

Impact of Diversification on Bank Risk Taking: Moderating Role of Corporate Governance

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Abstract

The paper explores the effects of diversification on banks' risk taking while also examines how corporate governance moderates this relationship. This research employs sample of listed banks from Asian emerging economies and gathers data from annual reports of banks and DataStream for the period of 2012 to 2022. The data in this research was analyzed using a two-stage dynamic panel system GMM, descriptive statistics, multicollinearity diagnostic tests, and correlation analysis. Overall findings of the study show that diversification, whether income or assets significantly related to banks' risk-taking. Income diversification reduces banks' risk-taking while asset diversification is detrimental to financial stability. Furthermore, female board members moderate the relationship between diversification and bank risk-taking in Asian emerging countries. The findings suggest that the current study is helpful for managers, regulators, policymakers and researchers. Policymakers should make appropriate risk-taking decisions while considering factors such as diversification.

Keywords: Diversification; Banks Risk Taking; Female Board Director; Dynamic Panel Approach; Asian Emerging Economies

1. Introduction

Some of the most successful companies of the previous century have been those that have diversified their operations across multiple countries and industries. Gomes and Livdan (2004) found that diversity leads to the firm's growth and helps the firm explore new markets. According to Daud, Salamudin, and Ahmed (2009), diversification is the primary factor in the highest-performing companies as measured by accounting metrics. Some companies do not diversify because their managers are afraid of losing their jobs, according to research by Anderson, Bates, Kahloul, and Hallara (2010). The problem of under or over-diversification is a challenge faced by all businesses, regardless of size, as explained by Li and Qian (2008).

According to Ansoff (1957), corporate diversification, such as the introduction of new products, can take place at the corporate or business level. According to Boz, Yigit, and Anil (2013), this strategy involves establishing a larger number of businesses to facilitate greater expansion and growth while decreasing the company's overall risk. Therefore, there are two main types of business diversification: product diversification and geographic diversity. Previous research has utilised these types to examine the effect of corporate diversification on business performance, therefore they have some empirical credence (2010). Some research has found a favourable correlation between corporate diversification and firm success, while other studies have found no such correlation at all (2013). However, some studies have found a negative correlation between organisational diversification and business success. For instance, Lang and Stulz (1994) show that diversified companies often trade at a discount of roughly 8% compared to a portfolio of equivalent stand-alone companies.

For this reason, Graham, Lemmon, and Wolf (1998) argue that the discount should not be understood as value destruction owing to diversification, as diversified businesses are already discounted. To lower overall portfolio risk, diversification is recommended (Haugen, 2001). The cost of financial intermediation is lowered and the motivation to keep an eye on things is raised when businesses diversify (Diamond, 1984). Banks appear to profit from diversification in franchise value, however, Baele et al. (2007) reports that diversification raises systematic risk. However, Laeven and Levine (2007) show that diversification exists for financial conglomerates. However, Hughes et al. (1996) find that only highly inefficient banks benefit from geographical diversification, which contradicts their earlier findings. Bos and Kolari (2005) examine the impact of diversity on the efficiency of a selection of large banks throughout Europe and the United States and reach a good conclusion. Solnik (1974) demonstrates that the combination of stocks from the US and Europe results in portfolios that exhibit only 50% of the risk compared to locally diversified investments consisting solely of United States stocks. Additionally, Levy and Sarnat (1970) establish that the links between established and developing territories offer a noteworthy advantage in terms of reducing risk. A lessening of diversification's benefits as a result of growing connections between the world's stock markets (Abedifar et al., 2013, 2018; Demirgüç-Kunt & Huizinga, 2004; Edirisuriya et al., 2015).

Jensen and Meckling (1976) believe that managers diversify to safeguard the worth of their human capital, whereas the latter proposes that corporations do so to maximize the managers' gains. Similarly, Shleifer and Vishny (1989) argue that managers diversify since they are more effective at managing assets in some other sectors, and hence their expertise is more valuable to the company if it expands into those sectors. There is a current dialectic between the financial road, which prioritizes concentration as a strategy for risk mastery, and the durable road, which prioritizes diversification to spread risk more evenly throughout the organization's activities and practices (Martinet, 2006). Markowitz (1952) defines diversification as "the practice by which a portfolio's assets are spread across several different investment vehicles." Non-interest revenue provides banks with a stable stream of funds, as noted by Huang and Chen (2006).

