Alexandria Journal of Accounting Research
Issued by the Accounting Department, Third Issue, Sep, 2025, Vol. 9

Unlocking the Nexus between Leverage and Financial Distress: The Dual Role of Operational Efficiency and Firm Size in Egypt

Dr. Asmaa Hamdy Abdelaziz Mohamed Elmahdy

Lecturer, Faculty of Management Sciences
October University for Modern Sciences and Arts (MSA), Egypt
ahabdelaziz@msa.edu.eg

Abstract

Purpose— This study investigates how financial leverage affects financial distress among non-financial companies listed on the Egyptian Exchange (EGX). It also examines the mediating role of operational efficiency and the moderating role of firm size in the Egyptian economic context.

Design/methodology/approach – The study utilizes a dynamic panel data technique, employing the Generalized Method of Moments (GMM) on a dataset comprising 684 firm-year observations of Egyptian non-financial companies from 2013 to 2024.

Findings— The results indicate that financial leverage has a significant and negative impact on financial distress, supporting the trade-off theory. Companies deliberately utilize debt to optimize their capital structure and reduce financial vulnerability. Furthermore, operational efficiency mediates this effect, as companies with efficient operations exhibit greater resilience. The study also reveals that firm size moderates the relationship; larger companies can more easily manage financial responsibilities due to better access to capital markets and economies of scale.

Research implications— This study provides implications for financial institutions, government authorities, and corporate executives. Regulators are urged to tailor leverage policies based on company characteristics and support operational efficiency in credit risk assessment. It is also recommended that companies adopt context-specific capital structure strategies and invest in AI-driven credit risk tools.

Originality/value— This paper contributes to research on financial leverage and financial distress in developing countries, particularly Egypt. Its uniqueness lies in integrating operational efficiency as a mediating factor and firm size as a moderating factor to understand how company-specific factors influence the relationship between financial leverage and financial distress.

Keywords: Financial Leverage, Financial Distress, Operational Efficiency, Firm Size, Trade-off Theory, GMM.

Received on 12/7/2025, accepted on 28/7/2025.

العلاقة بين الرافعة المالية والضائقة المالية: تحليل الدور الوسيط للكفاءة التشغيلية والدور المعدل لحجم الشركة في مصر

ملخص البحث

الغرض من الدراسة – تهدف هذه الدراسة إلى تحليل تأثير الرافعة المالية على الضائقة المالية في الشركات غير المالية المدرجة في البورصة المصرية(EGX)، مع التركيز على الدور الوسيط للكفاءة التشغيلية والدور المعدل لحجم الشركة في السياق الاقتصادي المصري.

التصميم/المنهجية/ الاسلوب– اعتمدت الدراسة على تقنيات بيانات البانل الديناميكية، باستخدام طريقة المربعات الصغرى المعممة(GMM)، وذلك بناءً على عينة تتكون من 684 مشاهدة سنوية لشركات غير مالية مصرية خلال الفترة من 2013 إلى 2024.

النتائج – أظهرت النتائج أن الرافعة المالية تؤثر بشكل سلبي ومعنوي على الضائقة المالية، بما يدعم نظرية المقايضة .(Trade–off Theory) إذ تقوم الشركات باستخدام الديون بشكل متعمد لتحسين هيكل رأس المال وتقليل درجة التعرض للمخاطر المالية. كما تبين أن الكفاءة التشغيلية تلعب دورًا وسيطًا في هذه العلاقة، حيث تتمتع الشركات ذات الكفاءة التشغيلية العالية بقدرة أكبر على مواجهة الضغوط المالية. وكشفت النتائج أيضًا أن حجم الشركة يضطلع بدور معدل؛ حيث تتمكن الشركات الأكبر حجمًا من إدارة التزاماتها المالية بشكل أكثر فاعلية، نتيجةً لتوفرها على موارد أكبر وإمكانية وصول أيسر إلى أسواق رأس المال وتحقيق وفورات الحجم.

الدلالات التطبيقية للبحث – تقدم هذه الدراسة توصيات لصناع السياسات المالية، والجهات الرقابية، ومديري الشركات. توصي الدراسة بضرورة تصميم سياسات الرفع المالي بناءً على خصائص الشركات، ودعم الكفاءة التشغيلية في تقييم مخاطر الائتمان. كما يُنصح الشركات بتبني استراتيجيات هيكل رأسمالي تتناسب مع السياق المحلي، والاستثمار في أدوات مدعومة بالذكاء الاصطناعي لتقييم مخاطر الائتمان.

الأصالة/القيمة – تسهم هذه الدراسة في إثراء الأدبيات الخاصة بالرافعة المالية والضائقة المالية في الدول النامية، لا سيما في الحالة المصرية. وتكمن قيمة الدراسة في دمج متغير الكفاءة التشغيلية كعامل وسيط، وحجم الشركة كعامل معدل، لفهم كيف تؤثر الخصائص المؤسسية على العلاقة بين الرافعة المالية والضائقة المالية.

الكلمات الدالة: الرافعة المالية، الضائقة المالية، الكفاءة التشغيلية، حجم الشركة، نظرية المقايضة، طريقة GMM.

1. Introduction

Publicly traded companies worldwide have faced significant financial distress, as evidenced by repayment defaults, declining asset values, organizational restructuring, and, in extreme cases, delisting from stock exchanges (Shahwan & Habib, 2020). These challenges were further exacerbated by the COVID-19 pandemic, which disrupted business operations and heightened financial vulnerabilities for companies globally (Teymouri & Sadeghi, 2020). Consequently, corporate managers must implement risk management techniques to maintain performance, enhance financial stability, and diminish the probability of financial distress (Chen et al., 2020).

According to Geng et al. (2015), Mariano et al. (2021), and Ninh et al. (2018), financial distress occurs when a firm is unable to meet its financial obligations, typically due to liquidity constraints, excessive debt, and ineffective cash flow management. Empirical evidence suggests that firms with high leverage ratios struggle to maintain financial stability, as they allocate resources less effectively and are more susceptible to shocks due to higher debt servicing costs (Pindado & Rodrigues, 2005; Younas et al., 2021). Additionally, firms often conceal signs of financial distress until bankruptcy becomes unavoidable (Pindado & Rodrigues, 2005; Whitaker, 1999; Turetsky& McEwen, 2001; Yazdanfar, 2013).

Operational efficiency measures a firm's ability to maximize resource utilization without compromising service quality, serving as a vital mediating variable between leverage and financial distress Prior research (Panduru et al., 2024; Kusumastuti & Kurniasih, 2024; Ige-Gbadeyan, 2023) shows that financial leverage and operational efficiency have a positive relationship, suggesting that effective operational efficiency can mitigate the risks associated with excessive debt.

Firm size significantly moderates the relationship between leverage and financial distress. Large firms can manage substantial amounts of debt and

successfully navigate financial distress due to economies of scale and improved access to financing opportunities (Muigai & Muriithi, 2017; Marin, 2013). In contrast, smaller firms are more susceptible to financial distress because they often face higher financing costs and limited resources (Campbell, 1996).

