

IMPACT OF RISK GOVERNANCE ON PERFORMANCE AND CAPITAL REQUIREMENTS: EVIDENCE FROM EGYPTIAN BANKS

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Abstract

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This study aims to examine the impact of banks' risk governance (RG) on Egyptian listed banks' performance and capital requirements as prescribed in Basel regulations. Secondary data from annual reports of all twelve banks listed on the Egyptian Stock Market (EGX) over eleven years (2010–2020) are analyzed using the dynamic ordinary least squares method; where the RG framework is presented by the proxy of the presence of chief risk officer (CRO), risk committee (RC), and audit committee (AC) characteristics. Secondary data from annual reports of all twelve banks listed on the EGX over eleven years are analyzed using the dynamic ordinary least squares method. The results support the role of banks' RG in improving banks' both market-based and accounting-based performance. These findings support the importance of having an independent risk committee and a powerful CRO because they can regulate banks' increasing risk and acquire the advantages of capital requirements by investing assets in more profitable ways with low risk. This paper is one of the few empirical attempts in emerging economics to link bank RG, risk-taking behavior, performance, and capital adequacy ratio (CAR) as defined by Basel III.

Keywords: Risk Governance, Risk Committee, Chief Risk Officer, Audit Committee, Egyptian Listed Banks, Bank Performance, Basel III

Authors' individual contribution: Conceptualization — T.H.I.; Methodology — E.A.A.; Investigation — E.A.A.; Writing — T.H.I. and E.A.A.; Supervision — T.H.I.

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1. INTRODUCTION

The banking industry is one of the most effective and controllable economic sectors. It is one of the primary instruments of financial policy that impacts economic development. It is well-documented that a bank may be financially stable when it fulfils its promises with respect to investment support and the implementation of solid corporate governance processes. In the global banking industry, risk management (RM), capital

requirements, and solid governance frameworks acquired great significance during and after the 2007–2008 financial crisis. Failures in governance, RM, and board decisions have all been identified as factors for banks' weak performance. An increase in risk governance (RG) tools are needed to strengthen the banking sector's internal governance framework because it is believed that managers have more opportunities to engage in corrupt practices at the expense of bank

stakeholders because of the lack of sound bank rules for applying governance mechanisms.

RG is a major issue that regulators and capital market participants throughout the globe are working hard to solve. When the global economy was rocked by a financial crisis brought on by a lack of control and excessive risk, two firm-level methods had a big impact on the size of shareholder losses. First, there was a lack of RM and corporate governance instruments before the global financial crisis, as banks relied more on the audit committee (AC) and less qualified risk committee (RC) with low power, which might have led to more unplanned choices and tail risk (Kashyap, Rajan, & Stein, 2008). Second, internal processes and capital rules are working together to improve bank performance since they are misaligned with the bank's goal (Ellul & Yerramilli, 2013; Ayadi et al., 2018).

There has been a compelling need to strengthen RG processes and frameworks as a result of recent high-profile corporate collapses. According to Hoyt and Liebenberg (2011), the usual approach to evaluating risk is inadequate and requires the implementation of a complete and strong RM plan, especially in financial institutions. The RG framework is crucial to identify and analyze the collective risks that influence the value of banks, as well as to develop a comprehensive enterprise-wide plan to adequately manage such risks (Meulbroek, 2002). In 2005, the International Risk Governance Council (IRGC) developed a RG framework to help financial institutions with their financial reporting processes. According to that framework, RG is a governance mechanism utilized by the board of directors (BOD) to oversee RM problems by strengthening the power and effectiveness of the risk committee. Through the BOD committees, board members monitor the RM process, risk reporting, and risk disclosure (Klai & Omri, 2011; Kakanda, Salim, & Chandren, 2017). Concerning the elements that influence a bank's RG structure, there are several factors, including risk culture, strategy, international rules, and national governance. As a result, RG instruments play an important role in supporting BOD in achieving its strategy by matching it with the bank's risk appetite (Chan-Serafin, Brief, & George, 2013; Ullah, 2014).

Previous research reveals that RG influences bank performance, for example, the results of Aebi, Sabato, and Schmid (2012), as well as Ellul and Yerramilli (2013), on the impact of RM on bank profitability in the United States; found that institutions with better RG procedures were more profitable during the financial crisis. Furthermore, they reveal that banks perform better when the chief risk officer (CRO) reports directly to BOD. As a result of increased regulatory and stakeholder demand, Okoye, Adetiloye, Erin, and Evbuomwan (2017a), Kakanda et al. (2017), and Chavarin (2020) argued that RG strategies must be institutionalized in both developed and developing countries. Okoye et al. (2017a) argue that strong RG mechanisms, for example, the inclusion of a strong independent risk committee and a prominent CRO, are associated with long-term institutional success. While the majority of RG research focuses on developed-country banks such as those in the United States,

Italy, and Europe (Ellul & Yerramilli, 2013; Dupire & Slagmulder, 2019) confirm that RG characteristics are positively associated with bank performance, whereas banks with tighter RM controls performed better following the great recession.

However, there are differing viewpoints on the optimum RG structure and its influence on bank performance, capital, and risk levels, since most research disregards the impact on bank risk in that relationship (Luu, Nguyen, Vu, & Tuan, 2019; Hunjra, Hanif, Mehmood, & Nguyen, 2021). According to Shivaani (2018), RG had a relatively minimal impact during the financial crisis and insignificant effects were observed on banks' performance. In addition, having a RM committee and hiring a CRO would not improve corporate performance. Instead, regulators and banks must ensure that governance structures are not excessively inflexible, risk-averse, or efficient in decision-making.

Recent Basel regulatory ideas emphasize the need for RM and the creation of a risk committee. According to the Basel Committee's report (Bank for International Settlements [BIS], 2015), a good RM strategy will allow banks to better resist market volatility. The bank's BOD is in charge of RG. Board members must actively engage in risk monitoring and reporting (Klai & Omri, 2011; Kakanda et al., 2017). Since the majority of risk committee members should be non-executive directors, it may be stated that Basel III guidelines on banking oversight have concentrated on independence. As a result, the study's major goal is to assess how Egyptian banks' RG structures affect capital needs and performance.

As a consequence, we anticipate that our findings will be valuable to academic researchers, practitioners, and regulators. First, practitioners in both developed and developing nations are increasingly examining the link between risk, capital adequacy ratio (CAR), and performance without considering the role of bank risk. As a consequence, this study is revolutionary since it reveals a previously unknown fact about banks in one of the emerging economies, such as Egypt. Second, it would support decision-makers in creating policies aimed at enhancing Egypt's financial industry. As a result, it is necessary to assess Egyptian banks' capital adequacy levels to avoid them going bankrupt. In terms of research, we looked at the literature on bank RG and conclude that investigating the contention between RG, capital, and bank performance is lacking and needs in-depth analysis. Moreover, it determines a relation between RG framework adoption and performance, as well as bank capital requirements, while taking bank risk into account. Finally, the findings of this study may assist in enhancing Egyptian banks' governance systems and risk-taking which have required robust RG instruments to aid bank management in moving their emphasis from a defensive to a more proactive approach to RM.