Non-interest income activities have a favourable effect on the risk-adjusted return on equity, as found by Ekanayake and Wanamalie (2017). This suggests that shareholders' risk-return trade-offs can benefit from a slight rise in non-interest revenue activities. Chiorazzo et al. (2008) discovered that larger banks benefited more from revenue diversification since it increased risk-adjusted returns. Profitability, market share, debt capacity, development possibility, risk reduction, and the requirement for efficient use of human and financial resources are all boosted by a company's diversified portfolio (Afza et al., 2008). Companies might benefit from diversification by allowing them to test out new markets (Gomes and Livdan 2004). Lewellen (1971) argues that diversified companies require more debt financing than non-diversified ones. The effectiveness of a company's financial results is directly tied to its corporate governance. Here, we focus on the link between good CG and a company's bottom line. The enterprises benefit from a good governance framework in the ways that Claessens and Yurtoglu (2013) describe: increased access to financing, improved financial performance, and better treatment of stakeholders.

When it comes to the correlation between diversity and banks' willingness to take risks, the moderating role of female board directors is complex and considerable. With their unique viewpoints brought to the surface, we can examine the risks of diversification schemes in a more holistic light. Women on boards are more likely to put an emphasis on risk management and push for strong procedures that reduce the propensity for recklessness. A more nuanced assessment of diversification-related hazards may result from their impact on boardroom decision-making processes. Also, by getting involved, they can strengthen governance standards, which might lead banks to be more risk-aware and consider the risks and advantages of diversity. In general, financial institutions are more likely to take a careful and comprehensive approach to risk management when female board directors are involved since their presence tends to attenuate the connection of diversification and risk-taking.

The purpose of the research is to investigate how banks' risk-taking practices relate to diversification. It goes even beyond by looking at how the presence of FBD influences the association between diversification and the level of risk-taking by banks. These are some of how our research adds to what has already been reported. To begin, our research shows that banks in developing Asian nations are more willing to take risks

when they diversify their assets and income streams. Additionally, this study fills a gap in the literature by documenting the influence of diversification on banks' risk-taking, with a moderating role played by the female board of directors. Furthermore, the article presents proof by the use of a two-stage system GMM approach. The study's overall results demonstrate a strong correlation between banks' risk-taking and performance and diversity, whether it is in terms of revenue or assets. Banks can lower their risk-taking with income diversification. Additionally, in developing Asian nations, female board members mitigate the association between diversity and bank risk-taking. Using the study's findings, regulators, legislators, and bankers can control the amount of risk that banks take. Therefore, policymakers and bank regulators may benefit from our study's results on the nuances of diversification and risk-taking, with the moderating impact of CG for Asian banks.

The paper covers the empirical studies in section 2, while section 3 provides the discussion on methodology, section 4 presents the study's findings and the conclusion is justified in the last section.

2. Literature Review

The link between diversity and security has been the subject of extensive research. It has been found in some research that bank diversification increases stability. There is proof that spreading out one's financial risks makes it less likely that one will experience financial hardship. You can do this by expanding into new areas and releasing a broader range of products and services.

According to research by Amidu and Wolfe (2013), diversification strategies improve banking sector stability. Iskandar-Datta and McLaughlin (2007) argue that financial institutions can make better use of managerial talent, increase productivity, and reduce supervision costs by diversifying their portfolios (Boyd & Prescott, 1986). Deng, Elyasian, and Jia (2013) analyzed the characteristics of diversification using a sample of US banks and they discovered that higher levels of institutional ownership have a positive effect on diversification, which in turn helps reduce risk.

Several other studies, however, contradict the prior literature by concluding that increased bank diversification is linked to greater bank risk-taking. Stiroh and Rumble (2006) link lower performance with increased fee based income because diversified banks have fewer reasons to keep an eye on loan defaults. A study by Hayden, Porath, and Westernhagen (2007) on German banks between 1996 and 2002 examines the effect of portfolio diversification on risk and finds that it reduces returns. In their research, Acharya et al. (2006) were interested in the relationship between bank holding companies' diversification, risk-taking, and financial performance in the US. According to their findings, non-interest activities boost profits but increase risk. Broadening non-interest income initiatives leads to higher banks' credit risks, according to Lepetit et al. (2008) on European banks to analyse the impact of diversification strategy on banks' risk-taking between 1996 and 2002.