Theories were examined to determine the relationship between financial leverage and financial distress. Firstly, signaling theory perceives elevated debt levels as a possible indication of economic distress, wherein firms unintentionally convey signs of disrupted financial stability to external stakeholders. Conversely, trade-off theory suggests that leverage is a strategic tool, enabling firms to weigh the tax advantages of debt against the risk of distress, provided it remains within an optimal range. Examining this dynamic is particularly relevant in markets where firms face financial instability due to macroeconomic shocks in emerging markets.

Although financial distress has been extensively studied, few investigations have examined the direct relationship between leverage and financial distress (as measured by Z-score) while also considering the mediating role of operational efficiency and the moderating effect of firm size. Existing research suggests that leverage and financial distress have a positive relationship, with firms exhibiting higher debt levels displaying greater instability and an increased likelihood of bankruptcy (Lee et al., 2017; Lucky & Michael, 2019). However, the extent to which operational effectiveness mediates this relationship remains unclear. Moreover, prior studies suggest that larger firms may have better access to financial resources and economies of scale, which could mitigate the negative impact of leverage on financial distress (Muigai & Muriithi, 2017; Fredrick, 2018). In the Egyptian context, it is unknown to what degree firm size can moderate this relationship. Building on the discussion above, this paper investigates how leverage impacts financial distress, with operational efficiency serving as a mediator and firm size acting as a moderator. Therefore, it focuses on the following research question: Does leverage significantly affect financial distress among Egyptian non-financial

firms? If so, how does operational efficiency mediate it, and how does firm size moderate this impact?

This paper adds to the literature on corporate finance and distress prediction through several significant avenues. *First*, this study fills a crucial gap in the empirical literature by examining the direct and indirect effects of leverage on financial distress in an emerging economy. This study builds upon previous research into the determinants of financial distress in developing markets (Shahwan & Habib, 2020; Eldomiaty et al., 2019) by presenting a more sophisticated framework that integrates mediation and moderation analysis. This approach provides a deeper insight into the leverage-distress relationship among Egyptian non-financial firms from 2013 to 2024. *Second*, this study empirically evaluates the mediating role of operational efficiency in the relationship between leverage and financial distress, thereby contributing to the existing literature. This insight offers practical implications for corporate managers seeking to enhance financial resilience through effective operational strategy. *Third*, the paper introduces firm size as a moderating variable, a dimension that has mainly been underexplored in the context of financial distress. This study demonstrates that firm size affects the leverage-distress relationship, indicating that larger firms can better absorb financial shocks due to economies of scale, enhanced access to financing, and reputational benefits. *Fourth*, to strengthen the validity of its findings, the study includes important macroeconomic control variables, such as GDP growth and inflation, which are crucial for understanding the broader economic context that affects firm-level financial distress. The research provides practical policy implications for corporate decision-makers, investors, and regulators in Egypt and comparable economies. The findings clarify the influence of leverage on financial distress, both directly and through operational channels, while highlighting firm size as a moderating variable. This supports the development of more informed financial policies, targeted risk assessments, and strategies for building resilience in volatile economic environments.

The remainder of this paper is organized as follows: Section two presents the literature review and hypothesis development, while Section three illustrates the research design. Section four presents the empirical findings, and Section five discusses the conclusions, practical implications, limitations, and recommendations for future research.

2. Literature Review and Hypotheses Development

2.1 Financial Leverage and Financial Distress

Signaling theory, developed by Spence (1973), focuses on the behavior of parties involved in a transaction that has access to different types of information. This theory is based on the idea that company information is not equally accessible to managers and shareholders, as specific details are exclusively known to managers and remain hidden from investors, resulting in information asymmetry between the two (Adam, Safitri, & Wahyudi, 2018). Annual reports serve as one of the primary signals firms issue to external stakeholders, particularly investors. These reports typically include financial statements, accounting disclosures, and other critical data that reflect the firm's financial health and strategic direction. Releasing such information is essential for reducing information asymmetry between insiders and outsiders (Adam et al., 2018). Within this theoretical framework, high levels of financial leverage can be interpreted as a negative signal indicating increased financial vulnerability. The signaling theory thus supports the view that financial leverage is positively associated with financial distress. As leverage increases, the perceived risk of insolvency or reduced financial flexibility also rises, sending cautionary signals to investors and stakeholders regarding the firm's long-term viability (Adam et al., 2018).

Previous empirical studies have supported the claim that higher leverage increases financial distress, reduces financial flexibility, and increases the probability of insolvency. For instance, Lubben (2000) investigated the relationship between excessive leverage and Chapter 11 bankruptcy expenses. The research examined 300 U.S. companies that filed for Chapter 11

bankruptcy in the 1990s. Regression analysis was used to examine how legal fees, as a percentage of total assets, varied with different levels of leverage. Average legal fees accounted for 1.8% of total assets, exhibiting a significant positive relationship with leverage. The results also showed that firms with a debt-to-equity ratio over 2x paid 25% more in legal fees than their less leveraged peers. These findings suggest that greater leverage leads to higher fixed restructuring costs, ultimately resulting in financial distress. Building on this relationship, Fich et al. (2008) investigated how governance deficiencies contributed to the acceleration of financial distress. The sample included 500 S&P 1500 companies from 1996 to 2006, using leverage ratios and board independence as proxies for governance. The findings indicated that companies with poor governance systems, particularly those with less than 50% independent boards, were twice as likely to experience financial distress ($p < 0.01$). Moreover, higher leverage increased financial distress by 40%. Similarly, Agarwal & Taffler (2008) examined the long-term forecasting ability of accounting models for bankruptcy risk. The study analyzed a dataset of 2,000 U.S. companies spanning the period from 1980 to 2005. Using a hazard model framework, the Altman Z-score model and leverage ratios were included as predictors, while bankruptcy occurrence served as the dependent variable. The findings revealed that the Z-score model predicted bankruptcy with an accuracy of 72%. Leverage levels exceeding 60% (debt/assets ratio> 0.6) increased the company's hazard ratio by 1.5 times. The results suggest that excessive leverage erodes equity buffers, thereby compromising a company's ability to withstand economic shocks and increasing its vulnerability to financial distress.

The implications of leverage were also explored during periods of economic turmoil. Ray (2011) examined the impact of leverage on financial distress during a monetary crisis. In particular, during the 2008 financial crisis, the study concentrated on 45 automobile companies in India from 2005 to 2010. Companies were categorized as safe, grey, or distressed using the Altman Z-score. The findings showed that after the 2008 crisis, the

percentage of companies in the grey zone rose by 40%, primarily due to higher borrowing. Distress was mainly associated with a debt-to-equity ratio of 1.5 ($p<0.05$). Expanding the scope geographically, Alifiah (2014) examined how financial ratios, notably leverage, affected the economic crisis in South Africa Discriminant analysis was used to assess distress status using the Altman Z-score, with the leverage ratio and total debt-to-total assets serving as independent variables. The sample consisted of 120 companies: 60 distressed and 60 non-distressed, listed on the Johannesburg Stock Exchange from 2007 to 2011. The results revealed that companies with debt ratios exceeding 60% had a 55% greater probability of distress and bankruptcy. Similarly, Simanjuntak et al. (2017) analyzed the relationship between leverage and financial distress among 85 Indonesian manufacturing firms from 2011 to 2015. Financial distress was measured using the Altman Z-score, while leverage was assessed using the debt-to-equity ratio. The findings showed that companies with debt-to-equity ratios greater than 1.2 had a 48% higher likelihood of experiencing financial distress. The research also indicated that company size and profitability negatively impacted the probability of distress. These findings imply that excessive debt diminishes a company's operational flexibility and reinvestment capacity. Finally, Jaafar et al. (2018) investigated the effect of leverage on financial distress among 120 Malaysian firms from 2009 to 2015. The Altman Z-score assessed financial distress, while the total debt-to-total assets ratio measured leverage. The results indicated that companies with leverage levels exceeding 50% had more than twice the likelihood of financial distress.

