

# The Moderating effect of board independence on the relationship between ownership structure and corporate risk among firm: evidence of list firm in Egypt

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## Abstract:

Corporate governance and risk management are integral components of modern business management. This paper aimed to investigate how and whether the presence of independent directors on the board influences how ownership structure affects corporate risk. The composition and independence of a company's board of directors play a vital role in determining the level of corporate risk. This research delved into the intricate dynamics between these elements to understand how they influence corporate risk. Specifically, the research aimed to examine how board independence acts as a moderating factor on the relationship between ownership structure and corporate risk. By examining the Egypt context, this study contributes to the broader understanding of corporate governance in emerging markets. The paper relied on Agency Theory and Resource Dependence Theory. The research employed the use of causal research design. The study population was sixty (60) firms listed in the Egyptian Stock exchange as of 31<sup>st</sup> December 2021. Secondary data sources included financial reports, annual reports, and surveys. Data analysis was conducted using quantitative techniques with the aid of statistical software STATA. The statistical results revealed significant moderating effect of board independence on the relationship between ownership structure and corporate risk. The findings have offered practical insights to corporate managers, investors, policymakers, and researchers, aiding them in making informed decisions and formulating effective governance and risk management strategies.

**Keywords:** Boards Independence, Ownership Structure, Corporate Risks, Corporate Governance, and Egypt.

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## **1. Introduction:**

Corporate governance plays a pivotal role in shaping the strategic direction and risk profile of companies (Shin, 2018). Two critical aspects of corporate governance are ownership structure and board independence (Aggarwal & Erel, 2018). Understanding how board independence moderates the relationship between ownership structure and corporate risk is of paramount importance for both scholars and practitioners. Ownership structure of a company can significantly impact the decision-making processes within a corporation (Dittmann et al., 2010; Edmans & Holderness, 2017). Likewise, board independence is a critical determinant of corporate governance effectiveness (Larcker & Tayan, 2014). The composition and independence of a company's board of directors play a crucial role in determining the level of corporate risk (Bebchuk, et al., 2013). Both variables have been widely studied in the corporate finance literature, but their combined effect on corporate risk remains a topic of interest and debate.

Kao et al., (2019) investigated ownership structure, board of directors, and company performance of listed Taiwanese companies. The key findings indicated that a firm performs better when it has a larger percentage of independent directors, a smaller board size, a two-tiered board structure, and no chief executive officer duality. In terms of ownership structure, blockholder ownership, institutional ownership, foreign ownership, and family ownership were all positively correlated to firm value. Bijoy and Mangla (2023) investigated the ownership structure and board composition as efficient corporate governance methods to control agency costs among listed firms in India. According to the study's findings, ownership by foreign institutional investors greatly reduces agency costs. Having institutional domestic ownership

also results in significantly reduced agency costs. Additionally, it was discovered that the size of the board and the number of independent directors have an inverse relationship with agency cost.

Rachdi and Ameer (2011) examined how board characteristics impact performance and risk-taking incentives in the banking sector. It was discovered that banks that take risks more often perform better. The study also found out that though board independence has little impact on organizational risk, it has a negative impact on performance. Sanni et al., (2019) looked specifically at deposit-taking banks listed in Nigeria from 2009 to 2018 and examined how risk-taking and board independence impacted bank performance. Board independence was shown to have a positive and considerable impact on performance. Goiaa (2018) examined the relationship between corporate governance systems and enterprise risk management, specifically, how risk management strategies in the context of Canadian listed firms might be impacted by corporate governance qualities, especially board characteristics. The findings show that factors connected to corporate governance such as board structure, director qualities, and board operating procedures are crucial in developing an integrated risk management strategy. In the BRIC (Brazil, Russia, India, and China) nations, Kopyrina and Stepanova's (2023) research looked at how ownership structure and board independence impacted the cost of debt. The result of the study is that there are no effects of board independence on cost of debt. The study found presence of significant ownership structure effects on the cost of debt that are country-specific.

