

Market Interest Rate and Profitability of Listed Commercial Banks in Kenya

Douglas Ragira Oywoki*, Dr. Munir Muganda and Dr. Alala Ondiek

Kibabii University, School of Business and Economics, P.O Box 1699-50200 Bungoma, Kenya

Received 12 Feb 2020, Accepted 15 April 2020, Available online 16 April 2020, Vol.8 (March/April 2020 issue)

Abstract

Banking sector remains an essential portion of any economy and it is among the main drivers. It is one of the sectors that assists to achieve Kenya's Vision 2030. Control measures of interest rates in Kenya due to accommodative economic plan with different administration has remained the basis of concern for the banking sector for a long period. A number of research have been performed in regard to the influence of market interest rate control on the income of registered banks within Kenya. However, only few authors have supported exploration on the topic of market terms of interest rates influence viability of listed money-making banks in developing economies particularly in Kenya. It was based on this contextual that this research was carried out. The research intended to scrutinize the influence of market interest rates on viability of listed money-making banks within Kenya. The four particular objectives were; to explore influence of real level of interest on viability of registered commercial banks at NSE in Kenya; to explore the influence of nominal interest rate on profitability of listed money-making banks within Kenya; to find out the influence of interbank level of interest on viability of listed profitmaking banks within Kenya and evaluate the controlling influence of bank size on correlation amid market interest rate and viability of listed commercial banks within Kenya. Longitudinal research design was embraced in this panel data. The scholar targeted eleven listed money-making banks in Kenya. Only listed banks were chosen for this research from 2003 to 2017. Eventually, 165 bank year data was involved in the sample. Data validity and reliability was undertaken to test for accuracy and consistency of the research instruments by involving professionals in finance. Document analysis was used to collect secondary data that related to market interest rate and profitability. Autoregressive distributed lag (ARDL) models were used and outcomes were within reach as depicted on tables and diagrams. The hypotheses testing for real interest rate, nominal interest rate, interbank rate and bank size was below 5% and significant. On the findings real interest rate, interbank rate, nominal interest rate and bank size have positive relationship on viability of listed money-making banks. The researcher found out that the estimated coefficient are positive for real, interbank and size and negative for nominal. It shows that real, interbank and size possess a progressive notable influence on ROA at 10% level whereas nominal has a negative notable influence on ROA at 10% level. The research results show that concentration on market interest rates influence banks' profitability positively and the influence is relatively significant. The study recommends there is obligation of the government to continuously monitor interest rate levels because it would aid to protect borrowers from exploitation by registered money-making banks at NSE in Kenya. Therefore, listed commercial banks should adopt other avenues for income generation and increase their bank size to be more profitable.

Keywords: Market interest rate, profitability, listed commercial bank in Kenya, bank size.

Introduction

Controlling measures of interest rates across the sphere due to changes of economic plans with different administration have remained the basis of interest in the financial sector for a long duration. Banking structure is a very important organ in any economy across the globe that aids businesses. Listed commercial banks have a capacity to promote the development of the country's economy. It assists a state to mobilize resources, decreases poverty and controls public money.

Further, when listed commercial banks roll out operations in a country speedy development is observed. Listed commercial bank contribute immensely to the country's fiscal development (Sergey, Alexandra, Pavel, & Elena, 2017).

Incorporation and liberalization of financial markets across the globe have brought instability in the global economy. Various economists and policymakers are keen on the variations of listed money-making bank's revenue affected by market interest rate. When variations can be projected at that moment appraising trade-offs between market interest rates stability and other policies turn out

Corresponding author's ORCID ID: 0000-0003-0671-2677
DOI: <https://doi.org/10.14741/ijmcr/v.8.2.16>

to be more likely. With this type of appraisal, policymakers had ability to put suitable weights on market interest rate policies and their relationship with other fiscal policies. Market interest rate is either payment received for postponing consumption or the expenditure associated with consuming when resources are limited. Customers with cash are prompted with two options; either spend the cash instantly or invest it for future use (El-Kassem, 2017).

Market interest rates are the major instruments of financial policy and a significant macro-economic variable associated with listed commercial banks profitability. Market interest rates is the amount received for funds utilized by a borrower. Listed commercial banks, due to their development function have a part to play in the processes of economic growth and its effectiveness affect fiscal progression. Financial services that listed commercial banks offer are different from other financial organisations and in return listed commercial banks charge interests on money borrowed (Wu & Liang, 2017).

