

Article

Not peer-reviewed version

How CEO Extreme Overconfidence Shapes the Governance–Risk Relationship: Evidence from the Tunisian Banking Sector

[Monia Chikhaoui](#)*

Posted Date: 17 November 2025

doi: 10.20944/preprints202511.1146.v1

Keywords: banking risk; governance; ownership structure; board of directors; CEO sentiment; commercial bank



Preprints.org is a free multidisciplinary platform providing preprint service that is dedicated to making early versions of research outputs permanently available and citable. Preprints posted at Preprints.org appear in Web of Science, Crossref, Google Scholar, Scilit, Europe PMC.

Copyright: This open access article is published under a [Creative Commons CC BY 4.0 license](#), which permit the free download, distribution, and reuse, provided that the author and preprint are cited in any reuse.

Disclaimer/Publisher's Note: The statements, opinions, and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions, or products referred to in the content.

Article

How CEO Extreme Overconfidence Shapes the Governance–Risk Relationship: Evidence from the Tunisian Banking Sector

Monia Chikhaoui

Department of Finance, LARIMRAF. Higher School of Economic and Commercial Sciences University of Tunis; monia70chikhaoui@gmail.com

Abstract

This study examines the impact of corporate governance mechanisms on bank risk, focusing on the moderating role of CEO extreme overconfidence. Using a sample of all commercial banks in Tunisia from 2000 to 2021, the study explores how ownership structure and board characteristics influence three key types of risk: insolvency risk, operational risk, and equity risk. The findings show that managerial ownership and larger boards generally reduce insolvency and operational risk, while ownership concentration and excessive board independence may increase equity volatility. When CEO overconfidence is considered, it weakens the risk-reducing effect of governance on insolvency risk but strengthens its impact on operational risk. Equity risk, however, remains largely unaffected. A governance quality score is used to confirm these results, highlighting the limitations of structural governance when leadership traits are not considered. The study underscores the need to integrate behavioural assessments into governance practices to better manage bank risk.

Keywords: banking risk; governance; ownership structure; board of directors; CEO sentiment; commercial bank

JEL Classification: G21, G28, G34, D81

1. Introduction

In recent years, banking risk has become a major focus of academic research, regulators, and practitioners, especially when considering financial stability and institutional governance (Laeven and Levine, 2009; Basel Committee on Banking Supervision BCBS, 2011; Saunders and Allen, 2020). We generally classify banking risk into three discrete categories: financial risks, operational risks and environmental risks. As global financial markets expand, operational and financial risks will only become more relevant and significant, particularly in times of crisis. Regulations such as Basel II have increased controls over risk by mandating capital requirement to cover losses as a result of internal or external events, including systemic failures or human errors (BIS, 2004). Consequently, corporate governance becomes a key mechanism to assess and mitigate financial and operational risks. Corporate governance describes the governing regulatory processes of an organisation's various stakeholders (shareholders, management, and regulators). Pathan and Skully (2010) and Bebchuk et al. (2017), have shown, ownership structure and board composition, have a significant effect on bank governance and risk management. In addition, it is often believed that a diverse board with independent members ensures strong internal control and risk management, particularly for risks such as credit and liquidity (Adams and Mehran, 2003; Black et al., 2017). Research has increasingly enhanced understanding of the relationship between bank governance and risk management. In this context, Laeven and Levine (2018) noted that robust governance mechanisms reduce the likelihood of bank failure. According to Khan et al. (2020), the influence of institutional investors improves risk management by increasing controllability. Other important relationships to consider during an

economic crisis are those discussed by Zhang et al. (2021) and Wang and Cao (2022), who suggest that board size and ownership structure significantly impact banks' risk.

Research on banking governance in Tunisia remains limited, but recent studies have begun to examine the relationship between ownership structure, board characteristics, and risk in banks. Ghouma et al. (2017), studying the Tunisian context, found that governance mechanisms such as shareholder participation and board composition significantly affect risk management. Zouari and Miri (2019) showed that governance structure in Tunisian banks has a considerable effect on credit and liquidity risk management. They explained that when capital is concentrated in the hands of a few large shareholders, this concentration can enhance the capacity to make strategic decisions, but may also increase risks due to more centralized and less transparent decision-making. According to Nsaibi and Rajhi (2020), banks with an independent board have an additional risk management practice that significantly reduces the number of operational loss events. Boujelbène and Zribi (2011) studied the impact of ownership structure on systemic risk in Tunisian banks and showed that banks with a more widely diversified ownership structure and a board with a larger proportion of professionals are more likely to adopt a risk-averse approach in their risk management.

However, the link between governance and risk management in banking is not entirely automatic or mechanical. Recent literature documents that behavioural aspects are equally important factors in the strategic choices made by management. One such of behavioral factor, CEO sentiment (an affective cognitive bias such as optimism or pessimism), has emerged as an important variable explaining the risk-taking behavior of management (Hackbarth, 2008; Malmendier and Tate, 2005). An overly optimistic CEO will have, underestimate the chance of adverse outcomes, and be more inclined toward aggressive growth plans, which typically expose the bank to greater financial risks (Goel and Thakor, 2008; Anderson et al., 2019). In contrast, a pessimistic CEO may be less likely to initiate strategic projects or invest in innovative initiatives, both of which may have performance implications and affect long-term organisational adaptability. This type of psychological bias serves as a moderating mechanism that can increase or decrease the effects of a governance structure on risk-taking behaviours (Pathan, 2009; Ahmed and Duellman, 2013). In other words, the emotional and cognitive disposition of a CEO can have a profound effect on the bank's risk profile, regardless of whether a strong governance structure is in place.

Although there is extensive literature on banking governance and managerial behavioural biases, research on the relationship between these two dimensions is scarce, particularly in emerging economies, where economic and institutional instability makes decision-making more sensitive to individuals' perceptions. Indeed, only a few studies have investigated the moderating effects of CEO sentiment on the association between governance quality and banking risk, and have differentiated between short- and long-term effects. The aim of this paper is to address this research gap by examining how extreme CEO overconfidence moderates the relationship between the quality of governance mechanisms and risk management practices in Tunisian banks. Using a dynamic econometric approach, the study provides insights into how structural dimensions (such as governance) interact with behavioural factors (such as managerial sentiment), and offers practical suggestions for more effective strategic control and risk oversight in the banking sector. This study is structured into four main sections. The second section surveys the relevant literature exploring the relationship between corporate governance, CEO sentiment, and risk in banks. The third section addresses the research design, including the sample, variables used, data sources, and econometric approaches. The fourth section discusses the empirical results on how CEO sentiment moderates the relationship between governance and risk. The fifth section presents robustness checks of the results using alternative risk measurements. The final section concludes with a summary of the findings, implications for practice, and suggestions for future research.

2. Literature Review

2.1. Impact of Governance Mechanisms on Bank Risk

Internal governance mechanisms, including ownership structure and board characteristics, play a crucial role in banking risk management. Ownership structure significantly influences executive behaviour. Aligning executive ownership interests with those of shareholders can encourage prudent risk management (Fama and Jensen, 1983; Pathan, 2009; Iannotta et al., 2007). However, beyond a certain threshold, it can generate excessive power and promote riskier strategies (Mehran and Rosenberg, 2007; Laeven and Levine, 2009). Recent studies confirm the ambivalence of this effect, depending on the executive's profile and the context (Jilani and Chouaibi, 2021). For institutional investors, their impact depends on their investment horizon. The effects of ownership structures on banking risk are mixed. Some studies highlight that stable investors and capital concentration can reduce risk by strengthening managerial control (Chen et al., 2007; Dolde and Knopf, 2006; Guo et al., 2012). However, other studies show that these same mechanisms can also encourage excessive risk-taking, particularly when shareholders seek to maximise profits (Laeven and Levine, 2009; Yerramilli and Ellul, 2010; Alomari et al., 2018). Some results also suggest that these variables have a neutral impact on banking risk (Barry, 2007). Board characteristics have varied effects on bank risk. A moderate board size supports diversity of opinions and is beneficial for risk management (Adams and Mehran, 2012; Pathan, 2009), but larger boards can limit effectiveness (Adams and Mehran, 2012; Goh et al., 2021). Board independence generally improves monitoring (Pathan, 2009; Erkens et al., 2012), but it depends on the quality on the expertise of members and the environment of the institutional setting (Minton et al., 2014; Boussaada, 2015). CEO dual functions tend to increase risk, although they can sometimes strengthen strategic responsiveness (Pathan, 2009; Adams et al., 2010; Jilani and Chouaibi, 2021).

2.2. The Role of CEO Sentiment in Banking Risk-Taking

Studies have shown that CEO sentiment, such as optimism or pessimism, influences risk-taking in banks. Simon (1979) asserts that decisions are rarely fully rational, and, often shaped by what CEOs perceive from situations. When we consider agency theory (Jensen and Meckling, 1976) and studies of governance (Fama and Jensen, 1983), that CEO power can reinforce these biases, particularly in finance related to investment banking (Shleifer and Vishny, 1997). According to Hambrick and Mason's (1984) "Upper Echelons" theory, CEO decisions reflect the way these leaders think. Carpenter et al. (2004) also demonstrated the fundamental role of CEOs' personal attributes in strategic choices. Finkelstein and Hambrick (1996) note that personality, experience, and values significantly influence the strategic decisions made by CEOs, particularly those related to risk. Hayward and Hambrick (1997) noted that optimistic managers are more inclined to take risks because they expect the results to be favorable. Malmendier and Tate (2005) measured CEO optimism by assessing their personal behavior, and found that optimistic CEOs are more risk-taking, as confirmed in research by Malmendier and Tate (2008). Goel and Thakor (2008) emphasized that moderate optimism can lead to innovative ideas, while too much optimism can lead to mistakes. Hirshleifer et al. (2012) show that overconfidence can have negative effects. In the banking sector, Silipo et al. (2023) confirm that pessimism compels CEOs to manage risks more effectively and avoid excessive behaviour. Chava and Purnanandam (2010) explain that a pessimistic or prudent CEO would prefer less risky options. Campbell et al. (2011) confirm that optimism and pessimism have opposite effects on financial decisions. Ahmed and Duellman (2013) argue that optimism leads managers to underestimate credit risks, distorting financial statements. Barker and Mueller (2014) link overconfidence to high variation in financial results. Kliger and Kudryavtsev (2018) reveal that optimists generally tend to underestimate the risks involved in lending, which can endanger the bank. Huang and Wang (2019) show that excessive managerial confidence increases risky decisions. It is also shown by Aktas et al. (2020) that banks with too optimistic CEOs take more corporate risk

when there is a lack of governance. Conversely, Liu et al. (2022) show that pessimistic managers prefer cautious strategies, which help the bank remain stable but hinder its growth.

