



Moderating Effect Of Financial Innovations On The Relationship Between Interest Rates And Financial Performance Of Commercial Banks In Kenya

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ABSTRACT

Profitability of commercial banks in Kenya have been declining since 2010 which was largely attributed to macro-economic factors, fiscal policies introduced by central bank of Kenya and market activities such as issuance of bonds and capping of interest rates. There has also been increased integration due to embracement of financial innovations in the banking sector however the moderating effects of Financial innovations on the relationship between GDP per capita and financial performance is still uncertain. The objective of this study was to investigate the moderating effect of financial innovation on the relationship between interest rates and financial performance of commercial banks in Kenya. The study was based on two theories: Interest parity theory and Constraint Induced Financial Innovation Theory. The study utilized secondary data for 10-year period as from 2011 to 2020. The target population of the study was 42 commercial banks that are licensed and supervised by the Central Bank of Kenya. Secondary panel data on financial performance of Commercial Banks was obtained from the individual institutions' financial reports while data on macroeconomic factors will be obtained from both Central Bank of Kenya and Kenya National Bureau of Statistics. Return on assets was used to measure financial performance. The study found a moderating effect of interest rates on financial performance of commercial banks in Kenya ($b = -5.292$, $t = -2.202$, $p = 0.028$). This study concludes that when a bank's innovations are at the highest, it can achieve a very high Return on assets even when it keeps its interest rates very low. The study recommends that banks should implement the highest degree of innovations, which will enable them achieve very high Return on assets even when they keep their interest rates very low.

Keywords: Financial Innovations, Interest rates, Financial Performance, Commercial Banks.

INTRODUCTION

Background of the study

Commercial Banks play an important role in the economic resource allocation of countries and contribute to economic growth of the country by making funds available for investors to borrow as well as financial deepening in the country (Gikombo., & Mbugua, 2018). The banking sector is the backbone of every country's economy in the world. It implements and brings about economic reforms. Any change in this sector through technology has a sweeping impact on any country.

According to European Commercial Bank 2003, the definition of financial innovation is described as a factor which creates cost reduction in a product and the organization which are mainly banks or other service sector. According to Akhavein et. al. (2005) there are three types of financial innovations: institutional innovation, process innovations and product innovations. Macroeconomic variables are the elements that typify the national economy and business environment. In an economy, these macroeconomic factors are not within the influence of one individual firm (Brueggeman & Fisher, 2011). Macroeconomic variables influence the complexity and volatility of the business setting (San & Heng, 2013). Due to increasing globalization and technological advances, economic turbulence in other (international) economies might creep into the local business environment. In this era of globalization, it is important for financial institutions to be

strongly integrated with the global economy. Increased integration and the growing economic fluctuations require more attention to be paid to determine the effect of macroeconomic variables and the company's development (Simiyu & Ngile, 2015).

Interest rate is main tool of monetary policy and an important macroeconomic variable, which is positively linked with country's economic growth. Commonly, interest rate is said to be the cost of capital, means the price paid for money used over a certain time period. (Investopedia.com). Where the interest rates spreads are very high, the banks often lend to individual who are perceived as low risk, while low interest rate spreads lead to crossing out of individual borrowers who are perceived as high risk.

Financial wellbeing of the banking sector is linked to the economic wellbeing of the country. This is because of their financial intermediation role, financial inclusion role and financial asset transformation role. Further note that the banking sector control the money supply in circulation and act as economic stimuli through provision of capital to the SMEs as well as large corporations for entrepreneurial activities (Mutemi & Makori, 2019).

Both Micro and Macro-economic factors affect the performance of a business, microeconomics factors are controllable and the effect can easily be anticipated and controlled. However, macroeconomic factors are beyond the control of an organization and its variations affect the turbulence and volatility of the business environment. In Kenya, the central bank influences macroeconomic variables not only through economic and fiscal policies but also through market activities such as issuance of bonds and capping of interest rates. Banks are then forced to adapt to the changes in order to protect and safeguard their future financial performance. It is therefore imperative for banks to predict the heterogenous effect of these macroeconomic variables on future corporate performances (Broadstock, Shu, & Xu, 2011).