## **2. Research Problem:**

Corporate governance in Egypt has gained increasing attention due to concerns regarding the financial stability and risk management of listed firms.

Just like many emerging markets, listed firms in Egypt have contributed significantly to economic growth and an expansion of securities exchange over the past few decades. This growth has brought to the forefront questions concerning the governance of listed companies. The composition and independence of boards play a pivotal role in the successful functioning of these firms and their ability to manage and mitigate risk. Board independence has been identified as a critical factor affecting corporate risk.

Despite the recognized importance of corporate governance in emerging economies, and specifically in Egypt, there is a noteworthy research gap in the empirical understanding of how board independence moderates the relationship between ownership structure and corporate risk in this context. By conducting a thorough investigation into the relationship between ownership structure, board independence and corporate risk, this research paper aimed at contributing not only to the academic literature but also to the development of corporate governance practices in the Egyptian financial market.

### **3. Theoretical Foundation**

The research was banked on two main theories, namely: agency theory and resource dependency theory. Incorporating these theories into the research provided a solid theoretical foundation for understanding the dynamics of ownership structure, board independence, and corporate risk.

#### **3.1. Agency Theory**

Agency theory is highly relevant in understanding the relationship between ownership structure, board independence, and corporate risk (Jensen & Meckling, 1976). It posits that in a corporation, there exists a principal-agent relationship where the shareholders (principal) delegate decision-making

authority to the board of directors (agents) (Donaldson & Davis, 1991; La Porta, et al., 2000). Different ownership structures can create varying degrees of conflicts of interest between these parties, influencing the level of corporate risk (Hossen & Mollah, 2015). Board independence, in this context, acts as a mechanism to mitigate agency problems. The study utilized agency theory to assess how different ownership structures impact the alignment of interests between shareholders and the board and, subsequently, corporate risk.

### **3.2. Resource Dependency Theory**

The theory suggests that organizations rely on external resources to function effectively (Hillman & Dalziel, 2003). Resource dependency theory was applied to understand how board independence affects a corporation's risk exposure. In the context of corporate governance, board members are often seen as external resources. Board independence can be seen as a measure of how reliant a corporation is on these external resources (Maury & Pajuste, 2012; Pfeffer & Salancik, 2003). The research used it in examining how the level of board independence influences the corporation's ability to manage risk, as a more dependent board may have a more conservative approach to risk management to protect its interests.

## **4. Empirical Literature Review**

Kao et al., (2019) investigated ownership structure, board of directors, and company performance of listed Taiwanese companies. The study employs a panel estimation to take use of the cross-sectional and time-series form of the data using a sample of Taiwanese listed companies from 1997 to 2015. The key findings indicate that a firm performs better when it has a larger percentage of

independent directors, a smaller board size, a two-tiered board structure, and no chief executive officer duality.

Kopyrina & Stepanova's (2023) research looked at how ownership structure and board independence impacted the cost of debt. They used unbalanced panel data of at-issue and yearly observations on the G-spread on corporate bonds issued in BRIC countries from 2007 to 2020 as well as the ownership and governance factors as of the date prior to the spread calculation to test the model of the impact of ownership and board structure on the cost of debt. Brazil contributed 409 spread observations, Russia 332, India 1683, and China 1458 to the data set. The results of the study are that there are no effects of board independence on cost of debt. The study also found presence of significant ownership structure effects on the cost of debt that is country specific. The findings show that state ownership has the biggest negative influence, and that concentrated ownership of firms and institutions also raises the cost of debt in Brazil.

Akbar et al., (2017) investigated the relationship between corporate risk-taking and board structure in the UK financial industry. They demonstrate how board independence, board size, and the CEO may all have an impact on corporate risk taking in financial organizations. A sample based on a panel dataset of all publicly listed companies in the UK financial industry over a 10-year period (2003–2012), including banks, insurance, real estate, and financial services companies was used. The results of this study suggest that the presence of powerful CEOs and non-executive directors on corporate boards reduces corporate risk-taking practices in financial firms after controlling for the effects of endogeneity through the application of the dynamic panel generalized

method of moments estimator. Corporate risks were found to be negatively related to board independence.