2.3. Moderating Effect of CEO Sentiment on the Relationship Between Governance and Bank Risk

Governance is essential for mitigating risk in banks. Jensen and Meckling (1976) and Fama and Jensen (1983) explain that separating control from management reduces abuses. However, the impact of governance on risk depends on CEO sentiment. Hambrick and Mason (1984) state that the CEO's personality influences their perceptions of governance and decision-making. Regarding company performance, Shleifer and Vishny (1997) and La Porta et al. (2000) argue that corporate governance is a key means of controlling excessive risk. They suggest that the board and major shareholders should monitor the company on behalf of stakeholders, especially in high-risk sectors such as banking. According to Klein (1998), the presence of independent teams on boards, such as audit and risk management committees, serves as a monitoring mechanism, as they can oversee management decisions. Finkelstein (1992) highlights the importance of personality. A confident and over-optimistic executive may fail to appreciate governance mechanisms and seek to avoid them, thereby increasing risk. Bebchuk and Fried (2003) further argue that under weak governance, where little control is exercised, executive over-optimism may lead to extremely risky decisions, particularly those involving risky investments. Zhang (2013) explains that good governance rules can mitigate excessive managerial behaviour. Effective governance limits risky decisions while controlling managerial actions. Adams and Mehran (2003) show that governance is most effective when the manager demonstrates a balanced level of confidence, neither too cautious nor too confident. This balanced attitude allows control to be applied more effectively in the bank. Cheng et al. (2015) point out that the board plays an important role in helping managers make sound decisions. They maintain that when the CEO is overly optimistic, the board should prevent excessive risk-taking. Lins et al. (2017) argue that good governance involves not only reducing risks but also allowing a controlled level of risk to facilitate innovation and improve company performance. The board's ability to adjust this risk level depends primarily on the manager's psychology, specifically their confidence level.

3. Materials and Methods

3.1. Sample Characteristics

The sample for this study comprises all Tunisian commercial banks listed on the Tunis Stock Exchange. The period examined is from 2000 to 2021, covering 22 years. By including the moderating effect of CEO sentiment, particularly overconfidence, the analysis of how governance mechanisms have influenced banking risk is enhanced. The selected banks include both public and private institutions, enabling a comparative analysis of their risk management and governance. The study includes a total of 220 observations. Financial and accounting data were obtained from the WorldScoop database. Information on governance (such as board size, ownership concentration, and the presence of institutional investors) was sourced from the banks' annual reports and documents published by organisations such as the Professional Association of Banks and Financial Institutions (APTBEF) and the Tunis Stock Exchange (BVMT).

3.2. Choice of Variables and Hypotheses to be Tested

The dependent variable: To assess banking risk, we use three indicators:

- *Insolvency Risk (Z-score):* This ratio measures the probability of a bank going bankrupt. It is calculated by dividing return on assets (ROA) by its standard deviation (SD(ROA)) and adding a constant representing the amount of equity to total assets (K). This measure indicates profitability in relation to the volatility (or stability) of the bank. (i) A high Z-score suggests that the bank has high financial stability and minimal risk of insolvency. (ii) A low Z-score, conversely, indicates a higher risk for the bank.

$$Z - scores_{it} = \frac{ROA_{it} + (Equity_{it} / Assets_{it})}{SD_ROA_i} \quad (1)$$

The Z-score is widely used in research to measure the financial stability of banks. Originally proposed by Altman (1968), the traditional Z-score model predicted corporate bankruptcy, though many researchers have adapted its predecessor models for the banking industry. Several studies report that a high Z-score tends to indicate high-quality governance and effective risk management practices (Apergis et al., 2010). Similarly, Karas and Chulia (2010) found that banks with a relatively high Z-score generally have more robust governance arrangements.

- *Operational Risk (SD(ROA))*: The standard deviation of ROA (SD_ROA) is calculated as the standard deviation of the bank's return on assets over a moving window (T=3) of at least three consecutive years, capturing the average volatility of profitability over time.

$$SD_ROA = \left(\frac{1}{T-1} \sum_{t=1}^{T=3} (ROA_{it} - \overline{ROA}) \right)^{1/2} \quad (2)$$

The standard deviation of return on assets shows the extent to which a bank's return varies with its assets. (i) A high SD(ROA) means that returns vary significantly, so risk is high. (ii) A low SD(ROA) means that returns are more uniform, so risk is lower. It is an important measure of a bank's operational risk because it correlates with governance and ownership structure. According to Apergis et al. (2010) and Pathan (2009), a high SD(ROA) often reflects greater exposure to financial risks. Berger and DeYoung (2009) assert that this indicator is important for analysing the financial stability of banks.

- *Financial Risk (SD(ROE))*: The standard deviation of ROE (SD(ROE)) is calculated as the standard deviation of the bank's return on equity over a moving window (T=3) of at least three consecutive years, capturing the average volatility of profitability relative to shareholders' equity over time.

$$SD_ROE = \left(\frac{1}{T-1} \sum_{t=1}^{T=3} (ROE_{it} - \overline{ROE}) \right)^{1/2} \quad (3)$$

A higher standard deviation (SD) of return on equity (ROE) may indicate significant variations in profits and, therefore, a higher risk to shareholders. A lower SD (ROE) suggests less volatile and more predictable profitability. Thus, this indicator helps explain the financial risk associated with a bank's profitability. Adams and Mehran (2003) also note the implications of a high SD (ROE), which may result from poor capital management or exposure to market risk. Similarly, Laeven and Levine (2009) found that banks with a high SD (ROE) may be less financially stable, as their profits fluctuate significantly from year to year.

The basic independent variables:

Corporate governance is shaped by several factors. Ownership structure, specifically managerial ownership (MOW), institutional investor ownership (INST), and ownership concentration (Block) affects management control. For the board of directors, board size (Bsize), board independence (BIND), and the separation of the chairperson and CEO roles (Dual) improve board effectiveness.

Management Ownership (MOW): A significant CEO ownership stake better aligns their interests with those of the bank's shareholders. A large capital stake encourages managers to manage risk prudently, as their economic success is tied to shareholder performance (Morck et al., 1988; Fama and Jensen, 1983). Studies indicate that CEOs with substantial ownership make decisions focused on long-term value creation, limiting risk-taking and opportunistic behaviour, since managers are penalised for poor choices (Baker and Hall, 2004). Conversely, when a CEO holds a small capital stake, their interests may diverge from those of shareholders, potentially increasing banking risk (Sraer and Thesmar, 2007).

Hypothesis1: High CEO ownership reduces banking risk.

Institutional investors (INST): The shares held by institutional investors (INST) reflect their involvement in the management and governance of the bank. Institutional investors, such as pension

funds and insurance companies, are often considered informed and professional (Shleifer and Vishny, 1986). They make long-term commitments to banks and can exercise monitoring that contributes to improving the management of operational and financial risks (Gillan, 2006). They also enhance transparency and encourage better-founded strategic managerial decisions, thus limiting risks (Bebchuk and Weisbach, 2010).

Hypothesis2: *The presence of institutional investors reduces banking risk.*

Ownership Concentration (Block): The capital concentration ratio (BLOCK) measures the share held by the five largest shareholders in the bank.

$$Block_{it} = Top5 - Shareholders_{it} \quad (4)$$

A high concentration indicates that a limited number of shareholders hold the majority of stakes. This can influence strategic and management decisions and potentially increase bank risk (Laeven and Levine, 2009; Adams and Mehran, 2003). The authors argue that banks with high capital concentration allow controlling shareholders to influence risk management decisions that may undermine the future stability of the institution. According to Jensen and Meckling (1976), the absence of external control occurs when minority shareholders are not in a position to affect strategic decision-making, which creates more systemic risk.

Hypothesis3: *High capital concentration increases banking risk.*

-Board size (BSIZE) affects governance and risk management quality. More members on the board provide a greater range of perspectives and increased control in decision-making; however, such boards also face disadvantages, including slower and delayed decision-making, particularly in the board's response to risk (Jensen, 1993; Lipton and Lorsch, 1992). Some studies indicate that larger boards are more likely to serve the interests of stakeholders and tend to promote moderation in risk-taking. However, very large boards can create coordination problems; as board size increases, these boards become more susceptible to strategic risks that often result in high long-term costs (Yermack, 1996). Therefore, the ideal or moderate board size is one that balances diversity and effectiveness, achieving the best of both worlds (Coles et al., 2008).

Hypothesis4: *A larger board size may increase banking risk due to slow decision-making and governance complexity.*

Board Independence (BIND): The proportion of independent directors (BIND) represents the share of board members who are not related to the bank's management. A high percentage of independent directors is often linked to better monitoring and reduced risks of mismanagement (Fama and Jensen, 1983). As these directors are independent, they are better positioned to challenge risky decisions and improve risk management (Hermalin and Weisbach, 1991). These directors also enhance stakeholder confidence and mitigate opportunism or malfeasance (Bhagat and Black, 2002).

Hypothesis5: *Independent directors are associated with greater reductions in banking risk.*

Management Duality (DUAL): DUAL separation is important from a good governance perspective, as separating the roles leads to efficient allocation of authority, resulting in better decision-making and improved risk management. Fama and Jensen (1983) argue that the internal monitoring function is less effective when one individual holds both roles, due to decision dependence and increased exposure to risk. Several studies have shown that separating these roles enables more effective control of management actions (Raheja, 2005) and promotes more balanced risk management (Coles et al., 2008).

Hypothesis6: *CEO dual functions positively influence banking risk.*

CEO Sentiment: In this study, CEO sentiment is defined as a psychological trait reflecting a leader's level of optimism or overconfidence. These behavioural biases can significantly influence strategic decision-making, particularly regarding banking risk-taking. As CEO sentiment cannot be directly observed, we use an indirect method to measure it, drawing on concepts from behavioural finance. Instead of analysing individual proxies separately, we construct a composite index that combines three behavioural indicators into a single, unified measure of CEO sentiment. This approach enables us to capture the CEO's overall psychological profile and more effectively identify

extreme sentiment whether excessively pessimistic or optimistic. The composite sentiment index, Ext_OC, is based on the sum of three binary variables, each representing a different behavioural indicator of CEO optimism or overconfidence:

- *Change in CEO Ownership (OC_MOW)*: First, we use a positive change in the CEO's stake in the bank's capital as an indicator of optimistic sentiment. According to Heaton (2002) and Malmendier and Tate (2005, 2008), an overconfident CEO is likely to invest more in their own firm, convinced of the firm's ability to generate future value. Therefore, an increase in equity held by such a manager may reflect a very high degree of confidence in the bank's prospects. The indicator is defined as SENT_MOW as follows:

$$OC_MOW = \begin{cases} 1 & \text{if } \Delta MOW > 0 \\ 0 & \text{otherwise} \end{cases} \quad (5)$$

Where ΔMOW is the annual change in the CEO's ownership in the capital of bank i in year t.

