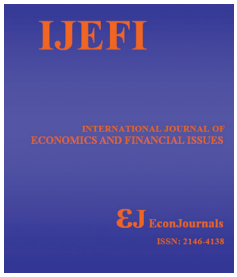

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Moderating Role of Board Size between the Board Characteristics and the Bank's Performance: Application of GMM

Ivy Eklemet*, Ibrahim Mohammed, Emmanuel Gyamera, Deborah Adu Twumwaah

University of Professional Studies, Accra, Ghana. *Email: eklemet.ivy@upsamail.edu.gh

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ABSTRACT

The paper examines the moderating role of board size between board characteristics and the bank's performance. The study collected data from 18 licensed banks in Ghana from 2012 to 2020, giving 180 observations for this study. The study adopted the System Generalized Method of Moments to assess the causal relationship between board characteristics and the bank's performance in Ghana. The generalized method of moments was adopted in this study to control the problems of endogeneity and unobserved heterogeneity issues. The findings show a significant relationship between board characteristics (non-executive directors, directors share ownership, and board gender diversity) and bank performance. The results also indicate that the board size moderates the positive relationship between board characteristics and the bank's performance. Nonetheless, the interaction effect was stronger for the director's share ownership than other board characteristics. The findings highlight that the board size moderates or enhances the relationship between board characteristics and the bank's performance. Therefore, board size is an essential criterion for promoting gender diversity and non-executive directors on the board. Based on the results, the study recommends strengthening the board with competent non-executive directors and female directors to enhance the independence and effectiveness of the board to prevent opportunistic behaviors of managers espoused through agency theory.

Keywords: Board Size, Bank's Performance, Non-executive Director, Board Gender Diversity
JEL Classifications: G21, G30, L25, O16

1. INTRODUCTION

The clamor for increased female representation in top management and boardroom has received tremendous attention in academia and the media. Fostering diversity on board has become a topical issue in public debates in recent times (Yang et al., 2019), especially on the issue of board gender diversity. According to Rao and Tilt (2016), the concept of diversity relates to the board composition and a varied combination of attributes, characteristics, and expertise contributed by individual directors to the board decision-making process. Proponents of board diversity argued from both agency theory and resource dependence theory. They opined that a well-diversified board should bring four main benefits to the firm: (a) information in the form of advice and counsel, (b) access to channels of information between the firm and external contingencies, (c) preferential access to resources and (d) legitimacy. Due to resource dependency theory, the last decade has seen an increased trend for appointing female and non-executive directors to boards in several countries to enhance the board's competence and independence (Huang and Kisgen, 2013). However, despite the increasing trend in appointing female directors to boards globally, the trend in appointing more female directors to boards is progressing slowly in Ghana compared with global trends.

A diverse board with different experiences, skills, gender, age, and qualification positively affects the quality of governance and indicates a well-run company. There are several reasons why it is perceived that gender diversity, especially at the board level, should have a positive effect on the firm's performance. Firstly, it

is based on the assumption that a heterogeneous board would better understand the customers in the marketplace and be able to fashion marketing policies and delineate specific gender. A heterogeneous board is particular to fashion consumer policies that would be gender inclusive, positively affecting the firm's performance. Secondly, a gender-diverse board may lead to a better corporate image and a higher firm performance. A firm obtains and sustains a competitive advantage over its competitors where it can project a positive image to the customers. Finally, board gender diversity policies ensure selection of a candidate for a position on the board is not skewed towards one gender but instead opened up to both genders.

Studies have shown that addressing gender parity and increasing participation of women on board and other decision-making positions play a significant role in institutional capacity building and add to the individual and the state's social-economic development. There are several benefits the gender diversity to the board: Firstly, women can contribute special skills and expertise that complement those of men when deliberating on issues and making decisions that affect the progress of the company. Secondly, a gender balance improves the effectiveness of the board. Finally, the board's gender diversity sends necessary signals to the long-term, risk-averse stakeholders - a signal based on female leadership style, such as being more conscientious in performing tasks and more risk-averse in investing their assets in the company. According to Loukil et al. (2020), the presence of women executives on the board raises transparency and disclosure and reduces asymmetric information. Mobb et al. (2021) supported this assertion and opined that informed women executives could reduce anomalous CEO payments and the probability of a financial restatement. This implies a selection process from a larger sample and is expected to lead to better performance for the firm.

Proponents of board gender diversity argue that intensifying board gender diversity in the boardroom can enhance the power of the boards to perform their control and strategic roles effectively (Kang et al., 2010). Several studies have been conducted on board characteristics and firms' performance, especially those involving board size and non-executive directors. However, studies involving board gender diversity, especially in developing economies like Ghana, are adequate. Even globally, studies done on board gender diversity have revealed mixed and uncertain outcomes, making it difficult for gender diversity in Ghana more complex. While some studies opined there exists a positive relationship between board gender diversity and the firm's performance (Gulamhussen and Santa, 2010; Erhardt et al., 2003; Farrell and Herch, 2005; Smith et al., 2005; Carter et al., 2003), others opined there is no relationship between board gender diversity, and the firm's performance or the relationship is insignificant (Shrader et al., 1997; Randoy et al., 2006; Wolfers, 2006; Campbell and Minguez-Vera, 2007). In contrast, these studies revealed a negative relationship (Wachudi and Mboya, 2009; Rose, 2007; Bohren and Stroom, 2007). Such inconsistent outcomes make it difficult to discuss gender diversity with the board based on economic rather than social perspectives.

The mixed outcome could be attributed to wrong estimation challenges often associated with violating regression assumptions involving ordinary least square and panel data estimation. Recent literature involving Wintoki et al. (2012), Tchamyou et al. (2019) opined that the previous firm's performance affects the current period's performance plus the error terms, which create endogeneity and unobserved heterogeneity challenges in regression. Therefore, I am motivated to use a dynamic panel data estimator (GMM), an estimation technique to improve upon possible potential biases of endogeneity and unobserved heterogeneity issues relating to lagged firms' performance identified in recent literature. The second motivation is to conduct advanced analysis to determine whether board gender diversity plays a moderating role between board characteristics and the firm's performance. This study would assess: (1) the direct effect of board characteristics, board gender diversity, and the firm's performance and (2) the indirect effect of the interaction term of board characteristics and board gender diversity, and the firm's performance. Finally, the interplay of board characteristics and board gender diversity and bank performance, especially in a developing country perspective like Ghana, has received very little attention on the role of board gender diversity in the interplay between board characteristics and bank performance, especially in a developing country perspective like Ghana. This study begins with a review of related literature in section 2 and is followed up with a methodology for section 3. Section 3 presents the methods employed to collect data for the study and their analysis. Section 4 presents the results and the attendant discussion of the research results. Finally, the study ends with some conclusions and limitations for the study.