The remainder of this paper is organized as follows: Section 2 is a review of the literature and hypotheses development; Section 3 is the research method; Section 4 is the data analysis and discussion of results; Section 5 is the conclusions and suggestions for future research.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Risk governance and bank performance: A conceptual framework

The global financial crisis of 2007–2008 was exacerbated by banking governance and RM flaws in financial institutions (Mehran, Morrison, & Shapiro, 2011; Dabari & Saidin, 2015). It is probable that before the crisis, banks (BOD) attempted to increase shareholder value at the price of growing risks, thus making the usual factors of corporate governance inefficient (Fahlenbrach & Stulz, 2011; Beltratti & Stulz, 2012). Theoretically, it can be argued that the RM practices of financial organizations before the crisis, as well as their capital raising operations, were ultimately the outcome of a cost-benefit trade-off made by corporate boards and shareholders. The weaknesses in traditional governance include inattentive management and BOD that do not devote enough time and attention to RM, which leads them to face difficulty in identifying, measuring, monitoring, and communicating risk exposures (Financial Stability Board [FSB], 2012). According to Stulz (2008), senior management and BOD are responsible for determining the degree of risk that should be taken. Moreover, BOD with senior management must identify the firm's risk tolerance (Dermine, 2013; BIS, 2015).

To avoid another economic crisis, policymakers changed their expectations of directors and risk supervision and regulatory authorities established legislation demanding better RG tools. Ellul and Yerramilli (2013) examined the importance of corporate governance and RM in mitigating bank risk and the influence this had on bank performance on 74 US banks from 2006 to 2011 using a developed risk management index (RMI). The CRO's appointment, enterprise risk management (ERM) implementation, audit committee independence, risk department, and board risk committee were all used to determine the RMI. The results reveal that most RG factors have a favorable and substantial influence on US bank performance. Additionally, robust RM mechanisms constrain US bank risk-taking behavior. Moreover, according to Aebi et al. (2012), the results indicated that during the global financial crisis, banks with higher RG were able to manage risk in a much better way.

The post-crisis studies revealed contradictory findings on the impact of several RG tools on banks' performance. For example, Mongiardino and Plath (2010), Battaglia and Gallo (2015), as well as Erin, Adegboye, and Bamigboye (2021), examined the relationship between bank failure and the bank's RG patterns that are set by corporate governance systems. The results indicated that banks had higher stock returns and return on equity (ROE) during the crisis because CRO reports directly to BOD, not the chief executive officer (CEO). Also, they mentioned that the risk committee and CRO should be more independent with direct access to change banks' risk appetite to match the bank strategy. On the other hand, Gontarek (2016) found that the influence of RG during the financial crisis was very limited, and no statistically significant impacts were discovered on banks' performance.

Numerous studies on RG have been conducted in Asia, for example, Battaglia and Gallo (2015) examined whether increased RG was associated with improved banking performance in China and India. The results found that the size of the risk committee was directly related to ROE and return on assets (ROA), while the number of risk committee meetings was positively associated with market value. Similarly, Nahar, Azim, and Anne Jubb (2016) demonstrated that RG was positively related to the performance of Bangladesh listed banks during the crisis period.

Concerning the influences of a risk committee as important RGs tools settled by Basel regulations, Nakano and Nguyen (2012) indicated that financial institutions needed to form an independent committee inside the board to oversee RM policies and structure. According to PricewaterhouseCoopers (PwC, 2017), risk committees are an excellent approach to increasing board oversight of risk, but they are not the only option to react to risk concerns. According to Culp (2002), the board RC should include "at least one person with RM experience commensurate with the company's capital structure, risk profile, complexity, operations, size, and other suitable risk criteria" (p. 12). The ownership structure of a corporation may also impact RM. For example, banks tied to corporate groups may make choices that benefit the organization as a whole, relegating RM to a secondary function. Risk committees, for example, lack enough independent members, and risk managers lack practical power in the bank's most important decisions, according to Karyani, Dewo, Santoso, and Frensidi (2019).

The traditional perspective of corporate governance is that shareholders and executives are in a fundamental conflict. While shareholders want a return on their investment, managers are more inclined to seek other benefits, such as the authority and prestige that come with running a large and successful firm. Due to their improved access to inside information and the impotence of the numerous and dispersed owners, managers are likely to have the upper hand in this circumstance (Fama & Jensen, 1983). Research shows that RG processes have a higher ability to enhance the value of the organization (Bargeron, Lehn, & Zutter, 2010). McShane, Nair, and Rustambekov (2011) investigated the impact of ERM on company's value (*Tobin's Q*). This study investigated a total of 82 insurance companies. They found that ERM implementation has not increased the value of insurance companies in the United States, as companies with strong ERM are more likely to take risks. Furthermore, Al-Matari, Al-Swidi, and Fadzil (2014) discovered that a successful CG system increases public confidence in the financial institutions, which leads to better operations and higher investor interest.

RG has a positive and significant impact on bank performance, according to previous research (Aebi et al., 2012; Rahim, Bakar, & Ganapathy, 2015; Chavarín, 2020; Erin et al., 2021), while RG has no impact on selected firm performance, according to other researches (Shivaani, 2018; Karyani et al., 2019). Based on the above discussion, we use *ROA* as a proxy for accounting-based performance and *Tobin's Q* as a proxy for market-based performance, as recommended by Ellul and Yerramilli (2013) and

Nahar et al. (2016). Hence, the first initial hypothesis and its sub-hypotheses are formulated as follows:

H1: The existence of a RG structure is significantly related to the performance of the Egyptian listed banks.

H1a: The overall RG structure has a significant effect on banks' ROA.

H1b: The overall RG structure has a significant effect on banks' Tobin's Q.

2.2. The influences of banks risk and capital requirements

The past financial crisis resulted in significant modifications to key financial institution laws. Those modifications are intended to reduce their risk-taking, raise bank capital requirements, and advocate the use of RG mechanisms. Banking CEOs have actively invested in complicated assets (high risk) to delight shareholders and competitors. As a result, all financial institutions must maintain a good RM framework. Fatima and Razzaque (2014) concluded that risk and capital management are critical success elements in financial institutions, and they play a critical role in allowing management to function more efficiently, particularly with the implementation of the Basel laws. In response to the global financial crisis and the adjustments in Basel minimum regulatory requirements such as reserve requirements, capital adequacy requirements, RG, and risk appetite frameworks to control BOD decisions, much attention has been paid to CAR and its effect on banks' risk-taking behavior. According to Harkati, Alhabshi, and Kassim (2020), as well as Sarin and Summers (2016), banks can be considered well-capitalized if they have sufficient capital reserves.