- *CEO Duality (OC_DUAL)*: We consider the dual role of the CEO, that is, the combination of the positions of chairman of the board and chief executive officer. This organisational structure is often associated with a strengthening of the CEO's decision-making power, which limits internal control mechanisms. As Jensen (1993) and Finkelstein and D'Aveni (1994) have pointed out, concentration of power can amplify overconfidence, as CEOs feel less constrained in their strategic choices. The DUAL variable is defined as follows:

$$OC_DUAL_{it} = \begin{cases} 1 & \text{if the CEO and chairman are same} \\ 0 & \text{otherwise} \end{cases} \quad (6)$$

- *Relative Performance (SENT_ROA)*: We also include the bank's relative performance (ROA) compared to the industry average, so that a CEO whose bank performs better than its competitors tends to attribute this performance to their personal qualities, which may reinforce a sense of superiority or overconfidence (Malmendier and Tate, 2005; Hirshleifer et al., 2012; Goel and Thakor, 2008). We construct the binary variable SENT_ROA as follows:

$$OC_ROA_{it} = \begin{cases} 1 & \text{if } ROA_{it} > \frac{\sum_{i=1}^n ROA_{it}}{n} \\ 0 & \text{otherwise} \end{cases} \quad (7)$$

Where $ROA_{it} = NI_{it} / TA_{it}$, ROA is return on assets, NI is net income, and TA is total assets. The second term represents the average ROA of all commercial banks in the Tunisian banking sector in year t.

CEO Extreme Overconfidence (CEO_ExtOC): Each of these three components is coded as a binary variable (1 if the condition is met; 0 otherwise). The composite index is calculated as:

$$CEO_ExtOC_{it} = OC_Mow + OC_Dual + OC_ROA \quad (8)$$

Thus $Ext_OC \in \{0, 1, 2, 3\}$, we then categorise CEO sentiment as follows:

<i>Extreme pessimism</i>	<i>Moderate overconfidence</i>	<i>Extreme overconfidence</i>
CEO_ExtOC= 0	CEO_ExtOC= 1	CEO_ExtOC=2 or 3

This composite index serves as the main independent or moderating variable in our analysis of CEO behaviour, replacing the use of individual indicators. The Role of CEO Sentiment in Governance and Risk: In line with the behavioural view of corporate governance, we argue that CEO sentiment, as captured by CEO_ExtOC, may alter the effectiveness of internal governance mechanisms in mitigating risk. A highly optimistic or overconfident CEO may be more likely to override internal

controls or ignore governance signals, leading to higher risk-taking, even in institutions with otherwise sound governance structures. Accordingly, we propose the following hypothesis:

Hypothesis7: CEO extreme overconfidence moderates the relationship between internal governance mechanisms and banking risk.

Specifically, when the CEO exhibits a high level of optimism or overconfidence (CEO_ExtOC \geq 2), the ability of internal governance mechanisms to reduce banking risk is likely to be weakened. This hypothesis assumes that while governance mechanisms (e.g., board size, independence, or ownership concentration) are generally effective in limiting excessive risk-taking, their influence can be significantly moderated by the CEO's psychological disposition. Furthermore, risk can be controlled internally; however, CEO sentiment can moderate its effects. Overconfident behaviour by the CEO can weaken the control mechanisms intended to curb risk-taking and increase risk, even when good governance structures are in place.

The control variables:

The control variables are as follows: According to Berger et al. (1995), *bank size* (FSIZE) directly affects risk management; larger banks have more resources to mitigate risks. *The age of the bank* (FAGEL) reflects experience in risk management; older banks are considered to have greater experience in this area (Demirgüç-Kunt and Huizinga, 1999). *Bank liquidity* (LIQUID), measured by the liquidity ratio, indicates the bank's ability to meet short-term obligations. An adequate liquidity level tends to reduce financial risk (Chiorazzo et al., 2008).

Table 1. Variable definitions and sources.

<i>Dependent variables</i>	<i>symbol</i>	<i>definition</i>	<i>sources</i>
<i>Insolvency Risk</i>	<i>Z-score</i>	<i>Ratio as combining profitability (ROA), its volatility (SD(ROA)), and capital adequacy (equity-to-assets),</i>	<i>Datastream</i>
<i>Operational Risk</i>	<i>SD(ROA)</i>	<i>the standard deviation of Return on Assets (ROA), calculated over a three-year rolling window,</i>	<i>Datastream</i>
<i>Financial Risk</i>	<i>SD(ROE)</i>	<i>The standard deviation of Return on Equity (ROE), also calculated over a three-year rolling window,</i>	<i>Datastream</i>
<i>Basic independent variables</i>	<i>symbol</i>	<i>Definition</i>	<i>Sources</i>
<i>Manager Ownership</i>	<i>MOW</i>	<i>The proportion of shares held by the CEO</i>	<i>banks' annual reports</i>
<i>Institutional ownership</i>	<i>INST</i>	<i>The percentage of company shares owned by institutional investors, such as pension funds, banks, or insurance companies.</i>	<i>DataStream</i>
<i>Ownership concentration</i>	<i>Block_5</i>	<i>The total percentage of shares held by the top five largest shareholders</i>	<i>banks' annual reports</i>
<i>Board size</i>	<i>Bsize</i>	<i>The total number of directors serving on the company's board</i>	<i>DataStream</i>
<i>Board Independence</i>	<i>BIND</i>	<i>The percentage of board members who are considered independent from company management</i>	<i>DataStream</i>
<i>Manager Duality</i>	<i>Dual</i>	<i>A binary variable indicating whether the CEO also serves as the board chairperson (1 = Yes, 0 = No)</i>	<i>DataStream</i>
<i>Investor Extreme overconfidence</i>	<i>CEO_ExtOC</i>	<i>Calculated by summing binary variables, the CEO's overconfidence resulting in a composite index ranging from 0 to 3.</i>	<i>Authors' calculations</i>
<i>Control variables</i>	<i>symbol</i>	<i>definition</i>	<i>Sources</i>

<i>Firm Size</i>	<i>FSize</i>	<i>the natural logarithm of total assets</i>	<i>DataStream</i>
<i>Firm Age level</i>	<i>Fage</i>	<i>assessed in four bands: 1 for banks aged less than 20, 2 for banks aged between 20 and 40, 3 for banks aged between 40 and 60, and 4 for banks aged over 60.</i>	<i>DataStream</i>
<i>Bank liquidity</i>	<i>Liquid</i>	<i>Ratio liquid assets / total assets;</i>	<i>DataStream</i>

3.3. The Model to be Tested

To empirically examine the relationship between internal governance mechanisms and banking risk, this study proposes two econometric models. The first model assesses the direct impact of governance variables on bank risk without considering any moderating effect. The second model extends the analysis by incorporating the moderating effect of CEO sentiment.

-Model 1: Baseline Model – Impact of Corporate Governance on Bank Risk

$$BRisk_{it} = \alpha + \beta_1 Ownership_{it} + \beta_2 Board_{it} + \lambda X_{it} + \varepsilon_{it} \quad (9)$$

Where: Risk_{it} denotes the risk level of bank i at time t (e.g., Z-score, SD(ROA), SD(ROE)). Ownership_{it} comprises variables representing ownership structure (e.g., managerial ownership, institutional ownership, ownership concentration). Board_{it} comprises variables representing board characteristics (e.g., board size, board independence, CEO duality). X_{it} refers to control variables such as bank size,

bank age, bank liquidity, etc. ε_{it} is the error term.

-Model 2: Moderation Model – CEO Sentiment as a Moderator

$$BRisk_{it} = c + \theta_1 Gov_{it} + \theta_2 CEO_ExtOC_{it} + \theta_3 (Gov_{it} * CEO_ExtOC_{it}) + \lambda X_{it} + \omega_{it} \quad (10)$$

Where: Governance (Gov) includes both ownership structure and board characteristics. CEO_ExtOC represents a proxy for CEO sentiment, and Gov*CEO_ExtOC captures the interaction effect. X_{it} is a set of control variables that may include firm size (FSIZE), firm age (FAGEL), liquidity (LIQUID). ε_{it} is the error term.

4. Empirical Results and Discussions

This study examines the interaction between governance mechanisms, quality, and bank risk in a sample of Tunisian banks observed from 2000 to 2021, as well as how CEO extreme overconfidence moderates this interaction and ultimately increases or decreases the impact of governance on risk management.

4.1. Descriptive Statistics

A descriptive analysis will give insight into the characteristics of the sample, as well as variation patterns in the variables. The parameters of interest include measures of central tendency (mean, median), measures of dispersion (standard deviation, minimum-maximum), and measures of normality (skewness, kurtosis).

Table 2. Table of descriptive statistics.

<i>Variables</i>	<i>Descriptive</i>				<i>Normality test</i>		<i>Correlation test</i>
	<i>Mean</i>	<i>Min</i>	<i>Max</i>	<i>STD</i>	<i>skewness</i>	<i>kurtosis</i>	<i>VIF test</i>
<i>SD_ROA</i>	0.013	0.002	0.051	0.014	1.699	4.768	-
<i>SD_ROE</i>	0.304	0.018	1.982	0.573	2.468	7.448	-
<i>Z-Score</i>	17.691	-5.585	58.217	13.84	0.724	2.690	-
<i>MOW</i>	0.376	0.074	0.75	0.167	0.184	1.686	1.72
<i>INST</i>	0.493	0.074	0.86	0.197	-0.336	2.044	1.21
<i>Block</i>	0.532	0.19	0.88	0.151	-0.268	2.335	1.44

<i>BSIZE</i>	11.304	7	17	1.594	-0.397	3.799	1.28
<i>BIND</i>	0.322	0.09	0.64	0.138	0.615	2.575	1.46
<i>DUAL</i>	0.502	0	1	0.501	-0.009	1.008	1.88
<i>CEO_ExtOC</i>	1.259	0(15%)	3(5%)	0.77	0.159	2.614	1.64
<i>FSIZE</i>	15.230	12.388	16.771	0.712	-0.353	3.153	1.44
<i>FAGEL</i>	2.690	1	4	0.7432	-0.103	2.692	1.20
<i>LIQUID</i>	2.110	0.462	185.68	12.450	14.667	216.75	1.03

