T	Sig.
(Constant)	-4.382	-4.565	.000
TA	-7.163E-9	-3.497	.001
MBV	.055	.821	.412
IRP	.006	7.673	.000
ATOR	4.693	4.257	.000
CR	.813	4.426	.000
EPS	13.927	10.324	.000

Model Summary:

- R-squared = 0.546
- Adjusted R^2 = 0.535
- F-value = 50.504
- Sig. = .000

The R-squared figure of 0.546 tells us that our independent variables account for roughly 54.6% of the variation we observe in financial performance measured through ROA. The adjusted R^2 value, sitting at 0.535, reinforces that the model fits well, explaining about 53.5% of ROA's variability. Our F-statistic reaches significance at the 1% level ($p < .01$), which means the regression model as a whole holds up statistically.

Breaking down the individual variable effects, we find:

- TA (Total Assets): Demonstrates a statistically significant negative association with ROA at the 1% level. This suggests that when firms in our sample carry larger asset bases, their returns on those assets tend to run lower.
- IRP (Interest Coverage Ratio), ATOR (Asset Turnover), CR (Current Ratio), and EPS (Earnings Per Share): Each of these shows statistically significant positive relationships with ROA at the 1% level, pointing to their beneficial influence on how well assets generate returns.
- MBV (Market Value to Book Value): Does not appear to exert any statistically meaningful effect on ROA.

These patterns underscore how different elements of capital structure do not all push financial performance in the same direction—some enhance asset-based profitability while others seem to constrain it.

5.5.1. Interpretation of the negative TA-ROA relationship

Contrary to Hypothesis H1, Total Assets (TA) demonstrates a statistically significant negative relationship with ROA at the 1% level. This counterintuitive finding warrants careful interpretation and aligns with emerging evidence from capital-intensive industries in developing markets.

Several theoretical and contextual explanations may account for this result. First, inefficient asset utilization may characterize the sampled firms, in which asset growth outpaces revenue-generating capacity. Jordanian industrial companies often invest heavily in fixed assets—machinery, equipment, and manufacturing infrastructure—which require time to generate proportional returns. When these assets remain underutilized or operate below optimal capacity, they inflate the asset base without corresponding increases in profit, thereby suppressing ROA.

Second, the high fixed-asset burden inherent in industrial firms creates pressure on profitability. Unlike service-oriented sectors, manufacturing enterprises face substantial depreciation expenses and maintenance costs, which erode net income relative to total assets. This structural challenge is particularly pronounced in Jordan's industrial sector, where firms compete in price-sensitive markets with limited economies of scale.

Third, excess capital intensity without proportional returns suggests potential overinvestment during the study period (2014-2021). This timeframe encompassed regional instability and the COVID-19 pandemic, circumstances under which firms may have expanded asset

bases while demand recovery lagged, resulting in temporarily depressed asset productivity. Similar patterns have been documented in comparable emerging-market contexts in which investment cycles do not align with demand trajectories (Nassar, 2016; Mutegi, 2016).
These findings do not invalidate the importance of asset investment but rather highlight the critical role of asset efficiency over mere asset accumulation. The results support Agency Cost Theory, suggesting that unchecked asset growth—potentially driven by managerial empire-building rather than value maximization—can harm shareholder returns. Managers should prioritize improving asset turnover and capacity optimization over aggressive expansion strategies. This interpretation is consistent with Murtadlo et al. (2014), who similarly found no positive relationship between total assets and financial performance.

5.6. Multiple regression analysis for the second model (ROE)

To assess how capital structure affects financial performance among Jordanian industrial companies on the ASE when performance is measured through Return on Equity (ROE), we applied a multiple regression approach using least squares estimation. What we discovered appears in Table 7:

Table 7: Regression Analysis Results for ROE

Variable	B	T	Sig.
(Constant)	-0.589	-0.018	.986
TA	-2.530E-8	-0.356	.722
MBV	-46.288	-20.000	.000
IRP	0.006	0.219	.827
ATOR	39.342	1.027	.305
CR	5.127	0.803	.423
EPS	60.368	1.288	.199

Model Summary:

