“Relationship between Jordan’s corruption level and company capital structure”

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RELATIONSHIP BETWEEN JORDAN'S CORRUPTION LEVEL AND COMPANY CAPITAL STRUCTURE

Abstract

Recently, corruption has become widespread, and firms' responses to corruption carry significant implications. The aim of this study is to check how corruption levels in Jordan influence the capital structure of 80 non-financial companies listed on the Amman Stock Exchange (ASE) from 2013 to 2022. Capital structure is the main dependent variable, and corruption is the crucial variable analyzed as the independent factor. Control variables include company age, profitability, asset tangibility, company size, and the Gross Domestic Product (GDP), in addition to the inflation rate, to create a solid framework for analyzing this nexus. This quantitative research paper applies the fixed-effect (FE) estimation to examine the static model of the study and the generalized method of moment (GMM) for the dynamic model via panel data investigation encompassing 800 company-year observations. The R2 results explain 42.1% of the variations in capital structure level. Accordingly, a 1% upsurge in corruption is accompanied by a 0.0367-unit upsurge in the capital structure ratio. This response is interpreted through the lens of the shielding theory, suggesting that firms raise debt to protect themselves against the predations of corrupt officials. The analysis reveals meaningful connections between the control variables and the capital structure. Specifically, increases in tangibility, firm size, inflation, and GDP correspond to a 3.56%, 1.07%, 6.06%, and 2.143% increase in capital structure, respectively, indicating a positive influence. Conversely, the firm age and profitability variables show adverse effects on capital structure, with coefficients of –1.46% and –7.3%, respectively.

Keywords corruption perception index, financial leverage, shielding theory, developing country, generalized method of moments

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INTRODUCTION

Corruption remains a major issue in developing nations (Han et al., 2022), with Jordan being particularly affected (Al-Hiari, 2022). Corruption's economic consequences are recognized, impeding investment and slowing growth (Thakur & Kannadhasanm, 2019). Corruption may improve efficiency for companies by "greasing the wheels" (Phan & Archer, 2020). However, it can also impede growth (Nguyen & Bui, 2022), like "sand in the wheels," and lower the quality of public administrative services (Singh & Kannadhasan, 2020). There has been a somewhat inconclusive picture, with evidence favoring both positions (Smith, 2016). Corruption involves public officials misusing state power for personal acquisition (Otusanya & Lauwo, 2019), affecting corporate financial decisions (Wei & Kong, 2017), especially firm capital structure (Tran et al., 2023). Thus, this paper will explore the influence of Jordan's corruption on companies' capital structure. Previous work has only focused on how corruption influences macroeconomic factors such as foreign direct investment (FDI), economic growth, and financial markets. Yet, its effect on corporate capital

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structures remains under-examined. This gap is significant, as corruption has ripple effects on borrowing costs, stock valuations, and corporate governance (Al-Hiyari et al., 2024). The corruption in Jordan has had adverse consequences on the investment climate, which highlights the worth of this investigation (Gharaibeh & Kharabsheh, 2022). Strikingly, no prior research has specifically investigated this nexus in Jordanian-listed firms, underscoring the study's significance and timeliness. Jordan offers an ideal opportunity to analyze how corruption affects capital structure, given the influential role played by the government in business activities (Al-Hiari, 2022; Khalaf et al., 2023). It is not yet known how country-level corruption influences corporate financial decisions (Tran et al., 2023). So far, very little attention has been paid to the role of how corruption affects businesses' financial decisions globally (Singh & Kannadhasan, 2020). Nevertheless, there are differing opinions and mixed results on this connection (Adeleke et al., 2021). Thus, this study addresses a fundamental question in Jordan as a developing country. How does corruption impact ASE-listed companies' capital structure?

1. LITERATURE REVIEW

Corruption has long been a problem in various countries, but there is growing concern, especially in less developed nations (Ibrahim, 2021). Corruption, historically, was frequently employed as a term to depict a governance problem arising from ineffective state administration (Monteverde, 2019). The definition of corruption used in previous studies was primarily based on the World Bank's perspective, which defines it as misusing public office for personal gain (Phan & Archer, 2020). Paying close attention to corruption (Van Vu et al., 2018), scholars and professionals recognize it as a significant problem in developing economies (Shwekeh et al., 2021). Despite the consensus among theoretical frameworks and experiential evidence regarding the unfavorable effects of corruption on the macroeconomic environment, there is still ongoing debate regarding its specific implications for business financial decisions (Tran et al., 2023).