Increased integration through embracement of advanced financial innovations and the growing economic fluctuations require more attention to be paid to. Financial innovations have been used by banks as formidable strategic variables to outstrip any form of competition thus becoming an effective means by which banks can improve their performance while simultaneously being able to maintain their effectiveness in the market. However, financial innovations' effect on the strength and direction on the relationship between interest rates and financial performance is yet to be determined. This study therefore addressed this gap by empirically examining the moderating effect of financial innovations on the relationship between interest rates and Financial Performance of Commercial Banks in Kenya. The study used a more advanced technique of analysis, Panel data, and covered a 10 Years Period (2011-2020).

LITERATURE REVIEW

Theoretical Framework

Interest rate Parity Theory

The theory was developed by Keynes in 1936. The theory is of the notion that the variations in the rate of interests between one nation's currency and that of its counterparts in other countries who trade across borders account for the fluctuations in the nominal rate of interest. The theory rests on the notion of the differences in interest rates of other economies and the local economy. Parity condition rests on the idea that the differences in interest rate for 2 different currencies is accounted by a discount or premium for the forward rate of exchanges on the foreign currency whereby there is no trading activity as regarding selling and buying of currency in the market (Bhole & Dash, 2002). This theory was relevant to this study because it relates the existence of parity which performs a vital function in banking transactions. Banks charge interest on loans in order to make profits so as to sustain market share and perform their role of intermediation efficiently. Thus, the financial performance of banks are often affected by the rate of interest charge on loans. Increased interest rates lead to higher profitability while decreased interest rates leads to lower profitability and hence poor financial performance of banks.

Constraint Induced Financial Innovation Theory

The theory was developed by Silber in 1983. Silber argues that the entities have a purpose of maximizing their profits and this is the main factor contributing to innovations. The theory stated that the main motive for embracing financial innovation in a firm is to improve its financial position. However, in the process of improving financial performance a firm faces some constraints like

external handicaps such as policy and internal handicaps such as organizational management. The constraints not only give an assurance on the stability of the management they reduce the competence of any financial institution. Thus, financial institutions struggle towards removing or lessening or casting the constraints off through financial innovation (Silber, 1983).

The theory was relevant to this study because it sheds light on the reasons that make banks venture into financial innovations (Ryabov, 2019). Financial constraints significantly reduce the probability that a firm undertakes innovative projects. According to Silber (1975, 1983, Silber, 2004 cited in Kombe & Wafula, 2015) financial innovation occurs to remove or lessen the constraints imposed on firms. Firms facing imperfections (e.g. regulation, entry barriers) have the greatest incentive to innovate and boost profits because of the high shadow costs of such constraints (Silber 2004 cited in Kombe & Wafula, 2015).

Literature Review

Olalere et.al (2021) studied the moderating role of financial innovations on financial risks, business risk and firm value nexus. The study applies the balanced panel data to analyse the 16 commercial banks in Nigeria over the period 2009 to 2017 making up to 144 observations. The empirical results reveal that credit risk is significantly positive with firm value while liquidity risk, operational risk, market risk and solvency risk have a significant negative effect on firm value. Further results revealed that business risk is significantly negative with firm value. The financial innovation significantly moderates the relationship between financial risks, business risk and firm value of the banks. Other factors that significantly affects the firm value in the model of the study are bank size, GDP growth, diversification, profitability and Herfindahl-Hirschman Index. The study was conducted in Nigeria which doesn't clearly reflects Kenyan setup, more so observations of the study was limited.

Ivon Yossy, (2017) conducted a study on the moderating Effect of Innovation on Strategy-Financial Performance Relationship: Experience of "Batik" SMEs. Mixed method was used in the study for the reason that it can reveal more in-depth explanation about the phenomena. 71 managers of batik SMEs in Solo city participated and the result of the study showed that innovation significantly moderates strategy-financial performance relationship. Innovation is a pure moderating variable. The study focused on relationship between strategy and financial performance. The scope of the study was also shallow and not explorative.