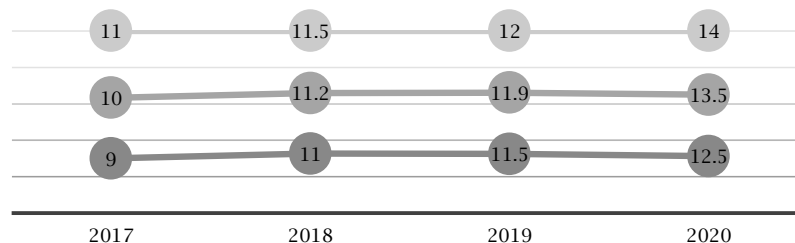
Indeed, studies have shown that when risk is adequately managed, available resources may be more efficiently utilized to invest in potentially successful projects since stakeholders have faith in them (Nocco & Stulz, 2006; Gelman, Greenberg, & Rosenboim, 2018). Studies have demonstrated that an efficient RG structure would increase shareholder value by lowering the organization's total risk, which in turn reduces the capital cost (Beasley, Clune, & Hermanson, 2005). According to John, Litov, and Yeung (2008), consistent growth in the firm value is based on the organization's RM strategy, designing and implementing a complete RM system that

improves a company's value by reducing cash flow volatility, decreasing profit volatility, enhancing return on capital and enhancing performance.

Abou-El-Sood (2016), as well as Ibrahim and Rizvi (2018), specify that the global financial crisis was attributed to deficient corporate governance mechanisms (as BOD did not identify the banks' risk factors in its risk appetite framework) and RM. Furthermore, according to Kirkpatrick (2009), BOD should provide more information about the anticipated risk factors and RM systems, particularly those risks that directly influence bank capital. Fahmy (2018) stressed the necessity of RM, which extends beyond financial risk assessment to include general management risks to align with the bank's risk appetite and governance structure. The relationship between the bank's risk (BOD governance, CEO duality, and independent directors) was analyzed by Alam, Ahmad, and Muneeza (2020) who indicated that strong bank boards (boards that represent more of the bank shareholders' interests), especially small and less restrictive boards, positively increase bank risk-taking. In comparison, CEO power (the CEO's capacity to influence board decisions) has a detrimental effect on bank risk-taking. Bank capital regulations push management to take on more risk but if the risk is avoided, managers may be able to make more effective investments.

Starting in 2015, after the several changes in Basel III regulations and the increase in bank capital requirements, the Central Bank of Egypt (CBE) has repeatedly pushed banks to improve its internal control systems and support application systems to ensure adequate and strong management, avoiding any credit concentration risk and ensuring bank stability (Zaky & Soliman, 2017). Risk-adjusted capital requirements under Basel III are seven times higher than those under Basel II, according to Carney and Hamilton-Hart (2015). If the bank's CAR falls below the required level, BOD must exercise caution in issuing credit and making decisions based on the risk committee, CRO, and the audit committee, as any wrong decision will not only affect the bank's capital but its profitability too. As it can be seen in Figure 1, between 2016 and 2020, CAR of Egyptian banks ranged from 9% to 14%, indicating that the Egyptian banking system complies with Basel II moving to Basel III regulations.

Figure 1. Changes of the Egyptian banks' capital adequacy ratio (CAR)



Based on the above discussion, it can be assumed that bank risk and investment decisions are primarily driven by BOD decisions (particularly before the global financial crisis) that may cause banks to fail. On the other hand, studies conducted

after the global financial crisis focused primarily on the role of RM and the board risk committee in supporting BOD decisions, particularly those related to bank capital requirements, without taking into account the role of RM and the board risk committee

in supporting BOD decisions or their relationship to the bank's risk. The peer-review discovered that financial institutions used a variety of proxies as indicators of RG, including risk culture, risk appetite, specific roles of the BOD, board risk committees, including CRO, and internal audit. The research questions that need to be answered are:

RQ1: Are banks' capital requirements considered a source or a motivation for banks to raise their risk-taking on the asset portfolio of banks?

RQ2: How can the bank's BOD govern bank risks and at the same time satisfy its capital requirements under restrictive regulations?

RQ3: Is "risk governance" the missing bank's tool to satisfy its capital requirements and at the same time control its risk level?

Based on the above discussion, Egypt, as an emerging market, provides an interesting spot for the current study since most prior studies examining RG tools and their effectiveness was undertaken in the context of developed countries, focusing on the impact of RG on performance and ignoring how banks' capital requirements as an internal governance mechanism affect the level of bank risk. For this purpose, the following hypotheses will be tested:

H2: The existence of RG structure is significantly related to the capital requirements of the Egyptian listed banks.

H3: RG is mediating the relationship between the Egyptian listed bank's risk and bank performance.

H3a: RG is mediating the relationship between the Egyptian listed bank's risk and bank performance as measured by ROA.

H3b: RG is mediating the relationship between the Egyptian listed bank's risk and bank performance as measured by Tobin's Q.

H4: RG is mediating the relationship between the Egyptian listed banks' risk and their bank capital requirements (CAR).

3. RESEARCH METHOD

3.1. Sample selection and data sources

The population of this study consists of all twelve banks listed on the Egyptian Stock Market (EGX) over eleven years (2010–2020). The period was chosen for several reasons. First, it covers the period after the global financial crisis. Second, the Basel accords were applied within the Egyptian banking sector. The annual reports were used to pick up information on the disclosure of RG tools such as board composition, CRO, audit committee, and risk

committee characteristics. Such hand-collected information is challenging since not all the listed banks have the same disclosure level.

3.2. Data analysis techniques

Data is analyzed based on valid techniques to provide a foundation for answering the research questions and testing the hypotheses. Analysis of the data was carried out with the help of factor analysis, correlation analysis, and panel data modelling. The paper employs Hausman's statistical tests to determine whether the fixed or random-effects model is the most appropriate to test the hypotheses that have been proposed. The F-test is used to choose between the models to test, and it is also used to calculate the level of significance. The endogeneity issue is a prevalent and important concern in governance studies, and our study did not disregard it, as we assert that board structure is related to previous success (Elshandidy & Neri, 2015; Alshabmi, Adam, Mustafa, Thomran, & Abdelmaksoud, 2020). Such difficulty did not appear in our study, as panel estimation may reduce unobservable heterogeneity-induced bias.

3.3. The study variables

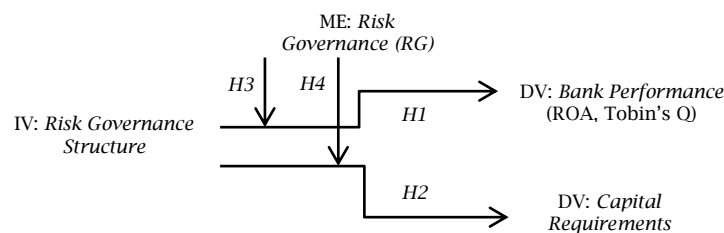
This study aims to investigate the effect of RG on bank performance and capital requirements. The research model is shown in Figure 2.

The risk governance index (RGI) was established to calculate the RG disclosure ratings for each bank-year *i* year *t* (RG_{it}) based on the Basel committee (BIS, 2015) governance standards, which included 13 RG and RM functions, namely:

- CRO_Presence,
- CRO_Executive,
- CRO_Financial Experience,
- CRO_Member of RC,
- CRO_Stature,
- RC_Existence,
- ERM_Score,
- RC_Activism,
- RC_Accounting_or_Financial_Experience,
- AC_Existence,
- AC_Independence,
- AC_Size,
- AC_Meetings.