The primary focus of studies on corrupt practices has been analyzing the broader macro-level effects of corruption. For example, Han et al. (2022) investigated the impact of anti-corruption campaigns on reducing poverty in China. According to their research, these campaigns resulted in higher income and lower poverty rates. Likewise, Thede and Karpaty (2022) unearthed a detrimental association between the corruption index and foreign direct investment (FDI) in Sweden from 1997 to 2015. Additionally, empirical evidence backs up the notion that corruption has a detrimental impact on economic growth (Nguyen & Bui, 2022). In addition, Olamide and Maredza (2023) conducted a study on how corruption affected the economic development of South Africa from 1990 to 2019. The research findings showed a clear inverse relationship between the two factors, especially in the short term. Therefore, if the environment is corrupt, governments may lack the trust of local and foreign investors. Corruption is a pervasive problem that impacts every sector of society worldwide. A significant challenge developing countries face is its detrimental impact on social welfare.

Nonetheless, some literary works have delved into the connection between a company's financial decisions and a corrupt environment. For example, Gaviria (2002) conducted a study on private enterprises in 20 Latin American nations and discovered that corruption, precisely the act of paying bribes, has detrimental effects on company competitiveness, investment, sales, and employment. Likewise, Tran's (2022) study revealed that corruption adversely influences corporations' propensity to engage in risk-taking. The study by Fan et al. (2012) focused on examining the connection between a company's CSR choices, ownership structure patterns, and institutional factors, such as corruption. They utilized data sets from single-country and multi-country sources to investigate this relationship. According to Lemma (2015) and Monteverde (2019), the current body of literature on perceived corruption highlights the fact that a corrupt environment has substantial negative impacts on society's economic and social aspects. When evaluating the effects that a corrupt environment can have, one question that can provide valuable insights is how companies can effectively mitigate the costs associated with

operating in a corrupt environment. Thakur and Kannadhasan (2019) propose that companies can effectively avoid rent-seeking behavior by implementing changes to their financial policies, as indicated by practical studies in the field.

Jordan placed 75th (Easy) out of 189 countries in the World Bank's Doing Business 2020 report for ease of doing business. Jordan scored 49 points and was ranked 63rd out of 180 countries in Transparency International's 2023 CPI. The economy of Jordan is affected by corruption, causing various adverse effects (Al-Hiari, 2022). When conducting business in Jordan, business executives encounter the challenge of corruption, as reported by the World Economic Forum's Global Competitiveness Report 2020. According to the World Bank (2023), corruption has had a severe impact on the economy of Jordan, resulting in a decline and hindering its development. Additionally, in Jordan, government organizations oversee most public services related to business operations. These services include business registration, real estate transfers, business condition monitoring, and tax collection. Developing countries are more affected by corruption than their developed counterparts. Because of their weak regulation mechanisms and low social productivity, corrupt activities in emerging markets can damage economic development. As a result, the main objective of this study is to examine the impact of corruption on the capital structure within this market. Because of countries like Jordan's unique legal and cultural contexts, it is crucial to consider the connection between corruption levels and corporate financial strategies. As Alodat et al. (2023) and Mansour et al. (2020) noted, this relationship has not been explored in any previous study. Additionally, it is essential to note that research conducted in various countries may not apply universally.

Businesses face operating costs in an environment plagued by corruption (Smith, 2016), as they must offer bribes to corrupt officials (Thede & Karpaty, 2022). Furthermore, managers exhibit a preference for their interests, placing them above those of their shareholders. Corruption enables managers to access shareholders' assets because of their greater flexibility in making liquidity-related choices (Tran et al., 2023). They will probably redirect corporate funds towards unprofitable investment ventures that serve their interests (Mansour et al., 2022a). The presence of these mechanisms leads to firms experiencing heightened costs of obtaining external financing (Mansour et al., 2023b; Tran et al., 2023). Hence, companies in provinces with a high prevalence of corruption exhibit reduced levels of financial leverage (Phan & Archer, 2020).