When looking at the correlation between geographic diversity and BHC value, Goetz, Laeven, and Levine (2013) conclude that a higher degree of geographic diversity is always accompanied by a lower BHC value. Brighi and Venturelli (2016) analyse the influence of regional and operational diversification on bank efficiency employing a group of 491 Italian banks that functioned throughout the economic downturn of 2008 and the 2010 bailout crisis. Neither scenario is good for a bank's bottom line. While the crisis risk of Italian banks remained constant throughout 2008, it worsened during the sovereign debt crisis.

Williams and Prather (2010) use data on Australian banks from 1987 to 2004 to analyse the effect of diversification on banks' risk and return, and they find that diversification increases shareholder returns, but that fee-based income is more risky than income obtained through interest margins. Comparable findings were found by Delpachitra and Lester (2013) using the same sample of Australian banks between 2000 and 2009: diversifying revenue and income does not increase profits or reduce exposure to risks. Using a cross-section of Asian countries, Lee et al. (2014) conclude that diversification does not boost bank profits but does decrease risk. Banks' performance and risk-adjusted profits have been shown to improve when their employees are heavily involved in noninterest-based activities. Hsieh et al. (2013) look at diversification problems in the same countries from 2004 to 2009 and arrive at the same conclusion that diversification of assets does not enhance the soundness of banks.

Regarding Mexican financial institutions, the work of Maudos and Sols (2009) provides useful insight into the connection between types of income diversification. According to the research by Hidayat et al. (2012), which uses a sample of Indonesian banks to examine the correlation between product diversification and risk. For Vietnamese banks, Batten and Vo (2016) show the risk faced by banks with greater involvement in nontraditional industries. Using panel data from 88 Chinese banks from 1996 to 2006, Berger et al. (2010) conclude that diversity leads to lower profits and more risk.

Wu et al. (2020) analysed data from 1000 banks in 39 emerging nations between 2000 and 2016. Their findings indicate that there is a clear positive link between income and financing diversification and the stability and riskiness of banks. Moreover, they stress that heightened diversity diminishes the bank's effectiveness while concurrently elevating risk. In addition, Saghi-Zedek (2016) argues that diversifying income sources enhances profitability and mitigates credit risk for European commercial banks. Amidu and Wolfe (2013) have verified that income diversification has a favourable effect on the stability of banks in 55 emerging economies. This effect is particularly strong in competitive environments. According to Sanya and Wolfe (2011), diversifying revenue reduces the risk of insolvency and has a favourable influence on the soundness of banks in developing world. However, contrary to the research reviewed earlier, other studies assert that bank diversity leads to higher riskiness and lower banks' soundness. AlKhouri et al. (2019) analyse 69 banks, including both conventional and Islamic banks, in the GCC region. The study affirms that the diversity of revenue reduces the stability of banks, whereas the diversification of assets enhances the stability of Islamic banks.

Williams and Prather (2010) analysed Australian banks and determined that engaging in fee based revenue activities raises the risk for banks.

The study conducted by Abuzayed et al. (2018) examines the influence of diversification on the level of riskiness and soundness of banks in the region. The study's findings indicate that both asset and income diversification do not affect stability. However, it is seen that more diversity leads to a reduction in risk. In their study, Hsieh et al. (2013) investigated the impact of diversity in assets and revenue on the stability of banks in 22 Asian nations. The study presents empirical evidence that asset diversification alone does not suffice to augment the stability of banks. Conversely, the diversification of revenue sources has a positive impact on the stability of banks. According to Stiroh (2010), the effect of diversity on reducing risk in banking is uncertain. Despite several research investigating the correlation between diversity and the stability and risk of banks, there is a lack of agreement about the influence of diversification (in terms of assets, revenue) on banks' propensity for risk-taking and overall soundness. Thus, the research proposes that

H1: Diversification significantly influence risk-taking of banks.