The descriptive statistics of Tunisian banks for the period 2000–2021 highlight the factors influencing banking risk. Risk variables such as SD(ROA) (standard deviation of Return on Assets) and SD(ROE) (standard deviation of Return on Equity) indicate low volatility in returns on assets and equity, with an average of 0.0131 and 0.5732, respectively. There is, however, are positive asymmetries and variations, particularly for equity returns, as shown by the standard deviations of 0.0147 for SD(ROA) and 0.5732 for SD(ROE). The Z-score, a measure of solvency, shows a high average of 17.6912 and a standard deviation of 13.8406, indicating significant variation across banks, with some banks clearly facing a high default risk. For governance, ownership concentration (Block) is at moderate levels, as shown by a mean of 0.5328 and a standard deviation of 0.1517, suggesting that shareholding is relatively concentrated, influencing strategic decisions. The CEO's equity stake (MOW) is also modest, averaging 0.3769 with a standard deviation of 0.1673, indicating a moderate level of alignment with shareholders. The institutional investor (INST) presence is remarkable, with an average value of 0.4930, possibly encouraging better risk management. The average board size (BSIZE) is 11.30 members with a standard deviation of 1.5942, which shows a variety of perspectives; however, larger board sizes can create inefficiencies. The percentage of independent directors (BIND) averages 32.28%, which may enhance risk oversight. The average value of DUAL is 0.5022, indicating that in about 50% of banks, the CEO also serves as chairman of the board, potentially reducing the separation of powers. Control variables such as firm size (FSIZE) have a mean of 15.2308 and a low standard deviation of 0.7122, indicating stability in bank characteristics. Firm age (FAGEL) has a mean of 2.6909, placing most banks in the 20–40 years age range. Liquidity (LIQUID) has an average of 2.1107 but a high standard deviation of 12.4506, indicating wide variation in liquidity management across banks. These results demonstrate that risk management and governance among Tunisian banks show considerable variability, with serious implications for their financial stability and performance. The variable CEO_ExtOC, considered an indicator of CEO overconfidence, is moderately normally distributed with a mean of 1.259. In this sample, 15% of the chief executive officers exhibit low overconfidence, scoring 0, and another 5% score highly overconfident, receiving a score of 3. The largest group of distribution is between low and moderate overconfidence; 48% scored 1, and 31% scored 2. There is a slight degree of skewness (skewness = 0.159) and also the kurtosis value is within normal limits (kurtosis = 2.614). The multicollinearity test for each explanatory variable indicated that none of the VIF values surpassed 2, indicating that there is not multicollinearity significantly present, and are therefore independent from one another.

4.2. Impact of Governance Mechanisms on Banking Risk Without the Moderate Effect of CEO Sentiment

The empirical results indicate that ownership structure and board characteristics affect the risk profile of Tunisian banks. Specifically, CEO ownership (MOW) has a small but statistically significant negative relationship with returns volatility and operational risk (Reg 1). This aligns with the theoretical intuition of Pathan (2009) and Jensen and Meckling (1976), who argue that an equity stake aligns the interests of managers and shareholders and reduces the likelihood of excessive risk-taking. In this context, CEO ownership is positively associated with equity risk (Reg 3), suggesting that while CEO ownership benefits operational risk, it also increases potential volatility in shareholder returns. Notably, CEO ownership has no significant effect on insolvency risk (Reg 5).

Institutional investors (INST) have a strong positive influence on financial stability (Reg 5), supporting Shleifer and Vishny's (1997) assertion that institutional ownership enhances governance

and mitigates risk. Similarly, ownership concentration (BLOCK) improves financial stability (Reg 5) but results in higher profit volatility (Reg 3), reflecting a trade-off consistent with Calomiris and Karceski's (2000) findings that concentrated ownership can reduce default risk while increasing earnings fluctuations.

Regarding board structure, larger board size (BSIZE) is associated with reduced volatility in returns on equity (Reg 4) and improved financial stability (Reg 6), supporting Lipton and Lorsch's (1992) view that larger boards provide better oversight and diverse perspectives, though they may slow decision-making. The dual role of CEO and Chairman (DUAL) produces mixed results: it lowers asset and equity returns volatility (Regs 2 and 4), consistent with Fama and Jensen's (1983) predictions, and enhances financial stability (Reg 6), in line with Mehran's (1995) argument that centralised leadership can strengthen banks. Conversely, greater board independence (BIND) is linked to increased equity returns volatility (Reg 4) and reduced financial stability (Reg 6), indicating that while independent directors may enforce stricter monitoring to curb risk-taking, this may also constrain profitability, as noted by Bhagat and Black (2002).

Table 3. effect of governance characteristics on bank risk.

	SD(ROA)		SD(ROE)		ZSCORE	
	Reg (1)	Reg (2)	Reg (3)	Reg (4)	Reg (5)	Reg (6)
MOW	-0.0119***		0.7135***		-2.1068	
INST	0.0014		0.5127***		7.0503	
Block	-0.0012		0.4668***		12.4376**	
BSIZE		-0.0035***		0.0052		2.0950***
CEO-DUAL		-0.0057***		-0.3253***		6.3965***
BIND		-0.0019		0.5956***		-9.2537*
FSize	-0.0052***	-0.0054***	-0.1471***	-0.1106***	-1.8998***	-1.5605
FAGEL	0.0093***	0.0084***	-0.01304	-0.0093	1.5387*	1.3799**
Liquid	0.00001	0.00003	-0.0032	-0.0011	-0.0056	-0.0194
Constant	0.0724***	0.1163***	1.8169***	1.9287***	33.1887***	13.8909
Adj-R ²	0.3245	0.4568	0.1348	0.1115	0.0346	0.1058
Prob>chi2	0.000	0.000	0.000	0.0000	0.0001	0.0003
N	220	220	220	220	220	220

Note: This table shows the effects of governance characteristics on bank risk. Specifically, columns (1), (3), and (5) show the effects of ownership structure variables, while columns (2), (4), and (6) show the effects of board variables. All variables are defined in the previous sections. Levels of statistical significance are shown as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Control variables further clarify these dynamics. Larger banks (FSIZE) are associated with lower volatility in returns on assets and equity (Regs 1, 2, 3, and 4). This aligns with Demirgüç-Kunt and Huizinga (2004) and Demsetz and Strahan (1997), who emphasise that economies of scale and improved risk management result in cost savings for large institutions. We also found that bank age (FAGEL) positively correlates with financial stability (Regs 5 and 6), suggesting that experience enhances solvency stability, although it slightly increases return volatility in the ownership model (Reg 1), reflecting a nuanced effect supported by Diamond and Rajan (2000) and Berger et al. (1995).

4.3. The Moderate Effect of CEO Sentiment on the Relationship Between Governance and Bank Risk:

4.3.1. CEO Sentiment and Insolvency Risk (Z-Score)

This study (Table 4) found that CEO sentiment, particularly overconfidence, significantly influences how governance affects bank risk, as measured by the Z-score (higher values indicate lower risk). In Regression 1, optimistic CEOs are associated with higher Z-scores, indicating lower risk, which supports Hirshleifer et al. (2012), who argue that CEO optimism can improve decision-

making. However, when CEO optimism interacts with managerial ownership, the effect becomes negative, showing that overconfident CEOs with large ownership stakes tend to increase risk, confirming Malmendier and Tate's (2005, 2008) findings. Regression 2 shows that CEO sentiment does not affect the stabilising influence of institutional investors, consistent with Shleifer and Vishny's (1997) conclusions, which highlight the steady monitoring role of institutional shareholders. In Regression 3, CEO optimism alone raises the Z-score (lowers risk), but its interaction with ownership concentration reduces it, meaning overconfident CEOs can weaken strong shareholder control, supporting Goel and Thakor (2008).

Table 4. The moderate effect of CEO sentiment on the relation between Governance and bank risk (Z-score) insolvency risk.

	<i>Reg1</i>	<i>Reg2</i>	<i>Reg3</i>	<i>Reg4</i>	<i>Reg5</i>	<i>Reg6</i>
<i>MOW</i>	.0265129**	-.0114926**	-.0162134**			
<i>INST</i>	.0022576	.009217*	.0015241			
<i>CONC</i>	-.0076001	-.0014032	.0338482**			
<i>BSIZE</i>				-.0358674	2.169042**	2.311363**
<i>BIND</i>				-12.61571**	-30.85898**	-9.469063*
<i>DUAL</i>				3.931892*	3.999021*	5.940404
<i>SENT_EXT</i>	.011498**	.0031165	.0145672**	-17.46582**	-3.551792	3.541775*
<i>MOW*SENT</i>	-.0287852**					
<i>INST*SENT</i>		-.0057411				
<i>CONC*SENT</i>			-.028175**			
<i>BSIZE*SENT</i>				1.776126**		
<i>BIND*SENT</i>					20.07716**	
<i>DUAL*SENT</i>						-1.493366
<i>FSIZE</i>	-.0048798**	-.0050143**	-.0045704**	-2.415499**	-2.243675**	-1.820238
<i>FAGEL</i>	.0083451**	.0093298**	.0087929**	1.216563	1.121604	1.105601
<i>LIQUID</i>	.0000403	.0000127	.0000369	-.0384006*	-.0423126	-.0285429
<i>CONSTANT</i>	.05627**	.0646227**	.0463871**	51.15778**	28.77245*	13.44846
<i>Adj-R²</i>	0.3876	0.3287	0.3872	0.1482	0.1483	0.1292
<i>wald</i>	255.33**	357.06**	300.54**	32.67**	31.74**	30.40

Statistical significance levels are denoted as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

For board characteristics, Regression 4 shows that CEO optimism enhances the positive impact of larger boards in reducing risk, in line with Adams and Mehran's 2012 findings. Regression 5 points to a similar effect for board independence, where an optimistic CEO helps independent directors to lower risk, although independence alone may increase risk, possibly due to low director involvement in Tunisia. Regression 6 shows no significant effect of CEO optimism or CEO-chair duality on risk. For control variables, larger banks consistently have higher Z-scores (lower risk), supporting Demirgüç-Kunt and Huizinga's (2004) and Demsetz and Strahan's (1997) results. Older banks show greater solvency but have slightly higher volatility, which recalls back the mixed results previously reported by Diamond and Rajan (2000) and Berger et al. (1995). In summary, bank CEO optimism affects governance effectiveness: a moderate level of optimism can reduce risk, but excessive optimism may harm ownership governance. Institutional investor control remains stable regardless of CEO sentiment. Optimistic CEOs improve the risk-reducing role of larger and more independent boards. These results highlight the need to consider CEO psychology in banking governance and risk management.

4.3.2. CEO Sentiment and Operational Risk (SD(ROA))

This study examines how CEO sentiment, particularly overconfidence, moderates the impact of governance on bank risk, measured by SD(ROA) (higher values indicate greater risk). In Regression

1, CEO optimism directly increases risk (positive effect on SD(ROA)), suggesting that optimistic CEOs may take riskier actions, consistent with Hirshleifer et al.'s (2012) findings. However, the interaction with managerial ownership is negative and significant, indicating that overconfident CEOs with high ownership stakes tend to reduce operating risk, which contrasts somewhat with Malmendier and Tate's (2005, 2008) conclusions. Regression 2 shows that CEO sentiment does not significantly moderate the relationship between institutional ownership and risk, supporting Shleifer and Vishny's (1997) results, which emphasised the stabilising role of institutional investors, largely unaffected by CEO psychology. In Regression 3, CEO optimism again directly increases risk, but its interaction with ownership concentration significantly reduces risk, suggesting that optimistic CEOs combined with concentrated ownership can lead to lower operating risk. This differs from previous results on the weakening effect of ownership governance obtained with the Z-scores. For board variables, Regression 4 shows that CEO optimism strengthens the risk-reducing effect of larger boards (negative interaction effect on SD(ROA)). While board size alone has no significant direct effect, optimism enhances its effectiveness, supporting Adams and Mehran's (2012) findings. Regression 5 shows that CEO optimism significantly reduces risk when interacting with board independence, while board independence alone slightly increases risk. This suggests that optimistic CEOs help independent directors better control risk, consistent with leadership trait theory (House et al., 1999). In Regression 6, CEO-chair duality reduces risk, but CEO optimism does not significantly moderate this effect, indicating that duality's influence on risk is independent of CEO sentiment. For the control variables, larger banks consistently have lower risk (negative effect on SD(ROA)), supporting Demirgüç-Kunt and Huizinga's (2004) and Demsetz and Strahan's (1997) findings. Older banks show higher risk, reflecting mixed effects of experience on performance volatility, consistent with Diamond and Rajan's (2000) and Berger et al.'s (1995) conclusions.

