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The Effect of Financial Innovation and Bank Competition on Firm Value: A Comparative Study of Malaysian and Nigerian Banks

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Abstract

This study examines the effect of financial innovation (FI) and bank competition on firm value. FI is the act of creating new financial instruments as well as new financial technologies, institutions, and markets. The study used the sys-GMM estimation technique based on data extracted from 26 commercial banks in Nigeria and Malaysia over the period 2009 to 2019, totaling 286 observations. Given the results of the study, FI has a significant negative effect on firm value in Nigeria, and bank competition has a significant negative effect on firm value in Nigeria. By contrast, FI has a significant positive effect on firm value in Malaysia, and bank competition has a significant positive effect on firm value in Malaysia. The return on asset (ROA), bank size, GDP growth, and the inflation rate are significantly related to firm value. The interactive effect (FI * COMP) has a significant positive relationship with firm value in Nigeria and Malaysia. The empirical study confirms the notion that FI is a real driver of economic progress, competitiveness, and economic development. According to the study, policymakers should address the weaknesses exposed by the financial crisis, which contributed to the introduction of various current financial regulatory frameworks to capture the risks posed by the FI process.

Keywords: Financial Innovation, Firm Value, Bank Competition, Dynamic Panel Data, Emerging Markets

JEL Classification Code: G20, L25, O32

1. Introduction

The rapid innovation in the business cycle enormously influences the dynamic economic environment of financial institutions (Błach, 2011). The basic economic activities of banks have expanded through financial innovation, ultimately playing a critical role in economic growth by facilitating financial transactions in international trade, stimulating financial inclusion, empowering remittance, and stirring financial efficiency. Financial sector development in developing countries and emerging markets is part of the private sector development strategy to stimulate economic growth and reduce poverty. The development of the financial sector in emerging and developing economies emerges as a result of opportunities offered through financial innovation (Napier, 2014; Ndako, 2010). As an agent of economic change, financial innovation triggers financial development through financial services diversification (Merton, 1992; Silve & Plekhanov, 2014) and spurring financial intermediation efficiency (Johnson & Kwak, 2012). It fosters advancement in technology (Valverde et al., 2007), and efficiently allocates financial resources through new channel productive output (Duasa 2014), and hence accelerating sustainable economic growth.

The financial crisis that started in 2007 changed those beliefs, as excessive risk-taking in some specialized innovating products brought down the financial system and produced the deepest and most prolonged economic crisis since the Great Depression. Complex financial instruments such as debt obligations (CDOs), credit default swaps (CDSs), and asset securitization were developed at the time to address the issues related to credit transactions, appropriate

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risk evaluation, and help in minimizing the information asymmetry (Tufano, 2003). The emergence of financial innovation has enabled financial institutions to engage in risky ventures and acquire the profits of risk technologies that can efficiently and effectively transform their business. Besides, the financial transactions modernization and the general economic welfare improvement are a result of the positive role of financial innovations (Ashby, 2010; Qamruzzaman & Jianguo, 2017). Developed capital markets accompanied by active derivatives market relatively exudes benefits through key factors such as lower cost of capital, reduction in pricing, mitigating exposures to risk, wider access to capital, and improved liquidity, among other things. The theoretical argument posits that financial innovation should help in the efficient movement of capital, targeting improved risk management and liquidity. It contributes to effective management and credit risk transfer, offers optimal diversification of the portfolio, less trading cost, and provides a wider dispersion of credit risk.

The contemporary study on competition and innovation in the banking industry has dramatically improved in recent years. The study by Hinson et al. (2006) critically explicated that some of the areas with severe competition in the banking industry is the product development aspect. The commercial banks that introduced new financial services, especially those who are ICT-oriented, have taken advantage of these developments, which has brought about intense competition and innovations in the banking industry. The current study offers some of the most significant and critical issues in the theoretical literature on the nexus between financial innovation, bank competition, and firm value in the context of emerging and developing countries.

The study offers an essential tool to regulators and bridges the gap in contemporary literature through robust estimates to make conclusive findings. The study offers implications to institutional and individual investors when making vital investment choices. The remaining sections of this study are organized as follows: section two focuses on the review of literature, section three explains the methodology, section four discusses the findings and the conclusion ends this research."

