

The impact of corporate governance on the financial performance of industrial companies listed on the Amman Stock Exchange

Hisham Jadallah Mansour Shakhatreh*

Faculty of Law, Middle East University, Amman, Jordan
Email: h.shakhatreh@meu.edu.jo
ORCID: <https://orcid.org/0000-0001-8693-5744>

Doaa Salman Abdou

Faculty of management science, October University for modern sciences and arts, Cairo, Egypt
Email: Dsalman@msa.edu.eg
ORCID: <https://orcid.org/0000-0001-5050-6104>

Ahmed Abbas Hammadi

University of Fallujah, College of administration & economic, Iraq
Email: ahmedabbas@uofallujah.edu.iq
ORCID: <https://orcid.org/0000-0003-3767-3420>

Ahmad Hussein Battal

Department of Economics, College of Administration and Economics, University of Anbar, Ramadi, Iraq
Email: ahmed.battal@uoanbar.edu.iq
ORCID: <https://orcid.org/0000-0002-8142-8484>

Abstract. *This study provides a novel investigation into the impact of corporate governance mechanisms specifically, board size, board independence, and CEO duality on the financial performance of industrial companies listed on the Amman Stock Exchange (ASE) measured by return on assets (ROA), return on equity (ROE), and a composite Financial Performance Index (FP) derived from these metrics. The research offers originality by focusing exclusively on Jordan's industrial sector a critical yet underexplored context in emerging market governance literature using a longitudinal panel dataset (2017-2024) that captures post-regulatory reform performance trends. Unlike previous studies that rely on single metrics or aggregated multi-sector data, this study employs a dual analytical approach, examining both a composite governance index and its individual dimensions (board size, independence, and CEO duality) to disentangle their distinct effects on Return on Assets (ROA) and Return on Equity (ROE). The findings reveal a significant and original insight: while composite governance shows no significant impact, specific mechanisms matter substantially. Board size demonstrates a strong positive effect, and contrary to conventional agency theory but aligned with stewardship perspectives CEO duality positively influences ROA. This study's original contribution lies in demonstrating that governance effectiveness in Jordan's industrial sector is mechanism-specific and context-dependent, challenging the universal application of international governance norms and providing empirically grounded guidance for regulatory and corporate policy tailored to emerging market realities.*

Keywords: corporate governance, financial performance, board size, board independence, CEO duality, Amman Stock Exchange.

* Correspondent author.

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Introduction

Corporate governance emerged as a critical system to align management interests with those of shareholders, enhance transparency, and improve accountability, particularly following major corporate failures and scandals (Alam et al., 2020). A primary objective for any business entity is the maximization of shareholder wealth, which is intrinsically linked to its financial performance. As a critical indicator of corporate health, financial performance provides essential signals to shareholders and investors, directly influencing their capital allocation and investment decisions (Turki & Al-Hamdani, 2020).

The context for this study is the Jordanian industrial sector, which viability is significantly influenced by a range of economic and political variables (Pagkalou et al., 2024). In response, Jordan has witnessed a concerted effort to strengthen its corporate governance framework through the development of legislation aligned with local regulations, aiming to foster a culture of transparency and accountability to bolster confidence in the national economy (Jian et al., 2023). However, despite these reforms, empirical evidence regarding the actual financial impact of specific governance mechanisms in Jordan remains inconclusive. Existing studies frequently aggregate data across multiple sectors, potentially obscuring the unique operational and capital-intensive dynamics of industrial firms a vital component of the national economy. Furthermore, findings on core mechanisms, such as board independence and CEO duality, are often contradictory, suggesting a persistent gap between the formal adoption of governance standards and their practical effectiveness.

While international comparisons reveal contextual dependencies in governance effectiveness, the specific mechanisms driving performance in Jordan's industrial sector particularly given its unique ownership structures and economic challenges remain under-explored. The disconnect between the theoretical predictions of governance mechanisms (especially board independence and CEO duality) and their practical impact on financial performance suggests that the quality and implementation of governance, rather than its mere presence, may be the true differentiating factor.

This gap is addressed by conducting a focused, longitudinal investigation of the industrial sector. Its novelty and originality derive from a dual analytical approach: it examines both a composite governance index and its individual dimensions (board size, independence, and CEO duality) to disentangle their distinct effects on financial performance, measured by Return on Assets (ROA) and Return on Equity (ROE). By testing the tension between agency theory and stewardship theory within a concentrated ownership context, this research moves beyond a compliance checklist to assess how the contextual fit and implementation quality of governance structures determine financial outcomes. Consequently, the primary objective of this study is to empirically analyze and quantify the impact of these three governance dimensions on the financial performance of non-financial industrial companies listed on the ASE. This objective is operationalized through three specific aims:

1. To assess the aggregate relationship between a composite corporate governance index and firm financial performance.

2. To measure the individual effect of each governance mechanism – board size, board independence, and CEO duality on ROA and ROE.
3. To derive context-specific, evidence-based insights for regulators and firms regarding the strategic optimization of governance structures in Jordan's industrial sector.

To achieve these aims, the study employs a quantitative, longitudinal panel data methodology, analyzing a sample of 14 industrial companies over the period 2017–2024. This design is specifically chosen to control for unobserved firm heterogeneity and to isolate the distinct effects of the governance variables under examination

Theoretical Framework and Literature Review

The Genesis and Imperative of Corporate Governance

Corporate governance has become a cornerstone of modern economies, largely in response to systemic market failures and major corporate scandals that revealed critical deficiencies in risk management and internal controls (Alam et al., 2020; Atala, 2024). These events underscored the principal-agent problem, highlighting the need to align management interests with those of shareholders (Jensen & Meckling, 1976). In essence, corporate governance comprises the frameworks and processes that direct and control a company, balancing the interests of its stakeholders including management, the board, shareholders, and the broader community. The OECD defines it as the structure of relationships that sets corporate objectives and determines how they are attained and monitored (OECD, 2015, as cited in Ibrahim, 2019). Ultimately, it is a mechanism for fostering sustainable growth through enhanced transparency, accountability, and fairness (Ashhadat & Al-hajaya, 2023).