In contrast, regarding the relationship between financial leverage and financial distress, Markowitz (1959) and Sharpe (1964) proposed that the trade-off theory explains how firms balance the benefits and costs of debt financing. While leveraging may provide tax advantages and lower the cost of capital, it also increases the financial obligations that firms must meet, heightening the risk of financial distress if not managed correctly. The theory relies on the principle of risk-return trade-offs, where firms must carefully

weigh the benefits of additional debt against the rising probability of financial instability. This theory incorporates the concept of risk aversion, particularly from the perspective of firms seeking to finance their operations. Risk-averse firms will likely avoid high debt levels unless the associated benefits, such as tax shields or improved capital efficiency, outweigh the increased financial risk. However, excessive financial leverage can signal declining financial flexibility and heightened vulnerability to external shocks, especially during economic downturns or deteriorating revenues. Accordingly, the trade-off theory supports the view that a negative relationship exists between financial leverage and financial distress. However, if leverage increases beyond the optimal capital structure, the likelihood of financial distress rises, diminishing the firm's ability to sustain operations and meet its financial obligations (Ijaiya, Jimoh, Attah, Abdulmumin & Naifu, 2021). Therefore, the theory emphasizes that firms must maintain a prudent balance between debt and equity to minimize distress risk while maximizing value.

Dahiya et al. (2003) supported the tradeoff theory by claiming that leverage could negatively impact financial distress, suggesting that a firm's ability to manage its debt effectively or its specific capital structure could reduce the likelihood of distress in some instances. Dahiya et al. (2003) investigated how debtor-in-possession (DIP) funding influenced bankruptcy outcomes. The sample included 73 U.S. companies filing for Chapter 11 bankruptcy between 1988 and 1997. A binary logistic regression model was employed to compare the results of companies that received DIP loans with those that did not. The independent variables included DIP funding status, leverage ratios, and industry-specific restrictions, while the dependent variable was the outcome of bankruptcy emergence (emergence vs. liquidation). Compared to just 42% for companies lacking such funding, those receiving DIP financing had a 68% chance of recovering from bankruptcy. DIP-financed companies also spent 30% less time in bankruptcy. These findings imply that structured leverage through DIP loans may expedite

company recovery by providing essential leverage and signaling operational viability to creditors and markets.

On the other hand, several studies emphasize the significance of firm-specific or contextual variables when assessing financial distress, indicating that leverage alone may not be the sole predictor of financial distress. Restianti & Agustina (2018) analyzed the factors leading to financial distress in 75 Indonesian manufacturing companies from 2012 to 2016. The Altman Z-score measured financial distress, while the debt-to-assets ratio assessed leverage. The findings showed no significant relationship between leverage and financial distress. Instead, the research indicated that operating cash flows and profitability were more powerful indicators. These results suggest that, under specific conditions, internal financial performance measures may surpass leverage as indicators of financial distress. Similarly, Finishtya (2019) analyzed the causes of financial distress among 50 Indonesian manufacturing companies from 2013 to 2017. The Altman Z-score measured financial distress, whereas the debt-to-equity ratio assessed leverage. The findings revealed no significant relationship between leverage and financial distress. Instead, liquidity ratios and profitability were more accurate predictors of distress.

Based on prior literature, companies in developing economies, such as Egypt, often face financial limitations and restricted access to external equity markets. In these contexts, optimal financial leverage can yield tax benefits, enhance liquidity, and facilitate ongoing operations, thereby reducing the likelihood of financial distress. Moreover, well-managed leverage may convey organizational strength and creditworthiness, particularly when macroeconomic conditions remain stable. Therefore, the following hypothesis is formulated:

H1: Financial leverage has a significant negative effect on the financial distress of Egyptian firms.

2.2 Financial Leverage, Operational Efficiency, and Financial Distress

Lagat (2021) evaluated the relevance of the Multiple Discriminant Analysis (MDA) model in forecasting corporate financial distress among listed companies in Kenya. Audited financial statements from 2000 to 2019 were examined for 21 companies classified as distressed or non-distressed. The Z-score was calculated by extracting financial ratios related to liquidity, profitability, efficiency, leverage, and activity. The results showed that the MDA model was effective in Kenya, accurately forecasting 71% of non-distressed and 64% of distressed firms. While the activity ratio had limited forecasting power, the liquidity, profitability, efficiency, and leverage ratios were reliable indicators of financial distress. Similarly, Afandy (2024) investigated the mediating effect of operational efficiency on the impact of leverage and cost management on earnings stability. The sample included 280 hotels in Indonesia using Structural Equation Modeling-Partial Least Squares (SEM-PLS). The results showed that financial leverage significantly improves operational efficiency, leading to increased profits. Additionally, cost management strengthens earnings stability through the mediation of operational efficiency. These findings imply the strategic role of operational efficiency as a mediating variable between leverage and financial stability.

Although previous studies have investigated the direct relationship between financial leverage and financial distress, the mediating role of operational efficiency within this relationship remains insufficiently examined, particularly within emerging markets such as Egypt. Egyptian firms frequently resort to debt to sustain their operations in an economic environment shaped by currency fluctuations, inflation, and restricted access to equity financing. When managed appropriately, financial leverage has the potential to drive operational enhancements through improved asset utilization and cost efficiency. Thus, the increased operational efficiency can mitigate the adverse effects of leverage, reducing the likelihood of financial distress.

Based on the prior literature, the following hypotheses are formulated:

H2: Operational efficiency mediates the effect of financial leverage on the financial distress of Egyptian firms.

H2a: The financial leverage has a significant positive effect on the operational efficiency of Egyptian firms.

H2b: Operational efficiency has a significant and negative effect on the financial distress of Egyptian firms.

2.3. Financial Leverage, Operational Efficiency, Firm Size, and Financial Distress

Several empirical studies have investigated the role of firm size as a moderating variable in the relationship between financial leverage and financial distress, yielding mixed findings across various industries and methodologies. Some studies have shown that firm size significantly moderates the relationship between leverage and financial distress, particularly in capital-intensive sectors. For example, Susanti, Arismaya, and Nubatonis (2024) analyzed 24 energy sector companies listed on the Indonesian Sharia Stock Index (ISSI) from 2020 to 2023. The results revealed that firm size moderated the influence of leverage and cash flow on financial distress. These findings suggest that larger firms possess more resources to manage debt obligations and navigate financial challenges, thus reducing the distress risks associated with high leverage. Similarly, Ramadani & Ratmono (2023) examined 128 manufacturing companies listed on the Indonesia Stock Exchange between 2018 and 2020. Their results indicated that firm size moderates the effect of leverage and operating cash flow on financial distress. Larger firms benefit from greater financial flexibility, enabling them to handle high leverage levels more effectively. Interestingly, their study also found that firm size weakens the relationship between liquidity and financial distress, suggesting a more complex moderating influence that depends on the specific financial indicators involved.