2. Literature Review

Financial innovation has been a core topic for scholars, because of its important contribution to economic growth and the stability of financial systems. New financial products, such as the securitization of assets, were believed to have tremendous potential for the diversification and efficient management of risk. The actual effect of financial innovation on the stability of banks has been widely questioned in developed economies (Instefjord, 2005; Thakor, 2012; Kero, 2013). Notwithstanding, there remains numerous gaps in the understanding of financial innovation-firm value nexus, providing the prospect for further research despite the remarkable body of work. At first, there has been very little theoretical and empirical integration as present literature on financial innovation is fragmented with incomplete views (Hauser et al., 2006). Subsequently, a vital issue is in determining the significant role of financial innovation and bank competition on firm value has remained largely ignored in the literature (Hanssens et al., 2009). Hence, the issue of financial innovation and competition is a relatively new notion in emerging economies such as Nigeria and Malaysia.

Akhisar et al. (2015) investigated the effects of the bank's profitability performance of electronic-based banking services. The effects of ROA and ROE performance were analysed the data, which are 23 developed and developing countries' electronic banking services through 2005 to 2013, by dynamic panel data methods. The innovative nature of electronic banking services will show the bank's performance significantly. Both the analyzing method and involvement of developed and developing countries' banking data are the most obvious differences of the study from similar studies in the literature. Results showed that bank profitability of developed and developing countries affected by the ratio of the number of branches to the number of ATMs is highly significant and electronic banking services are also significant. Results showed that some variables were found to be in contrast to the expected negative relationship, because of diversity in the level of development of the countries, the socio-cultural structure, and electronic banking infrastructure.

Gichungu and Oloko (2015) sought to establish the relationship between bank innovations and the financial performance of Commercial Banks in Kenya between 2009 and 2013. The study specifically sought to establish the effect of mobile phone banking, ATM banking, online banking, and agency banking on the financial performance of commercial banks in Kenya. The study established that the identified bank innovations, precisely, mobile phone banking, online banking, agency banking, and ATM banking had positively impacted the financial performance of commercial banks in Kenya over the 5 years between 2009 and 2013.

Cherotich et al. (2015) tried to establish the effect of financial innovations on the financial performance of commercial banks in Kenya. This study relied on secondary data. It adopted a census where all the 44 banks were used in the study and there was no sampling since the population size was small. The study found out that there is a strong relationship between financial innovations and financial performance. The study concluded that financial innovations positively affect financial performance. Based on these results, the study recommends that financial innovation information should be available particularly to regulatory

and advisory bodies for guidance to the commercial banks on the need.

The research and development (R&D) expenditure results in innovation for any firm but affects the financial performance and riskiness of the firm at the same time. The relation between innovation, the riskiness of the firm, and financial performance are discussed in this study. Cortez et al. (2015) investigated a cross-country comparison of innovation and financial performance of electronic companies. The study focuses on the US, Japan, Korea, and Taiwan for the period 2002 to 2012, using panel data. The findings revealed that a significant positive nexus exists between R&D cost, intangible assets, and financial performance. Syed et al. (2016) determined the impact of innovation on financial performance and also looked into the impact of innovation on the riskiness of the firms. This study was conducted on the most innovative firms according to Forbes magazine over the period 1998–2012. Their findings showed a positive, significant, and robust relationship between innovation and financial performance which is consistent with the existing literature. On the other hand, the impact of innovation on riskiness is positive and significant which shows that more innovative firms are riskier and ultimately profitability is increased for those firms.

Innovation is widely regarded as one of the most important sources of sustainable competitive advantage in an increasingly changing environment because it leads to product and process improvements make continuous advances that help firms to survive, allows firms to grow more quickly, be more efficient, and ultimately be more profitable than non-innovators. Atalay et al. (2013) investigated the innovation and performance nexus. The survey of this study was conducted on top-level managers of 113 firms operating in the automotive supplier industry which is one of the most innovative industries in Turkey, as of the year 2011. The obtained data from the questionnaires are analyzed through the SPSS statistical package program. Analysis results demonstrated that technological innovation (product and process innovation) has a significant and positive impact on firm performance, but no evidence was found for a significant and positive relationship between non-technological innovation (organizational and marketing innovation) and firm performance. The study by Dewally and Shao (2013) empirically suggested that financial innovation may contribute to unintended volatility and instability of the financial system. Pham and Quddus (2021) examined the impact of innovation activities on firm efficiency using panel data of fourteen finance companies and nine technology companies from 2011 to 2019 in Vietnam.