Prior studies indicate that board gender diversity (BGD) has a substantial influence on CG and decision-making procedures. This is because boards with a diverse gender composition are more effective in monitoring management, BGD improves decision-making processes and results, and female directors tend to prioritize ethical considerations more than their male counterparts. The available information regarding the correlation between BGD and corporate risk-taking is inconclusive. Several studies indicate that women generally exhibit a greater aversion to risk compared to men. Additionally, it has been found that higher BGD is linked to reduced firm risk, and diverse boards are more inclined to engage in merger and acquisition endeavours (Levi et al., 2014). In contrast, alternative research indicates that female directors have a greater inclination towards taking risks compared to their male counterparts.

Byrnes et al. (1999) discovered that men have a greater propensity for engaging in risk-taking behaviours and dangerous experiments compared to women. Gulamhussen and Santa (2015) examine the involvement of women in a sample of 461 major banks from countries belonging to the OECD. They find that when women are present in boardrooms, it has a negative influence on the level of banks riskiness. Rossi et al. (2017) discovered a negative correlation between the presence of FBD and the level of risk-taking in Italian enterprises, based on a sample of 41 companies. Adams and Ferreira (2009) discovered a negative correlation between the return volatility and the presence of FBD. In their study, Hutchinson et al. (2015) analyse a group of Australian companies and demonstrate that increasing the representation of women on corporate boards has a moderating impact on the level of risk-taking by the firms and leads to an improvement in their overall worth. In their study, Jizi and Nehme (2017) discover that the involvement of women on corporate boards leads to a decrease in the fluctuation of business returns. Abou-El-Sood (2019) demonstrates that banks in Gulf nations that

have a higher proportion of female directors tend to allocate their investments towards projects with lower levels of risk.

In contrast, Berger et al. (2014) discovered that the percentage of female bank directors was positively correlated with an escalation in portfolio risk. Saeed et al. (2019) demonstrates, through their study on a sample of Indian enterprises, that female directors have a greater propensity for risk-taking compared to FBD. Additional research indicates that women's level of risk aversion diminishes following their successful advancement in male-dominated environments and assimilation into a society traditionally dominated by men. Another set of research discovered that the presence of FBD did not influence the level of risk associated with equity (Sila et al., 2016) and that the gender diversity of a company's board of directors did not affect the firm's level of debt (Matsa and Miller, 2013). Bruna et al. (2019) concluded that there is no evidence to show a substantial relationship between BGD and company risk-taking. Furthermore, while the inclusion of diverse board members may mitigate business risk, it does not consistently provide advantages for shareholders. For example, diversity can lead to conflicts and decrease the unity within a group (Carter et al., 2003). Additionally, diverse boards may make decisions that are too cautious owing to internal disagreements and the difficulty in reaching an agreement on risky policies (Bernile et al., 2018).

H2: The female board of directors moderates the link of diversification and bank risk-taking.

3. Methodology

The research design includes specifying the scope of the study, the research questions and hypotheses, the variables, and the strategy for data collection. Our study is secondary deductive, and we employ a quantitative method of data collection. Using information gleaned from the accounting information of listed banks in developing nations of Asia between 2012 and 2022, we examine the effect of diversification on banks' risk-taking and the moderating role of female boards of directors on their connection.

As the study's dependent variable, risk-taking is analyzed as the independent variable, Diversification. However, the presence of female board directors is the proxy for moderating variable corporate governance. The study's control variables are banks' liquidity, leverage, size, and growth. Detailed explanations of each of these factors follow.