Okibo and Wario (2014) using the descriptive survey research methodology, examined a random group of selected banks in Kenya to examine the impacts of e-banking on growth of client base. The research used purposive sampling to select three banks and stratified random sampling approach to ensure equal representation. They focused their study on services provided by the banks, availability of services, level of education and adoption, and the issues surrounding e-banking. They concluded that e-banking has influenced the development of the client base for the Commercial Banks in Kenya, by improving the accessibility of banking services to a larger populace in the nation.

Using descriptive survey research design, Ngumi (2013) conducted a research study to determine the impacts of innovative practices on the profitability of the Kenyan Commercial banks. The study sampled all the 43 commercial banks across the region and applied various linear regression scrutinies to investigate the statistical implication of several independent variables allied to the system. The results indicated that innovations in the banking system have greater influences on profitability of the financial institutions in Kenya.

The studies above provide valuable insights on interest rates and financial performance; however, they do so only partially. Given the volatile macroeconomic environment in Kenya, there is need for up to date research on the complex relationship between interest rates and financial performance. Basing on the foregoing, it is imperative to study the relationship between interest rates and financial performance in Kenya. This study therefore seeks to answer the question: what is the effect of interest rates on the financial performance of Commercial Banks in Kenya?

METHODOLOGY

This study focused on cross-sectional descriptive survey design. The population of this study was comprised of 42 commercial banks licensed by the Central bank of Kenya from 2011 to 2020. This was a census study and consequently there was be no sampling. The study used secondary data

obtained from the 42 banks' annual financial reports for a ten years' time period from 2011 to 2020. Data collected was checked for missing values, extreme values, errors and inconsistency as part of data cleaning. This involved the use of Histograms and Box plots to aid in data visualization with aim of detecting abnormalities. Data was analysed using Descriptive statistics, Panel Unit Root, Stationarity test, Co-integration Test, Hausman Test, and Post estimation diagnostic tests. Results of the analysis were presented through percentages, means, standard deviations and frequencies using tables.

Data analysis

The study targeted 42 commercial banks registered with CBK (2019), with each firm being studied for a period of ten years (from 2011 to 2020). To minimise truncated data, three banks, Chase Bank (K) Ltd, Dubai Bank Ltd, and Imperial Bank, Ltd which were placed in receivership in the 2015/2016 financial year, were dropped from the analysis, as they were missing roughly a half of their data. Unbalanced data sets might make some statistical models to be invalid (Maddala, 2001). However, CBA (Commercial Bank of Africa) and Giro Bank were included in the study as they only missed data for two and three years, respectively. CBA became defunct in 2019, having merged with the NIC Group (Mohammed, 2019). On the other hand, Giro Bank was acquired and absorbed by I & M Holdings in 2017 (CBK, 2018).

RESULTS

Consequently, of the 42 targeted banks, data were collected from 39 of them, giving a response rate of 92.86%. Each firm was studied for a period of ten years (from 2011 to 2020), except CBA and Giro Bank, giving a time series data of 385. The response rate reflected the view of Mugenda and Mugenda (2003) who indicated that a response rate of 70% and over is very good as it gives a representative sample for meaningful generalization and minimizes errors.

To test for moderation, panel data with 385 observations was used. To compute financial innovation, the three variables (value of KEPSS, mobile phone transactions and payment cards) in millions Kenya shillings were summed up and an average taken. The average was converted to natural logarithms and this constituted the variable, financial innovations. Summary statistics and histogram of financial innovation is displayed in Figure 12.