Corruption might yield a beneficial outcome for the debt ratio (Hu & Xu, 2019). Under the shielding theory postulated by Smith (2016), companies operating in exceedingly corrupt environments protect themselves against the rent-seeking behavior of corrupt officials through their financial choices. The shielding mechanism incorporates four commonly used financial policies: cash reserves, financial leverage (Singh & Kannadhasan, 2020), relocations, and acquisitions (Tran et al., 2023). In regions characterized by high levels of corruption, firms often choose to increase their debt ratios to show corrupt officials the elevated probability of facing bankruptcy (Monteverde, 2019). The officials who engage in corruption are opposed to the bankruptcy of these firms, as they expect future exploitation opportunities (Singh & Kannadhasan, 2020). As a result, corrupt officials are required to minimize their exploitation. Singh and Kannadhasan (2020) found evidence loadbearing the shielding theory, indicating that higher levels of corruption within a country positively correlate with its corporate capital structure. Tran et al. (2023) provide evidence that corruption significantly influences corporate dividend strategies, aligning with the motive for corruption avoidance.

Accordingly, the power of corruption on corporate financial decisions remains undefined. Extensive research is lacking on the influence of a country's corruption level on financial capital structure. According to Tran et al. (2023), the discoveries relating to this nexus are questionable and need further studies. The literature shows that companies may face exposure to a corrupt environment and the risk of expropriation. Companies can employ financial strategies to restrict the unauthorized acquisition of assets. The evidence substantiates the claim that companies adopt financial strategies regarding capital structure that prioritize reduced liquidity to safeguard their assets from seizure. This dynamic is evident in developing coun-

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tries such as Jordan, where firms often reduce their cash reserves to enhance the perceived risk of default. Thus, this research intentions to scrutinize the nexus between the corruption level in Jordan and the capital structure of ASE-listed companies from 2013 to 2022. As per the above review, our hypothesis posits that corruption level positively influences the corporate capital structure. HI: The level of corruption positively influences the corporate capital structure.

2. METHOD

2.1. Data collection

The data utilized in this study were collected from secondary sources (Mansour et al., 2024; Saleh & Mansour, 2024). This study employed diverse methods to gather these data, such as obtaining annual reports from most Jordan-listed companies over ten years. Thus, it extracts financial data from 80 non-financial companies from the ASE and the country's corruption data from the Transparency International databases. Moreover, this study also acquires macroeconomic country statistics through the World Bank's World Development Indicators (WDI) database. After excluding financial companies and observations with missing data to eliminate the impact of outliers (Alshira'h & Lutf, 2023), this study applies winsorization to all firm-specific factors (Lutfi et al., 2022), setting the 1st and 99th percentiles as the boundaries. It acquired a sample comprising 800 observations from 80 listed firms from 2013 to 2022.

2.2. Variables measurement

The sections covered in this paper summarize the recommended framework, define the research variables, and measure them.

2.2.1. *Measure of capital structure*

The significance of financial capital structure must be acknowledged by businesses globally (Saleh et al., 2021). Debt and equity are combined in the capital structure for corporate financing (Mansour et al., 2023b). The capital structure proxy is financial leverage, which is the essential response variable in this study. Due to the underdeveloped capital market (Mansour et al., 2022a), Jordanian firms rely on bank loans rather than issuing bonds for financing (Mansour et al., 2023b; Shubita, 2023). In line with the existing literature (e.g., Alodat et al., 2023; Alshirah et al., 2022; Mansour et al., 2023a; Shubita, 2020), this study uses the ratio of total debt to total assets to assess the capital structure of publicly listed companies in ASE.

2.2.2. *Measure of country's corruption*

Corruption is the independent variable. Unlike related studies (e.g., Adeleke et al., 2021) that used narrow or single proxies for corruption, such as bribery only, the existing study used a comprehensive and renowned proxy for country corruption, which Transparency International offered (https://www.transparency.org/en/cpi/2023). Thus, as in previous works (e.g., Olamide & Maredza, 2021; Shaari et al., 2022), the corruption perception index is used to measure corruption in this study. Lourenço et al. (2020) argue that the corruption perception rankings developed by Transparency International are widely acknowledged as a credible metric. The scale is 0-100. The scale ranges from 0 (high corruption) to 100 (minimal or no corruption). An inverse function is present (Wei et al., 2024).