The indices were principally developed based on Basel (BIS, 2015) and Financial Stability Board (FSB, 2013) governance recommendations to assess how national governments and the banking sector have progressed in the area of risk control since the global financial crisis.

Figure 2. Model variables examining relationship between variables



Notes: IV — independent variable, ME — mediator variable, DV — dependent variable.

Hence, the decomposition value of the correlation matrix of RG features can be calculated based on RGI using main component analysis as settled by (Akhigbe & Martin 2008; Ellul & Yerramilli, 2013; Mollah & Liljeblom, 2016). Each

item is to be assigned a value of 1 if it meets the requirements specified for that item and 0 otherwise. Table 1 summarizes the study variables and the proxies.

Table 1. The study variables and proxies

<i>Variables</i>	<i>Measurements/Proxies</i>
Independent variables (RGI)	
<i>CRO_Presence</i>	A dummy variable that takes the value of 1 if the CRO (or an equivalent function) is responsible for the enterprise risk management in the bank; and otherwise 0.
<i>CRO_Executive</i>	A dummy variable that takes the value of 1 if the CRO is an executive officer in the bank; and 0 otherwise.
<i>CRO_Financial Experience</i>	A dummy variable that takes the value of 1 if the CRO has a financial experience and is a 0 otherwise.
<i>CRO_Member of RC</i>	A dummy variable that takes the value of 1 if the CRO is a member of the RC; a 0 otherwise.
<i>CRO_Stature</i>	A dummy variable that identifies whether CRO reports to BOD, this is scored 1 or 0 otherwise.
<i>RC_Existence</i>	A dummy variable that if a risk committee exists in a bank this is scored 1 or 0 otherwise.
<i>ERM_Score</i>	A dummy variable that takes the value of 1 for banks with ERM framework, otherwise 0.
<i>RC_Activism</i>	A dummy variable; it is 1 if the number of an annual meeting is equal or more than four times, otherwise 0.
<i>RC_Accounting_or_Financial_Experience</i>	A dummy variable; if the number of RC with financial experience on BOD exceeds the mean scored 1 if so or 0 otherwise.
<i>AC_Existence</i>	A dummy variable; if an audit committee exists in a bank this is scored 1 or 0 otherwise.
<i>AC_Independence</i>	A dummy variable; if most of the AC members are independent directors this is scored 1 or 0 otherwise.
<i>AC_Size</i>	A dummy variable; if an audit committee size in a bank this is 3 or more members scored 1 or 0 otherwise.
<i>AC_Meetings</i>	A dummy variable; if the bank's board audit committee met more frequently during the year compared to other banks on average this is scored 1 or 0 otherwise.
Dependent variables	
<i>Bank_Risk</i>	$z_score = \frac{Avg(ROA) + Avg(Equity/Assets)}{StdDev(ROA)}$
<i>Bank_Capital_Requirements (CAR)</i>	$\frac{Tier\ One\ Capital + Tier\ Two\ Capital}{Risk\ weighted\ assets\ (RWA)}$
<i>ROA</i>	The proxy is used to measure bank performance which equals the ratio of net income divided by total assets.
<i>Tobin's Q</i>	Total assets (book value of equity/market value of equity).
Control variables	
<i>BOD</i>	<i>Board_Size</i> ; the number of directors on a bank's board should be ≤ 8 ; it is assigned a value of 1 or 0 otherwise.
	<i>Board_Independence</i> ; the proportion of independent directors on the board; it is assigned a value of 1 if the majority of BOD members are independent, and 0 otherwise.
	<i>Board_Meetings</i> ; a dummy variable; it is assigned a value of 1 if the number of an annual meeting is equal or more than 4 times, otherwise a value of 0 is assigned.
	<i>Board_Non-executives</i> ; the number of non-executives on board; it is assigned a value of 1 if the number of non-executive board members exceeds the mean and 0 otherwise.
<i>Bank_Size</i>	Measured using the proxy of the natural logarithm of total assets.
<i>Ownership_Structure</i>	A dummy variable; it is assigned a value of 0 if a bank is a public bank and 1 otherwise.
<i>Leverage</i>	Total debt/Total equity ratio.

4. EMPIRICAL RESULTS

4.1. Descriptive statistics

Descriptive statistics of the measures of *ROA*, *CAR*, *Bank_Risk* (*Log_z_score*), RG variables, financial and non-financial control factors are shown in Table 2. Egypt's listed banks are aiming to satisfy Basel II and Basel III criteria by increasing their *CAR*, where the mean of *CAR* is 16.62%. Such an increase is reflected in the Egyptian banks' loan and deposit growth, with a mean of 38.32% and 56.26%, respectively. Furthermore, it can be noted that the big difference between the minimum and maximum of *ROA* and *Tobin's Q* might result from

the difference in Egyptian banks' size (*Bank_Size*). The standard corporate governance indicators such as the average board size were taken into consideration, and banks with eight or more board members were assigned a value of 1; a value of 0 otherwise (Aebi et al., 2012; Zhang, Li, & Ortiz, 2021). According to Table 2, the average board size is 51% of the total board size because a strong BOD is thought to effectively oversee bank management on behalf of shareholders. Board meetings provide a forum for discussing the bank's growth and RM. There may be an increase in the danger of BOD incentives being monitored since 42% of the listed Egyptian banks have independent directors as regularly meeting boards demonstrated a reasonable awareness of their operational decisions to improve

financial performance as they were involved in strategic concerns and RM (Gurusamy, 2017). As a result of their involvement with many boards, directors become too busy to accomplish their tasks. Similarly, Francis and Osborne (2012) indicated that increasing the number of board meetings and independent board members has a favorable and substantial effect on ROE. There is a big difference

in how internal and external board members think about strategic visions. Independent and non-executive members care about the bank's long-term performance, especially risky issues, whereas executive members care about the institution's short-term performance (Galli, Mascia, & Rossi, 2020).

Table 2. Descriptive statistics of the dependent and control variables for all sampled banks

Variables	Mean	Std. deviation	Minimum	Maximum
CAR	0.166285	0.045995	0.080000	0.310000
ROA	0.087605	0.318453	0.060000	0.280000
Tobin's Q	0.493802	2.45360	0.5421500	24.5100
Log_Z_score	2.5500	2.21800	-3.01	7.0215
Leverage	0.320492	0.250328	0.03100	1.06100
Log_Assets	8.67304	4.52607	0.080000	25.6900
Board_Size	0.510000	0.502000	0	1
Board_Meetings	0.542300	0.499980	0	1
Board_Independence	0.420000	0.496000	0	1
Board_Non-executives	0.610000	0.489000	0	1
Bank_Ownership	0.690000	0.464000	0	1

Notes: The descriptive statistics of the variables for the entire sample (131 observations).

Moreover, Table 3 summarizes the descriptive statistics of each of the twelve RG variables (mean, standard deviation, minimum, and maximum) based on 131 observations (2010–2020). From the year-wise distribution of the mean values of RGI, it can be seen that the RG tools are increasing over time. This indicates that RG is becoming more important in the Egyptian banking sector, which might represent a changing regulatory environment in Egyptian banks as they adapt to the current Basel requirements and higher risk culture. It can be seen that 78% of Egyptian banks have RC with financial experience, whereas the average CRO existence is 49%. This indicates that most Egyptian banks did not set up a CRO during the study period. The CRO in the structure of bank RG and the lower existence of the CRO position affect the RC power as CRO acts as the committee tone to the top (BOD).