2. LITERATURE REVIEW

This section reviewed recent and related literature on board characteristics and the bank's financial performance. The primary concern is exploiting board characteristics to enhance the bank's performance. The section is organized into two sub-sections: Theoretical review and empirical review.

2.1. Theory Review

The main theories that underpin the board characteristics and the bank's performance nexus are the agency theory and resources dependency theory. The most influential theories on organization theory and strategic management are used to appraise a successful bank's performance. Agency theorists assert that effectively monitoring the agent's (i.e., management) performance to minimize their interest is one of the board's core functions. In contrast, resource dependence theorists contend that the provision of resources is another of the board.

2.1.1. Agency theory

An agency problem arises with an imperfect alignment of interest between the principal and the agent. The theoretical literature of this study hinges on the Agency theory espoused by Jensen and Meckling (1976). Aifuwa et al. (2018) opined that agency theory explains the relationship between the principal (owners of a firm) and the agent (i.e., board of directors) and the challenges arising from the principal-agent relationship. The principal appoints the agent legally to make decisions and take actions on its behalf

but cannot monitor the agent's behavior. The separation of the principal "ownership" and the agent "control" in the principal-agent relationship creates the grounds for a potential conflict of interests between the two parties.

The agency theory's the main core is information asymmetry, adverse selection, and moral hazard, in that order. Managers create information asymmetry to make the decisions that best suit their interests rather collective interest of the owners and the firm. Agency scholars advocate for independent boards to control agency problems inherent within the agent-principal relationship. According to McColgan (2001), the agency problem can be reduced with the help of corporate governance mechanisms. Corporate governance experts have argued for establishing an effective board of directors to monitor management's interests and protect the owners' interests due to the problems of separation and ownership between principals and agents.

Agency theorists argued for an independent board to curtail the agency conflict or problem associated with the agent-principal relationship. Similarly, Jensen and Meckling (1976) asserted that the board characteristics should provide the governance mechanisms that can minimize the conflict of interests on the management part by setting up an independent board to reduce the agency problem arising from the separation of ownership and management of a firm's resources.

Hillman and Daiziel (2003) state that a board of directors monitors management on shareholders' behalf and provides management advice and counsel. The monitoring function of the board is often described as the "control" role (Boyd, 1990; Zahra and Pearce, 1989).

An independent board is a team of directors with complementary skill sets that allows the board to work together with management to implement the most effective decisions for the firm. Several studies have used agency theory as a basis for the board composition to be independent and effective (Dalton et al., 2007; Johnson et al., 1996; Zahra and Pearce, 1989). At the same time, an effective board should add value to the firm. It should be composed of a mixture of strengths from the directors on the board. For example, the board may have at least one director with experience in finance and accounting, at least one with experience in sales and marketing, at least one with experience in general management, and at least one with expertise within the industry in which the firm is operating.

Therefore, from the agency theory perspective, the board's composition should thrive as an independent and effective board. There should be a blend between the executive and non-executive directors on the board, and the selection criteria should be competent and heterogeneous based on gender.

2.1.2. Resource stakeholder theory

The resource dependency theory was introduced by Salancik and Pfeffer (1978) and was used to explain how external resources can affect organizational behavior. The theory stresses that the changes in the firm's experience is due to how they negotiate with its external environment to secure access to the resources they need to succeed. The theory recognizes the influence of external forces on organizational behavior and acknowledges that these external forces constrain the organization. Therefore, successful firms attained control over their external environment. It is critical in strategic management that the board's composition be done to control their environment or minimize the threat from the external environment. A successful board requires directors to be appointed based on their networks, qualification, experience, and skill. Therefore, resource dependence theorists argued that the composition should be based on competence to enhance the board's effectiveness in exercising management. Again, Hillman et al., 2007) asserted that firms with specific external dependencies are likelier to have female directors on their boards. Firms need to continuously monitor their opportunities and threats by their market dynamics and balance power to ensure that the flow of resources is maintained. Therefore, bringing non-executive and female directors on the board is seen as a strategic partnership to increase the operational and financial performance of the firm. Therefore, the issue of board size and composition are not random but independent factors based on what the directors can contribute to the effective board.

Resource dependency scholars opined that firms that can attract influential directors in the form of non-executive directors could acquire critical resources from the environment. They argued for the selection of non-executive and female inclusion directors to the board based on competence, experience, and skills that can resource the board strategically to enhance the independence or effectiveness of the board. Most empirical literature asserts that a well-composed board positively affects a firm's performance (Bhagat and Black, 1999). Therefore, excluding competent persons from the board based on one gender would hinder the firm's success. A board should help control the firm's resources and provide effective communication between management and ownership (Nkundabanyanga et al., 2015), and monitor the performance of management.

2.2. Conceptual Theory and Hypotheses Development

This subsection linked the two leading theories to the board characteristics and the conceptual design for this study. This section is organized into direct and indirect effects of the board's characteristics and the firm's performance.

2.2.1. Direct effect between board characteristics and the firm's performance (i.e., without a moderator)

There are two main theories underlying the concept of board characteristics. These are Agency theory and resource dependency theory. Agency theory stresses that the board should be independent and competent in monitoring managerial performance. It implied there must be diversity in the board composition. It means the board should be the "watchdog" to curb opportunistic behaviors of management entrusted with the firm's resources. According to agency theory, agents (i.e., management) are opportunistic. They are strongly motivated to profit from information asymmetry between the agents (i.e., management) and principal (i.e., owners) of the firm (Jensen and Meckling, 1976). Against this premise, agency scholars suggest that the primary task of the board is to

safeguard the owners' interest from the agent's (i.e., management) misappropriation (Shleifer and Vishny, 1997). Therefore, the board composition must be diverse enough to perform its mandate. Resource dependency theory stresses the importance of bringing resourceful directors to the board to enhance the firm performance. For the directors to be able to advise, counsel, and monitor the performance of the management, the board should pull competent directors from diverse backgrounds, including female directors. Therefore, the board of directors should actively evaluate and select strategic alternatives developed by top management and provide suggestions that improve the quality of strategic decision-making. A board characterized as practical should control the firm's performance, monitor the activities performed by the firm, and assess the CEO's behavior. There are three main board characteristics used in this study: the number of non-executive directors (NED) on the board, directors share ownership (D_Own), and board gender diversity (BGD). These characteristics are discussed, and appropriate hypotheses are developed for each.