The Structural-Conduct Performance (SCP) hypothesis argues that firms earn higher returns in a concentrated market as compare to competitive markets because of collusion and domination. The study indicates that a positive nexus exists between market concentration and profitability of banks (Hassene et al., 2015; Hu & Xie, 2016). Prior studies empirically support the SCP hypothesis (Bhatti & Hussain, 2010) in Pakistan's banking industry. Further studies were conducted by Kamau and Were (2013) on the factors that drive bank performance in Kenya. The finding revealed that structure/collusive power is the source of superior performance. The findings by Tan and Floros (2014) revealed that a negative relationship exists between competition and profitability in the Chinese banking industry. Similarly, a negative relationship exists between competition and profitability in an empirical study conducted by Uddin and Suzuki (2014) using the banking sector data from Bangladesh.

The study by Rahman et al. (2021) examined the relationship between financial innovation and the financial performance of 42 commercial banks in Kenya. The results showed that financial innovations significantly contribute to bank financial performance and that firm-specific factors are more important in determining the firm's current financial performance than industry factors. Budhathoki et al. (2020) assessed bank competition in Nepal using the Panzar-Rosse model and found that the transformation of the financial system from monopolistic competition to perfect competition brings efficiency and stability in Nepal. Further studies revealed that a concentration market is less likely to result in a financial or banking crisis (Beck et al., 2006; Boyd et al., 2004). The study by Casu et al. (2010) showed that the financial stability of banks is severely affected when there are fewer incentives for banks in allocating, monitoring, and screening loans due to a severe increase in bank competition. The nexus between competition and financial stability was investigated by Andries and Capruru (2013) in the EU banking sector for the period 2003 to 2009 to affirm if the notion that increased competition concerning a single EU market is similar to the financial stability issue of the European financial system. The findings of the study validated the competition stability view in the case of the EU except for the new member countries group.

3. Methodology

3.1. Data and Definition of Variables

The dynamic panel data estimation is used in this study with a special focus on Nigeria and Malaysia, comprising of 16 Nigerian and 10 local Malaysian commercial banks for the period (2009–2019), totalling 286 observations. The study selected 16 banks in Nigeria out of 20 banks according to the availability of data. The variables were sourced from unconsolidated bank statements, whereas the

macroeconomic variables are sourced from the World Bank Indicators."

3.1.1. Firm Value

Total enterprise value or firm value is an economic measure reflecting the market value of a business. This study adopts the enterprise value to capture the overall market value as an economic measure useful for the firm valuation to help identify undervalued firms (Lifland, 2011; Bhullar & Bhatnagar, 2013; Olalere et al., 2020), unlike other studies (Jihadiet al., 2021; Cahyo et al., 2021) that use Price Book Value (PBV) proxy, among others. The equity value + total debt– cash & cash equivalents + preferred stock + minority interest measured the enterprise value. Hence, the firm value is measured as enterprise value divided by earnings before interest, taxes, depreciation, and amortization (EV/EBITDA).

3.1.2. Financial Innovation and Bank Competition

This study uses financial R&D intensity often regarded as intangible assets and part of technological resources. It is calculated by dividing financial R&D intensity by total revenue (Syed et al., 2016; Cortez et al., 2015).

Theoretical views argued that exploiting economies of scale and efficiency results in to increase in profit. This study follows the existing literature, such as Djalilov and Piesse (2016), Sinha and Sharma (2016), and Yao et al. (2018), who measured bank competition (i.e. Herfindahl-Hirschman Index) as the sum of the square of the market square of individual banks.

$$HHI = \sum_{i=1}^{n} \left(\frac{\text{Assets}_{it}}{\text{Assets}_{nt}} \right)^2 \qquad (1)$$

Where Assets_{it} represents the assets of the individual bank and Assets_{nt} represents the assets of all banks.