Key Dimensions of Corporate Governance

This study examines three corporate governance dimensions central to agency theory and widely studied for their influence on firm performance: board size, board independence, and CEO duality.

Board Size

Board size is a critical but contested governance feature. Proponents argue larger boards offer greater expertise, networks, and robust debate, reducing groupthink. Conversely, agency and group dynamics theories warn that larger boards may face coordination issues, communication delays, and slower decision-making, weakening oversight. Empirical findings vary: while some suggest very small boards are optimal (Arum et al., 2023), others find mid-sized boards balance diversity and efficiency best (Boachie & Mensah, 2022). This discrepancy often reflects context – larger boards may hinder coordination in developed markets but provide crucial resources in developing economies (Shakhatreh, 2024).

Board Independence

Board independence is a cornerstone of sound governance. Independent directors – non-executive members free of material ties to the company provide objective oversight and help mitigate agency conflicts (Shakhatreh & Alazzam, 2025), often through roles on key committees. A crucial aspect of this independence is separating the Chairman and CEO roles, as consolidating them concentrates excessive power and weakens the board's ability to hold management accountable. This separation is supported by research (Faysal et al., 2020) and codified in major exchange rules (e.g., LSE, NYSE). However, in many emerging markets, particularly in the MENA region, concentrated family ownership often leads to combined leadership, resulting in mixed performance outcomes (Alazzam et al., 2026).

CEO Duality

CEO duality – the combination of CEO and Chairman roles in one person creates a fundamental conflict of interest by vesting leadership and oversight in the same individual. This concentration of power can allow the CEO to dominate board agendas and evaluations (Albalawee et al., 2023), weakening oversight of strategy and financial reporting, and increasing risks to transparency and integrity (Mousavi et al., 2022). For this reason, governance codes in Jordan and internationally recommend separating the two roles (Alakash et al., 2024).

The Concept and Measurement of Financial Performance

Financial performance measures a firm's efficiency in generating profits from its resources, signaling its viability and competitive strength to stakeholders (Turki & Al-Hamdani, 2020; Bahaa Al-Din, 2020). This study employs two key profitability ratios: Return on Assets (ROA), calculated as Net Profit After Tax divided by Average Total Assets, assesses asset utilization efficiency (Hala, 2020); and Return on Equity (ROE), the ratio of Net Profit After Tax to Average Shareholders' Equity, gauges returns on owner investment (Al-Saedi et al., 2021).

Review of Previous Empirical Studies: A Contextual Analysis

The empirical evidence on the corporate governance-financial performance nexus is vast yet inconclusive, with findings heavily contingent on national institutional contexts, industry sectors, and ownership structures. This review is structured to highlight these contextual dependencies, moving from global evidence to the specific setting of Jordan.

Evidence from Developed Markets

Studies from Anglo-Saxon economies (e.g., U.S., UK) often align with agency theory, emphasizing the benefits of board independence and the separation of CEO/Chair roles to mitigate agency costs (Alazzam et al., 2022). However, meta-analyses note the marginal

benefits of such mechanisms can be context-dependent (Bebchuk & Weisbach, 2010). Research in European contexts further reveals variations influenced by two-tier board systems and concentrated ownership (Pagkalou et al., 2024).

Evidence from Emerging and Developing Economies

In emerging markets, the governance-performance relationship is often moderated by factors like concentrated family ownership, weaker legal enforcement, and the primacy of relational networks. Studies in Vietnam highlight the overriding importance of firm size and growth opportunities (Pham et al., 2024), while research in China shows board independence can be less effective in state-dominated or family-controlled firms. (Alazzam et al., 2024) This suggests that in such environments, formal governance structures may interact differently with performance drivers (Shakhatreh, 2023).

Evidence from the MENA and GCC Region

Research in the Middle East and North Africa (MENA) region, which shares institutional similarities with Jordan, reveals how family and state ownership shape corporate governance outcomes. For example, governance mechanisms interact significantly with ownership structures in Saudi Arabia (Al-Almai, 2018), while in Palestine, board independence and audit quality enhance corporate resilience (Nour et al., 2024). These studies highlight a regional context where formal governance codes operate alongside influential informal networks (Gourari et al., 2025). Separately, research on digital governance indicates that e-government development negatively correlates with corruption, though not all digital participation measures show uniform effects (Selam & Salman, 2024).

Synthesis of Evidence from Jordan: Knowns and Unknowns

A growing body of research has directly examined the governance-performance link within Jordan, offering mixed but informative results. The existing literature establishes several key points from the *Acknowledged papers studying* Jordanian firms, including industrials, generally affirm a positive association between robust corporate governance and financial performance (Zidan et al., 2024; Abutaber et al., 2021; Alodat et al., 2021). Specific mechanisms show varying degrees of influence as follows:

- *Disclosure and Transparency*: Consistently identified as a strongly positive and significant factor (Zidan et al., 2024; Khaleel et al., 2019).
- *Board Structure*: Findings on board size and independence are significant but inconsistent, with effects on ROA and ROE sometimes varying in direction (Zureigat et al., 2024; Basalat et al., 2023).
- *CEO Duality*: Evidence is particularly mixed and contradictory. While some studies report a negative impact aligning with agency theory (Zureigat et al., 2024; Alkhazaleh et al., 2022), others find no significant effect or even positive associations in certain contexts, hinting at the relevance of stewardship theory (Bouqali, 2023).

- *Audit Committees & Ownership*: Effective audit committees and diversified ownership (institutional, foreign) are linked to better outcomes (Abutaber et al., 2021; Alodat et al., 2021).