Finally, the internal AC serves as the second line of defense against bank risk and its role is mandatory in Egyptian banks in accordance with the central bank's latest governance code of conduct, while the RC, RM, and BOD are considered the first lines of defense in Egyptian banks based on Basel regulations. Approximately 90% of Egyptian listed banks have AC with regular meetings, but with low independence (less than 50%), implying that they do not have direct access to BOD, which could affect risk levels.

Table 3. Descriptive statistics of the RGI factors for all sampled banks

Variables	Mean	Std. dev.	Min	Max
CRO_Presence	0.48	0.501	0	1
CRO_Executive	0.42	0.495	0	1
CRO_Financial Experience	0.46	0.500	0	1
CRO_Member of RC	0.34	0.475	0	1
CRO_Stature	0.45	0.499	0	1
RC_Existence	0.89	0.318	0	1
ERM_Score	0.71	0.455	0	1
RC_Activism	0.70	0.458	0	1
RC_Accounting_or_Financial_Experience	0.78	0.415	0	1
AC_Existence	0.91	0.289	0	1
AC_Independence	0.43	0.497	0	1
AC_Size	0.65	0.479	0	1
AC_Meetings	0.85	0.356	0	1

Notes: This table summarizes the descriptive statistics for the RG variables used in this work (131 observations).

4.2. Factor analysis

Table 4 shows the results of factor analysis for only thirteen RG factors to exclude any negatively or less related factor, which are:

- CRO_Presence,
- CRO_Executive,
- CRO_Financial Experience,
- CRO_Member of RC,
- CRO_Stature,
- RC_Existence,
- ERM_Score,
- RC_Activism,
- RC_Accounting_or_Financial_Experience,
- AC_Existence,
- AC_Independence,
- AC_Size,
- AC_Meetings.

The Kaiser-Meyer-Olkin (KMO) test of Egyptian listed banks was 85.14% for the five CRO indicators, 75.34% for the four RC indicators, and 70.46% for only three AC indicators, as AC_Independence was eliminated using a factor analysis test. As a result, only twelve elements, rather than thirteen factors, above 70% were chosen to indicate a meritorious level.

Table 4. Factor analysis

Factor	No. of indicators	KMO	% of variance explained
CRO	5	0.851**	84.150
RC	4	0.753**	58.441
AC	3*	0.704**	50.448

Notes: * AC_Independence was excluded as it is negatively correlated with other AC variables; ** significance level at 5%.

4.3. Correlation analysis

Table 5 shows the Pearson Pairwise correlation coefficients for important Egyptian banks' outcomes, risk, capital requirements, and RG variables. They are shown in the following table. There was no evidence for multicollinearity. CAR and Bank_Risk are negatively correlated with CRO and RC, with correlation coefficients of -19%, 14%, and 17.2%, respectively. This suggests that RG variables may have a greater impact on Egyptian banks' risk-averse decisions, which would decrease capital

requirements at the same time as decreasing the probability of irrational decisions. The RG affects overall bank risk-taking through its independent RC and CRO. Moreover, the market-based performance is positively correlated with *Bank_Risk (Log_z_score)*, RC, and AC, with a mean of 21.8%, 10.6%, and 8.7%, respectively, implying that better RG control can withstand

the higher regulatory capital pressure and at the same time benefit the market value of the bank. This increases the confidence of the stockholders in the bank's stability. However, *ROA* is positively related to only the AC as an RG tool at a mean of 13.8%, which indicates that RG might not be the main determinant in improving the Egyptian banks' profitability.

Table 5. Pearson's correlation coefficient

		CAR	ROA	Tobin's Q	Log_z_score	CRO factor score	RC factor score	AC factor score
CAR	Pearson Corr.	1						
ROA	Pearson Corr.	-0.088	1					
	Sig. (2-tailed)	0.300						
Tobin's Q	Pearson Corr.	-0.071	-0.002	1				
	Sig. (2-tailed)	0.406	0.979					
Log_z_score	Pearson Corr.	-0.0181*	0.003	0.218**	1			
	Sig. (2-tailed)	0.242	0.220	0.042				
CRO factor score	Pearson Corr.	-0.190*	0.140	0.151	-0.172*	1		
	Sig. (2-tailed)	0.024	0.971	0.009				
RC factor score	Pearson Corr.	-0.141**	0.110	0.106**	0.133	0.444**	1	
	Sig. (2-tailed)	0.322	0.096	0.072	0.041			
AC factor score	Pearson Corr.	-0.157	0.138*	0.087*	0.112	0.242**	0.252**	1
	Sig. (2-tailed)	0.097	0.193	0.210	0.115	0.000		

Notes: * correlation is statistically significant at the 0.1 level (2-tailed); ** correlation is statistically significant at the 0.05 level (2-tailed); *** correlation is statistically significant at the 0.01 level (2-tailed).

5. RESEARCH MODEL

5.1. The relationship between banks' risk governance, performance, and capital

With panel data, fixed-effects and random-effects models are the most commonly estimated models. Mixed-effects models and population-averaged models are also employed. For panel regression, a Hausman specification test was used to assist in

selecting the appropriate model: the fixed effect model (FEM) or the random effect model (REM). To accept the null hypothesis, the Hausman test requires a p-value greater than or equal to 0.05. FEM is suitable when the null hypothesis mu be rejected (Zainodin & Yap, 2013). On the other hand, the Hausman test shows that FEM is a better model for examining the direct influence of RG practices on profitability and capital requirements. The following multivariate regression models were created for the first three hypotheses.

$$ROA_{Perf_{it}} = \beta_0 + \beta_1 RG_GRO_{it} + \beta_2 RG_RG_{it} + \beta_3 RG_AC_{it} + \beta_4 Board_Size_{it} + \beta_5 Board_Meetings_{it} + \beta_6 Board_Independence_{it} + \beta_7 Board_Non - executives_{it} + \beta_8 Bank_Ownership_{it} + \beta_9 Log_Assets_{it} + \beta_{10} Leverage_{it} + \alpha_{it} + \varepsilon_{it} \quad (1)$$

$$Tobin's\ Q_{Perf_{it}} = \beta_0 + \beta_1 RG_GRO_{it} + \beta_2 2RG_RG_{it} + \beta_3 RG_AC_{it} + \beta_4 Board_Size_{it} + \beta_5 Board_Meetings_{it} + \beta_6 Board_Independence_{it} + \beta_7 Board_Non - executives_{it} + \beta_8 Bank_Ownership_{it} + \beta_9 Log_Assets_{it} + \beta_{10} Leverage_{it} + \alpha_{it} + \varepsilon_{it} \quad (2)$$

$$CAR_{it} = \beta_0 + \beta_1 RG_GRO_{it} + \beta_2 2RG_RG_{it} + \beta_3 RG_AC_{it} + \beta_4 Board_Size_{it} + \beta_5 Board_Meetings_{it} + \beta_6 Board_Independence_{it} + \beta_7 Board_Non - executives_{it} + \beta_8 Bank_Ownership_{it} + \beta_9 Log_Assets_{it} + \beta_{10} Leverage_{it} + \alpha_{it} + \varepsilon_{it} \quad (3)$$