Table 1 Variables Summary

Name	Abbr.	Description	Source
Z-score	ZS	$Z = \text{ROA} + E/A / \sigma_{\text{ROA}}$	(Demirgüç-Kunt & Huizinga, 2004b)
Non-performing loans ratio	NPL	The ratio of Non-Performing Loans to Gross Loans	(Abedifar et al., 2013b);

Income Diversification	ID	The ratio of Non-Interest Income to Total Operating Income	(Meslier et al., 2014; Stiroh & Rumble, 2006; Williams, 2016)
Asset Diversification	AD	The ratio of Non-Interest-Bearing Assets to Total Assets.	Meslier et al. (2014)
Female Board of Directors	FBD	No. of female board directors	Williams, 2016
Leverage	Lev	Equity to Total Assets Ratio	(Lepetit et al., 2008)
Liquidity	Liq	Deposits to Total Assets Ratio	(Wagner, 2007)
Size	Size	Natural Log of Total Assets	(Lepetit et al., 2008)
Growth	Gw	Annual Change in Total Assets	(Abedifar et al., 2018b)

Below is the econometric model employed in this research

$$(BR)_{i,t} = \alpha + \beta_1(Div)_{i,t} + \beta_2(FBD)_{i,t} + \beta_3(Div * FBD)_{i,t} + \gamma_1(Lev)_{i,t} + \gamma_2(Liq)_{i,t} + \gamma_3(size)_{i,t} + \gamma_4(Gw)_{i,t} + \mu_{i,t} \quad (1)$$

Where BR denotes Risk taking which is our dependent variable. Div is an independent variable in our model, and FBD is the female board of directors which is a moderating variable. Div*FBD is the moderating term employed in the study, Leverage (Lev), Liquidity (Liq), Bank Size (size) and Growth (Gw) are bank-level control variables. μ is an error term.

For this investigation, this research implemented a two-stage system using the dynamic panel GMM estimate method presented by (Arellano & Bover, 1990). In light of these factors, we decided to employ a dynamic system-GMM panel model. The first step in addressing omitted variable bias is recognizing that such models are likely improperly defined due to the presence of missing variables. To keep an eye on the endogeneity of the lagged dependent variable in a system dynamic panel in which the explanatory factors are linked to the error term. Third, the GMM estimator performs better in the presence of heteroskedasticity.

4. Results and Discussion

The influence of outside factors on reliant factors is the topic of this chapter. Data is tabulated with a correlation matrix, descriptive statistics, and the Generalized Method of Moments.

Table 2: Descriptive Statistics of overall sample

	Mean	Median	Maximum	Minimum	Std. Dev.	Obs.
ZS	3.0517	3.6568	5.8632	0.1063	1.0810	844
NPL	0.0651	0.0482	0.7135	0.0107	0.0540	844
ID	0.1337	0.3092	1.4521	-0.7013	0.0212	844
AD	0.3653	0.3718	1.1072	0.0572	0.2042	844
FBD	0.2034	0.2107	3.0000	0.0000	0.0214	844

Lev	0.1012	0.0907	0.7376	-0.113	0.0931	844
Liq	0.7572	0.7509	2.7803	0.0343	0.2783	844
Size	14.303	13.934	20.579	9.2091	2.1532	844
Gw	0.1636	0.1235	3.8663	-0.372	0.2427	728

Note: ZS is bank level Z-Score, NPL is Non-performing Loans Ratio, ID is the Income Diversification, AD is Assets Diversification, FBD is the female board of directors, Lev is Leverage, Liq is Liquidity, Size is Bank Size, Gw is Growth.

Table 2 displays the study's descriptive statistics. Z-Score and the percentage of loans that went into default serve as the study's risk indicators. There is no outlier in the data, as the average values of risk taking and performance of listed banks in Asian Emerging Economies follow the same trend with smaller fluctuations in the values of bank risk taking. Diversification strategies of the study consists of Income diversification and Assets diversification. The mean diversification score indicates that banks in the area allocate around one-third of their high-risk assets towards non-interest revenue activities. Furthermore, about 20% of the banks in Asian emerging economies has female directors on the board. Control variables in the present study include Leverage, Liquidity, Bank Size and Growth. All these control variables show lesser variations in the values.

Table 3: Test of Multicollinearity

Variable	VIF	1/VIF
Lev	1.87	0.5358
Liq	1.77	0.5636
FBD	1.42	0.6924
AD	1.40	0.7150
Size	1.31	0.7609
ID	1.11	0.8979

Note: VIF = Variance Inflation Factor

For table 3 we describe the VIF used to confirm multicollinearity in the analysis. VIF values are less than 5 (Ringle et al., 2015), hence we can rule out the possibility of multicollinearity.