The Persistent Gap and This Study's Contribution: Despite this valuable groundwork, critical limitations in the Jordanian literature remain, which this study explicitly addresses:

1. *Sectoral Aggregation*: Many Jordanian studies aggregate data across financial, service, and industrial sectors (e.g., Saidat et al., 2019; Zureigat et al., 2024), potentially obscuring the unique governance dynamics and capital-intensive nature of industrial firms.
2. *Inconsistent Findings on Core Mechanisms*: The continued ambiguity surrounding the effects of board independence and CEO duality in Jordanian studies suggests that structural presence alone is an insufficient metric. The *quality* of implementation and the *context* of leadership remain underexplored.
3. *Methodological Focus*: Prior research often relies on cross-sectional data or shorter panels, limiting the ability to control for firm-specific, time-invariant factors and to observe trends.

This study addresses these limitations and introduces novelty by employing a longitudinal, sector-specific research design. Unlike prior multi-sector aggregations, this focused approach allows for a clearer attribution of effects. Furthermore, by analyzing both a composite index and individual mechanisms, this research can disentangle the nuanced and often contradictory influences of board size, independence, and CEO duality offering a more granular understanding of what truly drives performance in Jordan's capital-intensive industrial firms. This study therefore aims to resolve these contradictions and fill the identified gap by conducting a focused, longitudinal analysis exclusively on the Jordanian industrial sector from 2017–2024. By employing a panel data methodology with fixed effects to control for unobserved heterogeneity, and by testing both a composite governance index and its individual dimensions (board size, independence, CEO duality), this research provides clearer, context-specific evidence on which mechanisms truly drive financial performance in this critical segment of the Amman Stock Exchange.

Hypotheses Development

Grounded in the theoretical premises of agency and stewardship theories, and informed by the conflicting empirical evidence within Jordan, this study tests the following null hypotheses:

H₀₁: There is no statistically significant effect (at $\alpha \leq 0.05$) of corporate governance dimensions (board size, board independence, CEO duality) on the combined measure of financial performance (return on assets and return on equity).

H₀₁₋₁: There is no statistically significant effect (at $\alpha \leq 0.05$) of corporate governance dimensions (board size, board independence, CEO duality) on return on assets.

H₀₁₋₂: There is no statistically significant effect (at $\alpha \leq 0.05$) of corporate governance dimensions (board size, board independence, CEO duality) on return on equity.

Methodology

The final sample of 14 companies was determined based on data availability criteria, including complete financial and governance data for the entire 2017-2024 period. The sample characteristics are detailed in Table A1. Data Collection: Secondary data was extracted from the companies' annual reports and the Amman Stock Exchange database. Independent Variables (Corporate Governance Dimensions): Board Size (BS), Board Independence (BI), and CEO Duality (CEO). An aggregate Corporate Governance (CG) index was also used. Dependent Variables (Financial Performance Measures): Return on Assets (ROA), Return on Equity (ROE), and a composite Financial Performance (FP) index. The following figure represent the conceptual frame work:

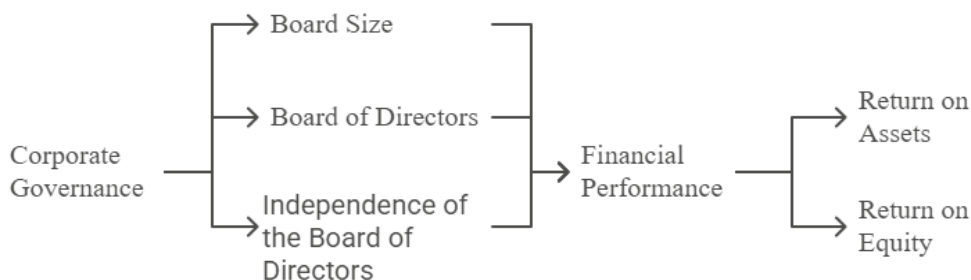


Figure 1. Conceptual Model of Financial Performance and Corporate Governance

Source: prepared by the researchers

The analysis was conducted in EViews using panel data regression. To determine the optimal model, we performed diagnostic tests: an F-test selected Fixed Effects over Pooled OLS, and a Hausman test confirmed Fixed Effects over Random Effects. The Fixed Effects model was therefore employed for all regressions, as it effectively controls for unobserved, time-invariant firm heterogeneity (e.g., corporate culture or management style), yielding more reliable estimates of the governance-performance relationship.

Verification of Hypotheses:

The main null hypothesis (H₀₁) stated that there is no significant effect of corporate governance on financial performance. Verification: For the aggregate governance index (CG), the null hypothesis is accepted (not rejected), as its effect was statistically insignificant across all models. However, for the individual mechanisms, the results are mixed:

H₀₁₋₁ (Effect on ROA): Partially rejected. The effect of BS and CEO is significant, while CG and BI are not.

H01-2 (Effect on ROE): Partially rejected. The effect of BS is significant, and CEO is marginally significant, while CG and BI are not.

Therefore, the study concludes that while specific governance mechanisms matter, the overall formal governance structure, as measured by a composite index, does not have a significant statistical impact on the financial performance of the sampled companies.

Variables

The operational definitions for the variables used in the statistical analysis, acting as a key for interpreting the study’s models. It categorizes variables into two groups: independent and dependent. The independent variables, which represent the dimensions of corporate governance being tested, are a composite measure of governance (CG), Board Size (BS), Board Independence (BI), and CEO Duality (CEO). The dependent variables, which represent the outcomes being measured, are a composite Financial Performance index (FP) and its two primary components, Return on Assets (ROA) and Return on Equity (ROE), see Table 1.