Non-executive directors (NED) on the board: According to agency theory, non-executive directors (NED) play a key role in monitoring management performance. From the agency theory perspective, an effective board should exhibit board independence, diversity of skills, experience, and gender, and increasing representation of non-executive directors (NED) to monitor the management effectively. Therefore, the person selected on the board is a critical factor for the firm's success from the perspective of resource dependency theory and agency theory. Agency theorists opined that non-executive directors enhance the board's independence to monitor the management performance and add value to the fiduciary responsibilities (Jensen and Meckling, 1976). Therefore, having more non-executive directors on the board would improve the board's monitoring activities. Therefore, this study expects that more non-executive directors on the board would enhance the bank's performance. Resource dependence theorists opined that non-executive directors should be selected based on expertise, knowledge, and external networks (Wang and Hussainey, 2013). Previous studies opined a positive association between a non-executive director and the firm's performance (Abor and Biekpe, 2007; Chen and Zhou, 2007; Lo et al., 2010; Wang and Hussainey, 2013). This leads the study to hypothesize that:

H01: There is no significant relationship between non-executive directors (NED) and the bank's performance (BP) for this study.

Director shares ownership (D_Own): Agency theorist asserts that director ownership strengthens the monitoring role entrusted to the board. Brickley et al. (1988) argue that director's share ownership gives them an additional incentive to ensure that the firm runs effectively and efficiently and can monitor management properly since they have a particular interest in the firm's performance and would act in the best interest to protect shareholders' values since they are also at the board level. We expect a positive association between the director's share ownership and the bank's performance (Bebchuk et al., 2002; Palia and Lichtenberg, 1999; Becht et al., 2005). This leads the study to hypothesize that:

H02: There is no significant relationship between directors' share ownership (D_Own) and the bank's performance for this study.

Board gender diversity (BGD): Resource dependency theorists argued that women are more oriented towards social problems. Therefore, their inclusion on the board is inclined to solve social issues in the external environment. Increasing female participation in the boardroom would benefit decision-making with heterogeneous ideas and values, which may improve the decision-making process's effectiveness (Nielsen and Huse, 2010). The proponent of increasing board gender diversity (BGD) opined that women have greater sensitivity, can sustain issues, and are more able to comply with ethical values than their male counterparts (Ibrahim et al., 2009). Again, women are more committed to socially responsible conduct (Ibrahim et al., 2009; Lagasio Cucari, 2019; Nadeem et al., 2017). Most studies on the relationship between board gender diversity and a firm's performance revealed mixed and ambitious outcomes. These scholars conclude there was a positive association between board gender diversity and the firm's performance (Gulamhussen and Santa, 2010; Erhardt et al., 2003; Catalyst, 2004; Smith et al., 2006), those reported a negative association between board gender diversity and the firm's performance (Wachudi and Mboya, 2009; Rose, 2007; Bohren and Stroom, 2007) and no significant relationship (Kochen et al., 2003; Shrader et al., 1997; Randoy et al., 2006). This leads the study to hypothesize that:

H02: There is no significant relationship between board gender diversity (BGD) and the bank's performance for this study.

2.2.2. Indirect effect of board characteristics and the firm's performance (i.e., through a moderator)

Available literature revealed a mixed and uncertain relationship between board size and the firm's performance. Many scholars have questioned the positive relationship between the board size and the firm's financial performance and opined that the relationship needs to be more complex and requested a better explanation of the relationship (Hillman et al., 2009). The right board size has been in contention; while some argue for smaller board sizes, others favor larger board sizes (Eisenberg et al., 1989); other scholars support a large board size (Singh and Harianto, 1989; Adams and Mehran, 2003). These different positions on board size have resulted in many conflicting outcomes between board size and firm performance. Theoretically, based on the resource dependency perspective, board size is not an end to itself but rather a means to an end. Therefore, board size should reflect the firm's complexity and the sectors involved. A firm involved in many sectors should have a large board diversified to provide practical advice, whereas a firm that is simple and only in some sectors should have a small board. Large board sizes should be well-diversified with different backgrounds (Coles et al., 2008; Boone et al., 2007). A large board can accommodate diverse directors in terms of gender, qualification, experience, etc., while a small board size is mainly for the shareholders' interest without much diversification. A proponent's right composition of the board argues that it should improve its effectiveness and reduce CEO dominance on the board, thereby making it difficult to adopt a "golden parachute contract," which often is not in the best interest

of the shareholders' interest. It implies that board size depends on board characteristics and the firm performance.

Another concern is the relationship between board size and the firm's performance. Some studies opined there is a positive association between board size and firm performance (Dwivedi and Jain, 2005; Abor and Biekpe, 2007; Kiel and Nicholson, 2003), while others opined there is a negative association between board size and firm performance (Eisenberg et al., 1998; Nguyen et al., 2015; Srivastava, 2015) and those that opined there is no relationship or insignificant relationship between board size and the firm performance (Adams and Mehran, 2015; Belkhir, 2009; Zulkafli and Samad, 2007; Darko et al., 2016; Mak and Kusandi, 2005). Board size is not an end, but a means to an end. Therefore, a large board can attract outside directors in the form of non-executive and female directors to handle complex and large firms. Therefore, the board size moderates the relationship between the board's characteristics and the firm's performance. A moderator is a third variable that changes the relationship between the dependent and independent variables. The role of the board size in the study is to enhance or strain the relationship between the board characteristics and the firm's performance through interaction regression analysis. This leads the study to hypothesize three null hypotheses to assess the moderating role of the board size between board characteristics (NED, D_Own, and BGD) and the bank's performance in this study.

H04: Board size does not moderate the relationship between a non-executive director and the bank's performance.

H05: Board size does not moderate the relationship between directors' share ownership (D_Own) and the bank's performance.

H06: Board size does not moderate the relationship between board gender diversity (BGD) and the bank's performance.