In contrast, other research suggests that firm size does not always moderate the relationship between leverage and financial distress. For instance, Marginingsih et al. (2023) investigated retail companies listed on the Indonesia Stock Exchange from 2018 to 2022. The results showed that liquidity and leverage were significant predictors of financial distress, while firm size did not moderate the relationship between leverage and distress. However, firm size moderates the relationship between profitability and distress, suggesting that size may impact internal performance metrics more than capital structure risk.

These mixed results highlight a significant research gap, indicating that while firm size appears to moderate the influence of leverage on financial distress in specific contexts, this is not a universal conclusion. Variations in industry characteristics, financial management practices, and market conditions may account for these discrepancies in results. Therefore, particularly in developing countries like Egypt, where financial systems and firms' dynamics differ from those in developed countries, further analysis is necessary to explore the moderating influence of firm size on the relationship between leverage and financial distress.

Based on the prior literature, the following hypothesis is formulated:

H3: Firm size moderates the effect of financial leverage on the financial distress of Egyptian firms.

3. Research Design

3.1 Data Collection

According to previous literature, financial leverage can explain fluctuations in firms' financial distress through the mediating effect of operational efficiency and the moderating effect of firm size. From 2013 to 2024, Egypt faced significant economic and political challenges that impacted its financial environment, providing an ideal timeframe for analyzing the relationship between leverage and financial distress. These challenges included political unrest, security concerns, and economic shifts resulting from

international agreements and trade policies. In addition to disturbances linked to COVID-19, Egypt dealt with rising oil prices, currency devaluation, and severe inflation. Global events, such as the Russia-Ukraine crisis, have heightened pressure on Egypt's financial resilience, resulting in higher interest rates and a shortage of foreign currency. This study's timeframe serves as a basis for analysis and offers insight into the critical financial issues Egypt faced, making our research both relevant and timely.

This study employs five types of variables: the dependent variable, the independent variable, the mediating variable, the moderating variable, and the control variables. Table 1 presents these variables along with their descriptions, measurements, and sources.

3.2. The Study's Variables

Table 1: The Study's Variables

Variables	Description	Measurement	Prior Studies	Source
Dependent Variable				
FD	Financial Distress – the probability of a financial loss resulting from a borrower's failure to repay a loan.	Z-score = $1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 0.99X_5$ X_1 = Working Capital / Total Assets X_2 = Retained Earnings / Total Assets X_3 = EBIT / Total Assets X_4 = Market Capitalization / Total Liabilities X_5 = Sales / Total Assets	Mushafiq et al. (2023)	DataStream database
Independent Variables				
FL	Financial Leverage – the use of debt to increase returns from investments.	Total Liabilities / Total Equity	Mushafiq et al., (2023)	DataStream database

Variables	Description	Measurement	Prior Studies	Source
Mediator				
OE	Operational Efficiency – optimized use of resources like time, people, equipment, and money to serve the business.	Operating Expense / Total Revenue	Ali et al., (2021)	DataStream database
Moderator				
FS	Firm Size – refers to the scale on which a company operates.	LN (Sales Revenue)	Olawale et al., (2017)	DataStream database
Control Variables				
INF	Inflation– measures the general increase in prices, affecting purchasing power and business costs.	Annual percentage change in consumer price index (CPI)	Safitri, & Yuliana (2021)	Central Bank of Egypt (CBE)
GDPG	GDP Growth– indicates overall economic growth, which may impact firm performance and financial health.	Annual percentage growth rate of GDP at market prices based on constant local currency	Aghion, Bloom, Blundell & Griffith (2005)	World Bank database

3.3. Method

The analysis begins by extracting descriptive statistics for the model's variables, then performing a correlation analysis and examining whether the variables are stationary through unit root tests. This ensures their suitability for applying the Generalized Method of Moments (GMM) estimation model,

which is inappropriate if any variables are non-stationary. Given that this paper aims to investigate the effect of financial leverage on financial distress through the mediating impact of operational efficiency and the moderating effect of firm size, GMM is employed. GMM is preferred because it can address endogeneity issues and provide efficient, unbiased estimators when instrumented variables are present. Dynamic panel data models, where endogeneity may arise from omitted variables or measurement errors, are particularly well-suited for GMM, ensuring the reliability of the findings. Using lagged values of the explanatory variables as instruments, the GMM model is estimated to correct for endogeneity issues. Data analysis was conducted using EViews 12 for descriptive statistics, correlation analysis, and GMM modeling. Winsorizing was applied to all variables at the 1% and 99% significance levels. Thus, the regression model is formulated as follows:

$$FD_{it} = \alpha_0 + \beta_1 FL_{it} + \beta_2 OE_{it} + \beta_3 FS_{it} + \beta_4 FL_{it} \times FS_{it} + \beta_5 INF_t + \beta_6 GDPG_{it} + \varepsilon_{it}$$

Where:

FD_{it} is the financial distress of firm i at time t (measured by Z-score),

α_0 is the model constant,

β_1–β_6 are the model parameters,

FL_{it} is the financial leverage of firm i at time t,

OE_{it} is the operational efficiency of firm i at time t,

FS_{it} is the firm size of firm i at time t,

$FL_{it} \times FS_{it}$ is the interaction term testing the moderating effect of firm size on the impact of leverage on financial distress,

INF_{it} is the inflation rate at time t,

$GDPG_t$ is the GDP growth rate at time t,

ε_{it} is the random error term.

4. Data Analysis and Discussion of Results

4.1 Descriptive Statistics

The preliminary investigation of the panel analysis begins with descriptive statistics, as shown in Table 2. A detailed analysis of the descriptive

statistics of the variables is essential for understanding and evaluating their characteristics, which will be applied in the GMM model estimation. As indicated in Table 2, there are significant differences between the mean and the median regarding financial leverage and financial distress, with the mean being notably larger than the median in both cases. This suggests that the mean is closer to the tail in these right-skewed distributions, reflecting considerable increases in the ratio in recent years compared to earlier periods. The variation in the two variables is substantial, as demonstrated by the wide range of their standard deviations, which contrasts with the small disparities. Kurtosis values are slightly less than 3 for the GDP growth rate only. At the same time, they exceed 3 for all other variables, indicating that they yield occasional extreme returns, either significant positive returns or extreme negative ratios, resulting in heavy tails on the bell-shaped distribution curve.

Table 2. Descriptive Statistics

	FD	FL	OE	FS	GDPG	INF
Mean	3.283049	1.364994	0.918683	14.11453	0.041330	0.122120
Median	2.065572	0.955635	0.879771	14.37429	0.041500	0.105500
Maximum	52.69483	15.54186	17.62744	18.33912	0.065900	0.295100
Minimum	-0.955852	-40.98097	0.185858	6.845880	0.022000	0.050400
Standard Deviation	4.286356	2.653867	0.867549	1.894934	0.013468	0.065638
Skewness	5.991100	-7.010400	14.38671	-0.671286	0.178169	1.571512
Kurtosis	59.55180	120.7931	255.1650	3.653425	2.179792	5.122828

Source: Authors'alculati cons.