Table 4: Impact of Diversification on Bank Risk Taking Using GMM

Variables	Model I		Model II		Model III		Model IV	
	Coef.	t-Stat	Coef.	t-Stat	Coef.	t-Stat	Coef.	t-stat
L1.	0.184***	(3.13)	-0.150	(-0.82)	0.120	(0.60)	0.7587***	(6.58)
L2.	-0.179***	(-3.57)	-0.386***	(-3.30)	-0.375***	(-2.76)	0.1279**	(2.39)
ID	-1.004***	(-5.39)	---	---	-0.980***	(-5.97)	---	---
AD	---	---	1.336	(1.17)	---	---	2.340**	(2.24)
Lev	-0.806	(-0.61)	5.478	(1.23)	4.419	(1.14)	0.012*	(1.90)
Liq	1.228**	(2.57)	-0.720	(-0.59)	0.593	(0.53)	0.033	(0.43)
Size	-0.117	(-1.56)	0.259	(1.14)	0.234	(1.14)	0.025	(1.11)

Gw	-0.088	(-0.56)	-0.853**	(-2.39)	-0.422	(-1.28)	-0.012	(-1.29)
C	5.635***	(4.16)	1.144	(0.27)	1.336	(0.37)	-0.185	(-1.52)
Sargan	0.9999		0.9989		0.9998		0.9997	
AR1	0.1032		0.1293		0.1632		0.1185	
AR2	0.0242		0.0315		0.0295		0.0391	

Note: L1 represents the first lag of the DV, whereas L2 represents the second lag of the DV. ZS is bank level Z-Score, NPL is Non-performing Loans Ratio, ID is the Income Diversification, AD is Assets Diversification, Lev is Leverage, Liq is Liquidity, Size is Bank Size, Gw is Growth. ***, ** and * show significance level at 1%, 5% and 10% Estimation of models I–IV in table 4 is performed using risk-taking proxies from financial institutions. Z-score is used to estimate Models I and 2, while NPL ratio is used to estimate Models III and 4. Models I and III are estimated with income diversification, whereas Models II and IV are calculated using assets diversification for their independent variables. Banks' willingness to take risks is profoundly affected by the degree to which their income is diversified. According to (Lee et al., 2014) and empirical evidence, banks are more stable when they have a more diversified income stream. The study also used asset diversification as a measure of diversification, and it was positively associated with banks' risk taking. This finding suggests that banks are not reaping the full benefits of diversification because they have not fully diversified their non-interest-bearing assets (Moudud-UI-Huq, 2019). Banks' propensity to take risks benefits from increased liquidity, whereas this propensity suffers from increased expansion.

Table 5: GMM Regression with FBD as a moderator

Variables	Model I		Model II		Model III		Model IV	
	Coef.	t-Stat	Coef.	t-Stat	Coef.	t-Stat	Coef.	t-stat
L1.	0.055***	(21.12)	0.733**	(7.34)	0.7587**	(6.58)	0.758**	(6.58)
L2.	-0.035***	(-55.12)	0.133**	(2.50)	0.1279**	(2.39)	0.1279*	(2.39)
ID	-0.021***	(-3.18)	---	---	-0.003	(-0.86)	---	---
AD	---	---	-0.012**	(-2.519)	---	---	-2.40**	(-2.47)
FBD	-0.002***	(-2.904)	-0.042**	(-2.312)	-0.004*	(-1.703)	-0.035**	(-1.973)
Div*FBD	-0.293***	(-3.013)	-0.231**	(-2.425)	-0.025*	(-1.690)	-0.043**	(-2.016)
Lev	0.052**	(2.53)	-0.014	(-0.30)	0.033	(0.43)	0.012*	(1.90)
Liq	-0.075***	(-5.36)	-0.029*	(-1.70)	0.025	(1.11)	0.033	(0.43)
Size	-0.001	(-0.47)	-0.011*	(-1.86)	-0.012*	(1.90)	0.025	(1.11)
Gw	0.032***	(6.41)	-0.009	(-1.15)	-0.012	(-1.29)	-0.012	(-1.29)
C	-0.036	(-0.89)	-0.1375	(-1.19)	-0.185	(-1.52)	-0.185	(-1.52)
Sargan	0.9093		0.9988		0.9984		0.9974	
AR1	0.1342		0.1953		0.1721		0.1845	
AR2	0.0123		0.0151		0.0156		0.0201	