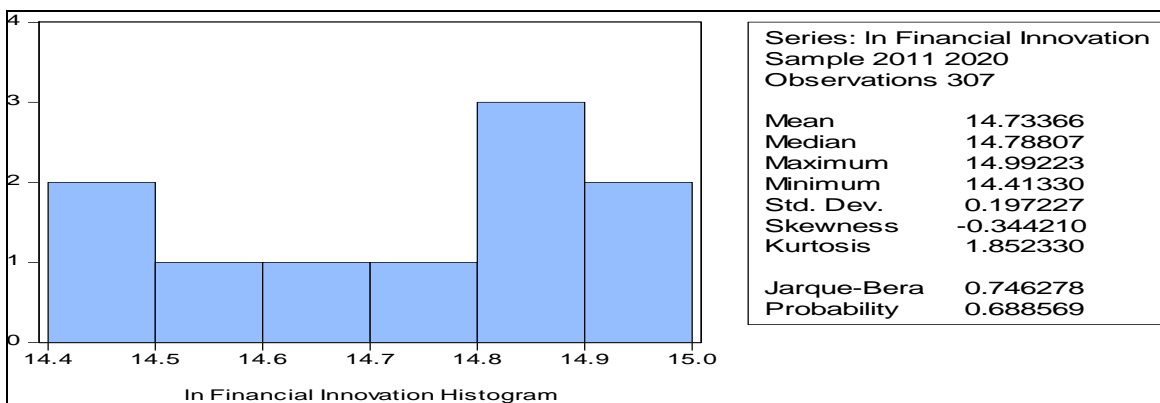


Figure 1: Summary Statistics and Histogram of Natural Log of Financial Innovations

Financial innovation (ln) ranged from a minimum 14.413 to a maximum 14.992, with a mean of 14.734. The median (14.788) was very close to the mean, suggesting the series could be normal. The standard deviation was 0.197, suggesting most values fell between from 14.537 to 14.931. The skewness (-0.344) and kurtosis (1.852) were all within the benchmark ± 2 (Field, 2005), suggesting that the distribution of financial innovation was normal. These conclusions were validated by results of the more explicit test for normality, *JB* (Jarque-Bera) = 0.746, $p=0.689$. The null hypothesis of the test is that the data is normally distributed. The results showed that the null hypothesis could not be rejected and hence the study concluded that the distribution of ln of financial innovations was normal. The results showed that transformation of the original data into natural logarithms ensured normality in the data.

First, before running tests for moderation, the effect of financial innovations on ROA was tested. A Hausmann test was conducted to determine whether a fixed or a random effects model was appropriate for the data. Results from the Hausman test, $\chi^2(1) = 1.49, p=0.222$, showed that the null hypothesis (that individual effects are not significantly correlated with at least one of the regressors) could not be rejected at 0.05 level. Thus, the results suggested that financial innovations were not significantly correlated with individual effects, showing that a random effects model was more appropriate for the data relative to a fixed effects model. The results of the random effects regression of ROA and financial innovations is given in Table 33. The random effects regression of ROA and financial innovations is given in Table below

Random effects Regression Analysis for ROA and Financial Innovation

N=307	B	Std. Error	t	Prob.	95% CI
Constant	-9.650	1.707	-5.65	0.00	-12.997 - -6.303
Fin. Innov.ln	2.195	0.335	6.54	0.00	1.537 – 2.852
<i>R</i> ² :					
Within = 0.155					
Between = 0.015					
Overall = 0.103					
Wald $\chi^2 = 42.76$					
Prob. = 0.000					
Rho=0.528					

Key: Fin. Innov.ln=Natural logarithm of financial innovation, CI=confidence interval

The Wald’s Chi- square test was found to be significant, $\chi^2(1) = 42.76, P<0.0001$, which indicated that the model adequately fitted the data. The results suggested that all the coefficients in the model were significantly different from zero. The value of *rho* (intraclass correlation) was 0.528, which indicated that about 53% of the variance in the error term was due to differences across panels.

The *B* coefficient for financial innovation was 2.195 and it was statistically significant at $p<0.05$ ($t=6.54, p<0.0001$). This suggested that showed that financial innovations have a significant and positive effect on financial performance of banks as measured by ROA. The results indicated that when natural log of financial innovations increases by one unit across time and between banks, ROA goes up by 2.195 or 481% ($r^2 = 2.195^2 = 4.818$). The 95% confidence interval for the coefficient ranged from 1.527 to 2.852. Thus, 95 times out of 100, when the population is sampled, there is 95% chance that the interval will cover the *B* coefficient for the variable. Since the confidence interval did not include a value of zero, it further supported the conclusion that the *B* coefficient was likely to be significant.

The within *R*² was 0.155, which indicated that financial innovations could explain about 16% of the variance in each bank. On the other hand, the between *R*² was 0.015, which showed that financial innovations could account for just about 2% of the variation between different banks. Overall, financial innovations could explain about 10% of the variation between and within banks.