4.2 Correlation Analysis

Table 3 presents the results of the multicollinearity test conducted on the variables, revealing no significant issues. Specifically, all correlation coefficients remain below the threshold of 0.75, indicating that the variables are sufficiently independent of each other. Furthermore, the correlation matrix highlights the importance of financial leverage, operational efficiency, and GDP growth rate in explaining financial distress among non-financial Egyptian firms. These variables demonstrate statistically significant

correlations with the dependent variable, underscoring their critical role in comprehending the determinants of financial distress.

Table 3. Correlation Analysis

	FD	FL	OE	FS	GDPG	INF
FD	1.000					
FL	-0.1115***	1.000				
OE	-0.0822**	-0.0135	1.000			
FS	0.0253	0.1312***	-0.2674***	1.000		
GDPG	0.0879**	-0.0154	0.0364	0.1325***	1.000	
INF	0.0145	0.0187	-0.0322	0.0079	0.2296***	1.000

***Significant correlation at the 0.01 level (2-tailed).*

** Significant correlation at the 0.05 level (2-tailed).*

Source: Authors' calculations.

4.3 Unit Root Tests

Assessing the stationarity of the variables is crucial before estimating the model with GMM, as this method is only applicable when the variables are stationary at their levels or in first differences. The Levin, Lin & Chu (LLC) and Im, Pesaran, and Shin tests, as shown in Table (4), demonstrate that the variables are stationary at their levels, except for inflation and firm size, which are stationary at levels in the LLC test and first differences in the Im, Pesaran, and Shin tests. Fundamental variations in test assumptions cause this divergence, as the LLC assumes a standard unit root process suitable for homogeneous panels, whereas the IPS accommodates heterogeneous roots across cross-sections. In the econometrics literature (Levin et al., 2002; Harris & Tzavalis, 1999), the LLC's common root assumption has strong theoretical support for datasets with similar entities operating in comparable economic settings. Therefore, this supports employing all variables at the level; none are I (2).

Table 4. Unit Root Tests

	Variable							
	Levin, Lin & Chu (LLC) test				Im, Pesaran and Shin tests			
	Level		1st difference		Level		1st difference	
	Intercept	Intercept and trend	Intercept	Intercept and trend	Intercept	Intercept and trend	Intercept	Intercept and trend
FD	-17.2690***	-19.1059***	-15.8114***	-18.4294***	-4.07396***	-1.51508*	-5.92887***	-1.13625
FL	-4.42774***	-9.93404***	-12.4352***	-24.6764***	-0.49776	0.03983	-4.99650***	-2.16854***
OE	-11.6539***	-12.9106***	-13.6462***	-27.8319***	-3.76972***	-0.39455	-5.53886***	-2.65445***
FS	-4.71255***	-16.1728***	-14.6757***	-15.7875***	0.87913	-2.08156***	-6.00938***	-1.43374*
GDPG	-18.1265***	-27.8690***	-29.6663***	-14.6023***	-5.71325***	-4.26599***	-13.9542***	-2.89746***
INF	-6.38784***	-4.28182***	-6.00326***	-2.74435**	-2.12485*	1.20007	-0.97639	2.28268

, **, and * indicate the rejection of the null hypothesis at the 1%, 5%, and 10% significance levels, respectively. The number of lags is determined by the Schwarz information criteria, with a maximum of 1 lag allowed. The bandwidth for the* Levin*, Lin & Chu (LLC) test is automatically determined by the Newey-West Bandwidth, employing the Bartlett Kernel spectral estimate method. The crucial values at the 1%, 5%, and 10% significance levels for the* Levin*, Lin & Chu (LLC) test and Im, Pesaran and Shin tests are -1.90320, -1.77908, and -1.72104 for the test with only an intercept, and -2.89768, -2.59088, and -2.48192 for the test with an intercept and trend.*

Source: Authors' calculations.

4.4 GMM Model Results

4.4.1 Analysis of Hypothesis 1

Table 5 presents the GMM results. Model 1 was developed to test Hypothesis 1, examining the impact of financial leverage on financial distress. The findings in Model 1 demonstrate a statistically significant positive effect of the current value of FD, measured by Z-score, on its previous value within a defined period, indicated by a coefficient of 0.455990 ($P < 0.000$). The coefficient of 0.065384 ($P < 0.000$) indicates a positive impact of financial leverage on the Z-score, suggesting a reduction in financial distress. This result aligns with the trade-off theory, which posits that firms balance the tax advantages of debt against the potential costs of financial distress. Consequently, these findings support the acceptance of H1. The analysis of control factors indicates that both inflation and GDP growth have significant positive impacts on Z-score, with coefficients of 2.484392 ($p < 0.000$) and

21.93281 (p < 0.000), respectively. These findings imply that the Z-score increases as inflation rises, possibly due to revenue growth induced by inflation outpacing cost increases. Additionally, as GDP growth rises, the Z-score increases, indicating that macroeconomic expansion improves financial health and reduces default risk.

Table 5: The impact of financial leverage on financial distress

Estimates of fixed effects	Model 1 (Financial distress)
	coefficient
FD(-1)	0.455990***
FL	0.065384***
Control variables	
INF	2.484392***
GDPG	21.93281***
Other statistics	
Sargan–Hansen J-Stat	37.39346 (0.359742)
Year fixed effect	Yes
Firm fixed effect	Yes
	m statistics (prob)
AR (1)	-2.170912 (0.0299)
AR (2)	0.633495 (0.5264)

Note: Significance levels *** p < 0.01, ** p < 0.05, and * p < 0.1.

4.4.2 Analysis of Hypothesis 2

Table 6 illustrates the mediating effect of operational efficiency on the relationship between financial leverage and financial distress. Model 2 regressed operational efficiency on financial leverage as the initial step to assess the mediation hypothesis, following the approach established by Baron & Kenny (1986). The financial leverage coefficient in Model 2 was significantly positive, with a coefficient of 0.553666 at the 1% level, indicating a positive impact of financial leverage on operational efficiency. This finding suggests that higher financial leverage may encourage firms to improve operational efficiency, manage the increased risk associated with debt obligations, and maintain financial stability, supporting H2a.

In the next step, Model 3 regressed financial distress on operational efficiency as the second step to assess the mediation hypothesis. The coefficient of operational efficiency was 1.616176 and statistically significant at the 1% level, indicating that improvements in operational efficiency are associated with higher Z-scores, which in turn suggest a reduction in financial distress. Efficient operations can enhance profitability, improve cash flow management, and optimize resource allocation, thereby improving the firm's solvency profile and supporting H2b. Moreover, the results showed that the positive impact of financial leverage on the Z-score remains significant, with a coefficient of 0.049281 and a p-value of 0.049281, which is statistically significant at the 1% level, supporting the partial mediation of H2.