Warisa et al., (2019) looked specifically at Pakistani listed companies to examine how board independence, ownership structure, and company expansion impacted corporate risk between 2013 and 2017. It was discovered that family ownership structure has a considerable influence on a firm's risk-taking behavior when there is board independence. Board independence, however, was considered an explanatory variable in the research. The current study treats board independence as a moderator hence a conceptual gap.

Using fixed and random factors, Younas, et al., (2019) investigated board structure and corporate risk-taking across businesses listed in the USA and Germany between 2004 and 2015. Board independence was shown to increase business risk-taking, however the research only used board independence as an explanatory factor while the current study treats it as a moderator.

Zhang et al., (2018) examined state ownership, board independence, and stock return volatility in China. To determine the effect of state ownership and board independence on return volatility, static panels and dynamic models were used. The study focused on 444 non-financial firms that had been continuously listed from 2000 to 2012. This was because financial firms follow different governance procedures. According to the research, putting more emphasis on board independence led to an even greater rise in corporate risks. The study sought to determine how corporate governance affected corporate risk during the transformation of Chinese state-owned enterprises. The study's objectives were to investigate how controlling shareholder types affect corporate risk as well as the implications of board independence, state ownership, and other

governance factors. Board independence, state ownership, and other governance components were estimated to have implications on return volatility using the dynamic and static panel models. The study focused on non-financial firms, but the current study focuses on all firms listed at the EGX.

Rachdi and Ameur (2011) examined how board characteristics impact performance and risk-taking unconfirms, in the banking sector. The empirical investigation, which used a sample of 11 large Tunisian commercial banks between 1997 and 2006, produced the solid findings listed below: The presence of independent directors on the board of directors has a negative impact on performance but has little bearing on risk-taking. Lower CEO ownership is associated with lower performance in Tunisian banks. Both generalized least square (GLS), random effect (RE), and generalized method of moments (GMM) system techniques were used to investigate this relationship. It was discovered that banks that take risks more often perform better. Though it has little impact on organizational risk, board independence has a negative impact on performance. Agency costs were not included in the research.

Sanni et al., (2019) looked specifically at deposit-taking banks listed in Nigeria from 2009 to 2018 and examined how risk-taking and board independence impacted bank performance. Board independence was shown to have a positive and considerable impact on performance. However, a strong negative relationship between market risk, credit risk, and bank profitability was discovered. The research concentrated on deposit-taking enterprises.

Fauzi and Locke (2012) studied the impact of ownership structures and board structure on the performance of listed companies in New Zealand. The analysis demonstrates that there is a non-linear relationship between board structures, ownership structures, and firm performance. The outcome shows

that managerial ownership, board committees, and the board of directors all positively and significantly influence firm performance. Blockholder ownership, female directors on the board, and nonexecutive directors all contribute to reduced firm performance. The current study used standard deviation of ROA to measure firm risk.

## 5. Conceptual Framework

The conceptual model in Figure 1 shows the relationship among ownership structure as the independent variable on corporate risk as the dependent variable being moderated by board dependence. Key variables to be collected and analyzed include ownership structure which was operationalized in terms of managerial ownership, foreign ownership, government ownership and corporate ownership. Board independence was measured based on the number of independent directors. While corporate risk was estimated based on volatility of firm’s earnings (stand deviation of return on asset, SDROA) governance mechanisms could include board composition, ownership structure, and the presence of risk committees.