3. METHODOLOGY

This study is empirical research involving a quantitative method to collect secondary data to measure phenomena and test research hypotheses (Moyo and Munoriyarwa, 2021). The study focused on 20 of the 23 licensed banks from the Bank of Ghana. A purposive sampling methodology was adapted to select banks that have operated within the ten-period understudy. The study used a dynamic panel data estimator, the Generalized Method of Moments (GMM), to assess the relationship between the variables. Secondary data is extracted from the published financial statements from these 20 licensed banks from 2012 to 2021 and organized into dependent, independent, and control variables for the analysis. The study employed descriptive statistics, correlational analysis, collinearity, and panel data regression as the data analytical tools for this study. The analysis is done using STATA (version 15) as the data analysis software for this study.

3.1. Research Variables

Three research variables are used in this study: Dependent variable, independent variables, and control variables. A dependent variable, four independent variables, and two control variables were used to test the research hypotheses on the effect of board characteristics and the bank's performance nexus in Ghana.

3.1.1. Dependent variable (i.e., NIM)

3.1.1.1. Net interest margin (NIM)

NIM is the dependent variable used to operationalize bank's performance of banks. NIM is calculated as the ratio between received and paid interests, all over total assets. The ratio measures the margin a bank makes on its core business of the bank. The researchers used NIM as a proxy for measuring the efficiency in the banking sector. For formula for calculating NIM is expressed in equation (1):

$$NIM = \frac{Int.Rec. - Int.Paid}{Totalassets} \quad (1)$$

3.1.2. Independent variables (i.e., NED, D_Own, and BGD)

Corporate governance variables are independent variables used to determine the effect on firms' market value. The three corporate governance variables used are FED, Bsize, and NED.

3.1.2.1. Non-executive directors (NED)

A high number of independent directors on the board represent the board independently. Board independence advocates argue for more independent directors to enhance the board's monitoring activities. The proxy for measuring the NED is the number of non-executive directors on the board, similar to these studies (Chen et al., 2017; Naciti., 2019; Nyamongo and Temesgen, 2013).

NED = No of non-executive/No of directors on the board (2)

3.1.2.2. Director Ownership (D_Own)

Director Ownership (D_Own) is described as the situation where directors own shares in the firm. The proxy for measuring D_Own is the percentage of the shares owned by directors to the total number of shares outstanding at the end of the year. This is a highly disputed issue in corporate governance literature (Shleifer and Vishny, 1997; Sheu and Yang, 2005; Becht et al., 2005).

3.1.2.3. Board gender (BG)

Board Diversity (BG) is a structure that combines different qualities and expertise to affect the board's decision-making process. The proponent of board gender diversity argued that women are more oriented toward social problems and, therefore, are inclined to use social reasoning, which allows them to establish good relationships and respond to the needs of others. We expect board gender diversity should be positively associated with performance (Orji, 2010; Jaffe and Hyde, 2000). The proxy for measuring the BG is the number of female directors on the board (Byoun et al., 2016; Liu et al., 2014).

3.1.3. Moderating variables (i.e., Bsize)

Hillman et al., (2009) opined that an intervening variable exists in the relationship between board characteristics and firm performance. The intervening variable enhances or strains between board characteristics and the firm performance. A large board size enables the board composition to bring in more non-executive and female directors to enhance the independence and effectiveness

of the board. The large board size can accommodate diversity regarding non-executive directors, female directors, experiences, etc. Therefore, a large board size should enhance the board's effectiveness, while a small board size would strain the board's effectiveness.

In contrast, a small board strains the ability to appoint more non-executive and female directors to the board. Therefore, board size is conditional as an independent or effective board. Many studies on the relationship between board size and the firm's performance were mixed and needed more consensus. These studies found a positive relationship between board size and firm performance (Dwivedi and Jain, 2005; Abor and Biekpe, 2007; Kiev and Nicholson, 2003); other studies found a negative relationship (Eisenberg et al., 1998; Nguyen et al., 2015; Srivastava, 2015). These studies found an insignificant relationship between the board size and the firm's performance (Darko et al., 2016; Rouf, 2012; Mak and Kusandi, 2005; Sanda et al., 2005). Therefore, in this study, there is a paradigm shift from using board size as an independent variable to moderating variable since most of the board characteristics are conditional on the board size. A conditional or indirect analysis requires a much more profound analysis that explains better and clarifies the inconsistency between theory and empirical deviations. Therefore, the board size is used as a moderator variable to enhance or strain the relationship between the board characteristics and the firm performance. Therefore, the study includes board size to either enhance the board characteristics or strain the board characteristics as a moderating variable in model (1) to assess the relationship. The proxy for measuring the Bsize is the number of board members for firm.

Bsize = Number of board members (3)

3.1.4. Control variables (i.e., growth and debt ratio)

In order to identify the specific effect of board characteristics on the bank's performance, firm size, and growth were controlled in this study. Control variables affect dependent and independent variables; if not, control affects the study's outcome. The control variables used in this study are firm size and growth. According to Kiel and Nicholson (2003), firm size and growth co-vary with many board characteristics and firm performance nexus.

3.1.4.1. Bank size (size)

Size determines whether the bank is either economy of scale or diseconomies of scale in this study. Boone et al. (2007) asserted that as the firm size becomes more extensive and more diversified, the board size increases; therefore, more corporate advice and counsel are needed from the board. We expect the firm size to be positively associated with board characteristics and the bank's performance (Lehn et al., 2004; Abbasi Malik, 2015). As the bank size increases, the bank performance also increases significantly in the case of small and medium-sized banks in the banking sectors. The proxy for size is measured as the logarithm of the bank's total assets. The logarithm helps get the bank's total assets due to its capability to standardize values, thus bringing them to the same platform for more efficient analysis.