Table 6:The mediation effect of operational efficiency on the impact of financial leverage on financial distress

Estimates of fixed effects	Model 2 (operational efficiency)	Model 3 (financial distress)
	coefficient	coefficient
FD (-1)	-	0.636955
OE (-1)	0.553666***	-
FL	0.006676**	0.049281***
OE	-	1.616176***
Control variables		
INF	-0.564668***	3.838953***
GDPG	0.947911***	23.62283**
Other statistics		
Sargan–Hansen J-Stat	54.56196 (0.018662)	43.35232 (0.157039)
Year fixed effect	Yes	Yes
Firm fixed effect	Yes	Yes
	m statistics (prob)	
AR (1)	-0.836112 (0.4031)	-2.584385 (0.0098)
AR (2)	-1.114058 (0.2653)	-0.848565 (0.3961)

Note: Significance levels *** p < 0.01, ** p < 0.05, and * p < 0.1.

4.4.3 Analysis of Hypothesis 3

The results reveal several significant findings after examining firm size as a moderating variable in Model (4). The moderating effect of firm size has a positive influence on the impact of financial leverage on Z-score, with a (FL*FS) coefficient of 0.108067 and a statistically significant p-value of 0.05,

indicating that larger firms are more able to absorb financial shocks through higher leverage, thereby reducing financial distress and supporting H3. Furthermore, the effect of the control variables (inflation and GDP growth) remains constant. Additionally, the impact of financial leverage on the Z-score has remained unchanged.

Table 7: The moderation effect of firm size on the impact of leverage on financial distress

Estimates of fixed effects	Model 4 (financial distress)
	coefficient
FD(-1)	0.468900***
FL	1.427985**
FS	0.910071***
Moderating effect	
FL*FS	0.108067**
Control variables	
INF	2.826511***
GDPG	6.071108**
Other statistics	
Sargan–Hansen J-Stat	39.84856 (0.263158)
Year fixed effect	Yes
Firm fixed effect	Yes
	m statistics (prob)
AR (1)	-2.459270 (0.0139)
AR (2)	1.034948 (0.3007)

Note: Significance levels *** p < 0.01, ** p < 0.05, and * p < 0.1.

Ultimately, Table 8 presents the results of the hypothesis tests conducted in this study, offering a comprehensive overview of the hypothesis testing and its related results.

Table 8. Results Summary

Hypotheses	Whether Hypotheses are Supported
H1: Financial leverage has a significant negative effect on the financial distress of Egyptian firms.	Supported
H2: Operational efficiency mediates the effect of financial leverage on the financial distress of Egyptian firms.	Partial supported mediation effect
H2a: The financial leverage has a significant positive effect on the operational efficiency of Egyptian firms.	Supported
H2b: Operational efficiency has a significant and negative effect on the financial distress of Egyptian firms.	Supported
H3: Firm size moderates the effect of financial leverage on the financial distress of Egyptian firms.	Fully supported moderation effect

4.5. Discussion of Results

The primary aim of this study was to examine the influence of financial leverage on the financial distress of non-financial listed companies in the EGX index. The findings from this research indicate that the one-period lagged value of the Z-score has a significant impact on its present value, emphasizing the importance of using dynamic models for estimation. A positive historical Z-score indicates stability and growth potential, attracting investors and enhancing market confidence.

The results also showed a significant negative effect of financial leverage on financial distress. This finding suggests that firms maintaining an optimal debt ratio may benefit from tax shields on interest expenses while mitigating distress costs. This aligns with the findings of Dahiya et al. (2003), who reported that firms that manage their capital structure within optimal levels experience lower default risk and higher financial stability. However, these findings contradict the results of several studies (Lubben, 2000; Fich et al., 2008; Agarwal et al., 2008; Alifiah, 2014; Simanjuntak et al., 2017; Jaafar et al., 2018), which suggest that higher financial leverage is associated with

greater financial distress. They argue that, under certain conditions, financial leverage can be interpreted as a signal of bankruptcy and ineffective risk management techniques, which can positively impact firm distress. This result is also consistent with the tradeoff theory, which posits that firms strive to balance the tax benefits of debt against the costs of potential financial distress, optimizing their capital structure to minimize the overall cost of capital (Kraus & Litzenberger, 1973). Thus, the Egyptian Financial Regulatory Authority (FRA) is entitled to support the design of regulatory frameworks that encourage prudent debt usage while deterring excessive or mismanaged borrowing.

Furthermore, the results suggest that operational efficiency mediates the relationship between financial leverage and financial distress. Studies have confirmed that higher operational efficiency reduces financial distress by increasing profitability and enhancing the firm's ability to invest in value-enhancing projects (Lagat, 2021). Additionally, this mediating effect is consistent with previous empirical studies. For instance, Afandy (2024) demonstrates that high leverage should increase operational efficiency since firms are subject to greater scrutiny from creditors and investors, resulting in decreased financial distress. Therefore, Egyptian banks must incorporate creditworthiness assessments that consider leverage ratios and operational performance metrics. Firms demonstrating high efficiency in resource utilization may represent lower credit risk even at moderate-to-high levels of leverage, underscoring the need for a more nuanced risk evaluation framework.

Moreover, the results showed that firm size moderates the relationship between financial leverage and financial distress, thus supporting the trade-off argument. Although greater leverage typically increases the probability of financial distress, this impact is less pronounced in larger firms due to their enhanced ability to access capital markets, operational diversification, and stronger negotiating power with creditors (Kraus & Litzenberger, 1973; Titman & Wessels, 1988). Previous research (Susanti, Arismaya, & Nubatonis,

2024; Ramadani & Ratmono, 2023) confirmed this moderating effect. These results highlighted that larger firms may maintain greater debt levels without experiencing equivalent financial distress. Larger firms also benefit from creditor confidence and economies of scale, which help offset the negative effects of leverage. The Central Bank of Egypt should consider providing more flexible financing guidelines for larger firms while promoting financial resilience strategies among smaller firms.

5. Conclusions, Limitations, and Suggestions for Future Research

Several studies have shown that financial leverage can reduce financial distress. However, research regarding the Egyptian stock market is scarce. As a result, this study addresses a gap in the literature by investigating the influence of financial leverage on the financial distress of Egyptian non-financial firms through the mediating effect of operational efficiency and the moderating effect of firm size. This paper presents significant evidence that financial leverage has a negative impact on the financial distress of non-financial firms in Egypt, with a substantial increase in Z-score indicating that optimal financial leverage growth leads to improved financial health for these firms. The analysis confirms that Egyptian firms strategically utilize debt to enhance financial outcomes.

Furthermore, the results of this study show that operational efficiency mediates the relationship between financial leverage and financial distress. This indicates that the Z-score increases as leverage rises, suggesting that well-managed leverage can enhance a firm's operational efficiency and enable it to meet its financial obligations effectively while reducing the risk of financial distress. This dynamic is particularly crucial in Egypt, where external funding is sometimes limited, and operational effectiveness plays a significant role in economic resilience. The findings emphasize the need for customized leverage strategies tailored to the characteristics of companies, especially in developing countries like Egypt.

Finally, this research demonstrates that firm size moderates the relationship between financial leverage and financial distress, suggesting that larger firms' consistent cash flows, access to capital markets, and economies of scale enable them to absorb debt more effectively without experiencing distress, unlike smaller firms. This result aligns with the real challenges faced by Egyptian SMEs in managing working capital and sustaining expansion amid economic volatility, currency devaluation, and inflationary pressures. Consequently, the Central Bank of Egypt must consider tailoring financial regulations and support systems according to company size, facilitating SMEs in accessing affordable borrowing while ensuring appropriate leverage monitoring for larger firms.