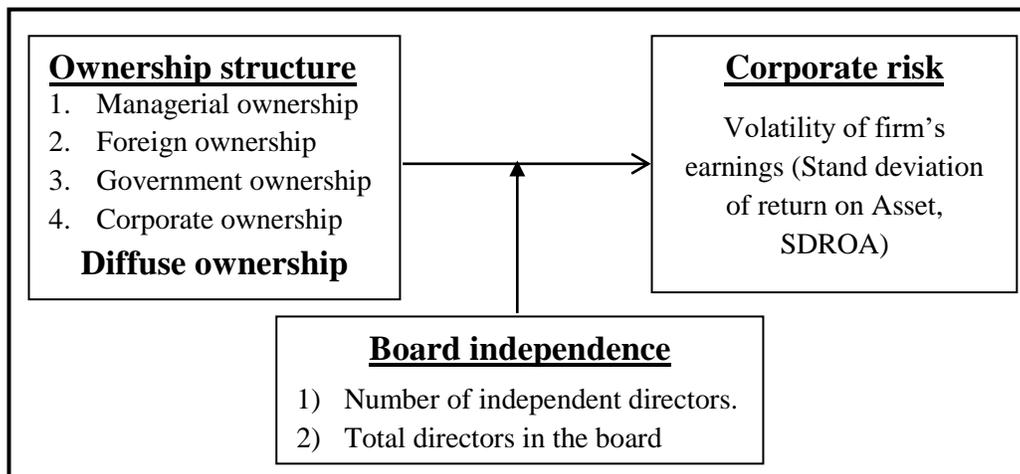


Figure 1: Conceptual Model

## 6. Methodology

The research employed the use of causal research design. The research involved the collection of financial and governance data from a representative sample of publicly traded companies, ensuring diversity across various industries and company sizes. The study population was sixty (60) firms at Egyptian Stock Exchange (EGX) as of 31<sup>st</sup> December 2021. The selection of the sample adhered to specific criteria aimed at achieving a representative and diverse dataset. These criteria included the selection of companies listed on major stock exchanges, encompassing various industries, geographic regions, and market capitalization ranges. Stepwise regression analysis was used to analyze the moderating effect of board dependence on the relationship between ownership structure and corporate risk. Data sources included financial reports, annual reports, and surveys, and data analysis was conducted using quantitative techniques by aid of statistical software STATA.

**Table (1) Distribution of the final sample by industry:**

Sector	number of observations	% of Sample
Agricultural	6	10
Automobile	1	1.67
Banks	10	16.67
Construction and Materials	5	8.33
Commercial and services	11	18.33
Energy and petroleum	4	6.67
Insurance	6	10
Investments	6	10
Manufacturing	8	13.33
Telecommunication	1	1.67
Real estate	1	1.67
Exchange traded funds	1	1.67
<b>Total</b>	<b>60</b>	<b>100</b>

## 7. Research Findings

The results obtained from the data analysis were thoroughly interpreted and discussed. This included addressing the statistical significance of findings, implications to theories, and the extent to which board independence moderated the influence ownership structure on corporate risk.

### 7.1 Descriptive Statistics of Board Independence

The number of independent directors to board size measured the descriptive statistics for board independence. The descriptive statistics of board independence are as shown in Table 2.

**Table (2): Descriptive Statistics of Board Independence**

<b>Variables</b>	<b>N</b>	<b>Mean</b>	<b>Min</b>	<b>Max</b>	<b>Std. Dev.</b>	<b>Skewness</b>	<b>Kurtosis</b>
Board Independence	647	5	2	0.875	0.185	0.528	2.120

The results indicated that board independence as measured by number of independent directors to board size had an average of 5 members with a minimum of 2 and maximum of 8 members. The standard deviation from the mean was 0.185 with a Skewness value of 0.528 and a Kurtosis of 2.120. The independence of the board in public listed companies is crucial for ensuring the proper governance of the company, protecting against conflicts of interest and corporate fraud, maintaining investor confidence, and ensuring effective oversight of the management.

### 7.2 Descriptive Findings for Ownership Structure

The descriptive statistics for ownership structure was assessed using managerial share ownership, foreign share ownership, government share ownership, corporate ownership and diffuse ownership. The descriptive statistics of ownership structure are as shown in Table 3.