- R-squared = 0.281
- Adjusted R^2 = 0.252
- F-value = 9.550
- Sig. = .000

Our R-squared of 0.281 reveals that the independent variables we examined capture about 28.1% of the variability seen in ROE. The adjusted R^2 figure, which lands at 0.252, tells us that capital structure variables account for roughly 25.2% of the fluctuations in financial performance when gauged through ROE, leaving the rest to be explained by factors we haven't included in our model.
The F-statistic achieves significance at the 1% level ($p < .01$), which validates that our regression model works meaningfully as a whole.
When we look at what individual variables are doing, several patterns emerge:

- MBV (Market Value to Book Value): Exhibits a statistically significant negative connection with ROE at the 1% level. This finding suggests that as MBV climbs higher, return on equity tends to drop—an inverse relationship that stands out clearly in the data.
- TA (Total Assets), IRP (Interest Coverage Ratio), ATOR (Asset Turnover), CR (Current Ratio), and EPS (Earnings Per Share): None of these demonstrates statistically significant effects on ROE. Put differently, these variables don't appear to meaningfully explain why equity-based performance varies across the firms we studied.

What this analysis reveals is that MBV plays a substantial role in shaping ROE—though in a negative direction—while the other capital structure measures we examined don't seem to leave much of a mark on equity returns for these companies.

5.6.1. Understanding the divergence between ROA and ROE models

The substantial difference in explanatory power between the ROA model (R^2 = 53.5%) and the ROE model (R^2 = 25.2%) reflects fundamental measurement distinctions. ROA measures total asset efficiency, while ROE captures returns to equity holders after debt obligations. This difference becomes pronounced in capital-intensive industries where leverage varies substantially across firms.
Table 2 reveals that ROE exhibits considerably higher standard deviation than ROA, indicating pronounced variability. This dispersion likely stems from equity volatility caused by accumulated losses, dividend distributions, and capital adjustments during the 2014-2021 period. Instances of negative or near-zero equity among financially distressed firms produce extreme ROE values that distort the distribution and weaken model fit. The study period's economic uncertainty—including regional instability and COVID-19 impacts—triggered losses that disproportionately affected ROE calculations.
The statistically significant negative MBV-ROE relationship suggests that firms with higher market valuations relative to book equity report lower equity returns. This may occur when high-growth firms reinvest heavily, temporarily depressing ROE as new investments mature, or when market expectations exceed actual accounting performance.
These findings indicate that capital structure decisions impact accounting-based performance (ROA) more predictably than equity-based performance (ROE) in Jordan's industrial sector. The weaker ROE model suggests equity returns are influenced by factors beyond traditional capital structure variables, including macroeconomic shocks and firm-specific circumstances.

Table 8: Summary of Hypotheses Testing Results

Hypothesis	Independent Variable	Expected Effect	ROA Result	ROE Result	Conclusion
H1	Total Assets (TA)	Positive	Negative*	Not Significant	Rejected
H2	Market-to-Book Value (MBV)	Positive	Not Significant	Negative*	Partially Rejected
H3	Interest Coverage Ratio (ICR)	Positive	Positive*	Not Significant	Partially Supported
H4	Asset Turnover (ATO)	Positive	Positive*	Not Significant	Partially Supported
H5	Current Ratio (CR)	Positive	Positive*	Not Significant	Partially Supported
H6	Earnings Per Share (EPS)	Positive	Positive*	Not Significant	Partially Supported

Note: *** indicates statistical significance at the 1% level.

6. Conclusion

This investigation examined how capital structure shapes financial performance among 33 industrial firms trading on Jordan's Amman Stock Exchange between 2014 and 2021, employing multiple regression analysis with dual performance measures: Return on Assets (ROA) and Return on Equity (ROE).

6.1. Empirical findings and model performance

Our analysis reveals that capital structure explains 53.5% of ROA variance but only 25.2% of ROE variance, underscoring fundamental differences in how capital structure influences asset-based versus equity-based performance. The ROA model demonstrates that Total Assets (TA) negatively affects performance (β significant at 1% level), while Interest Coverage Ratio (ICR), Asset Turnover (ATO), Current Ratio (CR), and Earnings Per Share (EPS) exhibit positive effects. Market-to-Book Value (MBV) shows no significant relationship with ROA. Conversely, the ROE model reveals that only MBV significantly influences performance—and negatively so—while all other capital structure indicators prove statistically insignificant.