3.1.3. Control Variables

The size of banks is measured by the natural log of total assets (Smirlock, 1985; Lee & Isa 2017). We expect a positive association between size and firm value. The GDP growth is used to document the influence of macroeconomic factors on bank profitability (Sinha & Sharma, 2016; Dumicic & Ridzak, 2013). According to well-documented literature, it is expected that the association between GDP growth and firm value is positive.

Banks that disclose higher revenue offer vital future opportunities from the investor's point of view. Based on empirical evidence, there is a positive association between and firm value (Hoyt & Liebenberg, 2011; Tahir & Razali, 2011). The study measures inflation using the annual change in the consumer price index (Oyebowale, 2019).

3.2. Model Specification

The study uses dynamic panel data (sys-GMM) to tackle the problem of intrinsic endogeneity, heteroscedasticity, and autocorrelation problems. The existence of heteroscedasticity is a major concern in regression analysis and the analysis of variance, as it invalidates statistical tests of significance that assume that the modelling errors all have the same variance. By using the two-step GMM estimator, the typical heteroscedasticity issues are solved in the models. Before estimating the dynamic panel model, the "Sargan test and Arellano-Bond test for autocorrelation are conducted" to confirm that the models are valid and correctly specified. Accepting the null hypothesis of Arellano-Bond tests indicates that the models are consistent and that the two conditions for sys-GMM are met. The baseline model is illustrated in equation 2.

$$\begin{aligned}
FV_{it} &= \alpha_0 + \delta FV_{it-1} + \sum_{a=1}^{a} \beta_a FI_t^a + \sum_{b=1}^{b} \beta_b COMP_t^b \\
&+ \sum_{c=1}^{c} \beta_c ROA_t^c + \sum_{d=1}^{d} \beta_d SIZE_t^d + \sum_{e=1}^{e} \beta_e GDP_t^e \qquad (2) \\
&+ \sum_{f=1}^{f} \beta_f INFL_t^f + \sum_{g=1}^{g} \beta_g FI*COMP_t^g + \upsilon_{it} + \mu_{it}
\end{aligned}$$

Where ε_{it} = idiosyncratic shocks, $i = n^{th}$ firm, $t^{th} = t^{th}$ year, FI represents the financial innovation, COMP represents Herfindahl-Hirschman Index, ROA denotes return on assets, SIZE represents the total asset of banks, GDP denotes gross domestic product while INFL represents the inflation rates.

4. Results and Discussion

4.1. Descriptive Statistics

The descriptive statistics of the variables are summarized in Table 1.

The firm value has a mean of 0.0957 (9 percent) for Nigerian commercial banks, while the mean for Malaysian banks is 0.1097 (10.9 percent). The financial innovation (FI) of Nigerian banks has a mean of 20 percent and the mean of Malaysian banks is 11 percent. Furthermore, the bank competition (COMP) average is 8 percent for Nigerian banks and approximately 2 percent for Malaysian banks. This implies that the commercial banks in both countries have less monopoly power in the economy. The average return on asset ratio for Nigerian banks is 2 percent, while the average return on asset for Malaysian banks is 6 percent. In Nigeria, the size of the bank has a mean of N17 million, while the mean of Malaysian banks is RM19 million. The mean of GDP growth is 1.5 percent for Nigeria and 4 percent for Malaysia. The mean inflation rate in Nigeria is 11 percent and 2 percent in Malaysia.

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Table 1: Summary of Descriptive Statistics

Variables	No	All Banks Mean	SD	No	Nigerian Mean	Banks SD	No	Malaysian Mean	Banks SD
FV	286	0.10111	0.05927	176	0.09573	0.06886	110	0.10973	0.03810
FI	286	0.17100	1	176	0.20600	1	110	0.11500	1
COMP	286	0.06078	0.23106	176	0.08783	0.29089	110	0.01752	0.02589
ROA	286	0.03997	0.06414	176	0.02261	0.02868	110	0.06773	0.09040
SIZE	286	18.0821	02.7045	176	17.7224	03.2956	110	18.6576	01.0696
GDP	286	0.03140	0.02159	176	0.02175	0.01507	110	0.04684	0.02153
INFL	286	0.08013	0.05235	176	0.11781	0.02624	110	0.01986	0.01015

Note: FV: Firm value; FI: financial innovation; HHI: Herfindahl-Hirschman Index; ROA: return on assets; SIZE: bank size; GDP: GDP growth; INFL; inflation.