Listed commercial banks profitability and market interest rate margins may be seen as indicators of effectiveness. Economies with poorly developed financial systems have high levels of profitability. High profitability margins are received by giving low returns on deposited funds and charging high market interest rates on credit. High market interest rates is a reflection of ineffectiveness of commercial banks. Entrenched in market interest rates are profitability, financial policy and effectiveness (Kiplangat, 2015).

Many research studies provided information on the link between profitability and market interest rate. However, hardly in Kenya has focus be on listed commercial banks. Nyapara (2012) examined the link between interest rates as well as the effectiveness of all registered banks within Kenya. The research wrapped up that there existed a progressive link between nominal interest rate changes on the income of banks. Ngure (2014) explored on the influence of interest levels on profitability of moneymaking banks within Kenya. The research concluded that interest rates took a substantial progressive result on success of money-making banks within Kenya at 95% level of trust. Nzioka (2013) coordinated a survey on the relationship that existed among firm size and financial performance. It was established that there was reasonable correlation between three of the studied factors of bank size. Oduor, Sichei, Tiriongo, & Shimba (2014) conducted a study on division and profitability of the interbank market in Kenya. The study established that Kenya's interbank market was partially and very much segmented by size. Additionally, the results acquired by various studies are not convincing on the influence of market interest rate on profitability.

This research was geared towards establishing the influence of market interest rates on the profitability of listed commercial banks within Kenya over fifteen years from 2003 to 2017. The paper expands awareness on the Kenyan banking industry which is of great significant to scholars, the authority, citizens, stakeholders, related

financial establishments and for decision makers. This formulates good guidelines and administration practices that promotes profitability in the industry.

2. Overview of listed Commercial Bank

In Kenya, financial sector encompasses of the Central Bank of Kenya which is a watchdog of the money-making banks; 28 national and 14 international moneymaking banks with branches, agencies and other channels around the nation; 1 loan finance firm; 8 representative offices of internationals commercial bank; 11 licensed deposit taking MFIs; 49 insurance firms; Post Office Savings Bank with a big setup of outlets across the nation; 79 foreign exchange bureaus; 3 accredited loan reference bureaus, 14 money remittance providers and nearly 200 deposit taking certified SACCOs with a market share of over 3 million Kenyans (CBK, 2017).

Target population comprised 11 registered banks at NSE (2017) namely; KCB, Co-op, Equity, Barclays, StanChart, CFC Stanibic, DTB, NBK, Housing Finance Corporation, National Industrial Credit and Investment & Mortgage bank. The researcher used Nairobi Security Exchange (2017) listed commercial banks because financial statements were uploaded online and hence collecting data was easy and quicker. These banks were carefully chosen due to their control of huge market stake. NSE (2017) annual report indicated among the 11 listed commercial banks jointly were able to account for 73.14% of the market holding anchored on branch size and financial strengths.

3. Market interest rate and Profitability

On the article, bank viability is considered by: return on asset which provides an indication of how efficiently administration use company asset to generate profit (Ghosh, 2007). Return on asset has been applied to measure profitability by Zeitun & Tian (2007), Salteh, Nwidobie, & Ghanavati (2015) in their previous study. The empirical findings are not conclusive on lucrateness of listed money-making banks as influenced by various variables.

Several theories suggests market interest rate that influence profitability. The exercise was established on Irving Fisher Theory of Interest, Liquidity Premium Theory, Economic Theory, and Liquidity Management Theory. Irving Fisher Concept of Interest states that real rate of interest is the difference of the anticipated rise rate and nominal rate of interest (Gylfason, 2017). According to Fisher nominal interest level is regarded as i , real interest level is r and inflation level is π , and thus a progressive correlation between a bank's profits and change in interest rate. Liquidity Premium Theory (Keynes 1946), argued that money is demanded for transaction, speculative, and precaution purposes. Therefore, viability of money-making banks is measured by the profit received from interests charged on loans. Focusing on the article, shareholder

concept showed in what manner commercial banks spread market interest rates by enhancing credit performance (Fowowe, 2017). Economic Theory suggested that when firm size increases, it permits an incremental advantage since firm size allows it to raise obstacles of entry to possible competitors and then achieve influence on economies of scale to achieve more profits (Wambari & Mwangi, 2017). The shift-ability concept of bank liquidity was deepened by Moulton (1918) who affirmed that if an institution retains a considerable amount of resources that can be transferred for currency without material damage in case of obligation, then there is irrelevance on maturities.