3.1.4.2.Growth

Growth represents the rate of growth of the firm. A growing firm can generate enough revenue to finance its operation and vice versa. A growing firm tends to contribute positively to the firm's performance and vice versa. Pandey (2008) concluded that growth positively correlates with a firm's performance. Park and Jang (2014) measured the growth using the current year's sales minus last year's sales divided by last year's sales and expressed it as a percentage change in annual sales. We

Growth = (Current year's NIM–Previous year's NIM)/Previous year's NIM (4)

3.2. Model Specification

Given the paucity of data, especially in most developing economies, panel data comes in handy in resolving the issue of data scarcity. Panel data can resolve the problems of omitted variables and unobserved heterogeneity issues usually associated with either pure cross-sectional data or pure time-series data. Panel data pools observations from a cross-sectional unit over several periods to facilitate the investigation of an effect that is not detectable in pure cross-sections or pure time-series studies. The panel regression equation differs from the regular time-series or cross-section regression by the double and addresses data scarcity, especially in developing countries. The general form of the panel data model can be specified as follows:

$$Y_{it} = \alpha + \beta X_{it} + \varepsilon_{it} \quad (5)$$

The subscript I represents the cross-sectional dimension, and t represents the time-series dimension. The coefficients of the explanatory factors are signified by β, and ε is the error term. *Y* represents bank profitability (dependent variables), and X denotes the independent variables. However, using panel data comes with endogeneity concerns caused by a correlation between the independent variable and the error terms. According to Clougherty, Duso and Muck (2016), estimation based on a panel data model may sometimes yield inconsistent estimates due to endogeneity concerns. Extensive pieces of literature in recent times have argued that the previous performance of a firm affects the current performance, and the levels of effect depend upon the previous period(s) dependent variable plus the error terms (Asongu and Minkoua, 2018; Tchamyou, 2019; Wintoki et al., 2012). Most studies assumed that the independent variable X_{it} and the error term ε_{it} are uncorrelated (i.e., exogeneity), and therefore, anytime this assumption is violated, that is when there is the correlation between the independent variable X_{it} and the error term ε_{it}, then there is endogeneity problem. Endogeneity may result in unobserved individual heterogeneity, which would cause the study's outcome to be disputed. Many studies have introduced a lag of the dependent variable as a consideration for the time persistence of performance to resolve this challenge. Arellano and Bover (1995) and Blundell and Bond (1998) developed the System Generalized Method of Moments (SGMM) to account for both the endogeneity and the unobserved heterogeneity issues in the panel data. Hence, equation (5) is modified into the GMM model as equation (6):

$$Y_{it} = \alpha + \Phi Y_{it-1} + \beta' X_{it} + v_t + \mu_t + \eta_t + \varepsilon_{it} \quad (6)$$

This study adopted and preferred GMM estimator for this analysis for two reasons:(1) GMM is best suited for analysis when the cross-section (N) is greater than the time of each sample selected for the analysis (i.e., N>T); otherwise, asymptotic imprecision may occur, or bias may arise. Secondly, the GMM estimator is tailored to incorporate the concerns of endogeneity; that is, the internal instrumentation process is engaged to control for the reverse causality and time-invariant fixed effect to control the unobserved heterogeneity concerns. Therefore, the empirical model specification for this study is expressed as equation (7):

$$\begin{aligned} NIM_{it} = {} & \alpha_0 + \alpha_1 MIN_{it-1} + \alpha_2 \left(NED\right)_{it} + \alpha_3 \left(D\_Own\right)_{it} + \\ & \alpha_4 \left(BGD\right)_{it} + \alpha_5 \left(Bsize\right)_{it} + \alpha_6 \left(Bsize * NED\right)_{it} + \\ & \alpha_7 \left(Bsize * D\_Own\right)_{it} + \alpha_8 \left(Bsize * BGD\right)_{it} + \\ & v + \mu_t + \eta_t + \varepsilon_{it} \end{aligned} \quad (7)$$

Where NIM is the proxy for the financial performance of the banks at the cross-section of i and year t, α_0 is the constant, and α_1 to α_8 are unknown coefficients to be estimated. The model controls for unobserved firm heterogeneity, (v_i) firm-fixed effects, (μ_t) the time-specific effects, and (η_t) that are time-variant and common to all banks, such as the effect of growth and bank size. Finally, ε_{it} represents the classical error term assumed to be independent and identically distributed.

4. RESULTS AND DISCUSSION

This section presented the results of the main aim of this study and followed up the discussion of the results. The section is divided into four main subsections: Descriptive statistics, Pearson correlation analysis, Hausman test specification test, and the panel regression result.

4.1. Descriptive Statistics

Descriptive statistics describe the basic features of the data to be used for the analysis. It used numerical or graphical methods to look for patterns in a data set. It helps to analyze the quantitative data conveniently. Descriptive statistics summarize the information in a dataset more conveniently. The data is summarized into mean, standard deviation, minimum, maximum, skewness, kurtosis, and jarque-berra as a precursor to inferential statistical analysis. The means help identify any possible irregularities before inferential statistics, while the standard deviation discloses the dispersion from the mean or the observation.

Table 1 shows the descriptive statistics for the variables used for the analysis. It begins with the means in the second column. The means help identify any possible irregularities before inferential statistics, while the standard deviation discloses the dispersion from the mean or the observation. The means for NIM, NED, D_Own, BGD, Bsize, Growth, and Size were 0.203, 6.919, 1.960, 0.026, 9.363, 0.258, and 16.096, respectively, for the ten-year understudy. The bank's performance (i.e., NIM) ranges from (0.432) to 0.492, with a mean of 0.203, indicating banks' financial performance of 20.3% for the period under-study. This indicates a good and appreciable bank performance. Table 1 reveals that the mean for the non-executive directors is approximately seven, with a maximum of 11 non-executive directors on the board. However, the minimum of three non-executive directors can cause worry that more outsiders should be brought to the board to enhance the board's independence. The average of female directors on the board was approximately 2, with a maximum of five female directors and a minimum of zero female directors on the board. This indicates that the boards of the banks do not have a critical mass of female directors that can have an optimal effect on the bank's performance, which is corroborated by (Liu et al., 2014). The data revealed that the highest female representation occurred in 2019 for Fidelity. Coincidentally, it happened when the board was the lowest seven-member board, and the NIM was at its highest. In contrast, the minimum female participation of zero happened to be at Republic Bank for 4-year continuously, from 2017 to 2020 but did not relate to the worst performance of the bank for the bank. Further evidence is needed to conclude the relationship between female directors and the bank's performance. Similarly, the sample mean for the board size is 9.363, with a maximum board size of 15 and the minimum size of six.

The standard deviation measures the spread of the variables and reveals how close or dispersed the variables are from the means of the dataset. The standard deviation for NIM, NED, D_Own, BGD, Bsize, Growth, and Size were 0.0.149, 1.822, 0.059, 1.009, 1.715, 0.314, and 2.242, respectively. This implies the standard is low and clusters around the mean. A low standard deviation shows reliable data for the estimation. It shows that the Bsize is the most volatile, followed by NED for the period under study, while FED is the least volatile of the variables for this study. It implies that board characteristics are very fluid and keep changing within the period under study.