Table 2: Result of Firm Value (FV) Sys-GMM Model

Variables	All Banks Model 1 Coef.	Nigeria Model 2 Coef.	Malaysia Model 3 Coef.
LFV	0.3631***	0.1649	0.5459***
FI	−1.3410**	−1.1149*	0.0030*
COMP	−4.6565***	−1.5031**	0.0151***
ROA	−0.0706***	−4.3590**	−0.0148
SIZE	−3.9229***	−6.4275	−0.0799***
GDP	−2.5976**	−5.9079*	−0.0436***
INFL	−0.0829**	0.4174**	−0.0102**
FI * COMP	−2.7649***	4.6362**	0.0163***
_cons	−5.2929***	−42.2199	0.0212***
AR1	−2.4613 (0.0138)	−1.5368 (0.1244)	−2.1556 (0.0311)
AR2	0.0804 (0.9359)	1.1834 (0.2366)	−0.2845 (0.7760)
Hansen Test	18.6939 (1.0000)	0.5589 (1.0000)	12.1852 (1.0000)
F Test	2875.87*** (0.0000)	257.71 (0.0000)	1535.86 (0.0000)
No of Instruments	62	62	62
Observations	286	176	110

Note: ***Indicates significant at 1%, ** at 5%, * at 10%.

4.2. Discussion

The coefficient estimates of the analysis are presented in Table 2 for the individual data at Nigerian and Malaysian banks.

The diagnostic tests of the sys-GMM estimator summarised in Table 2 validate that the models are specified correctly. Since the lag of firm value is significant and positive, this implies that the firm value is persistent.

The empirical model 1 indicates that financial innovation (FI) has a significant and negative impact on firm value. This implies that with a 1% decrease in financial innovation, the firm value will increase by 134 percent. Reduction in unsuccessful innovation will lead to higher firm value because high productivity and propensity help to transform small institutions to big enough to invest more in associated research and development. The finding is contrary to Chipeta and Muthinja (2018), Cortez et al. (2015), and Syed et al. (2016).

The bank competition has a significant and negative nexus with firm value. This implies that a decrease in the bank competition (COMP) by 1 percent will lead to an increase in the firm value by 465 percent. The plausible reason is that market domination will reduce profitability in a competitive market, while the reverse is the case in a concentrated market. Therefore, lowering unhealthy competition will foster the superior performance of banks. The findings are consistent with Uddin and Suzuki (2014). The return on assets has a significant and negative impact on firm value. Implying that a 1 percent decrease in return on an asset will lead to a 7 percent increase in firm value. The size of the bank has a significant and negative influence on firm value at 1%. This implies that with a 1 percent decrease in bank size, firm value increase by around 392 percent. The GDP growth has a significant negative impact on firm value. Implying that a reduction in unfavourable economic conditions by 1 percent will improve the firm value by around 259 percent, ceteris paribus. However, the inflation rate has a significant and negative effect on firm value. The interactive effect of financial innovation and bank competition (FI * COMP) has a significant and negative effect on firm value. This implies

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that the higher the financial innovation, the more negative the effect of bank competition on firm value.

Model 2 tested the relationship in the Nigerian context and found that financial innovation (FI) has a significant and negative effect on firm value. This implies that with a 1 percent decrease in financial innovation; the firm value will increase by around 111 percent. Financial innovation is an avenue for banks to increase firm value and gain a competitive advantage. The result revealed that banks with superior market capabilities could reduce sunk costs associated with unrealized innovation by utilizing more productive financial resources in their innovative efforts to improve firm value. The finding is contrary to Chipeta and Muthinja (2018), Cortez et al. (2015), Syed et al. (2016), and Ayadin and Karaaslan, (2014).