From the literature, market interest rate is a charge that customer pays to the bank and is meant for using borrowed money within a certain period (Scannella, 2016). Market interest rate comprises of real, nominal and interbank interest rate. Nominal interest rate is worked out by adding real interest rate and anticipated price rises level (Fisher,1975). In computing the real interest rate, we use the actual inflation rate (Mushtaq & Siddiqui, 2017). The inter-bank money market is a market in which commercial bank extends credit to one another on stated term (Khan, Kutan, Naz, & Qureshi, 2017). As a controlling variable, size of a bank is considered to affect viability of money-making banks (Lee, 2017).

From the literature, the situation is perceived that the influence of market interest rate on viability of listed money-making banks are not conclusive. The techniques used in the aforementioned studies generally consisted of the OLS, RE and FE approaches. Panel data occasionally experiences issues of autocorrelation or heteroscedasticity hence the researcher used of ARDL model.

4. Data source and Research methodology

This research used longitudinal research which is a research approach with recurrent observations of the same items over long periods of time. It involved tracking fluctuations over time (Bryman & Bell, 2017). The research used quantitative approach to make a decision concerning the influence of market interest rates on profitability. Also, it utilized longitudinal data to see the insights on the influence of market interest level inconsistency (Bryman & Bell, 2017).

The data gathering tool used in this research was document analysis. The researcher gathered relevant text, developed an organization and management scheme of the data, extracted original financial statements for annotation, assessed authenticity of the financial statements, explored financial statement’s agenda, biases, contextual information and asked questions about financial statements (Bowen, 2009). The research was carried out using secondary sources which were attained by analysing the content of financial reports of 11 banks quoted at NSE. This was appropriate for this research since all the audited information about the banks was freely accessible for the public as required by the company law

of Kenya Act. Bowen (2009) used document analysis to collect secondary data. Document analysis schedule was applied because the data gathered was secondary in nature. Mohajan (2018), said this method is never reactive and data collected is never subjected to likely misrepresentation. Document analysis has been used by Angers & Machtmes (2005) to explore views, environment factors and practices of middle school educators. Wild et al. (2009) conducted a research where engineers’ information essentials were investigated. Document analysis schedule was used to gather secondary data.

The following ARDL approach was applied to identify how market interest rate influenced revenue of listed money-making banks within Kenya. A distinct method for measuring the income of listed money-making banks within Kenya was employed. Thus, the researcher used the proxy ROA as accounting profitability measure and reflects the dependent variable. The explanatory variables were nominal interest rate, real interest rate, interbank rate plus bank size.

General ARDL typical is written as follows:

$$ROA = \beta_0 + \beta_1*ROA_{t-1} + \beta_2*RE_t + \beta_3*RE_{t-1} + \beta_4*RE_{t-2} + \beta_5*NO_t + \beta_6*NO_{t-1} + \beta_7*NO_{t-2} + \beta_8*IB_t + \beta_9*IB_{t-1} + \beta_{10}*IB_{t-2} + \beta_{11}*SIZE_t + \beta_{12}*SIZE_{t-1} + \epsilon_{it}$$

5. Empirical results

This area makes available the first-hand results of this article using descriptive, correlation and econometrics analysis.

Table 1: Summary of Descriptive Statistics

	ROA	Real	Nominal	Interbank	Size
Mean	3.629576	-1.839667	8.428333	6.885333	11.29498
Median	3.680000	-0.620000	8.800000	7.110000	11.47742
Maximum	7.700000	6.350000	15.75000	13.60000	13.22786
Minimum	-1.340000	-17.35000	1.460000	0.800000	8.275631
Std. Dev.	1.743540	6.127279	3.155258	3.305538	1.047188
Observations	165	165	165	165	165

Source: Researcher (2020)

As it is presented in table 1 above, between 2003 and 2017, the mean value of profitability which is measured by ROA is 3.629576% with a maximum of 7.700000 and a minimum of -1.340000. There is minimal variation of ROA close to the average value between 2003 and 2017 along Std. Dev. of 1.743540. The significance of this is that listed commercial banks with highest profitability is at 7.700000.