2.2.3. *Firm-specific control variables*

Following related studies such as Belghitar et al. (2019), Singh and Kannadhasan (2020), Shubita and Alsawalhah (2012), and Tran et al. (2023), this study accounts for several control variables. The variables are the company's age, profitability, asset tangibility, and company size. Table 1 contains a concise summary of each variable and the correct explanation to be formulated.

2.2.4. *Country-specific control variables*

In contrast to former studies (e.g., Tran et al., 2023) that focused solely on firm-specific control variables, this study also considers country-specific variables (Ramli et al., 2019). In this regard, this study accounts for two significant macro factors, for instance, Gross Domestic Product (GDP) growth besides inflation (INF). Using such country-specific control factors is well-documented in current literature (Lutfi et al., 2023; Nguyen & Bui, 2022; Thede & Karpaty, 2022).

2.3. Methodology

This study inspects the influence of country-level corruption on capital structure by utilizing the fundamental static model outlined below.

$$LEV = \beta_0 + \beta_1 Corrupt_{i,t} + \beta_2 AGE_{i,t} + \beta_3 ROA_{i,t} + \beta_4 TANG_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 INF_{i,t} + \beta_7 GDP_{i,t} + \beta_8 Year + \beta_9 Industry + \varepsilon_{i,t}. \quad (1)$$

The subscripts *i* and *t* denote the company and year, correspondingly. Corrupt is country-level corruption (corruption index.), which is the major independent variable. Following Olamide and Maredza (2021) and Singh and Kannadhasan (2020), the "Corruption Perceptions Index" (CPI) is employed as the quantitative tool for evaluating corruption at the national level (Lourenço et al., 2020). The CPI exhibits the highest variation in time series and cross-sectional data compared with other corruption indices. Over the years, the scaling of the CPI data has been altered. AGE, ROA, TANG, and SIZE are firm-specific control variables. By including two macroeconomic variables, INF and GDP, to consider the economy's impact. Additionally, this study uses dummy variables to handle the impacts of industry and year. Table 1 provides the delineations of the research variables.

Table 1. Variable definitions

Variables	Symbol	Operationalization
Dependent Variable		
Capital structure	LEV	As "Total debt / total assets"
Independent Variables		
Country-level corruption	Corrupt Index	The CPI is a yearly ranking developed to evaluate levels of corruption in nations. The scale varies between 0, which represents high corruption, and 100, which signifies low corruption.
Firm specific control variables		
Company age	AGE	Measured by the natural logarithm of the "total number of years since a company was established" to the year of data collection
Profitability	ROA	As "Net Income/Total Assets"
Tangibility	TANG	Fixed assets/Total assets
Company size	SIZE	Measured as the "natural logarithm of total assets".
Country-specific control variables		
Inflation	INF	Consumer prices (annual %)
Gross Domestic Product	GDP	Gross Domestic Product growth rate

3. RESULTS

3.1. Descriptive statistics

Table 2 briefly proposes vital statistics from this study on 80 ASE-listed firms (2013–2022). It highlights a capital structure (LEV) range between 0.046 and 0.805, with a mean of 0.323 and a standard deviation of 0.201. These statistics align closely with findings from similar studies conducted within the Jordanian context (Lutfi et al., 2022a; Mansour et al., 2022a). Regarding corruption, the indices vary from 45 to 53, averaging 48.571 with a standard deviation of 2.196, showing ongoing challenges despite anti-corruption efforts. In the global ranking of 180 nations, Jordan ranked 63rd in 2023, and fourth among Arab countries (Transparency International, 2023).

Table 2. Descriptive statistics

Variables	Obs.	Mean	Std. Dev.	Min	Max
LEV	800	0.323	0.201	0.046	0.805
CORRUPT	800	48.571	2.196	45	53
AGE	800	3.046	0.708	0	4.394
ROA	800	0.0349	0.0654	–0.106	0.161
TANG	800	0.499	0.2638	0	0.961
SIZE	800	17.333	1.314	13.999	21.31
INF	800	2.0857	2.213	–0.9	4.8
GDP	800	2.357	0.493	1.9	3.4

Table 2 displays the control variables statistics specific to the company. The study found slight company age, profitability, tangibility, and size varia-

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tions. AGE diverse from 0 to 4.394, with a mean of 3.046 and a standard deviation of 0.708. ROA varied from –0.106 to 0.161, with an average value (standard deviation) of 0.0349 (0.0654). TANG varied from 0 to 0.961, with a mean value (standard deviation) of 0.499 (0.2638). SIZE ranged from 13.999 to 21.31, with a mean of 17.333 and a standard deviation of 1.314. Additionally, the country-specific control variables' average values for INF and GDP were also 2.0857% and 2.357%, respectively.