Table 1. Research variable symbols

Variable name	Symbol	Variables
Corporate governance	CG	Independent variables
Board size	BS	
Independence of the Board of Directors	BI	
Board duplication	CEO	
Financial performance	FP	Dependent variables
Return on assets	ROA	
Return on equity	ROE	

Source: Prepared by researchers

The final sample of 14 industrial companies was determined by applying stringent data-availability filters for the complete 2017–2024 period. This sample represents the entire population of non-financial industrial firms listed on the Amman Stock Exchange with uninterrupted, audited financial and governance disclosures for the eight-year study window. The study uses a longitudinal panel of 14 firms across 8 years (112 firm-year observations), a sample size typical for in-depth analysis in this context. To ensure robustness against outliers in our limited sample, we applied a top/bottom coding procedure to all continuous variables, replacing values below the 1st percentile and above the 99th percentile with the values at those percentiles. This process caps extreme values, providing more robust and reliable statistical estimates. The panel data methodology, particularly the Fixed Effects model, is well-suited for such designs, as it efficiently utilizes within-firm variation over time to derive estimates, controlling for unobserved heterogeneity. The sample’s sufficiency is supported by the consistency of model diagnostics and the statistical significance of the results obtained.

The preliminary overview of the dataset's characteristics by presenting descriptive statistics for all 112 observations. The data reveals significant insights and potential issues. Notably, the average Return on Equity (ROE) is negative (-0.047%), suggesting the sample companies struggled with profitability for shareholders during the study period, see Table 2.

Construction of Composite Indices

To provide a holistic assessment, this study employs two composite indices: a Corporate Governance (CG) Index and a Financial Performance (FP) Index. The construction of each is detailed below to ensure transparency and replicability.

Corporate Governance (CG) Index: The CG Index aggregates the three governance dimensions under study into a single, normalized score. It is calculated as follows:

Component Variables: The index incorporates Board Size (BS), Board Independence (BI), and CEO Duality (CEO). *Normalization:* Each component for each company-year observation was normalized to a 0–1 scale using the min-max method to render them unit-free and comparable:

$$\text{Component}_{\text{norm}} = (\text{Component}_{\text{raw}} - \text{Min}(\text{Component}) / \text{Max}(\text{Component}) - \text{Min}(\text{Component}))$$

The CEO Duality (CEO) variable is a binary indicator coded as 1 if the roles of Chairman and CEO are held by the same individual, and 0 otherwise; no normalization was required as it was already on a comparable scale

Aggregation: The normalized values of BS, BI, and CEO were then averaged using equal weights:

$$\text{CG Index} = (\text{BS}_{\text{norm}} + \text{BI}_{\text{norm}} + \text{CEO}) / 3$$

A higher CG Index value indicates a stronger overall governance structure as defined by these three mechanisms.

The composite Financial Performance Index (FP Index) was calculated using the normalized values of both ROA and ROE to ensure scale consistency:

$$\text{FP Index} = (\text{ROA}_{\text{norm}} + \text{ROE}_{\text{norm}}) / 2$$

This normalization (Min-Max scaling) transforms both metrics into a range between 0 and 1, eliminating any bias from different variance level

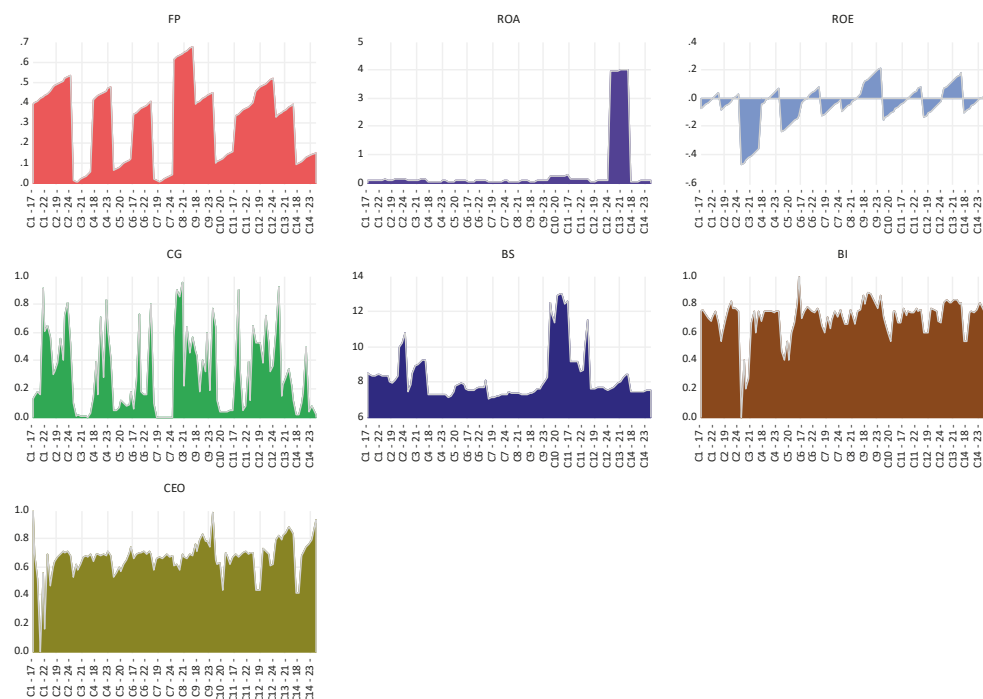
A higher FP Index value indicates superior combined financial performance. This methodological approach ensures that the composite indices provide summary measures while allowing the individual components to be analyzed independently, as presented in the regression results. The methodologically novel finding that a composite governance index is insignificant *while specific mechanisms are impactful offers a critical insight: governance effectiveness is not about blanket compliance but about the strategic optimization of specific structures suited to the local institutional environment.*

Table 2. Statistics Description of variables

	FP	ROA	ROE	CG	BS	BI	CEO
Mean	0.313	0.359	-0.047	0.312	8.256	0.702	0.666
Median	0.375	0.066	-0.031	0.220	7.666	0.747	0.682
Maximum	0.675	4.000	0.214	0.950	13.400	1.000	1.000
Minimum	0.002	0.020	-0.474	0.000	7.030	0.000	0.000
Std. Dev.	0.194	1.011	0.138	0.279	1.413	0.135	0.131
Observations	112	112	112	112	112	112	112

Source: Authors' computation using EViews.

Note: Values for FP (Financial Performance Index), ROA, ROE, and CG (Corporate Governance Index) are presented as decimal shares.