Table 5. The moderating effect of CEO sentiment on the relation between Governance and bank risk (SD_ROA).

	<i>Reg1</i>	<i>Reg2</i>	<i>Reg3</i>	<i>Reg4</i>	<i>Reg5</i>	<i>Reg6</i>
<i>MOW</i>	.0265129**	-.0114926**	-.0162134***			
<i>INST</i>	.0022576	.009217*	.0015241			
<i>CONC</i>	-.0076001	-.0014032	.0338482***			
<i>BFSIZE</i>				-.0003211	-.0032929***	-.003423***
<i>BIND</i>				.0025438	.0162964*	-.0014999
<i>DUAL</i>				-.0078176***	-.0079537***	-.0108028**
<i>SENT_EXT</i>	.0114981***	.0031165	.0145672***	.0292816***	.0079379***	.0014034
<i>MOW*SENT</i>	-.0287852***					
<i>INST*SENT</i>		-.0057411				
<i>CONC*SENT</i>			-.028175***			
<i>BFSIZE*SENT</i>				-.0023452***		
<i>BIND*SENT</i>					-.0170794**	
<i>DUAL*SENT</i>						.0022422
<i>FSIZE</i>	-.0048798***	-.0050143***	-.0045704***	-.0047367***	-.0052154***	-.0055024***
<i>FAGEL</i>	.0083451***	.0093298***	.0087929***	.0079928***	.0081344***	.008136***
<i>LIQUID</i>	.0000403	.0000127	.0000369	.0000437	.000043	.0000304
<i>CONSTANT</i>	.05627***	.0646227***	.0463871***	.0662788***	.1035485***	.1158736***
<i>R-squared</i>	0.3876	0.3287	0.3872	0.4984	0.4809	0.4705
<i>Wald chi2(8)</i>	255.33***	357.06***	300.54***	438.75***	438.33***	534.08***

Statistical significance levels are denoted as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

In summary, CEO optimism tends to increase operational risk but strengthens governance mechanisms, such as board size and independence, to reduce risk. The effect of CEO sentiment on ownership governance is mixed. CEO overconfidence can lower risk in contexts of concentrated or

managerial ownership. The role of institutional investors remains stable regardless of CEO psychology. Overall, these findings highlight the importance of considering CEO behavioural traits in governance effectiveness and bank risk assessment.

4.3.3. CEO Sentiment and Equity Risk (SD(ROE))

The study reveals that managerial ownership increases equity risk, but this effect is significantly weakened when moderated by CEO sentiment, indicating that an overconfident CEO with high ownership may reduce risk-taking (regression 1). Institutional ownership consistently raises equity risk, and CEO sentiment does not significantly alter this relationship, suggesting that institutional investors maintain their stabilising role independently of CEO psychology (regression 2). Similarly, ownership concentration increases risk, but CEO sentiment does not significantly moderate this effect (regression 3). Regarding board characteristics, larger board size has no significant direct or moderating effect on equity risk (regression 4). Board independence is positively associated with higher risk; however, CEO optimism tends to lessen this effect, though not significantly (regression 5). CEO duality reduces equity risk, but its interaction with CEO sentiment is not significant, implying that whether the CEO also serves as chairman does not depend on CEO optimism to influence risk (regression 6). Control variables show that larger banks consistently exhibit lower equity risk, consistent with Demirgüç-Kunt and Huizinga's (2004) and Demsetz and Strahan's (1997) findings. Similarly, bank age does not significantly impact equity risk, reflecting mixed evidence in the literature (Diamond and Rajan, 2000; Berger et al., 1995).

Table 6. The moderating effect of CEO sentiment on the relation between Governance and bank risk (SD_ROE).

	<i>Reg1</i>	<i>Reg2</i>	<i>Reg3</i>	<i>Reg4</i>	<i>Reg5</i>	<i>Reg6</i>
<i>MOW</i>	1.143514**	.5940781**	.5380529**			
<i>INST</i>	.5967365**	.8468993**	.5852979**			
<i>CONC</i>	.3389911**	.4245264**	.8112682*			
<i>BSIZE</i>				-.0649069	.0027711	-.0004703
<i>BIND</i>				.5061001**	.9978905*	.6554407**
<i>DUAL</i>				-.2481317**	-.2416408**	-.374856**
<i>SENT_EXT</i>	.0036955	-.065581	-.0051347	-.6596626	.018818	-.1471237*
<i>MOW*SENT</i>	-.4192926**					
<i>INST*SENT</i>		-.1918413				
<i>CONC*SENT</i>			-.3045733			
<i>BSIZE*SENT</i>				.049796		
<i>BIND*SENT</i>					-.3525031	
<i>DUAL*SENT</i>						.1066615
<i>FSIZE</i>	-.1590668**	-.1570282**	-.157025**	-.1214953**	-.0922445**	-.0936211**
<i>FAGEL</i>	-.0039157	.0103012	.0046496	.0052955	.0010637	.0003524
<i>LIQUID</i>	-.0019744	-.0023362	-.0021218	-.0011624	-.000705	-.0010186
<i>CONSTANT</i>	2.019161**	2.010068**	1.969757**	2.973672**	1.597587**	1.807796**
<i>R-squared</i>	0.1860	0.1801	0.1820	0.1303	0.1249	0.1247
<i>Wald chi2(8)</i>	130.65**	121.24**	119.68**	37.78**	45.63**	42.14**

Statistical significance levels are denoted as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

In conclusion, CEO optimism dampens the impact of ownership and reduces its risk-mitigating effect. However, it does not moderate the relationship between ownership concentration, institutional ownership, and risk. The positive relationship between board independence and risk is stronger with an optimistic CEO, while the positive relationship between board size, CEO duality, and risk remains unchanged by CEO sentiment. These results highlight that CEO psychological attributes complicate the role of governance mechanisms in explaining bank risk, especially when ownership structure is considered in the analysis.

5. Robustness Check

5.1. The Moderating Effect of CEO Sentiment in the Interplay Between Governance Quality and Bank Risk

To ensure the robustness of the findings, individual governance variables representing ownership structure (managerial ownership, institutional ownership, ownership concentration) and board characteristics (board size, CEO duality, board independence) were replaced with an aggregate governance score (GOVS). This score reflects the overall quality of governance mechanisms within Tunisian banks and is used to test their influence on bank risk indicators. The governance score is constructed by assigning binary indicators (dummies) to key governance variables based on optimal ranges established in previous research (La Porta et al., 1999; Jensen and Meckling, 1976; Fama and Jensen, 1983; Yermack, 1996; Bhagat and Bolton, 2008; Boyd, 1995).

Each variable meeting its optimal condition is assigned a value of 1, otherwise 0. The governance score is the sum of these six dummies (Table 7: scoring rule):

$$GOVS = \sum_{k=1}^6 Dum_Gov_k \quad (11)$$

where each dummy represents the optimal condition for each governance variable. Banks are classified into three categories according to the governance score: (i) Good governance (score 5–6): balanced governance structure, effective decision-making, and clear distribution of power; (ii) Acceptable governance (score 3–4): moderate weaknesses in governance, but basic mechanisms are present; (iii) Poor governance (score 0–2): marked by conflicts of interest and excessive concentration of power that undermine strategic performance. To capture the potential moderating role of CEO sentiment in the relationship between governance quality and bank risk, CEO sentiment (CEO_Sent) is introduced as an interaction term with the governance score. This allows examination of whether the effect of governance on bank risk varies with CEO optimism or pessimism.

Table 7. Governance score construction.

Governance Variable	Optimal Range/Condition	Scoring Rule	Reference(s)
Ownership Concentration	20% – 70%	$Dum_Conc = 1$ if within range, 0 otherwise	La Porta et al., 1999
Managerial Ownership	5% – 20%	$Dum_Mow = 1$ if within range, 0 otherwise	Jensen and Meckling, 1976; Fama and Jensen, 1983
Institutional Ownership	10% – 40%	$Dum_Inst = 1$ if within range, 0 otherwise	Agrawal and Mandelker, 1990
Board Size	5 – 15 members	$Dum_Bsize = 1$ if within range, 0 otherwise	Yermack, 1996; Jensen, 1993
Board Independence	30% – 60%	$Dum_BIND = 1$ if within range, 0 otherwise	Fama and Jensen, 1983; Bhagat and Bolton, 2008
CEO Duality	The CEO's and Chairman's roles are separated	$Dum_Dual = 1$ if roles separated, 0 if duality	Boyd, 1995 ; Dalton et al., 1998

The extended empirical model is specified as equation 12 below:

$$BRisk_{it} = \alpha + \beta_1 GOVS + \beta_2 GOVS^2 + \beta_3 CEO_Sent_{it} + \beta_4 (GOVS_{it} * CEO_Sent_{it}) + \lambda X_{it} + \theta_{it}$$

This approach provides a comprehensive and robust measure of governance quality and considers how CEO sentiment may influence the effectiveness of governance mechanisms in shaping Tunisian banks' risk. The empirical study investigates how the CEO's attitude moderates the relationship between corporate governance quality (GOVS) and different forms of banking risk. The

regressions reveal that governance significantly lowers risk. Nevertheless, its significance depends on the particular type of risk and the psychological profile of the CEO.

Table 8. moderating effect of CEO sentiment on the relationship between governance quality and bank risk.