3.2. Bivariate correlations

Pearson's correlation is used in Table 3 to examine relationships between key variables, uncovering valuable trends in company financial dynamics. This study used Pearson's correlations to study the interactions between the selected variables to prepare for a study formal empirical investigation. Notably, there is a substantial positive correlation ($p<0.05$) between CORRUPT, AGE, SIZE, and LEV factors at a significance level of 5% or higher. This implies that older and larger companies, or in more corrupt contexts, may have a more significant debt burden. The matrix also shows significant negative correlations between ROA and TANG with LEV. This suggests that companies with higher profitability and more tangible assets tend to use less debt. Finally, the relationships between INF, GDP, and LEV were insignificant, showing that these macroeconomic factors may not influence companies' capital structure (LEV). Moreover, VIF scores below 10 suggest no multicollinearity, revealing unique and non-redundant information for each variable.

3.3. Regression results

The study investigated the balanced panel dataset of 80 ASE-listed firms (2013–2022) using multivariate regression analysis. This enabled us to define the extent and nature of the link between independent and response variables. The primary variable for explanation is the perception of corruption. Therefore, this study expected that the hypothesis (*H1*) would be confirmed with a positive and significant calculated β_1 coefficient. Besides year and industry, this study's regression models included various control variables, including company-specific elements and country-specific factors. The initial step before performing the primary regression analysis involved examining the assumptions of multivariate analysis to prepare and screen the data. The diagnostic tests conducted in this study identified common issues in the filtered raw data (Lutfi et al., 2023), such as heteroscedasticity and autocorrelation (Al-Hiyari et al., 2024). Consequently, the results were validated using the Driscoll-Kraay estimator, which employs a robust standard error. Moreover, the current study effectively identified the best approach to assess the regression model through conducting different tests, including the Breusch and Pagan (LM) tests and, subsequently, the Hausman tests, to attain the study objective. Table 4 highlights the

Table 3. Correlation analysis

Variable	LEV	CORRUPT	AGE	ROA	TANG	SIZE	INF	GDP
LEV	1.000							
CORRUPT	0.123* (0.0029)	1.000						
AGE	0.1011* (0.0142)	0.0383 (0.353)	1.000					
ROA	–0.298* (0.0000)	–0.0076 (0.855)	0.0726 (0.0787)	1.000				
TANG	–0.0147 (0.7229)	–0.0108 (0.793)	–0.1575* (0.0001)	–0.1086* (0.0084)	1.000			
SIZE	0.361* (0.0000)	0.0108 (0.794)	0.2588* (0.0000)	0.2482* (0.0000)	–0.0658 (0.1112)	1.000		
INF	0.0048 (0.908)	–0.5814* (0.0000)	–0.0364 (0.378)	0.0214 (0.6047)	0.0067 (0.872)	–0.0054 (0.895)	1.000	
GDP	–0.028 (0.496)	0.07 (0.086)	–0.143* (0.0005)	0.136* (0.0009)	–0.0266 (0.521)	–0.0168 (0.684)	0.1516* (0.0002)	1.000
VIFs	–	1.59	1.12	1.22	1.08	1.42	1.04	1.06

Note: * $P < 0.05$. (2-tailed).

efficacy of different models in analyzing corruption and its impact on capital structure. The LM test outcomes show the random effects (RE) model's superiority over OLS, with a significant score (824.39, $p < 0.01$). Furthermore, the Hausman test supports the FE model over the RE model because of its ability to handle time-related variables, reduce biases from unobservable factors, and mitigate endogeneity issues (49.28, $p < 0.01$). Therefore, this study employs an FE model to explore how corruption influences capital structure, with the FE estimates offering robust explanatory insights.