As demonstrated in Table 1 above, mean of the real interest rate is -1.839667%, highest and lowest value of 6.350000 and -17.35000 individually. These findings indicate that listed commercial banks recorded positive profits within the period 2003 and 2017. Standard deviation of real interest rate is 6.127279. This is evident that a real interest rate is fluctuating and therefore listed commercial banks in Kenya could adjust interest earning positively within the period 2003 and 2017.

It is as well evident from the descriptive statics that the mean for nominal interest rate is 8.428333% and the Std. Dev. is 3.155258. The best and worst are 15.75000 and 1.460000 individually. It denotes that listed money-making banks in Kenya have positive profits.

The mean value for interbank rates is 6.885333% and the Std. Dev. of 3.305538. The highest and lowest values are 13.60000 and 0.800000. This implies that borrowing between banks allowed banks to make positive profits.

The mean value for assets is 11.29498% and the Std. Dev. of 1.047188. The highest and lowest are 13.22786 and 8.275631. It is an indication of differences between banks in terms of assets in reference to the fifteen year lagged bank size. Large banks make more profits than small banks by enjoying their competitive advantage.

Table 2: Correlation Matrix

	ROA	Real	Nominal	Interbank	Size
ROA	1.000000				
Real	0.276335	1.000000			
Nominal	0.308033	0.550367	1.000000		
Interbank	0.279189	0.430407	0.864848	1.000000	
Size	0.550899	0.465965	0.380302	0.344634	1.000000

Source: Researcher (2020)

From Table 2 above there exists a positive correlation concerning ROA and actual interest rate, nominal interest rate, interbank rates and size given that they are more than 0.05. Correlation matrix indicates that ROA is significantly and positively associated with real, nominal, interbank level of interest and bank size.

Time-Series Analysis -Variables Trend

(a) Return on asset: Figure 1: below traces the movement of the variable ROA for the assessment period.

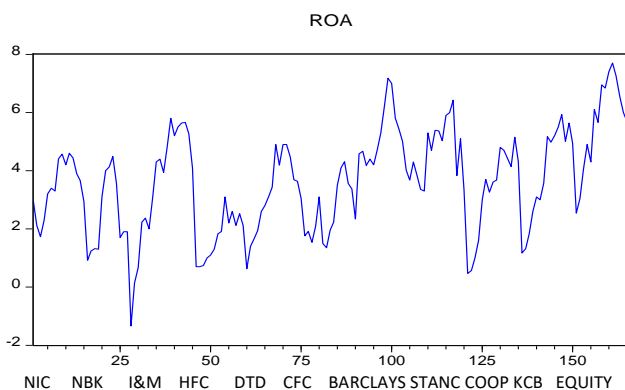


Figure 1: ROA (Source: Researcher (2020))

Figure 1 above shows an upward trend for each bank until 2016 where it started declining, this was due to the effect of capping that took place and set at 10%. Though NBK recorded a drop of 1.34% in the year 2015 before capping and started growing its profits slowly.

(b) Real interest rate: Figure 2: below shows the trend of real interest rate.

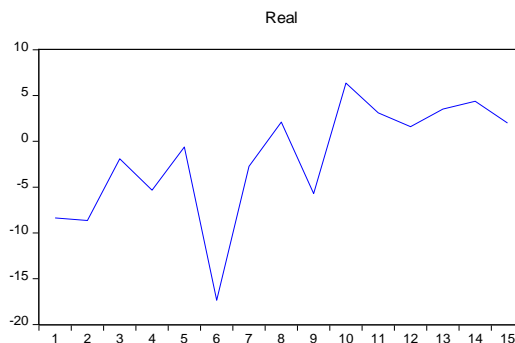


Figure 2: Real interest rate (Source: Researcher (2020))

Figure 2 above shows that average real interest rate went down to negative 17.35% in 2008 and this was due to the effect of post-election violence in 2007. Generally prices for commodities went high thus resulting to high inflation rate. The real interest rate started growing slowly but steadily and fell to -5.7% in 2011.