The fixed effect regression analysis is employed to test for the impact of the existence of RG on the performance of the Egyptian listed banks (*H1a* and *H1b*), as well as the capital requirements (*H2*), and the results are shown in Table 6. According to the results, the bank's *ROA* has an adjusted R^2 value of 15.21%, indicating that only bank RC components, as a RG instrument, have a limited impact on the Egyptian banks' *ROA*. This finding is consistent with prior research (Pagach & Warr, 2007; Minton, Taillard, & Williamson, 2014), although it differs from Erin, Asiriwa, Olojede, Ajetunmobi, and Usman (2018), who showed that enterprise RM implementation is inversely related to *ROA*. RM has a limited impact on bank profitability because banks are often unable to cope with risk, which might occur due to limitations in risk-measuring

technologies that may not be relevant to all types of banks. Moreover, *H1a* testing result indicates that CRO and AC processes do not affect the bank's market and accounting-based performance. Compensation arrangements for CROs, which are intended to incentivize CEO to avoid possible risks of long-term profit reductions, have not been demonstrated to be beneficial. Fundamentally, managers want riskier initiatives because they have the potential for higher returns, which will increase their pay. Finally, the results indicate that having a competent and independent RC may have a significant influence on a bank's *ROA* while not affecting *Tobin's Q*. This is in line with prior studies (Laeven & Levine, 2009; Aebi et al., 2012), which demonstrated that RCs assist BODs in their efforts to control RM and risk reporting.

Table 6. Regression results for banks' RM in terms of performance and capital requirements

Variables	ROA	Tobin's Q	CAR
	H1a	H1b	H2
RG_CRO	0.028171	0.227527	-0.230198*
RG_RC	0.121256**	0.106437	-0.007685
RG_AC	0.000661	0.251155	-0.004500
Size (Log_Assets)	-0.025580**	-0.005475	0.06125**
Leverage	-0.189336*	0.311330	0.027554*
Board_Meetings	0.0914763*	0.106345	0.096891
Board_Non-executives	0.090045	0.073925	-0.011761
Board_Size	0.059752	0.761641	0.111302**
Board_Independence	-0.005385	-0.738792*	0.008482
Bank_Ownership	0.068815	0.5133128	-0.001944
R-squared	0.213595	0.073794	0.270294
Adjusted R-squared	0.152157	0.02641	0.392758
F-statistic	3.476590	1.011846	2.040952
Prob (F-statistic)	0.000451	0.0637173	0.009962
Year fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes

Notes: The table reports regression results of banks (ROA, Tobin's Q, and CAR) on RG variables. Variables definitions are presented in Table 1; the t-statistics are ***, **, and * denote the level of significance at 1%, 5%, and 10% respectively.

Furthermore, as can be seen, board characteristics (*BOD_Meetings*) have a significant relationship with *ROA* (19.4%). This finding is consistent with previous research (Rahman, Noor, & Ismail, 2013; Ellul, 2015; Leone, Gallucci, & Santulli, 2018), which found that RM practices must be accompanied by a strong bank governance culture. Higher board sizes and meetings govern management choices more effectively since the board members have the skills necessary to enhance bank performance. Additionally, the majority of financial institutions must select between various governance tools to mitigate the severity of shareholder-management agency conflict.

The results indicate a significant positive relationship between *Leverage* and *CAR* of 6.25% and a negative relationship between *Leverage* and *ROA* of 18.933 %, indicating that increased *Leverage* may increase bank capital and motivate banks to take more risky decisions while adversely affecting bank performance. These findings are consistent with James and Joseph (2015) who indicated that increased *Leverage* provides a strong incentive for CEOs to take risks. Finally, it can be noticed that the natural logarithm of total assets was used as a measure of bank size to avoid extreme results and data irregularities that could arise as a result of the enormous total asset values held by each bank. The results show that there is a significant negative relationship between *Bank_Size* and *ROA* and

a positive relationship with *CAR*, with -2.55% and 6.125% respectively. Larger banks are more stable, and their businesses are more diverse. As a result, these banks are likely to have greater options to engage in a larger variety of loans and other asset positions, resulting in additional capital (Sullivan & Spong, 2007).

5.2. The role of RG in mediating the relationship between bank risk, performance, and capital requirements

Based on the agency theory of RG, it helps to monitor, discipline, and remove inefficient management team members to ensure that managers promote shareholders' interests (Naceur & Kandil, 2009). To satisfy the regulatory demand for improving RM, financial institutions have initiated several tools, such as establishing stand-alone RM units and RCs which are separate from ACs with responsibility for oversight and advice to the board on the current risk exposures of the entity and future risk strategy. Given the complexity of multiple risks faced by financial institutions, they concentrate on forming risk committees for risk monitoring higher banks' risk exposure (Aebi et al., 2012; Hines & Peters, 2015). RCs are classified as a risk governance structure to manage firms' risk appetite, accept risks, and effectively communicate hazards with different stakeholders. This procedure decreases the negative influence on banks' performance and market value (Barakat & Hussainey, 2013). Shareholders and managers, on the other hand, dominate the regulatory effect and push for more risk in well-capitalized banks, whereas the regulatory effect dominates bank risk-taking in inadequately capitalized banks due to banks' being subject to strict regulatory oversight by Jeitschko and Jeung (2007). As a consequence, it is essential to understand how the availability of good RM systems helps banks to make rational decisions, satisfy capital requirements, and enhance performance even when risk levels are increased.

By including a bank risk variable in the regression model, we were able to examine the mediation effect of bank risk governance factors on the relationship between bank risk, accounting, and market-based performance (*H3a* and *H3b*), as well as the relationship between bank risk and capital requirements (*H4*). The regression coefficients for the interaction of bank risk and risk governance criteria (*Log_z_score * CRO*, *Log_z_score * RC*, and *Log_z_score * AC*) reflect RG's mediating effect on the relationship between *Bank_Risk* (*Log_z_score*), *ROA*, and *Tobin's Q*.

$$ROA_{Perf_{it}} = \beta_0 + \beta_1 RG_CRO_{it \times PERF_{it}} + \beta_2 RG_RC_{it \times PERF_{it}} + \beta_3 RG_AC_{it \times PERF_{it}} + \beta_4 Board_Size_{it} + \beta_5 Board_Meetings_{it} + \beta_6 Board_Independence_{it} + \beta_7 Board_Non - executives_{it} + \beta_8 Ownership_{it} + \beta_9 Log_Assets_{it} + \beta_{10} Leverage_{it} + \alpha_{it} + \epsilon_{it} \tag{4}$$

$$Tobin's\ Q_Perf_{it} = \beta_0 + \beta_1 RG_CRO_{it \times PERF_{it}} + \beta_2 RG_RC_{it \times PERF_{it}} + \beta_3 RG_AC_{it \times PERF_{it}} + \beta_4 Board_Size_{it} + \beta_5 Board_Meetings_{it} + \beta_6 Board_Independence_{it} + \beta_7 Board_Non - executives_{it} + \beta_8 Ownership_{it} + \beta_9 Log_Assets_{it} + \beta_{10} Leverage_{it} + \alpha_{it} + \epsilon_{it} \tag{5}$$

$$CAR = \beta_0 + \beta_1 Score + \beta_2 RG_CRO_{it \times CAR_{it}} + \beta_3 RG_RC_{it \times CAR_{it}} + \beta_4 RG_AC_{it \times CAR_{it}} + \beta_5 Board_Size_{it} + \beta_6 Board_Meetings_{it} + \beta_7 Board_Independence_{it} + \beta_8 Board_Non - executives_{it} + \beta_9 Bank_Ownership_{it} + \beta_{10} Log_Assets_{it} + \beta_{11} Leverage_{it} + \alpha_{it} + \epsilon_{it} \tag{6}$$