The bank competition revealed a significant and negative effect on firm value. This indicates that with a 1 percent decrease in bank competition (COMP), the firm value will increase by approximately 150 percent. Theoretical views have argued that increased competition makes the market highly vulnerable to crisis, and thereby is less efficient. Further implications are that commercial banks in a highly competitive environment are more likely to engage in less competitive activities to generate higher profit that is less beneficial to consumers. These findings are consistent with Uddin and Suzuki, (2014), who found a significant negative association with bank performance. The return on assets has a significant and negative impact on firm value. This suggests that a 1 percent decrease in profitability (ROA) will increase firm value by 435 percent. The bank size has no significant influence on firm value. The GDP growth has a significant and negative on firm value. The inflation rate also has a significant and positive impact on firm value. This suggests a 1 percent improvement in the inflation rate will lead to an improvement in firm value by around 41 percent. The interactive effect of financial innovation and bank competition (FI * COMP) has a significant and positive effect on firm value. This implies that the higher the financial innovation, the more positive the effect of bank competition on firm value.

Model 3 revealed that financial innovation (FI) has a significant and positive impact on firm value in Malaysian banks. This implies that with a 1 percent improvement in financial innovation (FI), the firm value will increase by around 0.03 percent. Financial institutions attain competitive advantage and achieve better performance through their capacity to invent and innovate. The plausible reason is that adopting or implementing new ideas, products, or processes captures the ability of banks to innovate and modify their firm characteristics to provide an avenue for an improved rate of return. The finding is consistent with Chipeta and Muthinja (2018), Cortez et al. (2015), Syed et al. (2016), and Ayadin and Karaaslan (2014) who supported the significant

contribution of financial innovation to bank financial performance.

The bank competition (COMP) has a significant and positive impact on firm value. The return on assets has no significant influence on firm value at a 1 percent significant level. The bank size has a significant and negative influence on firm value. Implying that a 1 percent decrease in bank size will increase firm value by around 7.9 percent. The GDP growth has a significant and negative impact on firm value for Malaysian commercial banks. This suggests that a 1 percent decrease in GDP growth will lead to an increase in firm value by 4 percent.

Similarly, the inflation rate has a significant and negative impact on firm value at 5 percent. The interactive effect of financial innovation and bank competition (FI*COMP) has a significant and negative impact on firm value. This implies that the higher the financial innovation, the more negative the effect of bank competition on firm value at 1 percent.

5. Conclusion

The global financial crisis of 2007–2008 was triggered predominantly through the significant wave of innovativeness due to information and communication technologies applied, seriously posing a challenge to the financial sector. This study examined the effect of financial innovation and bank competition on the firm value of banks using the dynamic panel data (sys-GMM) for the period (2009–2019), totalling 286 observations. The study addresses the limitations of prior studies through comparative study (e.g. emerging and developing economy). The empirical findings of this study are significant to policymakers, investors, managers, and" research scholars.

The determinants of the firm value in this study are financial innovation, bank competition, profitability ratio, bank size, GDP growth rate and rate of inflation, and the interactive effect of financial innovation and bank competition (FI*COMP). The study provides credence on the significance of innovativeness in the banking sector and that every sector of the economy is fundamental to surviving in an increasingly globalized world. The empirical results provide practical evidence that financial innovation facilitates improvements and supports the banks to respond to constant change through diversification of demand patterns. This confirms the notion that financial innovation is the real driver of economic progress, competitiveness, and economic development. This current study contributed to existing knowledge as prior studies on financial innovation are linked to profitability and have repeatedly lack logical consistency in extant literature. First, policymakers must address the weaknesses revealed by the financial crisis that led to the emergence of the various current financial regulatory framework to capture the risks caused by the financial innovation process.

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The study provides the further implication that the aim of the reforming process in any financial sector should be to balance innovation and progress, on the one hand, and financial safety and stability, on the other hand. The results from this study imply that management should recognize that competition is detrimental to the financial value and long-term stability of the firm. Therefore, it is expected that appropriate regulations in the financial sector should focus on promoting efficient and healthy competition that also supports financial innovation. Regulations of such should exploit the trade-off between promoting competition that would improve the allocation of credit to productive areas and also reduce the failure of banks as a result of competition. Finally, investors, management, and policymakers should concentrate on promoting resourceful and healthy competition and an enabling environment that supports innovativeness that enables risk-sharing opportunities and enhanced firm value.

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