**Table 3: Descriptive Statistics of Ownership Structure**

	<b>N</b>	<b>Mean</b>	<b>Min</b>	<b>Max</b>	<b>Std. D</b>	<b>Skewness</b>	<b>Kurtosis</b>
Managerial ownership	647	0.207	0.132	0.413	0.032	3.421	7.305
Foreign ownership	647	0.495	0.272	0.524	0.090	2.764	9.704
Government ownership	647	0.213	0.010	0.648	0.097	4.287	8.225
Corporate ownership	647	0.501	0.227	0.621	0.033	2.740	6.935
Diffuse ownership	647	0.628	0.561	0.883	0.080	3.042	7.244

The results showed that managerial share ownership as measured by ratio of managerial ownership to total ownership had a mean of 0.207 with a minimum of 0.132 and maximum of 0.413. The standard deviation from the mean was 0.032 with a Skewness value of 3.421 and Kurtosis of 7.305. The results further indicate that foreign share ownership as measured by ratio of ratio of foreign ownership to total ownership had a mean of 0.495 with a minimum of 0.272 and maximum of 0.524. The standard deviation from the mean was 0.090 with a Skewness value of 2.764 and Kurtosis of 9.704. Government share ownership as measured by ratio of government ownership to total ownership had a mean of 0.213 with a minimum of 0.010 and maximum of 0.648. The standard deviation from the mean was 0.097 with a Skewness value was 4.287 and Kurtosis at 8.225.

Corporate ownership as measured by ratio of corporate ownership to total ownership had a mean of 0.501 with a minimum of 0.227 and maximum of 0.621. The standard deviation from the mean was 0.033 with a Skewness value was 2.740 and Kurtosis at 6.935. Diffuse ownership as measured by ratio of diffuse ownership to total ownership had a mean of 0.628 with a minimum of 0.561 and maximum of 0.883. The standard deviation from the mean was 0.080

with a Skewness value was 3.042 and Kurtosis at 7.244. The implication of the ownership structure plays a crucial role in determining the way public listed companies operate, as it influences key aspects such as decision-making processes, management incentives, and firm performance. From the findings, the indicators of ownership structure; managerial share ownership, foreign share ownership, government share ownership, corporate ownership, diffuse ownership are expected to affect corporate risk in diverse ways as their means differ independently.

### **7.3 Descriptive Statistics of Corporate Risk**

The descriptive statistics for corporate risk were measured as the Standard deviation of return on asset (SDROA). The descriptive statistics of Corporate Risk are as shown in Table 4.

**Table 4: Descriptive Statistics of Corporate Risk**

<b>Variables</b>	<b>N</b>	<b>Mean</b>	<b>Min</b>	<b>Max</b>	<b>Std. Dev.</b>	<b>Skewness</b>	<b>Kurtosis</b>
Corporate Risk	647	0.055	0.001	0.649	0.064	4.327	3.598

The results indicate that corporate risk as measured by standard deviation of return of assets had a mean of 0.055 with a minimum of 0.001 and maximum of 0.649. The standard deviation from the mean was 0.064 with a Skewness value of 4.327 and a Kurtosis of 3.598. Corporate risk is a significant concern for public listed companies and must be carefully managed to ensure their financial stability and reputation. Companies must implement effective risk management strategies to minimize the impact of various types of risks on their financial performance and reputation.