Based on the findings of this study, several practical implications can be drawn for policymakers, corporate managers, and investors operating in the Egyptian financial market. First, the findings emphasize that policymakers in Egypt should consider encouraging companies to use loans judiciously to enhance their capital structures. This can be achieved by introducing government programs that provide financial support, modifying regulations to facilitate easier access to loans, and implementing policies to sustain a stable and growing economy. Second, companies must also utilize their resources wisely and adapt to market demands to further improve their performance and mitigate the risk of financial distress. Third, it is recommended that companies invest in artificial intelligence-based modeling or machine learning for credit risk analysis to advance credit risk assessment, monitoring, and decision-making processes, as these technologies can identify patterns and trends that humans may overlook. Fourth, investors should examine specific financial indicators such as operating income and operating expenses within a company to assess its efficiency and effectiveness in conducting business operations. Fifth, investors may also use Altman's Z-Score to evaluate potential company investments, as it has been shown to have a positive association with financial stability. Finally, investors should consider qualitative factors such as poor management, economic and technological

changes, and insufficient experience, which may contribute to high credit risk or financial failure.

Further studies can expand the findings of this paper, which provide significant insights for stakeholders in the Egyptian stock market and other developing countries. This study has specific limitations that require further investigation. Specifically, it did not extend its examination to multiple countries, which could yield more extensive and generalizable conclusions. First, future studies could analyze other regions in the MENA Region, as it faces diverse economic challenges with varying regulatory environments and leverage structures. Different economic contexts can offer more comprehensive insights into how leverage structures influence financial distress. This will enhance the credibility of the results by providing a broader dataset. The risk of biases from researching a single country, where unique conditions can impact the results, is also mitigated by using a sample that includes multiple countries. Second, this study focused on a single measure of financial leverage, the debt-to-equity ratio, which may limit the understanding of capital structure in Egypt. Broadening the scope to include market leverage and the equity ratio can account for the differences between companies with varying proportions of intangible assets. Third, this study recommends incorporating more accounting-based approaches to measuring credit risk and bankruptcy, such as the O-Score by Ohlson (1980), which considers liquidity, company size, performance, and capital structure. Furthermore, this study advocates for the market-based method of Multivariate Discriminant Analysis (MDA) proposed by Gu (2002), which utilizes market-based variables to predict bankruptcy. This approach is also a statistical method used to evaluate potential investments, considering numerous market variables. Consequently, this paper invites further investigation.

References

Adam, M., Safitri, R., & Wahyudi, T. (2018). Effect of company size, liquidity, and operational efficiency on bank profitability with problem credit risk as a moderating variable at commercial banks that are listed on the Indonesia Stock Exchange. *Jurnal Perspektif Pembiayaan Dan Pembangunan Daerah, 6*(3), 331-344.

Afandy, C. (2024). The Role of Financial Leverage and Cost Management on Operational Efficiency and Earnings Stability in Hospitality Industry in Indonesia. *The Eastasouth Management and Business, 3*(01), 77–88.

Agarwal, V., & Taffler, R. (2008). Comparing the performance of market-based and accounting-based bankruptcy prediction models. *Journal of banking & finance, 32*(8), 1541–1551.

Aghion, P., Bloom, N., Blundell, R., Griffith, R., & Howitt, P. (2005). Competition and Innovation: An Inverted-U Relationship. *The Quarterly Journal of Economics, 120*(2), 701–728.

Ahram Online. (2014). El-Sisi wins Egypt's presidential race with 96.91% - politics - egypt - ahram online. *https://english.ahram.org.eg/News/102841.aspx*

Ahram Online. (2020). Egypt will continue to cut energy subsidies to reduce govt expenditure: Minister - economy - business - Ahram online. https://english.ahram.org.eg/NewsContent/3/12/312632/Business/Economy/Egypt-will-continue-to-cut-energy-subsidies-to-red.aspx

Ali, M. A., Shuib, M. S., & Nor, A. M. (2021). Protection of bank's wealth: How is Islamic Banks' financial performance affected by asset quality and operational efficiency? *Universal Journal of Accounting and Finance, 9*(4), 745-756.

Alifiah, M. N. (2014). Predicting financial distress companies in Malaysia's trading and services sector using macroeconomic variables. Procedia-Social and Behavioral Sciences, 129(1), 90-98.

Baik, B., Chae, J., Choi, S., & Farber, D. B. (2013). Changes in operational efficiency and firm performance: A frontier analysis approach. Contemporary Accounting Research, 30(3), 996-1026.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology, 51*(6), 1173.

BBC. (2014). Egypt raises fuel and electricity costs. BBC News. https://www.bbc.com/news/world-middle-east-28173507

Campbell, J. Y. (1996). Understanding risk and return. *Journal of Political economy, 104*(2), 298–345.

Chen, C. C., Chen, C. D., & Lien, D. (2020). Financial distress prediction model: The effects of corporate governance indicators. *Journal of Forecasting, 39*(8), 1238-1252.

Dahiya, S., John, K., Puri, M., & Ramírez, G. (2003). Debtor-in-possession financing and bankruptcy resolution: Empirical evidence. *Journal of Financial Economics, 69*(1), 259-280.

Davison, J., & Tolba, A. (2018). Egypt's Sisi wins 97 percent in election with no real opposition. Reuters, April 2.

Egypt Oil & Gas. (2018). Fuel prices hiked for the third time since 2016. https://egyptoil-

Eldomiaty, T., Apaydin, M., Fouad, J., Anwar, M., & El Zahed, H. (2023). Firm Growth and Total Factor Productivity: A Methodology for Examining the Size Controversy. *International Journal of Business and Economics, 22*(2), 99–112.

Embassy of Egypt. (2014). Fact sheet: Terrorism in Egypt. Embassy of Egypt, Washington, DC. https://www.egyptembassy.net/media/04252014-Egypt-UPDATED-Terrorism-Fact-Sheet.pdf

Fich, E. M., & Slezak, S. L. (2008). Can corporate governance save distressed firms from bankruptcy? An empirical analysis. Review of Quantitative Finance and Accounting, 30(2), 225-251.

Finishtya, F. C. (2019). The role of cash flow of operational, profitability, and financial leverage in predicting financial distress on manufacturing company in Indonesia. *Jurnal Aplikasi Manajemen, 17*(1), 110-117.

Fredrick, I. (2018). Capital structure and corporate financial distress of manufacturing firms in Nigeria. *Journal of Accounting and Taxation, 10*(7), 78–84.

Geng, R., Bose, I., & Chen, X. (2015). Prediction of financial distress: An empirical study of listed Chinese companies using data mining. *European Journal of Operational Research, 241*(1), 236-247.

Gu, Z. (2002). Analysing bankruptcy in the restaurant industry: a multiple discriminant model. *International Journal of Hospitality Management, 21*(1), 25–42.

Harris, R. D., & Tzavalis, E. (1999). Inference for unit roots in dynamic panels where the time dimension is fixed. *Journal of Econometrics, 91*(2), 201-226.

Ige-Gbadeyan, O. O. (2023). Evaluation of operational efficiency and financial health of non-life insurance companies in South Africa (Doctoral dissertation).