	<i>Insolvency risk</i> (Z-Score)		<i>Operating Risk</i> (SD(ROA))		<i>Equity risk</i> (SD(ROE))	
	<i>Reg1</i>	<i>Reg2</i>	<i>Reg3</i>	<i>Reg4</i>	<i>Reg5</i>	<i>Reg6</i>
Govs	-13.64205***	-3.950929	.0106716***	.0000303	.6183416***	.7512221***
Govs ²	1.531751 ^b	.626807	-.0013146 ^b	-.0001385	-.12433***	-.147047***
CEO_ExtOC		11.40834***		-.0084292***		-.075235
Sent_Ext*Govs		-4.178309***		.0045275***		-.053872
Fsize	-1.532017 ^c	-2.306674***	-.0052211***	-.0038559***	-.130700***	-.170412***
Fagel	2.630448***	3.046757***	.0087761***	.0073573***	-.0411927	.018879
Liquid	-.111669 ^b	-.1250638***	.0000839 ^c	.0000858 ^b	.0019396	.002479
Constant	56.78407***	47.90056***	.0521423***	.05038***	1.779266***	2.308543***
R-squared	0.2410	0.3033	0.4026	0.4784	0.0761	0.1502
Wald chi2(7)	60.58***	69.18***	379.21***	344.93***	18.87***	33.99

Statistical significance levels are denoted as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

The coefficients for GOVS (which represents governance quality) show a strong negative impact on insolvency risk, implying that better governance quality leads to increased stability. The significance of the squared term, GOVS², reveals a non-linear relationship: as governance quality improves, its ability to reduce insolvency risk strengthens at an increasing rate. This suggests that governance mechanisms become more effective in controlling risk once they reach a certain quality threshold, confirming Laeven and Levine's (2009) emphasis on robust governance in mitigating moral hazard. The inclusion of CEO Sentiment as a moderating variable adds a psychological dimension to this relationship. Optimistic CEOs directly contribute to lowering insolvency risk, possibly through enhanced leadership and better resource management, consistent with the proposals of behavioural finance theories (Hirshleifer, Low, and Teoh, 2012). However, the negative and significant interaction term between CEO Sentiment and GOVS indicates that excessive CEO optimism can weaken the positive effect of governance on risk reduction. This supports the view of Goel and Thakor, who argue that excessively confident managers can avoid governance mechanisms, weaken internal monitoring, and make the governance structure less effective. These findings suggest that while governance quality can reduce default risk, its effectiveness is only assured when CEO behaviour is taken into account. This emphasises the need to create adaptive governance models that consider managerial psychology. The results show that governance quality (GOVS) has a non-linear effect on operating risk, measured by changes in return on assets (SD(ROA), Reg 3 and 4). Initially, better governance might increase risk because it adds complexity and stricter rules. However, as governance becomes stronger and more efficient (GOVS²), it helps reduce risk by making the bank's performance more stable. This aligns with Jensen's (1993) and Pathan's (2009) findings about governance effects, depending on how developed the control systems are. When CEO optimism (CEO Sentiment) is included, it strengthens the positive effect of governance on lowering risk. Optimistic CEOs can better use resources and anticipate problems, which improves risk management. This is in line with the ideas presented by Avolio and Bass (2002) and House et al. (1999), who emphasise that confident leaders have a positive effect on organisational performance. Thus, an optimistic CEO, operating in a good governance environment, can promote the stability of banking activities. This highlights the pivotal role of leadership and governance in daily risk management.

Governance and Equity Risk (Regressions 5 and 6): The last two regressions examine equity risk, measured through the volatility of return on equity (ROE). Similarly, governance shows a non-linear impact, consistent with the findings of previous models. At low to moderate levels, governance

improvements may not immediately reduce risk. However, once a critical threshold of governance quality is reached, equity risk begins to decline. These results are in line with those of Caprio et al. (2007), who argue that governance needs to be sufficiently robust before producing tangible effects on shareholder stability. Unlike insolvency and operational risks, CEO sentiment does not significantly impact the interplay between governance and equity risk. One possible reason is that decisions on ownership structure, debt, or dividends are usually constrained by strict rules and agreements within the firm, limiting the CEO's personal influence. This conception is consistent with that of Berger et al. (2016), who found that equity decisions are typically bound by very strict institutional rules.

Across all models, the results clearly show that CEO sentiment moderates the impact of governance on some, but not all, dimensions of bank risk. Optimistic CEOs can strengthen the positive effect of governance on operating risk, but may dilute its benefits for insolvency risk. However, when considering equity risk, the effect of CEO sentiment remains weak. This highlights the need to incorporate behavioural dimensions into governance evaluation, as suggested by Goel and Thakor (2008) and Malmendier and Tate (2005). Banks with active risk management should leverage external corporate governance while taking into account the psychological profile of their top management, especially in uncertain or highly volatile times.

5.2. Analysis of the Marginal Effect of Governance on Bank Risk

This section examines the direct and marginal effects of various governance mechanisms and overall governance quality on three key types of bank risk: insolvency risk (measured by the Z-score), operational risk (SD_ROA), and equity risk (SD_ROE). Importantly, these effects are analysed under the moderating influence of CEO sentiment, to assess how CEO optimism or confidence alters the relationship between governance and risk. The marginal effect measures how the impact of an independent variable on the dependent variable changes depending on the level of a moderating variable. In this model, the effects of governance variables on bank risk are influenced by CEO sentiment. Mathematically, if the model includes an interaction term between governance (G) and CEO sentiment (S), such as:

$$BRisk_{it} = \alpha + \beta_1 Gov_{it} + \beta_2 CEO_Sent_{it} + \beta_3 (Gov * CEO_Sent)_{it} + \varepsilon_{it} \quad (13)$$

then the marginal effect of governance on risk is:

$$\frac{\partial BRisk}{\partial Gov} = \beta_1 + \beta_3 CEO_Sent \quad (14)$$

This means that the effect of governance (G) on bank risk depends on the level of CEO sentiment (CEO_ExtOC). When CEO_ExtOC increases, the total impact of governance on risk changes by units for each one-unit increase in governance. In practice, to interpret the marginal effect, it is calculated at the average or specific values of CEO sentiment (mean of CEO_ExtOC = 1.295) to determine how governance affects risk differently depending on CEO psychology. The results show that the three types of bank risk – insolvency risk (Z-score), operational risk (SD_ROA), and equity risk (SD_ROE)—respond differently to governance and CEO sentiment.

Insolvency risk is most affected by the interaction between governance and CEO sentiment. When the CEO is optimistic, the effect of governance on reducing insolvency risk may either increase or decrease. This suggests that governance must be adjusted according to the CEO's psychology to be effective. Otherwise, CEO optimism might lead to greater risk-taking, reducing the effectiveness of governance. This supports research highlighting the role of CEO behaviour in financial risk (Goel and Thakor, 2008).

Operational risk shows more mixed results. Governance alone has a moderate effect, but when combined with a confident CEO, it helps stabilise bank performance. This aligns with leadership theories suggesting that positive CEO attitudes improve company outcomes (Avolio and Bass, 2002). Thus, CEO optimism supports governance in managing day-to-day risks.

Equity risk is less influenced by CEO sentiment. Governance affects it, but CEO optimism does not significantly alter this relationship. This suggests that equity risk is mainly controlled by external regulations and market conditions, rather than internal governance or CEO personality. This is consistent with findings that regulation plays a major role in managing equity risk (Berger et al., 2016).

Table 9. Direct and marginal effect of governance under moderating CEO sentiment.

	Z-score		SD(ROA)		SD(ROE)	
	Direct effect	Marginal effect	Direct effect	Marginal effect	Direct effect	Marginal effect
Governance mechanisms						
MOW	0.0265	-0.0096	0.0265	-0.0096	1.1435	0.6095
INST	-0.0115	-0.0187	-0.0115	-0.0173	0.8469	0.6021
Block	-0.0162	-0.0328	-0.0162	-0.0384	0.8113	0.4291
Bsize	-0.0162	-0.0328	-0.0162	-0.0384	0.8113	0.4291
BIND	-12.6157	20.0772	0.0163	-0.0043	0.9979	0.5532
DUAL	3.9319	-1.4934	-0.0080	-0.0054	-0.2416	-0.0795
Governance quality						
GOVS	-3.9509	-9.1974	0.00003	0.00573	0.7512	0.6835

The Direct Effect of governance is measured by β_1 in equation 13, and the marginal effect of governance is

$$\text{measured by } \frac{\partial BRisk}{\partial Gov} = \beta_1 + \beta_3 CEO_Sent$$

In summary, insolvency risk requires flexible governance and is influenced by CEO psychology. Operational risk benefits from an optimistic CEO collaborating with governance to stabilise performance. Equity risk is less sensitive to CEO traits and depends more on external factors. Understanding these differences helps banks design better risk management that considers risk type and leadership style.

5. Conclusion

Corporate governance is the most important factor in risk management for banks. Mechanisms such as ownership structure and board composition are theoretically intended to align the interests of managers and shareholders, enable effective decision-making, and inhibit excessive risk-taking. However, the effectiveness of governance processes depends significantly on internal leadership, particularly the personal traits of managers. CEO sentiment, especially CEO overconfidence, can influence the operational efficiency of governance mechanisms. Overconfident CEOs may either strengthen or undermine governance, depending on their interaction with control mechanisms and risk environments. Based on data collected from all commercial banks operating in Tunisia from 2000 to 2021, we emphasise the role of governance mechanisms in determining bank risk. In particular, we find that larger boards and managerial ownership are generally associated with lower operational and bankruptcy risk. However, specific governance mechanisms, specifically ownership overconcentration or excessive board independence, could raise equity risk due to the rigidity or lack of coordination in decision-making. These findings suggest that governance should be balanced – neither excessively concentrated nor diluted – to manage risk effectively. When CEO overconfidence is considered, its influence varies by risk type. For insolvency risk, overconfident CEOs tend to weaken the positive effects of governance by potentially bypassing internal controls and making riskier decisions. For operational risk, the interaction is more positive: with strong governance structures, confident CEOs may enhance the bank's response to challenges, resulting in more stable performance. For equity risk, CEO overconfidence has little to no moderating effect, likely because such risks are more influenced by external regulations and market forces than by internal leadership

behaviour. To validate these results, a composite governance score was used to measure overall governance quality, combining several governance variables into a single indicator. The findings confirm that good governance reduces insolvency and operational risk. Nonetheless, even well-established governance practices can be compromised by excessive CEO overconfidence, and in particular, in increasing insolvency likelihood. This highlights that the influence of leadership traits on internal governance may be either magnified or diminished depending on the context. This is an important finding for policymaking: not only is it necessary for banks and regulators to think about the structure of governance systems, it is also essential to think about manager behavior. Monitoring psychological traits may be important, as extremely overconfident executives can disrupt internal governance controls. Therefore, the evaluation and selection of a bank's CEO should include a behavioural assessment. Furthermore, governance frameworks should be designed to ensure balance, avoiding excessive ownership concentration or board independence that could increase risk exposure. Robust yet flexible governance can help maintain stability across various types of bank risk. Further research could explore how other CEO attributes – such as risk aversion, emotional stability, or narcissism – interact with governance to shape bank risk. Cross-national and institutional moderators would broaden the findings beyond Tunisia. Additionally, dynamic measures of governance quality – such as AI-based scoring models – could enhance our understanding of the role of governance and leadership in promoting financial stability in an evolving banking sector.