### **Moderating Effect of Board Independence on the Relationship between Ownership Structure and Corporate Risk.**

The objective of the study was to determine the moderating effect of board independence on the relationship between ownership structure and corporate risk among firms listed at the Egyptian Stock Exchange. The hypothesis stated in the null form is as follows:

***H<sub>0</sub>: There is no significant moderating effect of board independence on the relationship between ownership structure and corporate risk among firms listed at Egyptian Stock Exchange.***

The study evaluated the moderating impact of board independence and explained the outcomes through the utilization of the coefficient of determination (R-Square) and regression coefficients. The study conducted a hierarchical regression analysis, wherein an interaction term, specifically the product of board independence and ownership structure, was included as an additional predictor. The presence of moderation is observed when the relationship between board independence and ownership structure serves as a significant predictor of corporate risk, with a statistical significance level of less than 0.05. The moderating effect was analyzed in 3 models/steps in line with the following models:

$$\text{Step i. } CR_{it} = \beta_0 + \beta_1.OS_{it} + \varepsilon_i$$

$$\text{Step ii. } CR_{it} = \beta_0 + \beta_1.OS_{it} + \beta_2.BI_{it} + \varepsilon$$

$$\text{Step iii. } CR_{it} = \beta_0 + \beta_1.OS_{it} + \beta_2.BI_{it} + \beta_3.OS_{it}*BI_{it} + \varepsilon_i,$$

Table 5 shows the regression coefficients for the first model.

**Table 5: Regression Results for Ownership Structure and Corporate Risk**

<b>Corporate Risk</b>	<b>Coef.</b>	<b>Std. Err.</b>	<b>z</b>	<b>P&gt; z </b>
Ownership Structure	-0.742	0.025	-29.140	0.000
Constant	0.883	0.014	62.730	0.000
Wald chi2(1)	848.87			
Prob > chi2	0.000			
R-squared	0.5682			

The fitted regression model was:

$$CR_{it} = 0.883 - 0.742OS_{it}$$

The first step involved conducting a regression analysis to examine the relationship between ownership structure and corporate risk among firms listed at the Egyptian Stock Exchange. The results indicated that the regression model was statistically significant, with a beta coefficient of -0.742 and a p – value of 0.000, which less than the predetermined alpha level of 0.05 is. Table 6 displays the anticipated correlation between ownership structure and board independence with regards to corporate risk, as outlined in step two.

**Table 6: Regression Results for Ownership Structure and Board Independence on Corporate Risk**

<b>Corporate Risk</b>	<b>Coef.</b>	<b>Std. Err.</b>	<b>z</b>	<b>P&gt; z </b>
Ownership Structure	-0.449	0.035	-12.660	0.000
Board Independence	-0.402	0.037	-10.990	0.006
Constant	0.931	0.014	68.180	0.000
Wald chi2(2)	1127.19			
Prob > chi2	0.0000			
R-squared	0.6364			

The fitted regression model was:

$$CR_{it} = 0.931 - 0.449OS_{it} - 0.402AC_{it}$$

In step two, the regression model of ownership structure and board independence on corporate risk was significant with  $\beta_1 = -0.449$ ,  $p = 0.000 < 0.05$ ,  $\beta_2 = -0.402$ ,  $p = 0.006 < 0.05$ . Step three predicted the relationship between ownership structure, board independence and the interaction term on corporate risk as indicated in Table 7.

**Table 7: Regression Results for Ownership Structure, Board Independence and Interaction Term on Corporate Risk**

<b>Corporate Risk</b>	<b>Coef.</b>	<b>Std. Err.</b>	<b>z</b>	<b>P&gt; z </b>
Ownership Structure	-0.3133	0.0371	-8.4400	0.000
Board Independence	-0.2649	0.0381	-6.9500	0.021
Ownership Structure*Board Independence	-0.3167	0.0368	-8.6200	0.004
Constant	0.9529	0.0132	72.2800	0.000
Wald chi2(2)	1329.62			
Prob > chi2	0.0000			
R-squared	0.674			

The fitted regression model was:

$$CR_{it} = 0.9529 - 0.3133OS_{it} - 0.2649BI_{it} - 0.3167OS*BI_{it}$$

In step three, the regression model of ownership structure, board independence and interaction term on corporate risk was significant with  $\beta_1 = -0.3133$ ,  $p = 0.000 < 0.05$ ,  $\beta_2 = -0.2649$ ,  $p = 0.021 < 0.05$ ,  $\beta_3 = -0.3167$ ,  $p = 0.004 < 0.05$ . Moderation exists when the interaction between board independence and ownership structure is a significant predictor of corporate risk ( $p < 0.05$ ). Therefore, the interaction term of ownership structure and board independence ( $OS*BI$ ) had a p-value of  $0.004 < 0.05$ . Therefore, we reject the null hypothesis that there is no significant moderating effect of board independence on the relationship between ownership structure and corporate risk among firms listed at Egyptian Stock Exchange.