Furthermore, Table 2 provides information on the skewness and kurtosis of the variables. The measures of skewness and kurtosis are used to determine if the dataset met the assumption of normality (Kline, 2011). The acceptable skewness values should be between −2 and +2, and the kurtosis should be between −7 and +7 when assessing normality in regression (Byrne, 2010; George and Mallery, 2010). The result shows that NIM, Bsize, NED, BGD, Growth, and Size exhibit a positive skewness and are closer to zero. A positive skewness implies that the dataset is positively skewed and that the right tail is longer than the left. Therefore, the skewness for NIM, Bsize, NED, BGD, Growth, and Size is approximately symmetrical. The kurtosis for NIM, NED, D_Own, BGD, Bsize, Growth, and Size was 2.333, 2.133, 2.160, 2.098, 2.178, 2.242, and 2.537, respectively. The kurtosis values of the variables are closer to 3, implying the normal distribution. A kurtosis of value lowers than three corresponds to a broadening of the peak and "thickening" of the tails. Therefore, it is platycurtic as it mirrors a normal distribution. Therefore, the null hypothesis of the Jarque-Bera test shows that the distribution is normal since the P-values are significant (i.e., P > 5%).

4.2. Pearson Correlation Analysis

This sub-section used Pearson correlation to assess the association between the variables. Pearson correlation uses the

coefficient index (r) to determine the strength of the relationship between the dependent and independent variables, with r ranging from −1 to +1. Using the correlation matrix ensures a relationship between dependent and independent variables and confirms an absence of multicollinearity problems among the independent variables. The result from the Person correlation analysis is presented in Table 2.

Table 2 shows that the correlation index (r) between NED, D_Own, BGD, Bsize, Growth, Size, and NIM are 0.692, 0.498, 0.421, 0.587, 0.532, and 0.602, respectively. It implies there is a significant and positive association between board characteristics and the bank's performance. Again, Table 2 revealed that the correlation between independent and dependent variables was high. However, a correlation between the independent variables was not high enough to violate the multicollinearity assumption. This implies that there is a correlation between tax revenue and economic growth. The table revealed that the P-values for these variables are below 5% (i.e., $P < 0.05$). According to Gujarati (2004), when the pairwise correlation coefficient between two independent variables is over 0.95, multicollinearity is a severe problem for the study. The existence of multicollinearity would not affect how the regression is performed but rather the interpretation (Anderson et al., 2009).

The second reason for performing Person correlational analysis is to identify traces of multicollinearity problems may cause a wrong interpretation of the outcomes for this study. A multicolliinearity test is important because it is used to ascertain whether the independent variables correlate. All things being equal, the desired outcome prior to regression analysis shows that none of the independent variables have a correlation coefficient >0.70. Again, the Variance Inflation Factor (VIF) and the tolerance level (TL) are the indices used to detect multicollinearity challenges among the independent variables used for the regression. Chatterjee and Hadi (2012) opined that when the VIF index is >10.0 and the TL index is lower than 0.10 indicates problem of multicollinearity with the regression analysis. The result of the VIF and TL index are presented in Table 3.

It is evidenced in Table 3 that VIF indexes for the variables were lower than 10.0, which confirms there is no multicollinearity problem in any of the variables, and the TL indexes were also above 0.10 (Tabachnick and Fidell, 1996; Hair et al., 2014). The highest tolerance was 0.472, far above the recommended tolerance level of 0.10. The result suggests that multicollinearity is not a concern when explaining the regression results. According to RayKov and Marcoulides (2006) and Anderson et al. (2009), multicollinearity would not affect how the regression is performed but instead affect the interpretation of the result.

Table 1: Descriptive statistics

Variable	Mean	S. Dev.	Max	Min	Skew	Kurtosis	JB	P-value
NIM	0.203	0.149	0.492	(0.432)	0.144	2.333	18.413	0.000
NED	6.919	1.822	11	3	0.166	2.133	19.409	0.000
D_Own	0.026	0.059	0.293	0	0.086	2.16	19.570	0.001
BGD	1.960	1.009	5	0	0.082	2.098	18.450	0.000
Bsize	9.363	1.715	15.000	6.000	0.091	2.178	9.363	0.002
Growth	0.258	0.314	1.177	(0.884)	0.110	2.242	16.910	0.000
Size	16.096	2.242	22.417	13.297	0.078	2.537	21.536	0.000

Source: Author's Stata version 15 Computation

Table 2: Correlation matrix

Variables	NIM	NED	D_Own	BGD	Bsize	Growth	Size
NIM							
Pearson Corr.	1.000						
Sig. (2-tailed)	….						
NED							
Pearson Corr.	0.692	1.000					
Sig. (2-tailed)	0.000	….					
D_Own							
Pearson Corr.	0.498	0.337	0.498				
Sig. (2-tailed)	0.000	0.003	0.000				
BGD							
Pearson Corr.	0.421	0.206	0.498	1.000			
Sig. (2-tailed)	0.009	0.000	0.000	….			
Bsize							
Pearson Corr.	0.587	0.454	0.498	0.359	1.000		
Sig. (2-tailed)	0.000	0.000	0.000	0.000	….		
Growth							
Pearson Corr.	0.532	0.219	0.498	0.210	0.368	1.000	
Sig. (2-tailed)	0.003	0.001	0.000	0.000	0.000	….	
Size							
Pearson Corr.	0.602	0.520	0.498	0.208	0.341	0.240	1.000
Sig. (2-tailed)	0.004	0.000	0.000	0.004	0.002	0.011	….

Source: Author's Stata version 15 Computation

4.3. Multivariate Regression Results

This sub-section presents the regression analysis based on the GMM estimator used to assess the direct and indirect relationship between the board characteristics, female directors, and the bank's performance. A regression analysis is an inferential statistic used to determine whether the relationship observed in the sample is similar to that of the larger population.

4.3.1. Econometric techniques for efficient estimation

First, we compare the Pooled OLS and fixed effect estimators' outcomes. It is essential to decide between Special GMM (SGMM) and Difference (GMM) as the most suitable estimator for this study. The outcomes are presented in Table 4.

The results revealed that models (1) to (4) should be analyzed using SGMM, as shown in Table 4. Table 4 shows that the value ∅ is 0.352 for the Pooled OLS and is considered the upper-bound estimate, while the value ∅ in te fixed effect estimator was 0.233, which is considered the lower-bound estimate. The rule-of-thumb for selecting between DGMM and SGMM recommended by Bond (2001) asserts that if the DGMM obtained, in this case, 0.058, it is close to or below the fixed effect estimator. It suggests that the estimate is downward biased because of weak instrumentation; therefore, SGMM should be preferred for this analysis. We settle for SGMM as the most suitable estimator, and it is likely to produce reasonable estimates, at least better than the Pooled OLS and fixed effect estimator.