Standardized beta coefficients were not reported for panel data because they are meaningless. Instead, confidence limits were reported. This is because standard deviation in panel data is not clear whether it applies to the whole sample (pooled) or within each panel separately and what each means (Park, 2011; Baltagi, et al., 2013).

Financial Innovations and Interest Rates on Financial Performance of Commercial Banks in Kenya

Table 35 presents results on the moderating effect of financial innovations on the effect of interest rates on financial performance of commercial banks in Kenya.

Financial Innovation and Interest Rates On ROA

N=307	B	Std. Error	t	Prob.	95% CI
Constant	-82.24	31.798	-2.586	0.010	-144.843 - -19.639
intRateIn	28.171	11.915	2.364	0.018	4.713 – 51.628
Fin. Innov.In	15.837	6.434	2.461	0.014	3.169 – 28.504
intRateXFIIn	-5.292	2.402	-2.202	0.028	-10.022 - -0.561

$R^2 = 0.115$
 $F(3, 273). = 11.82$
 $p = 0.000$

Key: Fin. Innov.In=Natural logarithm of financial innovation, CI=confidence interval. intRate=interest rate. **Source:** Survey Data (2022)

The *B* coefficient for the interaction between financial innovations and interest rates was -5.292 and was statistically significant at $p < .05$ ($t = -2,202$, $p = 0.028$). Moreover, the CI for the coefficient (-10.022 to -0.561) did not include a value of zero, suggesting that this coefficient could not be zero in the population. Thus, the study rejected the null hypothesis and concluded that there is a statistically significant moderating effect of Financial Innovations on the effect of interest rates on Financial Performance of Commercial Banks in Kenya.

Figure 13 graphs the interaction between interest rates and financial innovations on ROA.

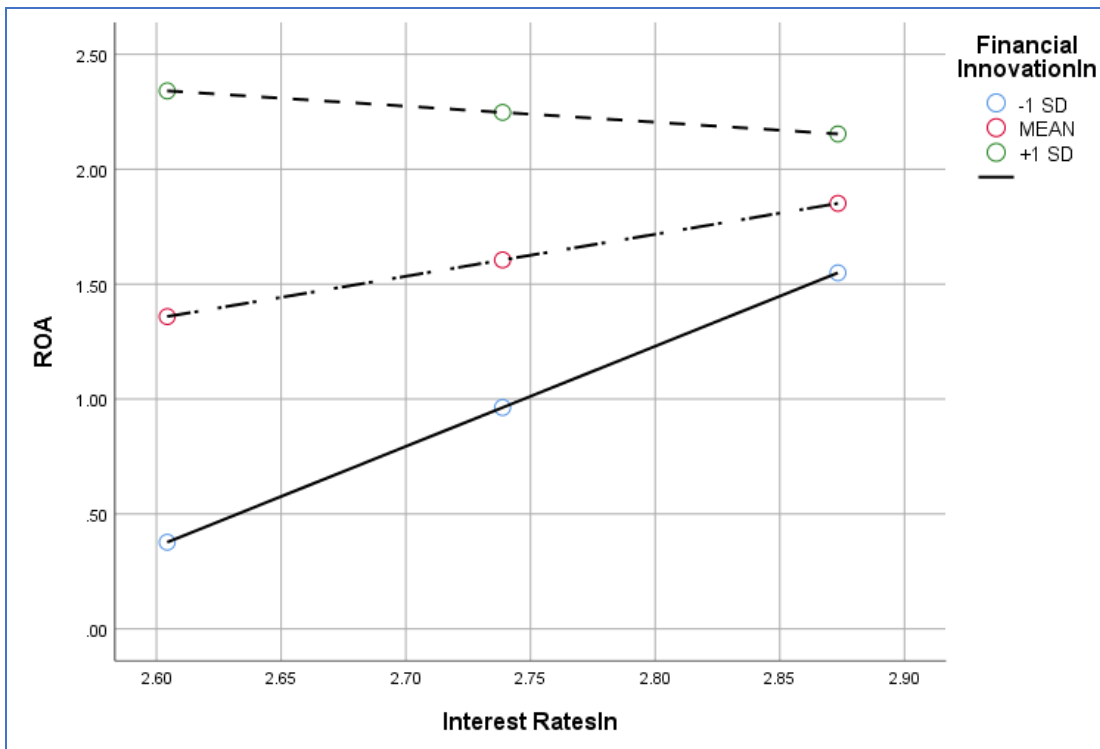


Figure 2: Interest Rates with Financial Innovations on ROA.