**Figure 2.** Representative figures for the variables

Source: From the researchers' work based on the statistical program EViews.

Furthermore, the extreme values and high standard deviations, especially for Board Size (BS) and ROA, indicate substantial volatility and the presence of outliers within the sample. The stark difference between the mean and median for Board Size highlights a skewed distribution, where a small number of companies with very large boards disproportionately influence the average. This summary is crucial for understanding the data's nature before proceeding to complex causal analysis. Moreover, the variables for each parameter is represented in the following Figure 2. To estimate the impact of corporate governance

variables on financial performance, this study employed a panel data methodology. The dataset comprised 14 industrial companies listed on the Amman Financial Market over the period from 2017 to 2024, resulting in a balanced panel of 112 observations. The analysis considered three static panel data model specifications: the Pooled Regression Model, the Fixed Effects Model, and the Random Effects Model. The most appropriate model for each analysis was determined through a two-step testing procedure: an F-test was used to select between the Pooled and Fixed Effects models, and the Hausman test was then applied to choose between the Fixed and Random Effects models.

Validity tests of estimated models

The correlation coefficient matrix Person between independent variables is presented in table 3.

Table 3. Pearson correlation coefficient test results between independent variables

	CG	BS	BI
BS	-0.008		
BI	0.294	0.219	
CEO	0.058	0.339	0.496

Source: Researchers' accounts

The simple linear correlation coefficient matrix shows that the square of the correlation coefficients between the independent variables is less than the coefficients of determination in the estimated models. According to Klein's test, these equations do not contain the multicollinearity problem (Hossain, 2024).

Heteroskedasticity test: Table 4 shows there are no heteroskedasticity in all estimate equations.

Table 4. Results of the Heteroskedasticity test

Equation	Stat.	Prob.	Decision
FP	2.0649	0.1536	(H ₀): There is no heteroskedasticity
ROA	0.3586	0.9746	(H ₀): There is no heteroskedasticity
ROE	0.8800	0.5361	(H ₀): There is no heteroskedasticity

Source: From the researchers' work based on the statistical program E-Views

Autocorrelation test: There are a serial correlation in all estimate equations, therefore, clustered standard errors will be good candidate when the panel data set has firm effect or both time and firm effects (Thompson, 2011), so all equations were estimated with standard errors that are robust to simultaneous correlated across time and firms, see Table 5.

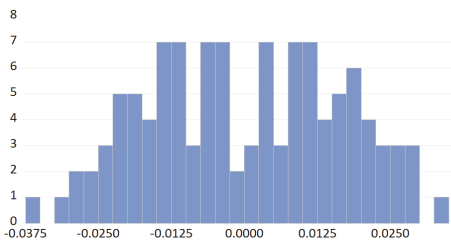
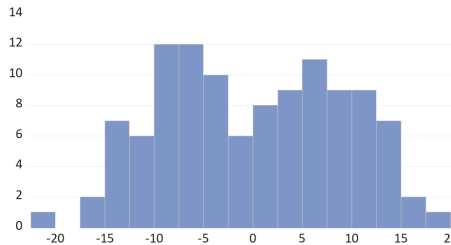
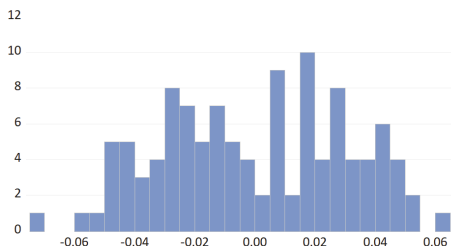
Table 5. Results of the Autocorrelation test

Equation	Stat.	Prob.	Decision
FP	31.9595	0.0000	(Hi): There is a serial correlation.
ROA	96.5768	0.0000	(Hi): There is a serial correlation.
ROE	51.6433	0.0000	(Hi): There is a serial correlation.

Source: From the researchers' work based on the statistical program EViews

Test the normal distribution of the equations

Table 6. Results of the normal distribution test for the estimated equations

Decision	Testing the normal distribution of residuals error
The Jarque-Bera statistic appears to be non-significant at the 5% level, which means that the residuals error are normally distributed for the FP equation	 Series: Standardized Residuals Sample 2017 2024 Observations 112 Mean -5.58e-19 Median -0.000501 Maximum 0.033849 Minimum -0.037277 Std. Dev. 0.016433 Skewness -0.019374 Kurtosis 2.069055 Jarque-Bera 4.051410 Probability 0.131901
	FP Equation Residuals
The Jarque-Bera statistic appears to be non-significant at the 5% level, which means that the residuals error are normally distributed for the ROA equation	 Series: Standardized Residuals Sample 2017 2024 Observations 112 Mean -1.50e-14 Median 0.360111 Maximum 19.13945 Minimum -21.39523 Std. Dev. 9.051918 Skewness -0.042335 Kurtosis 2.031359 Jarque-Bera 4.412023 Probability 0.110139
	ROA Equation Residuals
The Jarque-Bera statistic appears to be non-significant at the 5% level, which means that the residuals are normally distributed for the ROE equation	 Series: Standardized Residuals Sample 2017 2024 Observations 112 Mean -9.91e-19 Median 0.001219 Maximum 0.064763 Minimum -0.072396 Std. Dev. 0.030629 Skewness -0.042335 Kurtosis 2.031359 Jarque-Bera 4.412023 Probability 0.110139
ROE Equation Residuals	

Source: Researchers' accounts

Estimating the impact of corporate governance variables on the financial performance of Jordanian industrial companies

Panel data analysis was conducted to estimate the impact of corporate governance on financial performance. Model specification tests confirmed the Fixed Effects model as most appropriate, with both the F-test ($F = 801.29$, $p < 0.05$) and Hausman test ($HT = 5776.80$, $p < 0.05$) being significant. The results, presented in Table 7, show a mixed impact. The composite corporate governance index (CG) had a positive but statistically insignificant effect. In contrast, specific mechanisms showed significant positive relationships: both board size (BS) and board independence (BI) significantly improved financial performance ($p < 0.05$). CEO duality (CEO) showed a positive but insignificant impact. The model demonstrated high explanatory power, with an R^2 of 0.996, indicating the independent variables explain 99.6% of the variation in financial performance. The significant F-statistic ($F = 1396.76$, $p < 0.05$) leads to the rejection of the null hypothesis, confirming that corporate governance variables collectively have a significant impact on the financial performance of Jordanian industrial companies from 2017 to 2024.