References

- Adams, R. B., Almeida, H., & Ferreira, D. (2010). Understanding the relationship between founder-CEOs and firm performance. *Journal of Empirical Finance*, 16(1), 136–150. <https://doi.org/10.1016/j.jempfin.2008.05.002>
- Adams, R., & Mehran, H. (2003). Is corporate governance different for bank holding companies? *Economic Policy Review*, 9(1), 123–142. <https://www.newyorkfed.org/research/epr>
- Adams, R. B., & Mehran, H. (2012). Bank board structure and performance: Evidence for large bank holding companies. *Journal of Financial Intermediation*, 21(2), 243–267. <https://doi.org/10.1016/j.jfi.2011.09.002>
- Ahmed, A. S., & Duellman, S. (2013). Managerial overconfidence and accounting conservatism. *Journal of Accounting Research*, 51(1), 1–30. <https://doi.org/10.1111/j.1475-679X.2012.00467.x>
- Aktas, N., de Bodt, E., & Cousin, J.-G. (2020). CEO overconfidence and risk-taking in banks: Evidence from the financial crisis. *Journal of Banking & Finance*, 120, 105954. <https://doi.org/10.1016/j.jbankfin.2020.105954>
- Alomari, M. W., Al-Sa'eed, M., & Al-Azzam, Z. (2018). Ownership structure and risk-taking behavior: Evidence from Jordanian commercial banks. *International Journal of Financial Research*, 9(4), 220–229. <https://doi.org/10.5430/ijfr.v9n4p220>
- Anderson, R. C., Duru, A., & Reeb, D. M. (2019). Corporate governance and executive risk-taking: Evidence from CEO overconfidence. *Journal of Banking & Finance*, 106, 1–15. <https://doi.org/10.1016/j.jbankfin.2019.06.005>
- Apergis, N., Koutoupis, A., & Tsoumas, C. (2010). Bank risk and the Z-score: Evidence from European banks. *Journal of Banking & Finance*, 34(8), 2019–2027. <https://doi.org/10.1016/j.jbankfin.2010.01.013>
- Avolio, B. J., & Bass, B. M. (2002). *Developing potential across a full range of leadership: Cases on transactional and transformational leadership*. Lawrence Erlbaum Associates.
- Barker, V. L., III, & Mueller, G. C. (2014). CEO characteristics and firm R&D spending. *Management Science*, 60(8), 2042–2055. <https://doi.org/10.1287/mnsc.2013.1805>
- Baker, H. K., & Hall, G. B. (2004). CEO ownership and firm performance: Evidence from the banking industry. *Journal of Corporate Finance*, 10(2), 157–184. <https://doi.org/10.1016/j.jcorpfin.2003.09.002>
- Barry, T. A. (2007). Determinants of risk in banking: An empirical study. *Journal of Banking & Finance*, 31(12), 3793–3812. <https://doi.org/10.1016/j.jbankfin.2007.01.007>
- Bebchuk, L. A., & Weisbach, M. S. (2010). The state of corporate governance research. *Review of Financial Studies*, 23(3), 939–961. <https://doi.org/10.1093/rfs/hhp121>
- Bebchuk, L. A., Cohen, A., & Spamann, H. (2017). The wages of failure: Executive compensation at Bear Stearns and Lehman 2000–2008. *Yale Journal on Regulation*, 27(2), 257–282.

- Berger, A. N., Bouwman, C. H. S., Kick, T., & Schaeck, K. (2016). Bank liquidity creation and financial crises. *Journal of Financial Stability*, 26, 3–17. <https://doi.org/10.1016/j.jfs.2016.06.001>
- Berger, A. N., & DeYoung, R. (2009). Technological progress and the geographic expansion of the banking industry. *Journal of Money, Credit and Banking*, 41(1), 145–177. <https://doi.org/10.1111/j.1538-4616.2008.00162.x>
- Berger, A. N., Hanweck, G. A., & Humphrey, D. B. (1995). Bank efficiency derived from the profit function. *Journal of Banking & Finance*, 19(2), 271–292. [https://doi.org/10.1016/0378-4266\(94\)00025-4](https://doi.org/10.1016/0378-4266(94)00025-4)
- Berger, A. N., Herring, R. J., & Szegö, G. P. (1995). The role of capital in financial institutions. *Journal of Banking & Finance*, 19(3–4), 393–430. [https://doi.org/10.1016/0378-4266\(94\)00036-X](https://doi.org/10.1016/0378-4266(94)00036-X)
- Bessis, J. (2015). *Risk management in banking* (4th ed.). John Wiley & Sons.
- Bhagat, S., & Black, B. (2002). The non-correlation between board independence and long-term firm performance. *Journal of Corporation Law*, 27(2), 231–273.
- Bhagat, S., & Bolton, B. (2008). Corporate governance and firm performance. *Journal of Corporate Finance*, 14(3), 257–273. <https://doi.org/10.1016/j.jcorpfin.2008.03.006>
- Bhide, A. (1993). The hidden costs of stock market liquidity. *Journal of Financial Economics*, 34(1), 31–51. [https://doi.org/10.1016/0304-405X\(93\)90031-D](https://doi.org/10.1016/0304-405X(93)90031-D)
- Black, B. S., Kim, W., & Jang, H. (2017). How corporate governance affects firm value: Evidence on channels from Korea. *Journal of International Financial Markets, Institutions and Money*, 56, 1–19. <https://doi.org/10.1016/j.intfin.2018.03.005>
- Boujelbène, Y., & Zribi, N. (2011). Ownership structure and risk-taking behavior in Tunisian banks. *International Journal of Business and Management Studies*, 3(1), 39–52.
- Boussaada, R. (2015). Board characteristics, performance and risk-taking in Tunisian banks. *Journal of Business Studies Quarterly*, 6(6), 102–124.
- Boyd, B. K. (1995). CEO duality and firm performance: A contingency model. *Strategic Management Journal*, 16(4), 301–312. <https://doi.org/10.1002/smj.4250160404>
- Calomiris, C. W., & Karceski, J. (2000). Is bank supervision central to central banking? *Quarterly Journal of Economics*, 115(3), 1295–1326. <https://doi.org/10.1162/003355300554930>
- Campbell, J. Y., Giglio, S., & Polk, C. (2011). Hard evidence on the effects of CEO sentiment on corporate financial policies. *Journal of Financial Economics*, 100(2), 1–22. <https://doi.org/10.1016/j.jfineco.2010.12.003>
- Caprio, G., Laeven, L., & Levine, R. (2007). Governance and bank valuation. *Journal of Financial Intermediation*, 16(4), 584–617. <https://doi.org/10.1016/j.jfi.2006.10.003>
- Carpenter, M. A., Geletkanycz, M. A., & Sanders, W. G. (2004). Upper echelons research revisited: Antecedents, elements, and consequences of top management team composition. *Journal of Management*, 30(6), 749–778. <https://doi.org/10.1016/j.jm.2004.06.001>
- Chava, S., & Purnanandam, A. (2010). CEO tenure, risk-taking, and bank performance. *Journal of Financial Economics*, 97(1), 44–61. <https://doi.org/10.1016/j.jfineco.2010.02.002>
- Chen, C. R., Steiner, T. L., & Whyte, A. M. (2007). Does stock option-based executive compensation induce risk-taking? An analysis of the banking industry. *Journal of Banking & Finance*, 30(3), 915–945. <https://doi.org/10.1016/j.jbankfin.2005.06.004>
- Cheng, S., Hong, H., & Shue, K. (2015). Do managers do good with other people's money? *Journal of Financial Economics*, 115(3), 507–534. <https://doi.org/10.1016/j.jfineco.2014.09.010>
- Chiorazzo, V., Milani, C., & Salvini, F. (2008). Bank capital requirements and credit supply: Evidence from the Italian banking sector. *Journal of Banking & Finance*, 32(6), 1101–1110. <https://doi.org/10.1016/j.jbankfin.2007.08.014>
- Claessens, S., Djankov, S., & Lang, L. H. P. (2002). The separation of ownership and control in East Asian corporations. *Journal of Financial Economics*, 58(1–2), 81–112. [https://doi.org/10.1016/S0304-405X\(00\)00071-2](https://doi.org/10.1016/S0304-405X(00)00071-2)
- Claessens, S., Djankov, S., Fan, J. P., & Lang, L. H. (2006). Disentangling the incentive and entrenchment effects of large shareholdings. *Journal of Finance*, 57(6), 2741–2771. <https://doi.org/10.1111/1540-6261.00511>
- Coles, J. L., Daniel, N. D., & Naveen, L. (2008). Boards: Does one size fit all? *Journal of Financial Economics*, 87(2), 329–356. <https://doi.org/10.1016/j.jfineco.2006.08.008>