Table 7 displays the regression results using Log_z_score as RM. The regression coefficient of $Log_z_score * RC$ on ROA is a significant positive value (sig. > 10), implying that the RC existence, independence, and financial experience act as a mediating factor between $Bank_Risk$ and ROA , whereas other RG factors ($Log_z_score * CRO$ and $Log_z_score * AC$) have an insignificant relationship, while the coefficient of $Board_Non-executives$ and $Board_Size$ is significantly correlated with ROE , 0.1677 and 0.17663 respectively. These results are consistent with Laeven and Levine (2009), as well as Tao and Hutchinson (2013), who indicated that RM unit that focuses objectively on risk processes allows for a more accurate evaluation of the risk profile and adherence to RM strategies that increase performance. RM practices must be backed up by an effective corporate governance culture, even more so in complicated businesses like banking. Without the board of directors' direct support and engagement, RM becomes more difficult to implement effectively. Additionally, the regression analysis provides an F-statistic of 0.004082 and 0.001882 for testing hypotheses $H3b$ and $H3c$ about the mediating function of banks' RG in the link between $Bank_Risk$, $Tobin's Q$, and CAR .

Table 7. Regression results for the mediating role of RG on bank risk, performance, and capital requirements

Variables	ROA	Tobin's Q	CAR
	H3a	H3b	H4
RG_CRO	0.072423	-0.190296	-0.022044***
RG_RC	-0.036425	-0.251857	-0.010073**
RG_AC	0.047914	0.104446	0.016694
Size (Log_Assets)	-0.027734***	-0.013311	0.1501293*
Leverage	-0.125453	0.005158	0.025949
Bank_Ownership	0.067678	0.632347	0.007499
Board_Meetings	-0.001138	0.400699	0.002701
Board_Non-executives	0.167729**	-0.134425	-0.006427
Board_Size	0.176631*	0.0928047*	0.011009
Board_Independence	0.016526	0.0868631**	0.007619
Log_z_score	0.020935	0.347031**	-0.121236**
$Log_z_score * CRO$	0.3101769	0.318301**	-0.23001236*
$Log_z_score * RC$	0.298910**	0.208374**	-0.162730*
$Log_z_score * AC$	-0.016591	-0.040687	-0.051674**
R-squared	0.2332720	0.312435	0.534398
Adjusted R-squared	0.1980402	0.243773	0.389176
F-statistic	2.332692	2.101641	2.302662
Prob (F-statistic)	0.001577	0.004082	0.001882
Year fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes

Notes: The table shows bank regression findings on RG variables (ROA , $Tobin's Q$, and CAR). Variable definitions are presented in Table 1; the t-statistics are ***, **, and * denote the level of significance at 1%, 5%, and 10% respectively.

The results indicate the existence of a significant positive relationship between Egyptian banks' risk and market-based performance, which raises the importance of strong governance tools to protect stakeholders. $Log_z_score * CRO$ and $Log_z_score * RC$ significantly mediate the relationship between $Bank_Risk$ and $Tobin's Q$ with 31.83% and 20.83% at a statistically significant level of 5% and adjusted R-squared of 24.37% respectively, which indicates the critical role of RC and CRO, especially with the higher risk level. The results are consistent with Nahar et al. (2016), who stated that increasing the number of RC and having a risk management unit may increase risk disclosure and make banks more accountable and

transparent to stakeholders. Similarly, Abdul-Wahab and Abdul Razak (2019) claim that the performance of banks with stronger RC is more closely linked to risk-taking. The influence of RG improvements on future stock returns was explored by Andries and Brown (2017), who revealed that banks that have taken steps to enhance RG have seen their stock prices grow in recent years.

Log_z_score demonstrates a substantial negative relationship -0.1212 between risk-taking and CAR , indicating that CAR is important in effecting bank stability by keeping them away from default (higher z_score), but it may also trigger or drive banks to engage in high-risk activities. Moreover, the regression coefficients for $Log_z_score * CRO$, $Log_z_score * RC$, and $Log_z_score * AC$ on CAR were -23%, -16.2%, and 5.167%, which indicates that if the risk is managed, capital regulations may help managers to make more successful investments. Overall, the Basel accord's CAR has paid off in terms of limiting banks' risk-taking excesses and making RG a dominant tool in controlling banks' tail risk and enhancing their stability. The findings are consistent with Kombo and Njuguna (2017), who stated that during times of higher risk, particularly after a crisis, banks may take several decisions such as limiting lending, generating cash via the sale of market rights, cutting costs, and deferring dividend payments. When RG instruments like CRO with authority and direct access to BOD, RC with financial expertise, an independent manager, and an independent AC are in place, banks may satisfy their capital requirements while maintaining bank stability.

6. ROBUSTNESS TEST

This study conducted a robustness test based on different proxies of bank performance measures. We estimate our regressions using ROE as a proxy for banks' accounting-based performance following Okoye, Adetiloye, Erin, and Modebe (2017b). This proxy is the net income divided by the total equity ratio. Table 8 shows a favorable and substantial association between CRO features as one of the most essential RG instruments and ROE at the 10% level.

Table 8. Robustness test

Variables	ROE
RG_CRO	0.109081*
RG_RC	0.019205**
RG_AC	0.069804
Size (Log_Assets)	0.003492
Leverage	0.024267
Board_Meetings	0.060760
Board_Non-executives	0.005410
Board_Size	0.017103
Board_Independence	0.029306
Bank_Ownership	0.050694
Log_z_score	0.026150**
$Log_z_score * CRO$	0.271480*
$Log_z_score * RC$	0.211436**
$Log_z_score * AC$	0.011476
R-squared	0.170024
Adjusted R-squared	0.130134
F-statistic	1.955985
Prob (F-statistic)	0.0328426

Notes: The table summarizes the regression results for the mediating role of banks' RG variables in the relationship between $Bank_Risk$ (Log_z_score) and ROE . The variables are defined in Table 8; the t-statistics ***, **, and * indicate the level of significance at 1%, 5%, and 10% respectively.