4.3.2. GMM regression results

This sub-section aims to assess both the direct and indirect relationship between board characteristics and the bank's performance and results presented as a model (1) to model (4) in Table 5. Table 5 presents the estimated coefficients and the standard errors (in parenthesis) along with the significance levels of the coefficients. Model (1) is the baseline or the result of the direct relationship between board characteristics and the bank's performance (i.e., without the moderator), and models (2) to (4) are the interaction model or the result of the indirect relationship between board characteristics and the bank's performance (i.e., with the moderator: Board size). The analysis was conducted two-stepwise to assess the effect of the moderator between the board's characteristics and the bank's performance. The analysis was conducted stepwise to assess the effect of the moderator between the board characteristics and the bank's performance. Again, in all situations, the study used to size and growth as the control variables in this analysis.

Table 5 presents the coefficients estimates and the standard errors, t-statistics, and P-values for the variables from the SGMM regression used in this analysis. It is worth noting that the Wald Chi-squared statistics, AR (2) tests, and Sargan tests were jointly used to assess the overall fitness of the SGMM estimator as the most suitable for the analysis. The P-values for AR (2) were 0.246 and 0.213 for direct and indirect effects, respectively. It indicates no second-order autocorrelation at the 5% significance level at AR (2) test. Secondly, the result of the Sargan test revealed that the instruments used for the analysis were valid and not over-identified. Therefore, the model has not violated the econometrics diagnostics assumptions, and therefore, the models are stable and rightly specified to conjecture inferences from the results.

Table 5 shows that the coefficients of the board characteristics represented by the non-executive director (NED) and broad gender diversity (BGD) were positive and statistically significant with the

Table 3: Variance inflation factor (VIF) and the Tolerance level (TL) indexes

Variables	VIF level	Tolerance (i.e., 1/VIF)
NIM	2.957	0.338
NED	2.617	0.382
D_Own	4.299	0.233
BGD	3.082	0.324
Bsize	3.257	0.307
Growth	2.945	0.340
Size	2.006	0.499
Mean VIF	3.023	

Source: Author's Stata version 15 Computation

Table 4: Decision to select between SGMM and DGMM

	Pooled OLS	Fixed Effect	DGMM	Recommendation
Mode (1) NIM_{it}	0.352	0.233	0.058	SGMM

Source: Author's Stata version 15 Computation

Table 5: GMM regression results

	Direct Analysis	Indirect Analysis		
	Model (1)	Model (2)	Model (3)	Model (4)
NIM_{t-1}	0.238***	0.226***	0.197	0.213
	(0.116)	(0.078)	(0.085)	(0.066)
NED	0.353***	0.398***	0.304 ***	0.324***
	(0.127)	(0.168)	(0.103)	(0.111)
D_Own	0.243*	0.256***	0.212***	0.218***
	(0.092)	(0.073)	(0.092)	(0.073)
BGD	0.248**	0.278**	0.264	0.252
	(0.063)	(0.094)	(0.071)	(0.088)
BSIZE	0.514*	0.558***	0.514	0.533
	(0.230)	(0.212)	(0.141)	(0.197)
Growth	0.194**	0.162**	0.121	0.144
	(0.059)	(0.060)	(0.053)	(0.140)
Size	0.166	0.144	0.137	0.141
	(0.078)	(0.041)	(0.041)	(0.197)
BSize*NED		0.127***		
		(0.049)		
BSize*D_Own			0.144***	
			(0.059)	
BSize*BGD				0.204***
				(0.063)
Constant	(0.174)	(0.296)	0.213	(0.077)
	(0.206)	(0.203)	(0.077)	(0.156)
Firm-fixed effect	Yes	Yes	Yes	Yes
Time-fixed effect	Yes	Yes	Yes	Yes
Wald Chi-squared statistics	533.74	560.74	545.73	555.15
P-value	0.000	0.000	0.000	0.000
Sargan test	54.41	79.42	66.81	56.49
P-value	0.112	0.213	0.097	0.233
AR (2)	19.71	23.22	26.03	32.01
P-value	0.246	0.213	0.237	0.209

Standard errors in parentheses ***P<0.01, **P<0.05, and *P<0.1. Source: Author's Stata version 15 Computation

bank's financial performance at 5% level of significance, except the directors' share ownership (D_Own) that is only marginally significance at 10% level of significance. The coefficient of and the P-value of non-executive directors (NED) revealed a positive association with the bank's performance ($\beta = 0.353$; $P < 0.05$) under model (1), that is, the direct effect analysis. Since the $P < 0.05$ or 5% significance, we conclude that the non-executive director positively and significantly affects the bank's performance. This outcome is consistent with agency theory and previous studies (Chen et al., 2017; Jiang et al., 2020; Naciti, 2019; Nyamongo and Temesgen, 2013) that concluded that non-executive directors affect a firm's performance positively. Similarly, agency theory opined that non-executive directors enhance the board's independence to monitor the management performance and add value to the fiduciary responsibilities (Jensen and Meckling, 1976). Therefore, based on the result in Table 5 and the explanations, the study failed to reject the null hypothesis (H01) and concludes that non-executive directors (NED) have a significant relationship or affect the bank's performance.

Secondly, the coefficient and the P-value of directors' share ownership (D_Own) showed a positive association with the bank's performance ($\beta = 0.243$; $P < 0.10$) under model (1) or the direct effect analysis. It implied that the association between directors' share ownership and the bank's performance is only marginal significance at 10%. This outcome is inconsistent with previous studies (Bebchuk et al., 2002; Lichtenberg, 1999; Becht et al., 2005) that concluded that directors' ownership is positively and significantly associated with a firm's performance. Therefore, based on the result in Table 5 and the explanations, the study rejects the null hypothesis (H02) and concludes that there is a statistically significant association between directors' share ownership and bank performance in Ghana.