Note: L1 represents the first lag of the DV, whereas L2 represents the second lag of the DV, ZS is bank level Z-Score, NPL is Non-performing Loans Ratio, ID is the Income Diversification, AD is Assets Diversification, Lev is Leverage, Liq is Liquidity, Size is Bank Size, Gw is Growth. ***, ** and * show significance level at 1%, 5% and 10%

Table 5 estimates models I-IV using proxies for bank risk taking. For Models I and 2, Z-score is used for the estimation, while NPL ratio is used for Models III and IV. Models I and III are estimated with income diversification, whereas Models II and IV are calculated using assets diversification for their independent variables. Both proxies (income and asset diversification) negatively impact bank risk taking which implies that when banks pursue their diversification strategies, they are able to lower their risk and vice versa. Increasing the diversity of a bank's income or assets has been shown to improve its stability, in line with the empirical findings of the aforementioned studies (Boyd et al., 1993; Stiroh & Rumble, 2006).

Furthermore, the moderating role of CG is assessed with the female board of directors, the findings reveal that the presence of female board of directors is inversely related to bank risk taking. This means that when the number or influence of female board members grows, banks tend to adopt a more cautious attitude towards taking risks. This is consistent with previous studies that suggest that boards with a mix of genders tend to give greater importance to risk management and governance processes, which can result in more careful decision-making in financial institutions (Merzki & Rejeb, 2023; Wong et al., 2019). Moreover, FBD also negatively moderates the relationship between income and asset diversification and bank risk taking. This moderation analysis indicates that as the number or impact of female directors grows, the connection between diversity of income/assets and willingness to take risks becomes less prominent or less disposed towards engaging in high-risk behaviors (Şahin, Artan & Tuysuz, 2015; Bakhsh et al., 2020). Female board members may contribute to a more equitable assessment of risks related to income and asset diversification methods. Their viewpoints and impact might result in more cautious evaluations of risks or a stronger focus on efforts to reduce hazards, thereby tempering banks' tendency to take excessive risks in their quest of diversifying income and assets (Chan et al., 2016; Muhammad et al., 2023).

The banks risk taking is found to be significantly impacted by all of the control variables. Where higher leverage level and growth of banks increases bank risk taking while more the size of the banks and liquidity lower is the risk taking of the banks. It means that the stability of banks is adversely impacted by leverage and growth level whereas it is positively correlated with liquidity and bank size.

5. Conclusion

In developing countries, the banking industry is crucial to the country's overall development. The financial and industrial security of this sector need further investigation. Banks' willingness to take risks and their overall success are heavily influenced by their level of diversification. Although each of these factors has been studied separately to determine its effect on banks' risk-taking, the combined analysis

has not yet been conducted. The study's primary objective is to look into how the presence or absence of female board of directors affected the nexus between diversification and bank risk-taking of listed banks operating in 10 Asian Emerging economies.

The study's findings indicate a robust association between banks' risk appetite and their success and diversity, be it in terms of revenue or assets. Banks can mitigate their risk exposure by diversifying their sources of income. Moreover, in emerging Asian economies, the presence of women on corporate boards helps to reduce the correlation between diversity and the propensity of banks to take risks. The study's findings can be utilised by regulators, policymakers, and bankers to exercise control over the level of risk undertaken by banks. Hence, policymakers and bank regulators may gain valuable insights from our study's findings about the intricacies of diversification and risk-taking, along with the mitigating influence of corporate governance on Asian banks.

When making crucial financial decisions, bank management, regulators, and policymakers should take into account the recognized factors of financial stability. Banks in developing Asian economies are encouraged to diversify their sources of revenue. However, ineffective diversification can also contribute to an increase in risk, therefore careful management of diversification decisions is required. As a first step in broadening the scope of this research, it would be possible to include both listed and unregistered banks from the same pool of 10 Asian Emerging Economies. Secondly, additional research may include market-based metrics of bank risk-taking. Third, comparing results from both developed and emerging nations would be a valuable addition to the study's scope.

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