## 8. Discussion

The statistical analysis revealed that the p-value of the interaction term between ownership structure and board independence ( $OS*BI$ ) was 0.004, which is lower than the predetermined significance level of 0.05. The study found evidence to reject the null hypothesis, indicating that there is a significant

moderating effect of board independence on the relationship between ownership structure and corporate risk for firms listed at the Egyptian Stock Exchange.

The results align with the research conducted by Sanni et al., (2019) which examined the impact of board independence and risk-taking on the performance of banks. The study concluded that board independence has a positive and statistically significant influence on the performance of deposit-taking institutions. A significant inverse correlation was observed between market risk, credit risk, and the profitability of banks. The results are consistent with Gouiaa's (2018) study, which investigated the impact of corporate governance characteristics on risk management procedures in Canada. The study revealed that the autonomy of the board is a crucial factor in implementing a comprehensive risk management strategy.

The results are in alignment with the study conducted by To and Suzuki (2019), which examined the influence of firm risks on the change of board independence. The research utilized panel data of publicly listed companies in Vietnam and identified a U-shaped nonlinear effect of firm risk on the proportion of non-executive directors. The structure of ownership holds significant importance when it comes to managing corporate risks and governance. Akbar et al., (2017) examined the relationship between board structure and corporate risks among publicly listed finance-related firms in the United Kingdom. The authors discovered that board independence was associated with a negative impact on corporate risks. The study conducted by Habtoor et al., (2019) aimed to assess the influence of corporate ownership structure on corporate risks among firms that are publicly listed in Saudi Arabia. The findings of the study revealed that the ownership structure of a firm has no significant effect on the disclosure of corporate risks. The study by

Warisa et al., (2019) examined the influence of board independence, ownership structure, and firm growth on corporate risk. The findings revealed that the risk-taking behavior of a firm is significantly affected by the family ownership structure in the presence of board independence.

The results are in alignment with the research conducted by Younas et al., (2019) which investigated the relationship between board structure and corporate risk-taking in companies listed in the United States and Germany. The study revealed that greater board independence was associated with increased corporate risk-taking. However, it is worth noting that the study treated board independence as an explanatory variable. The study conducted by Zhang et al., (2018) investigated the relationship between state ownership, board independence, and stock return volatility in China. The results indicated that a greater emphasis on board independence was associated with an elevated level of firm risk. The study conducted by Rachdi and Ameer (2011) examined the relationship between board independence, firm performance, and corporate risk. The findings indicated that board independence had a negative impact on performance but did not have a significant effect on corporate risk. The study conducted by Chumba (2015) explored the correlation between board structure and risk-taking behavior by utilizing firm performance as a metric. The findings revealed that board size had a negative impact on corporate risk-taking. The study found that board independence had a significant impact on risk taking after moderation using firm performance.

## **9. Conclusion**

This research paper sought to contribute to the understanding of corporate governance in emerging markets, specifically in the Egypt context. By investigating the moderating influence of board dependence on the linkage

between ownership structures on corporate risk, this study aimed at providing valuable insights for policymakers, investors, and corporate stakeholders. The statistical analysis revealed significant moderation effect in the relationship between ownership structure and board independence. Therefore, the study found evidence to reject the null hypothesis, indicating that there is a significant moderating effect of board independence on the relationship between ownership structure and corporate risk for firms listed at the Egyptian Stock Exchange.

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