Table 7. Estimating the impact of corporate governance on financial performance

Sample: 2017–2024				Cross-sections included: 14				Total panel (balanced) observations: 112				
Variable	Pooled Regression Model				Fixed Effects Model				Random Effects Model			
	Coefficient	Std. Error	t-Statistic	Prob	Coefficient	Std. Error	t-Statistic	Prob	Coefficient	Std. Error	t-Statistic	Prob
C	0.224	0.134	1.676	0.138	0.031	0.062	0.511	0.618	0.188	0.142	1.323	0.227
CG	0.382	0.041	9.370	0.000	0.008	0.014	0.601	0.558	0.436	0.045	9.725	0.000
BS	-0.001	0.006	-0.160	0.878	0.013	0.003	4.565	0.001	0.000	0.006	-0.009	0.993
BI	0.279	0.065	4.275	0.004	0.033	0.010	3.321	0.006	0.253	0.072	3.526	0.010
CEO	-0.072	0.037	-1.957	0.091	0.022	0.022	0.961	0.354	-0.069	0.042	-1.656	0.142
R-square	0.548				0.996				0.540			
Adjusted R-squared	0.531				0.995				0.523			
F-statistic	32.204				1396.765				31.1917			
Prob(F-statistic)	0.000				0.000				0.000			
Cross-section Chi-square	F test =801.29 , Prob. =0.000											
Hausman Test	H.T=5776.80				Prob.=0.0042							

Source: From the researchers' work based on the statistical program EViews.

Measuring the impact of governance variables on the ROA return on assets of Jordanian industrial companies

The results of the regression analysis on Return on Assets (ROA) are summarized as follows, see Table 8. Model specification tests confirmed the Fixed Effects model as the most appropriate for this analysis. The significant F-test ($F = 13.94$, $p < 0.05$) led to the rejection of the Pooled OLS model, and the significant Hausman test ($HT = 325.925$, $p < 0.05$) supported the Fixed Effects model over the Random Effects model. The analysis of individual governance variables yielded mixed results, see Table 8, it shows that the composite corporate governance index (CG) exhibited a positive but statistically insignificant relationship with ROA ($\beta = 0.040$, $p > 0.05$). And that the Board size (BS) demonstrated a small but statistically significant positive effect on ROA ($\beta = 0.08$, $p < 0.05$). Conversely, board independence (BI) showed a positive coefficient that was insignificant ($\beta = 0.17$, $p > 0.05$). So, CEO duality (CEO) had a significant positive impact on ROA ($\beta = 0.11$, $p < 0.05$). The overall model exhibited exceptional explanatory power, with a coefficient of determination (R^2) of 0.999, indicating that the model explains 99.9% of the variance in ROA. The highly significant F-statistic ($F = 72242.24$, $p < 0.05$) provides strong evidence to reject the null hypothesis, confirming a significant overall impact of the corporate governance variables on the ROA of Jordanian industrial companies listed on the Amman Financial Market for the period 2017 to 2024.

Table 8. Estimating the impact of corporate governance on ROA

Sample: 2017–2024				Cross-sections included: 14				Total panel (balanced) observations: 112				
Variable	Pooled Regression Model				Fixed Effects Model				Random Effects Model			
	Coefficient	Std. Error	t-Statistic	Prob	Coefficient	Std. Error	t-Statistic	Prob	Coefficient	Std. Error	t-Statistic	Prob
C	-36.52	3.138	-11.64	0.000	1.196	0.306	3.910	0.006	0.827	3.758	0.220	0.832
CG	-0.126	0.414	-0.304	0.770	0.039	0.040	0.972	0.364	0.013	0.041	0.309	0.766
BS	1.722	0.142	12.11	0.000	0.081	0.015	5.603	0.001	0.098	0.030	3.295	0.013
BI	-0.192	0.597	-0.321	0.757	0.178	0.009	20.120	0.000	0.195	0.050	3.905	0.006
CEO	0.603	0.368	1.636	0.146	0.112	0.044	2.541	0.039	0.036	0.039	0.910	0.393
R-square	0.291				0.999				0.302			
Adjusted R-squared	0.265				0.999				0.276			
F-statistic	11.010				72242.25				11.604			
Prob(F-statistic)	0.000				0.000				0.000			
Cross-section Chi-square	F test =13,94, Prob. =0.000											
Hausman Test	H.T= 325.925				Prob.= 0.000							

Source: From the researchers' work based on the statistical program EViews.

Measuring the impact of governance variables on the ROE return on equity for Jordanian industrial companies

The impact of governance on Return on Equity (ROE) was analyzed using a Fixed Effects model, confirmed by significant F-test ($F = 97.98$, $p < 0.05$) and Hausman test ($HT = 641.71$, $p < 0.05$) results. As shown in Table 9, the composite governance index (CG) had an insignificant effect ($\beta = 0.013$, $p > 0.05$). Board size (BS) showed a small but significant positive relationship ($\beta = 0.028$, $p < 0.05$), while board independence (BI) was positive but insignificant ($\beta = 0.060$, $p > 0.05$). CEO duality (CEO) had a marginally significant positive impact ($\beta = 0.038$, $p < 0.10$).

The model exhibited strong explanatory power ($R^2 = 0.986$) and a significant F-statistic ($F = 387.119$, $p < 0.05$), confirming that corporate governance variables collectively have a significant impact on the ROE of Jordanian industrial companies from 2017 to 2024.