The R^2 of 42.1% illustrates the variables' explanatory power in understanding the variations in capital structure. Up to 42.1% of the variations in capital structure among Jordanian-listed companies can be explained by this model. The study model's validity was confirmed by the statistically significant F-test value of 279.11 at the 0.01 level. The relationship between CORRUPT and LEV is depicted through the regression coefficients in Table 4, which evaluate capital structure and are positively significant at the 1% level. The accuracy of Hypothesis 1, which claims a significant and affirmative link between corruption perception and capital structure in Jordan's non-financial sector, has been established. This study's outcomes align with Smith's shielding theory (Smith, 2016; Tran et al., 2023). There is a positive nexus between an increase of 1% in corruption and an increase of 0.0367 units in the LEV variable. This can be interpreted as the correlation between corruption levels and companies with higher debt ratios, suggesting that debt issuance is a strategic move to safeguard assets from appropriation, as debt holders are harder to confiscate than equity holders. Debt ratios at elevated levels signal increased bankruptcy threats, thereby discouraging corrupt officials from engaging in rent-seeking activities.

All the control factors that enhance LEV have been revealed to be significant. The coefficients displayed in Table 4 make this clear. According to Table 4, a one-unit change in TANG, SIZE, INF, and GDP leads to LEV changes of 3.56%, 1.07%, 6.06%, and 2.143%, respectively. Each unit change in tangible assets increases capital structure (LEV) by 3.56%. The intention for this consequence can be linked to the fact that tangible assets can serve as collateral, facilitating firms' access to financing in a potentially more cost-effective manner. A unit change in a firm's size results in a 1.07% increase in capital structure (LEV). Larger corporations frequently possess superior credit ratings and more predictable cash flows, rendering them more secure choices for lenders. These findings may be because larger companies are less likely to go bankrupt and have a more favorable reputation (Wei & Kong, 2017). This finding agrees with the trade-off theory, which posits that larger companies are more likely to employ greater amounts of debt.

Table 4. Influence of corruption level on corporate capital structure: A fixed-effects analysis

Variables	Coefficients (Std. Err.)	t	*P>t*
Constant	0.06083† (0.0408)	1.49	0.140
CORRUPT	0.0367* (0.013)	2.82	0.006
AGE	–0.0146* (0.00376)	–3.89	0.000
ROA	–0.073** (0.0318)	–2.29	0.022
TANG	0.0356** (0.0142)	2.51	0.012
SIZE	0.0107* (0.00387)	2.76	0.007
INF	0.0606* (0.0089)	6.84	0.000
GDP	0.02143* (0.00317)	6.76	0.000
Year Dummies		YES	
Industry Dummies		YES	
F-test		279.11	
Prob > F		0.0000	
R^2		42.1%	
Hausman results		(49.28)*	
Breusch & Pagan (LM) Test		824.39*	
Observations		800	
Companies		80	

Note: * $P < 0.01$, ** $P < 0.05$, and *** $P < 0.1$, † P-value insignificant.

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With every incremental rise in inflation, capital structure (LEV) experiences a corresponding increase of 6.06%. In response to elevated inflation, central banks may raise interest rates to manage inflation, consequently leading to higher borrowing costs (Mansour et al., 2023b). As a result, servicing existing debt becomes more expensive. If the GDP increases by one unit, the corresponding increase in capital structure (LEV) is expected to be approximately 2.143%. Also, it is likely that Jordanian-listed companies will rely on borrowing for expansion as the GDP grows. This means that firms will opt for greater debt levels in their financing when a country's economy is booming (Ramli et al., 2019). The variables AGE and ROA exhibited estimated coefficients of –0.0146 and –0.073, respectively, which were statistically significant at a 5% or higher level when examining their relationship with LEV. Mature and profitable companies experience a reduced requirement for debt financing because of their decreased external funding needs. The evidence gathered firmly indicates that the results uphold the pecking order theory, showing that successful companies prioritize retained earnings for their initial investments and view debt and equity as secondary alternatives.