6.2. Theoretical implications

These findings partially support Agency Cost Theory and challenge simplified applications of Trade-Off Theory in emerging markets. The negative TA-ROA relationship suggests potential agency problems where managerial empire-building through asset accumulation destroys rather than creates shareholder value. This contradicts traditional assumptions that larger asset bases inherently improve performance, indicating that asset efficiency matters more than asset scale in Jordan's capital-intensive industrial sector. The result aligns with Agency Cost Theory's prediction that unchecked growth pursued by managers may harm profitability.

The positive effects of ICR, ATO, CR, and EPS on ROA support Trade-Off Theory insofar as firms balancing debt capacity (ICR), operational efficiency (ATO), liquidity (CR), and profitability (EPS) achieve superior asset returns. However, the weak ROE model challenges the universality of these relationships, suggesting that Pecking Order Theory may better explain equity performance in contexts where information asymmetries, volatile equity bases, and accumulated losses dominate.

6.3. Divergence between ROA and ROE

The pronounced difference between models reflects measurement fundamentals: ROA captures total asset productivity regardless of financing structure, while ROE isolates equity holder returns after debt obligations. In Jordan's industrial sector, high leverage combined with equity volatility—stemming from losses during the study period's economic uncertainty (regional instability, COVID-19)—creates ROE distortions that weaken explanatory power. The negative MBV-ROE relationship further indicates market-book value disconnects where growth expectations embedded in market valuations fail to translate into accounting equity returns, possibly due to reinvestment lags or overvaluation.

6.4. Practical implications

For managers, these findings emphasize that capital structure optimization requires context-specific strategies. Blindly pursuing asset expansion risks eroding ROA; instead, firms should prioritize asset turnover improvement, maintain adequate liquidity buffers, and manage debt serviceability. The weak ROE model suggests equity investors face risks beyond traditional capital structure variables, necessitating attention to macroeconomic conditions and firm-specific governance quality.

For policymakers, results highlight the need for initiatives supporting operational efficiency rather than merely facilitating capital access. Regulatory frameworks encouraging transparency in asset utilization reporting and liquidity management would benefit industrial sector stability.

6.5. Limitations and future research

This study examines Jordanian industrial firms during a specific period (2014-2021) marked by economic volatility. Future research should broaden the variable scope to include firm age, ownership structure, and industry-specific factors. Investigators should employ panel data techniques accounting for time-fixed effects and explore nonlinear relationships between capital structure and performance. Cross-country comparisons within MENA markets would clarify whether findings reflect Jordan-specific conditions or broader regional patterns. Qualitative research investigating managerial decision-making processes around capital structure would complement quantitative insights.

6.6. Concluding remarks

Capital structure significantly influences financial performance in Jordan's industrial sector, but effects vary substantially depending on performance measurement. Asset-based performance (ROA) responds predictably to capital structure indicators, particularly operational efficiency and liquidity measures, while equity-based performance (ROE) proves more sensitive to market perceptions and equity base volatility. These findings challenge universal capital structure prescriptions, demonstrating that emerging market contexts require tailored approaches accounting for institutional constraints, information asymmetries, and macroeconomic instability. Ultimately, sustainable performance improvement demands not just optimal capital structures but also rigorous attention to asset efficiency and strategic flexibility.

6.7. recommendations

Drawing from what we've learned, we put forward several recommendations:

1) Broaden the variable scope: Future research should incorporate additional financial and non-financial indicators, especially those that didn't demonstrate significant effects in our current work.
2) Probe deeper into causality: Investigators ought to dig into what drives the positive or negative impacts that individual independent variables have on financial performance, with particular attention to how they differently affect ROA versus ROE.

3) Establish ongoing monitoring: Regular assessments of financial performance among ASE-listed industrial firms should become standard practice, allowing managers to spot performance shortfalls and roll out corrective measures promptly.
4) Test across contexts: This line of inquiry deserves replication in other economic sectors and across different timeframes to see whether our findings hold up more broadly or reflect something specific to this particular setting.

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