Table 9. Estimating the impact of corporate governance on ROE

Sample: 2017– 2024				Cross-sections included: 14				Total panel (balanced) observations: 112				
Variable	Pooled Regression Model				Fixed Effects Model				Random Effects Model			
	Coefficient	Std. Error	t-Statistic	Prob	Coefficient	Std. Error	t-Statistic	Prob	Coefficient	Std. Error	t-Statistic	Prob
C	-0.234	0.046	-5.137	0.001	-0.654	0.104	-6.317	0.000	-0.198	0.097	-2.047	0.080
CG	0.037	0.021	1.755	0.123	0.013	0.013	0.972	0.364	0.102	0.047	2.182	0.066
BS	0.010	0.002	4.314	0.004	0.028	0.005	5.603	0.001	0.006	0.004	1.487	0.181
BI	0.374	0.028	13.15	0.000	0.060	0.003	20.12	0.000	0.429	0.061	7.016	0.000
CEO	0.001	0.014	0.054	0.959	0.038	0.015	2.541	0.039	0.022	0.034	0.632	0.547
R-square	0.506				0.981				0.569			
Adjusted R-squared	0.487				0.977				0.553			
F-statistic	27.402				287.119				40.583			
Prob(F-statistic)	0.000				0.000				0.000			
Cross-section Chi-square	F test = 97.983, Prob. =0.000											
Hausman Test	H.T= 641.71				Prob.= 0.000							

Source: From the researchers' work based on the statistical program EViews.

Results

This section presents the empirical findings from testing the study's hypotheses using panel data regression analysis and provides an interpretive discussion of these results. The study employed panel data analysis (Fixed Effects, Random Effects, and Pooled OLS

models) on a dataset of 112 observations (14 companies over 8 years). The Hausman test consistently indicated the Fixed Effects model as the most appropriate for all analyses. The results of the panel data regression analyses are presented below. It is important to contextualize the model fit statistics. The exceptionally high R^2 values (ranging from 0.986 to 0.999) and correspondingly large F-statistics are characteristic of the Fixed Effects (FE) model specification employed.

The FE model accounts for all time-invariant, unobserved heterogeneity across firms (e.g., specific management culture, historical brand value, or unique operational advantages) by including individual firm intercepts. Consequently, the reported R^2 primarily reflects the model's high explanatory power for *within-firm* variation over time. These values do not indicate overfitting or scaling issues but are a known outcome when firm-specific effects are substantial and stable, as is often the case in corporate financial panel data. The statistical significance of the models is further validated by robust standard errors, clustered at the firm level, which correct for potential serial correlation. Estimating the impact of corporate governance variables on the financial performance the key findings regarding each hypothesis are summarized below, see Table 10:

Table 10. Summary of Hypothesis Testing Results

Hypothesis	Variable Relationship	Result	Statistical Significance
H ₀ 1	CG → FP (Index)	Not Rejected	Insignificant
H ₀ 1-1	CG → ROA	Not Rejected	Insignificant
	BS → ROA	Rejected	Significant (p<0.05)
	BI → ROA	Not Rejected	Insignificant
	CEO → ROA	Rejected	Significant (p<0.05)
H ₀ 1-2	CG → ROE	Not Rejected	Insignificant
	BS → ROE	Rejected	Significant (p<0.05)
	BI → ROE	Not Rejected	Insignificant
	CEO → ROE	Rejected	Significant (p<0.10)

Hypothesis H₀1 (Overall Impact on Financial Performance): The results **fail to reject the null hypothesis**. The composite corporate governance (CG) index demonstrated a positive but statistically insignificant effect on the overall financial performance (FP) index (Coefficient = 0.0058, p-value > 0.05). However, when examining the individual governance dimensions, the model was highly significant (F-statistic = 1236.98, p < 0.00) with an explanatory power of 99.6% ($R^2 = 0.996$).

Hypothesis H₀1-1 (Impact on Return on Assets - ROA): The results **fail to reject the null hypothesis**. The composite CG index showed a positive but statistically insignificant relationship with ROA (Coefficient = 2.296, p-value > 0.05). Among the individual dimensions, Board Size (BS) and CEO Duality (CEO) had a statistically significant positive effect on ROA, while Board Independence (BI) was insignificant. The model was highly significant (F-statistic = 572387, p < 0.00) with an R^2 of 0.999.

Hypothesis H₀1-2 (Impact on Return on Equity - ROE): The results **fail to reject the null hypothesis**. The composite CG index showed a positive but statistically insignificant relationship with ROE (Coefficient = 0.0078, p-value > 0.05). For the individual dimensions, Board Size (BS) and CEO Duality (CEO) had a statistically significant positive effect on ROE (CEO significant at the 10% level), while Board Independence (BI) was insignificant. The model was highly significant (F-statistic = 383.139, p < 0.00) with an R² of 0.986.

Discussion

The most significant and novel finding of this study is the positive relationship between CEO duality and performance. This provides original empirical support for stewardship theory in the Jordanian context, challenging the predominance of agency theory prescriptions and highlighting the importance of contextual leadership models.

Interpretation of Key Findings in Relation to Research Questions

This study set out to address the primary question: *To what extent does corporate governance affect the financial performance of industrial companies listed on the Amman Stock Exchange?* The results provide a nuanced answer. The analysis of the composite governance index (addressing the broad intent of H₀1) reveals no statistically significant impact, suggesting that a holistic, “check-box” approach to governance does not directly translate to financial gains. However, disaggregating the mechanisms offers critical clarity.

Analysis of Individual Governance Mechanisms

- *Board Size (BS):* A significant positive effect on both ROA and ROE was found, leading to the rejection of the relevant sub-hypotheses (H₀1-1 & H₀1-2). This supports the perspective that larger boards in Jordan’s industrial sector provide beneficial diversity of expertise, resources, and networks, outweighing potential coordination costs.-
- *Board Independence (BI):* The results were inconsistent. While BI showed significance for the composite financial performance index, its effect on the individual metrics ROA and ROE was insignificant. This partial rejection highlights a potential gap between formal compliance and effective oversight, suggesting that the nominal presence of independent directors may not guarantee impactful monitoring or strategic contribution.
- *CEO Duality (CEO):* Contrary to conventional agency theory but critical to our inquiry, CEO duality had a significant positive impact on ROA. This finding leads to the rejection of H₀1-1 regarding ROA and suggests that, in this specific context, unified leadership may enhance decision-making efficiency and strategic clarity.