This result supports *H1*, which assumes the existence of a significant relationship between RG tools and banks' performance. Moreover, regarding the mediating role of RG between *Bank_Risk* (*Log_z_score*) and *ROE*, results indicate the existence of a significant positive relationship between the intersection of *Bank_Risk* and CRO characteristics (*Log_z_score * CRO*) and *ROE* by 27.15% at level 10%. They also indicate the existence of a significant positive relationship between *Bank_Risk* and CRO characteristics (*Log_z_score * RC*) and *ROE* by 21.143% at level 5%. Aebi et al. (2012), Lingel and Sheedy (2012), as well as Ellul and Yerramilli (2013) confirm our results that CROs which report directly to BOD outperform banks reporting to CEO, demonstrating the essential role of independent directors in maximizing shareholder value. Therefore, the robustness tests suggest that RG supports bank risk-taking mitigation by ensuring that RC and CRO receive adequate weight in decisions that directly support BOD decisions.

7. DISCUSSION OF RESULTS

Based on the authors' knowledge, the impact of RG on banks' performance and capital requirements has never been studied in the context of Egyptian banks. Prior studies have focused on risk governance tools in developed and emerging countries (Chen, Nazir, Hashmi, & Shaikh, 2019; Ummah, Suhartono, & Mongid, 2020). Paying little attention to the Middle East and African regions, Hence, the empirical results would contribute to the ongoing calls for studying the impact of RG tools and practices in developing countries.

This paper aims to determine to what extent the suggested RG framework plays the main role in an Egyptian bank's risk, capital, and performance while the operating environment for banks will be quite different. Based on the provided evidence, it can be suggested that RG tools increase the financial performance at a significant level, as they play a mediating role between the bank risk and the performance, especially the market-based one, which raises the importance of strong governance tools to protect stakeholders. Some policymakers, regulators, and investors might think that having powerful, independent committees like RCs can help BOD and control any tail risk.

The findings show a significant positive relationship between *Board_Size* and *CAR* of 11.302% and a negative relationship with CRO characteristics of -23.01%. These findings are consistent with those of Nahar et al. (2016) and are based on the institutional theory, where Basel regulations for satisfying the required capital level and capital buffer do not aid management in risk control because BOD may take risky decisions to satisfy the required capital. Therefore, CRO is an essential RG tool that plays an effective role in decreasing banks' tail risk, while it might disable banks from satisfying their capital requirements. Hence, the empirical results support *H2b*.

Furthermore, hypotheses *H3* and *H4* related to the mediating role of RG between the Egyptian listed bank's risk, bank performance, and capital are accepted. The results indicate an association between RG mechanisms, especially RC, CRO, and *Tobin's Q*. Special emphasis should be given to

the surprising result of the negative association between risk and capital requirements with the existence of CRO and RC on the board.

Regarding the control variables, *Bank_Size*, *Board_Independence*, and *Board_Non-executives* have a statistically significant influence on the relationship between *Bank_Risk*, *ROA*, *Tobin's Q*, and *CAR* with the mediating function of bank RGI. Vallascas, Mollah, and Keasey (2017) discovered that during a financial crisis, independent directors take greater chances and shift risks onto the financial safety net, despite being more cautious. Moreover, bigger BOD prevented excessive loan growth, reducing bank tail risk before the global financial crisis.

Additionally, the results are consistent with Pathan (2009) definition of a strong board as a smaller board with greater independence, as there is a significant positive relationship between *Board_Size*, *ROA* and *Tobin's Q*, while *Board_Independence* has a strong and significant positive relationship with Egyptian bank *Board_Size*. The relation between firm size and governance is ambiguous since larger banks have lower *ROA* and higher *CAR*, as indicated in Table 7, such a result is consistent with Klapper and Love (2004) who indicated that enterprises may have serious agency issues that require tighter governance. As a result of the necessity for external capital, small enterprises may have superior governance structures. Since *Leverage* is statistically negligible across all factors in Table 7, the mediating function of RGI allows banks to regulate their *Leverage* while focusing on improving their investment decisions that impact positively banks' performance. Beltratti and Stulz (2012) found that better-performing banks had less debt, *Leverage*, and lower returns before the crisis. Dupirea and Slagmulder (2019). Finally, the results of this paper concluded that major banks have the potential to employ capital to increase performance. Therefore, RG is an essential tool required to control risk.

8. CONCLUSION

To fulfil the study's objectives, the perspectives of banking professionals on whether the tools of RG mediate the relationship between risk, performance, and capital requirements of banks in Egypt are examined. In this context, our study contains the final sample of 131 observations based on data from 12 Egyptian listed banks (2010-2020).

The findings of the study mostly support the strength of Egyptian banks in RG. A lot of RG principles, such as stronger risk oversight at the board level, stronger risk accountability in senior management, the presence of CRO, the promotion of risk culture, and a clear understanding of risk appetite, have begun to be seriously implemented by Egypt's listed banks, as suggested by the Basel Committee on Banking Supervision (BIS, 2015) and CBE. It requires BOD, CRO, and senior management to identify, assess, control, or mitigate any major risks, as well as to determine their total capital requirements. This can be justified based on the Egyptian banks' well-structured RM and corporate governance, which includes an independent executive-level RM committee to which all business units report identified risks to

an independent financial expert known as CRO, who is responsible for the aggregation of all material risks and reports directly to BOD rather than CEO.

Similar to Ellul and Yerramilli (2013) findings for banks in European countries, Battaglia and Gallo (2015) findings for banks in Asia, and Nahar et al. (2016) findings for banks in Bangladesh. The current study revealed that banks in Egypt are somewhat efficient in their RG processes, implying that it is an efficient channel for improving bank performance. RG tools, on the other hand, have a negative correlation with capital requirements in Egypt. Indeed, sound RM does not necessarily imply low risk, since improved RM systems may motivate decision-makers to take higher risks to maximize profits (Stulz, 2016). However, the higher the risk the more critical RM tools are required (Chavarín, 2020; Erin et al., 2021). Thus, good RG should ensure that banks choose the optimal level of risk that maximizes shareholder value.

RM departments that identify, measure, monitor, report, and control key categories of risk, as well as proper board and senior management supervision, have been shown to considerably improve bank performance, especially market-based (*Tobin's Q*). This means that capital market investors have confidence in Egyptian listed banks since the majority of them are publicly owned, as indicated by the resource dependence theory. As a result, bank registration on EGX is a way for

them to raise extra funds, enhance investors' expectations of future cash flows, and boost their value. As a result, RG must be evident in the link between bank risk-taking and performance. Finally, RGI developed in this study is a qualitative, observable, and quantitative RG indicator that considerably assists regulators' effective oversight, protects shareholders' rights and interests, and supports investors in selecting a preferred bank.

Furthermore, the findings of this study are expected to assist policymakers in developing a structured and harmonized RG structure based primarily on independent and qualified committees and CRO. In terms of practical consequences, our results may help board members and risk managers balance risk and performance by enhancing RG practices within the capital regulatory framework. It may help financial institutions strengthen their survival and development capabilities, limit unexpected shocks, and concentrate on controlling both internal and external bank operations to avoid an institutional collapse.

Finally, future research might be conducted to assess several RG mechanisms, such as CRO compensation and risk appetite, as well as their influence on a bank's future profit and stability. Future studies might also focus on other financial institutions, such as insurance companies, or compare RG techniques used by Islamic and non-Islamic banks.

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