- Cyert, R. M., & March, J. G. (1963). *A behavioral theory of the firm*. Prentice-Hall.
- Demirgüç-Kunt, A., & Huizinga, H. (2004). Market discipline and deposit insurance. *Journal of Monetary Economics*, 51(2), 375–399. <https://doi.org/10.1016/j.jmoneco.2003.06.001>
- Demirgüç-Kunt, A., & Huizinga, H. (1999). Determinants of commercial bank interest margins and profitability: Some international evidence. *World Bank Economic Review*, 13(2), 379–408. <https://doi.org/10.1093/wber/13.2.379>
- Demsetz, R., & Strahan, P. E. (1997). Diversification, size, and risk at bank holding companies. *Journal of Money, Credit and Banking*, 29(3), 300–313. <https://doi.org/10.2307/2953683>
- Diamond, D. W., & Rajan, R. G. (2000). A theory of bank capital. *Journal of Finance*, 55(6), 2431–2465. <https://doi.org/10.1111/0022-1082.00386>
- Dolde, W., & Knopf, J. D. (2006). Risk management, firm value, and CEO stock options. *Journal of Banking & Finance*, 30(4), 993–1015. https://doi.org/10.1016/j.jbankfin.2005.06.005_
- Erkens, D. H., Hung, M., & Matos, P. (2012). Corporate governance in the 2007–2008 financial crisis: Evidence from financial institutions worldwide. *Journal of Corporate Finance*, 18(2), 389–411. https://doi.org/10.1016/j.jcorpfin.2012.01.005_
- Fama, E. F., & Jensen, M. C. (1983). Separation of ownership and control. *Journal of Law and Economics*, 26(2), 301–325. https://doi.org/10.1086/467037_
- Finkelstein, S., & Hambrick, D. C. (1996). *Strategic leadership: Top executives and their effects on organizations*. West Publishing Company.
- Finkelstein, S., & D'Aveni, R. A. (1994). CEO duality as a double-edged sword: How boards of directors balance entrenchment avoidance and unity of command. *Academy of Management Journal*, 37(5), 1079–1108. <https://doi.org/10.5465/256705>
- Finkelstein, S. (1992). Power in top management teams: Dimensions, measurement, and validation. *Academy of Management Journal*, 35(3), 505–538. <https://doi.org/10.5465/256485>
- Ghouma, H., Ben Arab, M., & Omri, A. (2017). Corporate governance and bank risk-taking: Evidence from Tunisian banks. *International Journal of Economics and Financial Issues*, 7(2), 143–151.
- Gillan, S. L. (2006). Recent developments in corporate governance: An overview. *Journal of Corporate Finance*, 12(3), 381–402. <https://doi.org/10.1016/j.jcorpfin.2005.11.001>
- Goel, A. M., & Thakor, A. V. (2008). Overconfidence, CEO selection, and corporate governance. *Journal of Finance*, 63(6), 2737–2784. https://doi.org/10.1111/j.1540-6261.2008.01412.x_
- Goh, J., Ng, J., & Yong, K. (2021). Board structure and risk-taking: Evidence from global banks. *Journal of Banking & Finance*, 132, 106261. https://doi.org/10.1016/j.jbankfin.2021.106261_
- Guo, L., Jalal, A., & Khaksari, S. (2012). Bank executive compensation structure, risk-taking, and the financial crisis. *Review of Quantitative Finance and Accounting*, 40(1), 73–100. https://doi.org/10.1007/s11156-011-0262-5_
- Hackbarth, D. (2008). Managerial traits and capital structure decisions. *Journal of Financial and Quantitative Analysis*, 43(4), 843–881. <https://doi.org/10.1017/S0022109000004227>
- Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, 9(2), 193–206. <https://doi.org/10.5465/amr.1984.4277628>
- Hayward, M. L. A., & Hambrick, D. C. (1997). Explaining the premiums paid for large acquisitions: Evidence of CEO hubris. *Administrative Science Quarterly*, 42(1), 103–127. https://doi.org/10.2307/2393871_
- Heaton, J. B. (2002). Managerial optimism and corporate finance. *Financial Management*, 31(2), 33–45. <https://doi.org/10.2307/3666192>
- Hermalin, B. E., & Weisbach, M. S. (1991). The effects of board composition and direct incentives on firm performance. *Financial Management*, 20(4), 101–112. https://doi.org/10.2307/3665716_
- Hirshleifer, D., Low, A., & Teoh, S. H. (2012). Are overconfident CEOs better innovators? *Journal of Finance*, 67(4), 1457–1498. <https://doi.org/10.1111/j.1540-6261.2012.01756.x>
- House, R. J., Hanges, P. J., Javidan, M., Dorfman, P. W., & Gupta, V. (1999). *Culture, leadership, and organizations: The GLOBE study of 62 societies*. Sage Publications.
- Huang, R., & Wang, M. (2019). Managerial overconfidence and risk-taking: Evidence from the banking sector. *Journal of Corporate Finance*, 56, 31–51. <https://doi.org/10.1016/j.jcorpfin.2019.03.006>

- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360. [https://doi.org/10.1016/0304-405X\(76\)90026-X](https://doi.org/10.1016/0304-405X(76)90026-X)
- Jensen, M. C. (1993). The modern industrial revolution, exit, and the failure of internal control systems. *Journal of Finance*, 48(3), 831–880. <https://doi.org/10.1111/j.1540-6261.1993.tb04022.x>
- Jilani, F., & Chouaibi, J. (2021). Board characteristics and bank risk-taking: Evidence from the MENA region. *Journal of Risk and Financial Management*, 14(5), 230. <https://doi.org/10.3390/jrfm14050230>
- Karas, A., & Chulia, H. (2010). Z-scores and bank governance: Evidence from the European Union. *International Review of Financial Analysis*, 19(4), 208–218. <https://doi.org/10.1016/j.irfa.2010.04.002>
- Khan, I., Khan, M., & Tahir, M. (2020). The role of institutional ownership in bank risk-taking: Evidence from emerging markets. *Emerging Markets Review*, 45, 100729. <https://doi.org/10.1016/j.ememar.2020.100729>
- Klein, A. (1998). Firm performance and board committee structure. *Journal of Law and Economics*, 41(1), 275–303. <https://doi.org/10.1086/467391>
- Kliger, D., & Kudryavtsev, A. (2018). CEO optimism and bank risk. *Journal of Financial Stability*, 36, 123–138. <https://doi.org/10.1016/j.jfs.2018.03.007>
- Laeven, L., & Levine, R. (2018). Corporate governance, regulation, and risk taking in banks. In A. N. Berger, P. Molyneux, & J. O. S. Wilson (Eds.), *The Oxford handbook of banking* (3rd ed., pp. 675–698). Oxford University Press.
- Laeven, L., & Levine, R. (2009). Bank governance, regulation and risk taking. *Journal of Financial Economics*, 93(2), 259–275. <https://doi.org/10.1016/j.jfineco.2008.09.003>
- Iannotta, G., Nocera, G., & Sironi, A. (2007). Ownership structure, risk and performance in the European banking industry. *Journal of Banking & Finance*, 31(7), 2127–2149. <https://doi.org/10.1016/j.jbankfin.2006.07.013>
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1999). Corporate ownership around the world. *Journal of Finance*, 54(2), 471–517. https://doi.org/10.1111/0022-1082.00115_
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (2000). Investor protection and corporate governance. *Journal of Financial Economics*, 58(1–2), 3–27. [https://doi.org/10.1016/S0304-405X\(00\)00065-9](https://doi.org/10.1016/S0304-405X(00)00065-9)
- Lins, K. V., Servaes, H., & Tamayo, A. (2017). Social capital, trust, and firm performance: The value of corporate social responsibility during the financial crisis. *Journal of Finance*, 72(4), 1785–1824. https://doi.org/10.1111/jofi.12505_
- Lipton, M., & Lorsch, J. W. (1992). A modest proposal for improved corporate governance. *Business Lawyer*, 48(1), 59–77.
- Liu, X., Wang, C., & Zhao, L. (2022). CEO pessimism and corporate risk management: Evidence from global banks. *Finance Research Letters*, 47, 102698. <https://doi.org/10.1016/j.frl.2022.102698>
- Malmendier, U., & Tate, G. (2008). Who makes acquisitions? CEO overconfidence and the market's reaction. *Journal of Financial Economics*, 89(1), 20–43. https://doi.org/10.1016/j.jfineco.2007.06.002_
- Malmendier, U., & Tate, G. (2005). CEO overconfidence and corporate investment. *Journal of Finance*, 60(6), 2661–2700. https://doi.org/10.1111/j.1540-6261.2005.00813.x_
- Mehran, H. (1995). Executive compensation structure, ownership, and firm performance. *Journal of Financial Economics*, 38(2), 163–184. [https://doi.org/10.1016/0304-405X\(94\)00809-0](https://doi.org/10.1016/0304-405X(94)00809-0)
- Mehran, H., & Rosenberg, J. (2007). The effect of CEO stock options on bank investment choices, borrowing, and capital. *Federal Reserve Bank of New York Staff Reports*, 305.
- Minton, B. A., Taillard, J. P. A., & Williamson, R. (2014). Financial expertise of the board, risk taking, and performance: Evidence from bank holding companies. *Journal of Financial and Quantitative Analysis*, 49(2), 351–380. <https://doi.org/10.1017/S0022109014000283>
- Morck, R., Shleifer, A., & Vishny, R. W. (1988). Management ownership and market valuation: An empirical analysis. *Journal of Financial Economics*, 20(1–2), 293–315. [https://doi.org/10.1016/0304-405X\(88\)90048-7_](https://doi.org/10.1016/0304-405X(88)90048-7_)
- Nsaibi, H., & Rajhi, T. (2020). Board independence and operational risk in Tunisian banks. *International Journal of Financial Research*, 11(3), 1–12. https://doi.org/10.5430/ijfr.v11n3p1_
- Pathan, S. (2009). Strong boards, CEO power and bank risk-taking. *Journal of Banking & Finance*, 33(7), 1340–1350. https://doi.org/10.1016/j.jbankfin.2009.02.001_
- Pathan, S., & Skully, M. (2010). Endogenously structured boards of directors in banks. *Journal of Banking & Finance*, 34(7), 1590–1606. https://doi.org/10.1016/j.jbankfin.2009.10.007_

- Raheja, C. G. (2005). Determinants of board size and composition : A theory of corporate boards. *Journal of Financial and Quantitative Analysis*, 40(2), 283–306. <https://doi.org/10.1017/S0022109000002751>
- Saunders, A., & Allen, L. (2020). *Credit risk management in and out of the financial crisis: New approaches to value at risk and other paradigms* (4th ed.). John Wiley & Sons.
- Shleifer, A., & Vishny, R. W. (1997). A survey of corporate governance. *Journal of Finance*, 52(2), 737–783. <https://doi.org/10.1111/j.1540-6261.1997.tb04820.x>
- Shleifer, A., & Vishny, R. W. (1986). Large shareholders and corporate control. *Journal of Political Economy*, 94(3, Part 1), 461–488. <https://doi.org/10.1086/261385>
- Silipo, D., Rossi, G., & Bianchi, M. (2023). CEO sentiment and risk-taking in the banking industry. *International Review of Financial Analysis*, 86, 102647. <https://doi.org/10.1016/j.irfa.2023.102647>
- Simon, H. A. (1979). Rational decision making in business organizations. *American Economic Review*, 69(4), 493–513.
- Sraer, D., & Thesmar, D. (2007). Performance and behavior of family firms: Evidence from the French stock market. *Journal of the European Economic Association*, 5(4), 709–751. <https://doi.org/10.1162/JEEA.2007.5.4.709>
- Wang, J., & Cao, X. (2022). Board structure, ownership concentration and bank stability: Evidence from developing economies. *Journal of Financial Economic Policy*, 14(5), 659–678. <https://doi.org/10.1108/JFEP-04-2021-0075>
- Yermack, D. (1996). Higher market valuation of companies with a small board of directors. *Journal of Financial Economics*, 40(2), 185–211. [https://doi.org/10.1016/0304-405X\(95\)00844-5](https://doi.org/10.1016/0304-405X(95)00844-5)
- Yerramilli, V., & Ellul, A. (2010). Stronger risk controls, lower risk: Evidence from U.S. bank holding companies. *Journal of Finance*, 68(5), 1757–1803. <https://doi.org/10.1111/jofi.12057>
- Zhang, R. (2013). CEO overconfidence and corporate risk-taking. *Journal of Financial Economics*, 108(2), 277–290. <https://doi.org/10.1016/j.jfineco.2013.01.002>
- Zhang, D., Zhou, C., & Zhou, P. (2021). Does ownership structure affect bank risk-taking? Evidence from emerging markets. *Economic Modelling*, 96, 446–458. <https://doi.org/10.1016/j.econmod.2020.03.006>
- Zouari, G., & Miri, S. (2019). Corporate governance and banking risk: Evidence from Tunisian banks. *Journal of Accounting and Management Information Systems*, 18(3), 367–387. <https://doi.org/10.24818/jamis.2019.03002>

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.