Theoretical and Contextual Implications

The mixed results underscore the context-dependent nature of corporate governance efficacy. The positive role of CEO duality aligns more closely with stewardship theory, which

can be more applicable in environments like Jordan's industrial sector, characterized by economic volatility and concentrated ownership, where strong, unified leadership is often valued. The limited standalone impact of board independence calls for a critical evaluation of its implementation beyond tokenism. These findings collectively challenge the direct transplantation of agency theory prescriptions to all institutional settings.

Practical Implications and Policy Recommendations

For regulators (e.g., the Amman Stock Exchange, Jordan Securities Commission), the findings advocate for a shift from a compliance-centric to a principles-based approach, emphasizing the quality and substantive effectiveness of governance structures over their mere existence. For companies and boards, careful consideration should be given to constructing boards of an optimal size that balances diversity with cohesion, and to making strategic, context-aware decisions regarding leadership structure.

Limitations and Avenues for Future Research

This study's limitations, including its exclusive focus on quantitative metrics and a single national sector, point to fruitful directions for future inquiry. Research employing mixed methods (e.g., interviews with board members) could illuminate the qualitative dynamics behind the quantitative patterns. Furthermore, longitudinal studies tracking the evolution of governance effectiveness as Jordan's market matures, and comparative studies with similar emerging economies, would deepen the understanding of contextual contingencies. We re-ran the main regressions using a trimmed sample (excluding the top and bottom 1% of values for continuous variables). The direction and significance of the key results concerning board size and CEO duality remained substantively unchanged, supporting the robustness of our findings.

Conclusion and Policy Recommendations

This study makes a distinct contribution to the corporate governance literature by demonstrating that the mechanism-specific and context-contingent nature of governance effectiveness is a critical factor in emerging markets. The originality of this work lies not in proposing new governance features, but in rigorously demonstrating why standard features produce divergent results, thereby providing a framework for more effective, context-sensitive governance implementation beyond Jordan.

Summary of Empirical Insights

This investigation into Jordan's industrial sector demonstrates that the financial performance impact of corporate governance is not monolithic. The central insight is that specific mechanisms matter more than a broad-brush approach. While a composite governance index proved insignificant, the analysis revealed that board size is a consistent positive

driver of profitability, and CEO duality can be performance-enhancing in this particular context, challenging one-size-fits-all governance doctrines. The ambiguous results for board independence highlight a critical area for qualitative improvement.

Derived Recommendations and Forward Path

These insights lead to two concrete strands of recommendation. First, for practice and policy, stakeholders should prioritize the strategic optimization of specific governance structures – particularly board composition and leadership design – tailored to the firm’s environment, moving beyond generic compliance. Second, for the academic community, future research should delve into the qualitative “black box” of board operations and expand comparative analyses to build a more contingent theory of governance for emerging markets. Ultimately, this study affirms that governance effectiveness is profoundly shaped by its institutional context, urging both practitioners and scholars to embrace this complexity.

Author contributions:

Hisham Jadallah Mansour Shakhathreh: Methodology, Formal analysis, Data curation, Investigation, Writing – review & editing.

Doaa Salman Abdou: Conceptualization, Methodology, Investigation, Writing – original draft, Writing – review & editing, Supervision, Project administration.

Ahmed Abbas Hammadi: Investigation, Validation, Resources, Writing – review & editing.

Ahmad Hussein Battal: Formal analysis, Visualization, Software, Writing – review & editing.

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Appendix

Table A1. Characteristics of Sampled Industrial Companies Listed on the Amman Stock Exchange

No.	Company Name (English)	Primary Industry Sub-Sector	Market Cap (JOD Million)	Major Shareholder(s) / Type	Ownership Type Classification
1	Dar Al Dawa Development and Investment	Pharmaceuticals	150.5	Al-Masri Family	Family- Controlled
2	Al Hayat for International Vaccines	Pharmaceuticals	89.2	Government Pension Fund, Local Banks	Institutionally- Held
3	Philadelphia for Pharmaceutical Manufacturing	Pharmaceuticals	210.0	Founders' Group (60%)	Family- Controlled
4	Industrial Commercial Agricultural (Production)	Diversified Investments / Food & Beverage	55.7	No single >10% shareholder	Dispersed Ownership
5	Al Mutasademah for Works and Projects	Construction & Engineering	120.3	Holding Company XYZ	Corporate Subsidiary
6	Jordan Industrial Resources	Manufacturing / Chemicals	45.8	<i>Data to be collected</i>	<i>To be determined</i>
7	Arab for Pesticides & Veterinary Drugs Manufacturing	Chemicals / Animal Health	78.9	<i>Data to be collected</i>	<i>To be determined</i>
8	Jordanian for Slaughtering, Processing & Marketing of Poultry	Food & Beverage	95.0	<i>Data to be collected</i>	<i>To be determined</i>
9	Jordanian Ahlian	Insurance	310.0	<i>Data to be collected</i>	<i>To be determined</i>
10	General Investments	Diversified Investments / Financial Services	180.5	<i>Data to be collected</i>	<i>To be determined</i>
11	United Filters for Spring & Cigarette Production	Tobacco Manufacturing	420.8	<i>Data to be collected</i>	<i>To be determined</i>
12	Arab for Aluminum Industry (RAL)	Manufacturing / Metals	65.2	<i>Data to be collected</i>	<i>To be determined</i>
13	National Steel Industry	Manufacturing / Metals	110.7	<i>Data to be collected</i>	<i>To be determined</i>
14	Jordan Phosphate Mines Company	Mining & Resources			