3.4. Additional analysis

To mitigate any potential endogeneity issues, this study has incorporated a dynamic model that includes the lagged dependent variable in the analysis from the first year into Equation (1) in the following manner:

$$\begin{aligned} LEV &= \beta_0 + \beta_1 LEV_{i,t-1} + \beta_2 Corrupt_{i,t} \\ &+ \beta_3 AGE_{i,t} + \beta_4 ROA_{i,t} + \beta_5 TANG_{i,t} \\ &+ \beta_6 SIZE_{i,t} + \beta_7 INF_{i,t} + \beta_8 GDP_{i,t} \\ &+ \beta_9 Year + \beta_{10} Industry + \varepsilon_{i,t}. \end{aligned} \quad (2)$$

System GMM regression is widely regarded as the most suitable regression method for analyzing dynamic models (Wei & Kong, 2017). This approach is appropriate for the dataset of this study, which has a few time periods and many observations (Mansour et al., 2022b), and it effectively addresses endogeneity. By including lagged dependent variables (LEV $t\text{-}_1$) in the empirical models, researchers can effectively account for unobserved historical factors that may impact firms' current capital structures. This helps minimize any bias caused by omitted variables. Van Vu et al. (2018) also suggest that macroeconomic studies face challenges such as omitted variables and reverse causality bias. Following Nguyen and Bui (2022) and Tran et al. (2023), these issues will be resolved by applying a system GMM estimator for dynamic panels.

Table 5. Effect of corruption level on capital structure: A GMM analysis

Variables	Coefficients (Std. Err.)*	z	P>z
Constant	0.763* (0.2431)	3.14	0.002
LEV (t–1)	0.9744* (0.0792)	12.30	0.000
CORRUPT	0.0304** (0.0123)	2.47	0.014
AGE	–0.01321† (0.0189)	–0.70	0.484
ROA	–0.0503* (0.0116)	–4.34	0.000
TANG	0.2051* (0.0604)	3.40	0.001
SIZE	0.04879* (0.0151)	3.25	0.001
INF	0.0475* (0.0128)	3.70	0.000
GDP	0.1197** (0.0523)	2.29	0.022
Year Dummies	YES		
Wald chi2	320.01		
Prob > chi2	0.000		
Sargan test	0.2567		
AR(1)	0.0091		
AR(2)	0.9073		
Number of instruments	28		
Observations	800		
Companies	80		

Note: * $P < 0.01$, ** $P < 0.05$, and *** $P < 0.1$, † P-value insignificant. * Robust standard errors in parentheses.

In Table 5, the lagged LEV coefficient was statistically significant and positively associated at the 1% level. The previous LEV values impacted the current LEV values. Similarly, the LEV model consistently shows a significant positive effect of CORRUPT. The outcomes of the system GMM estimator in Table 5 closely match the outcomes of the FE regression model presented in Table 4, confirming the reliability of the findings. The conclusion drawn from the analysis of robustness is that *H1* remains valid. Thus, there are no indications of endogeneity problems in the companies studied.

3.5. Robustness analysis

To confirm the generalizability of the study results, the same regressions were conducted using

different measures of the capital structure. To be more precise, they used a market capital structure (a market-based measure of financial leverage by dividing total debt by the market value of assets), following the studies by Belghitar et al. (2019), Singh and Kannadhasan (2020), and Wei and Kong (2017).

Table 6. Effect of corruption level on market capital structure: A random-effect analysis

Variables	Coefficients (Std. Err.)	t	*P>t*
Constant	16.823* (5.222)	3.22	0.001
CORRUPT	0.1748* (0.0645)	2.71	0.009
AGE	–0.1368* (0.0239)	–5.72	0.000
ROA	–0.547* (0.1499)	–3.65	0.000
TANG	0.0347* (0.0104)	3.35	0.001
SIZE	0.0507* (0.0144)	3.52	0.001
INF	–0.268* (.0186)	–14.41	0.000
GDP	0.0686* (.0095)	7.24	0.000
Year Dummies	YES		
Industry Dummies	YES		
F-test	161.28		
Prob > F	0.0000		
R^2	0.1173		
Hausman results	(13.48†)		
Breusch & Pagan test	844.93*		
Observations	800		
Companies	80		

Note: * $P < 0.01$, ** $P < 0.05$, and *** $P < 0.1$, † *P*-value insignificant.

Along with the findings in Table 6, there is a clear and significant positive linkage between corruption and the new proxy measure. Furthermore, Table 6 approves that the RE estimator's results closely match the FE analysis outcomes in Table 5, verifying the credibility of our findings. The conclusion drawn from the robustness analysis is in support of *H1*. Overall, the findings confirm the initial conclusions about the strong influence of corruption levels on corporate financial choices and demonstrate the resilience of our main results across different measurements of capital structure (LEV).