Again, the coefficient and the P-value of board gender diversity (BGD) showed a positive and significant associated with the bank's performance ($\beta = 0.248$; $p < 0.05$) under model (1) or the direct effect analysis. Since the $P < 0.05$ or 5% significance, we conclude that board gender diversity positively and significantly affects the bank's performance. This outcome is consistent with resource dependency theory and previous studies (Gulamhussen and Santa, 2010; Erhardt et al., 2003; Catalyst, 2004; Smith et al., 2006). Therefore, based on the result in Table 5 and the explanations, the study failed to reject the null hypothesis (H03) and concludes that board gender diversity (BGD) is significant and positively associated with a bank's performance.

Finally, the study examined the effect of board size as a control variable in the baseline model (1) and observed that the coefficient and P-value of the board size and the bank's performance showed a positive and insignificant association of the bank's performance ($\beta = 0.248$; $P < 0.10$). However, the coefficient and P-values remained positive and significant after introducing the moderator variable in the model (2) to (4). This outcome has no significant relationship and is consistent with previous studies that opined there is no association between board size and a firm's performance (Adams and Mehran, 2015; Belkhir, 2009; Busta, 2007; Zulkafli and Samad, 2007). However, this is consistent with previous studies that opined a positive association between board size and firm performance (Dwivedi and Jain, 2005; Abor and Biekpe, 2007; Kiel and Nicholson, 2003). This inconsistent outcome in the literature calls for deeper regression analysis involving a moderator.

Our next step is to introduce a moderating variable to assess the interactive hypotheses in this study. The result from the indirect analysis is presented one after the other as the model (2) to Model (4). The study observed a significant improvement in model fitness through significant changes in Wald Chi-squared in the model (2) and model (4), especially.

Analyzing the result under the indirect analysis revealed that the coefficient and the P-value for the interaction term (Bsize*NED) showed a positive and significant association with the bank's performance ($\beta = 0.127$; $p < 0.05$) under model (2). Since the $P < 0.05$ or 5% significance, we conclude that the interaction between board size and the non-executive director is positively associated with the bank's performance. Again, we observed that by the inclusion of the interaction term in model (2), the coefficient and the P-value of the non-executive director remained positive and significantly associated with the bank's performance. However, the coefficient in models (2) to (4) improved significantly. It implies that the moderator's inclusion in models (2) to (4) has enhanced or improved the relationship between the non-executive director and the bank's performance. Therefore, based on the result in Table 5 and the explanations thereof, the study failed to reject the null hypothesis (H04) and concludes that board size moderates the relationship between non-executive directors (NED) and the bank's performance. This outcome is consistent with previous studies and agency and resource dependency theories. Previous studies conducted by Jiang et al. (2020) and Naciti (2019) and Nyamongo and Temesgen (2013) concluded that non-executive directors affect the firm's performance positively. Again, agency theory argues that non-executive directors enhance the independence of the board to monitor the management performance and to provide counsel and their networks to enhance the firm's performance positively.

Furthermore, the coefficient and the P-value for the interaction term (Bsize*D_Own) showed a positive and significant association with the bank's performance ($\beta = 0.144$; $p < 0.05$) under model (3). Since the $P < 0.05$ or 5% significance, we conclude that the interaction between board size and director share ownership is positively associated with the bank's performance. It is worth noting that after the interaction term (Bsize*D_Own) was included as a moderator in the model (2), the coefficient and the P-value of director shares ownership moved from insignificant in the model (1) to significant in model (2) to (4). It implies that the inclusion of the moderator variable (i.e., Bsize) moderated or enhanced the relationship between director share ownership and the bank's performance. Therefore, based on the result in Table 5 and the explanations thereof, the study failed to reject the null hypothesis (H05) and concludes that board size moderates the relationship between director share ownership (D_Own) and bank performance. This outcome is consistent with…….

Finally, the coefficient and the P-value for the interaction term (Bsize*BGD) showed a positive and significant association with the bank's performance ($\beta = 0.204$; $p < 0.05$) under model (4). Since the $P < 0.05$ or 5% significance, we conclude that the interaction between board size and board gender diversity is positively associated with the bank's performance. It is worth noting that after the interaction term (Bsize*BGD) was included as a moderator in the model (2), the coefficient of board gender diversity increased from 0.248 in model (1) to 0.252 in model (4). This confirms that when the interaction term was introduced into the model (4), it moderated or enhanced the relationship between board gender diversity and the bank's performance. Therefore, based on the result in Table 5 and the explanations thereof, the study failed to reject the null hypothesis (H06) and concludes that board size moderates the relationship between board gender diversity (BGD) and bank performance. This outcome is consistent with previous studies and resource dependence theory. The finding corroborates with previous studies that appointing female directors to the board is positively associated with a bank's performance (Carter et al., 2003; Latendre, 2004; Smith et al., 2006). Similarly, the proponent of board gender diversity argues that women have greater sensitivity to sustain and comply with ethical issues than their male counterparts (Ibrahin et al., 2009). Again, resource dependency theory argues for the selection of directors to the board based on their competence rather than from one dominant gender.

5. CONCLUSIONS AND RECOMMENDATIONS

The paper aims to assess the relationship between board characteristics and bank performance and the moderating effect of board size on the relationship. The AR (2) AND Sargan test results jointly confirm the absence of second-order autocorrelation, and the over-identification restriction is valid for this study. First, the findings show a significant positive association between board characteristics (non-executive directors, directors share ownership, and board gender diversity) and bank performance. The study revealed that the coefficients of the interaction terms between board size and board characteristics (Bsize*NED), (Bsize*D_Own), and (Bsize*BGD) were revealing and instructive in understanding the relationship better. The P-values of the coefficients of the interaction terms were <5%, demonstrating that the effect of board characteristics on the bank's performance is conditional on the board size and that the higher the board size, the stronger the effect of board characteristics on the bank's performance. Therefore, the board size moderates the relationship between non-executive directors and the bank's performance. This outcome is consistent with both agency theory and resource dependency theory. The findings have significant implications. For instance, it provides the necessary evidence needed to strengthen the board with competent non-executive directors and female directors to enhance the independence and effectiveness of the board to prevent opportunistic behaviors of managers espoused through agency theory. There are two main limitations to this study. The first limitation of this study is that the study requires a large sample size. The sample was the main limitation of this study. However, care was taken to ensure that this limitation did not compromise the validity of the findings. The second limitation is based on the fact that the study looks only at the moderating role of board size between the relationship of board characteristics and the bank's performance, and no attempt was made to assess the mediating role of the board size between the relationship of board characteristics and the bank's performance. Therefore, future research should include a mediating variable to assess the interaction between board characteristics and the bank's performance.

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