Ijaiya, M. A., Jimoh, A. T., Attah, J. A., Abdulmumin, B. A., & Nafiu, A. I. (2021). Murabaha-related credit risk and financial performance of Islamic banks in Africa. *International Journal of Islamic Banking and Finance Research, 5*(1), 60-69.

Jaafar, M. N., Muhamat, A. A., Alwi, S. F. S., Karim, N. A., & Rahman, S. A. (2018). Determinants of financial distress among the companies practise note 17 listed in Bursa Malaysia. *International Journal of Academic Research in Business and Social Sciences, 8*(11), 798-809.

Khalil, A., & Ghandour, Y. E. (2018). The Egyptian devaluation—One year later. Infomineo, Value Added Business Research.

Khurshid, M. K., Sabir, H. M., Tahir, S. H., & Abrar, M. (2019). Impact of ownership structure and board composition on financial distress of Pakistan Stock Exchange listed manufacturing firms. & Applied Sciences & Technologies, 11(2), 1-14.

Kohli, N., & Saha, G. C. (2008). Corporate governance and valuations: Evidence from selected Indian companies. *International Journal of Disclosure and Governance, 5*(3), 236–251.

Kraus, A., & Litzenberger, R. H. (1973). A state-preference model of optimal financial leverage. *The journal of finance, 28*(4), 911-922.

Kusumastuti, D. W., & Kurniasih, L. (2024). Water disclosure: The moderating role of CSR in the relationship between ownership structure and leverage. *Journal of Economics, Management, Accounting, Digital Business, Creative Economy, Entrepreneur (JEBDEKER), 5*(1), 204–231.

Lagat, N. J. (2021). Validity of the multiple discriminate analysis failure prediction model on corporate financial distress: An analysis of the Kenyan market.

Lee, D., & Manual, V. S. (2019). A Study on effect of capital structure on the financial distress of non-financial companies listed in Bursa Malaysia Stock Exchange (KLSE). *International Journal of Academic Research in Business and Social Sciences, 9*(6), 428–450.

Levin, A., Lin, C. F., & Chu, C. S. J. (2002). Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of econometrics, 108*(1), 1-24.

Levin, A., Lin, C. F., & Chu, C. S. J. (2002). Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of econometrics, 108*(1), 1-24.

Lubben, S. J. (2000). The direct costs of corporate reorganization: An empirical examination of professional fees in large Chapter 11 cases. *The American Bankruptcy Law Journal, 74*(4), 509–522.

Lucky, L. A., & Michael, A. O. (2019). Leverage and corporate financial distress in Nigeria: A panel data analysis. Asian Finance & Banking Review, 3(2), 26-38.

Mariano, S. S. G., Izadi, J., & Pratt, M. (2021). Can we predict the likelihood of financial distress in companies from their corporate governance and borrowing? *International Journal of Accounting & Information Management, 29*(2), 305-323.

Marin, M. (2013). Can financial risk management help prevent bankruptcy? *Journal of Finance and Accountancy, 12*(1), 1–18.

Markowitz, H. M. (1959). Portfolio Selection, 1959. *Journal of Finance, 7*(1), 77–91.

Michaelson, R. (2019). Egypt's Tahrir Square on lockdown as regime moves to stifle protests. The Guardian. https://www.theguardian.com/world/2019/sep/27/egypt-authorities-step-up-security-country-braces-protests

Muigai, R. G., & Muriithi, J. G. (2017). The moderating effect of firm size on the relationship between capital structure and financial distress of non-financial companies listed in Kenya. *Journal of finance and accounting, 5*(4), 151-158.

Mushafiq, M., Sindhu, M. I., & Sohail, M. K. (2023). Financial performance under the influence of credit risk in non-financial firms: evidence from Pakistan. *Journal of Economic and Administrative Sciences, 39*(1), 25–42.

Ninh, B. P. V., Do Thanh, T., & Hong, D. V. (2018). Financial distress and bankruptcy prediction: An appropriate model for listed firms in Vietnam. Economic Systems, 42(4), 616-624.

Ohlson, J. (1980). Financial ratios and the probabilistic prediction of bankruptcy. *Journal of Accounting Research, 18*(1), 109–131.

Olawale, L. S., Ilo, B. M., & Lawal, F. K. (2017). The effect of firm size on the performance of firms in Nigeria. Aestimatio: *The IEB International Journal of Finance, 15*(1), 68-87.

Pindado, J., & Rodrigues, L. (2005). Determinants of financial distress costs. Financial Markets and Portfolio Management, 19(4), 343-359.

Ramadani, A., & Ratmono, D. (2023). Financial distress prediction: the role of financial ratio and firm size. JRAK, 15(1), 19-26.

Ray, S. (2011). Assessing corporate financial distress in automobile industry of India: An application of Altman's model. *Research Journal of Finance and Accounting, 2*(3), 155–168.

Restianti, T., & Agustina, L. (2018). The effect of financial ratios on financial distress conditions in sub industrial sector company. *Accounting Analysis Journal, 7*(1), 25-33.

Safitri, M. G., & Yuliana, I. (2021). The effect of profitability and leverage on financial distress with inflation as moderating. *Jurnal Aset (Akuntansi Aset), 13*(1), 134-143.

Shahwan, T. M., & Habib, A. M. (2020). Does the efficiency of corporate governance and intellectual capital affect a firm's financial distress? Evidence from Egypt. *Journal of intellectual capital, 21*(3), 403-430.

Sharpe, W. F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk. *The journal of finance, 19*(3), 425–442.

Simanjuntak, C. E. B., Krist, F. T., & Aminah, W. (2017). The effect of financial ratios on financial distress. eProceedings of Management, 4(2), 1580–1587.

Spence, M. (1973). Job market signaling. *The Quarterly Journal of Economics, 87*(3), 355–374.

Spence, M. (1978). Job market signaling. In Uncertainty in economics (281–306). Academic Press.

Susanti, E., Arismaya, A. D., & Nubatonis, G. A. S. (2024). The influence of operating capacity, leverage, and cash flow on financial distress with firm size as moderating Variable. *Islamic Accounting Journal, 4*(02), 126-137.

Teymouri, M. R., & Sadeghi, M. (2020). Investigating the effect of firm characteristics on accounting conservatism and the effect of accounting conservatism on financial governance. Archives of Pharmacy Practice, 11(1), 124–133.

Titman, S., & Wessels, R. (1988). The determinants of capital structure choice. *The Journal of finance, 43*(1), 1-19.

Turetsky, H. F., & McEwen, R. A. (2001). An Empirical Investigation of Firm Longevity: A Model of the Ex-Ante Predictors of Financial Distress. Review of Quantitative Finance and Accounting, 16(4), 323-343.

USIP. (2019). Egypt timeline: Since the Arab uprising. United States Institute of Peace. https://www.usip.org/egypt-timeline-arab-uprising

Whitaker, R. B. (1999). The early stages of financial distress. *Journal of economics and finance, 23*(2), 123–132.

Yazdanfar, D. (2013). Profitability determinants among micro firms: evidence from Swedish data. *International Journal of Managerial Finance, 9*(2), 151-160.

Younas, N., UdDin, S., Awan, T., & Khan, M. Y. (2021). Corporate governance and financial distress: Asian emerging market perspective. Corporate Governance: *The International Journal of Business in Society, 21*(4), 702-715.