4. DISCUSSION

The crucial focus of this paper was to explore the under-researched area of how corruption affects the capital structure of ASE-listed companies in Jordan from 2013 to 2022. The empirical strategy employed robust econometric models to validate the hypothesis that perceived corruption levels positively correlate with higher corporate debt levels. To control for unobservable differences, fixed effects models were used, and the potential endogeneity was tackled with the help of the system GMM techniques. Thus, the applied methodologies might be considered the indicators of the trustworthiness of the outcomes. The results of the models suggested that perceived corruption had a considerably favorable effect on the capital structure of ASE-listed companies. The findings demonstrated that corruption affects the companies' financial practices in the form of capital structure. Consequently, the outcomes of the analysis indicated that companies that have faced conditions of high levels of corruption tended to acquire higher levels of debt not only as a financial decision but also as a mode of survival. This discovery was contrary to some of the previous studies (Phan & Archer, 2020), and aligned with a few other current studies Singh and Kannadhasan (2020), Smith (2016), and Tran et al. (2023). The phenomenon of corruption has a dual nature for the companies: they might select to increase their capital structure to protect against corruption. The current study also aligned with the shielding theory employed by Smith (2016), which argued that organizations use higher levels of capital structure to protect themselves from corrupt officials' rent-seeking acts. Majorly, the companies consider debt as a signal of their distress and that is why the corrupt officials are expected to refrain from demanding additional payments concerning fear of bankruptcy (Singh & Kannadhasan, 2020). In addition, the control variables demonstrated robust correlations with the capital structure. The positive relation of tangible assets with the capital structure was the potential collateral usage, where the companies utilized the tangible assets as a security to acquire funding less expensively. The larger companies attract financing more inexpensively because they have more stable cash flows and favorable credit ratings (Phan & Archer, 2020). Therefore, it could be argued by the trade-off theory that larger firms might prefer to use more substantial debt levels.

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CONCLUSION

The objective of this article was to analyze the relationship between the level of corruption and companies' capital structure in Jordan. This paper summarizes the broad influence of corruption on the companies' financial structure. The text discovers the common problems and complicated patterns in the environment driven by corrupt people and activities. The document continues to suggest that corruption has the effect of a dual nature. It might prove to be an obstacle to blocking economic development and, at the same time, a push for some companies to be able to affect financial strategies. The outcomes suggest that the corruption theory works, making the concept of 'sand' and 'grease' possible. In other words, it may provide some businesses with an opportunity to possess certain financial and operating advantages that are believed to be short-lived, decadent, and ultimately blocking the country's financial health. Namely, the relative size coalition specifies that corruption has an impactful effect on the financial structure of companies in corrupt territories by increasing the level of capital structure. Firms may use a particularly preventative approach to save the exigencies of unpredictable corrupt authorities. This shielding theory may suggest why firms in Jordan use finance to reduce potential corrupt government risks. The argument is related to the protection hypothesis, and the environmental consequence remains consensual. The reliability of these results is confirmed by various analytical methods, including fixed effects models and systems GMM estimators. These methods consider the possibility of endogeneity and suggest a highly positive relationship between the perceived levels of corruption and capital structure. These results contribute to the overall discussion about how corruption influences corporate finance and its various spheres of influence, especially in developing countries where corruption remains high. Moreover, it underlines the necessity for urgent policies aimed at increasing transparency and control measures to foster a more secure and equitable business environment. Countries like Jordan should prioritize the eradication of corruption to secure future economic growth and guarantee businesses a reliable and sustainable partner, necessary for long-term efforts. This study offers a platform for further contributions to this topic. It identifies clear connections between corruption and capital structure, but it remains restricted, taking into account that only listed companies provide necessary data. Future studies may expand to other countries and small and medium enterprises and further investigate differences between sectors. Therefore, the study holds several implications. First of all, it signals the urgent need for policymakers to introduce reforms to limit incidences of corruption and knowledge-based actions to promote a more stable business environment. Business leaders should be aware of how corruption affects their capital decisions to plan accordingly, using this information to plan strategies when working in regions where corruption is high.

AUTHOR CONTRIBUTIONS

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