The graph shows the relationship between interest rates and ROA at three levels of financial innovations (mean, one standard deviation below and above the mean). The results show that when financial innovations are low, increasing interest rates will result in the greatest increase in ROA. When financial innovations are medium, ROA is higher but increases in interest rates will produce only small increases in ROA. On the other hand, when financial innovations are at the highest, the ROA will also be at the highest level. However, increasing interest rates at this point will result

either in little change or even slight decrease in ROA. The findings imply that bank performance is at the highest with the highest innovations. However, at this point, changes in interest rates produce little or even slightly decrease in ROA.

FINDINGS

This study found a moderating effect of financial innovations on the relationships between interest rates and financial performance of commercial banks in Kenya. The study found that bank performance is at the highest with the highest innovations. However, at this point, changes in interest rates produce little or even slight decrease in ROA. On the other hand, when financial innovations are low, ROA will also be low, but increasing interest rates will result in the greatest increase in ROA. The results suggest that manipulation of interest rates to improve ROA occurs only well when bank innovations are low. Once a bank has attained a very high level of innovation (mobile phone banking, ATMS, KEPSS), manipulation of interest rates does not lead to great changes in ROA. This study concludes that when a bank's innovations are at the highest, it can achieve a very high ROA even when it keeps its interest rates very low. This could be a novel and potentially revolutionary finding from this study.

There are few empirical studies that report the moderating effect of financial innovations on the effect of interest rates on financial performance of banks. This is one of such studies. For example, Olalere et.al (2021) studied the moderating role of financial innovations on financial risks, business risk and firm value nexus and found that financial innovation significantly moderates the relationship between financial risks, business risk and firm value of the banks. Yossy, (2017) conducted a study on the moderating effect of innovation on strategy-financial performance relationship. Okibo and Wario (2014) found that e-banking has influenced the development of the client base for the Commercial Banks in Kenya, by improving the accessibility of banking services to a larger populace in the nation. Ngumi (2013) reports that innovations in the banking system have greater influences on profitability of the financial institutions in Kenya. None of these studies look at the moderating effect of financial innovations on the effect of interest rates macroeconomic variables on financial performance.

The moderating effect of financial innovations on the relationship between interest rates and financial performance could be explained by the fact that, unlike GDP per capita, banks can, to some extent, manipulate interest rates. Commercial banks do not control GDP per capita but exercise some control on interest rates. For example, although the CBK sets out CBR, the bank can manipulate the interest rate, so long as it remains within the acceptable range. This study argues that innovations and interest rates are, to some extent, manipulable by commercial banks, and hence the significant moderating effect. However, the provenance of GDP per capita is external to the bank whereas innovations are internal, consequently, there is absence of any moderating effect.

CONCLUSION

This study concludes that when a bank's innovations are at the highest, it can achieve a very high ROA even when it keeps its interest rates very low. This could be a novel and potentially revolutionary finding from this study. This study argues that innovations and interest rates are, to some extent, manipulable by commercial banks, and hence the significant moderating effect. However, the provenance of GDP per capita is external to the bank whereas innovations are internal, consequently, there is absence of any moderating effect.

RECOMMENDATIONS

The moderation model showed that when a bank's innovations are at the highest, it can achieve a very high ROA even when it keeps its interest rates very low. Consequently, banks should implement financial innovations, which could allow them to reduce drastically the interest rates they charge on customers.

One limitation of this study was that time series data was only for a period of ten years. Other studies could be conducted with longer periods, which could improve the statistical power of tests. Regression findings from this study on interest rates was not absolutely conclusive. Other studies could be conducted to delineate more clearly the effect of interest rates on bank performance.

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