(c) Nominal interest rate: Figure 3: below shows the trend of nominal interest rate

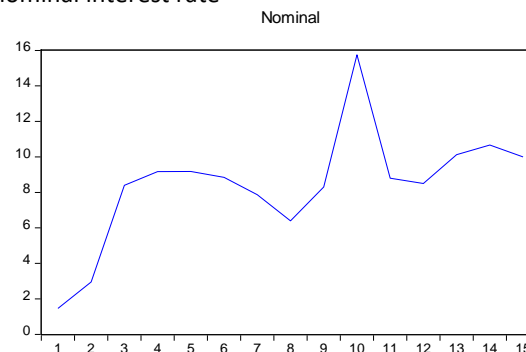


Figure 3: Nominal interest rate (Source: Researcher (2020))

From the figure 3 above, average nominal interest rate had an upward trend until 2008 and started declining due to the effect of post-election violence in 2007. The nominal interest rate started growing slowly but shot to 15.75% in 2012 and fell down in the following year. After 2013, the nominal interest rate started growing slowly and steadily until 14th September 2016 when capping took place at 10%.

(d) Interbank interest rate: The interbank level of interest within the period are shown in Figure 4.

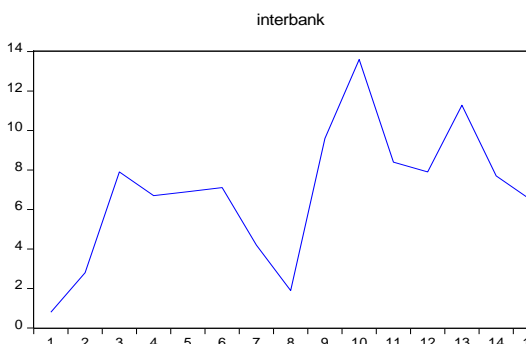


Figure 4: Interbank interest rate (Source: Researcher (2020))

From the figure 4 above, the average interbank interest rate had an upward trend with a slight drop in 2006 and started growing again steadily. In the year 2009 it started declining and went as low as 1.89% in 2010 indicating that banks had minimal liquidity issues. Thereafter the interbank interest rate shot to 13.6% in 2012 with minimal fluctuations up to 2015 then went high and later dropped to 6.5% in 2017.

Figure 5 below shows an upward growth of bank size in the fifteen years for each bank that is over the years, banks grew their asset base.

Stationary variable characteristics

The model study variables were tested using Unit Root Test, ADF Test and PP Test so that the researcher can explore the stationary and order of incorporation characteristics as given in the Table 3 below.

(e) Bank size: the bank size time-series log for the period.

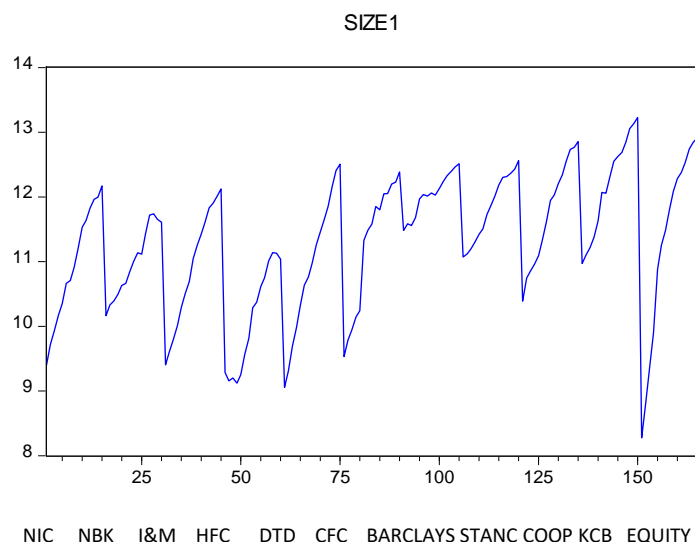


Figure 5: Bank Size (Source: Researcher (2020))

Table 3: Unit root Test result

Sequences	Order	Exogenous	ADF Test t-statistic (p value)	PP Test t-statistic (p value)
ROA	Level	Intercept	-3.50(0.0093)	-3.906424(0.0025)
		Trend and intercept	-3.98(0.0112)	-4.447885(0.0024)
Real interest rate	Level	Intercept	-6.33(1.0000)	-10.74688(0.0000)
		Trend and intercept	-4.93(1.0000)	-10.73660(0.0000)
	First Difference	Constant	-1.01(1.0000)	-90.57897(0.0001)
		Constant &Trend	-9.75(1.0000)	-90.08331(0.0001)
Nominal interest rate	Level	Intercept	-3.00(1.0000)	-11.93340(0.0000)
		Trend and intercept	-3.74(1.0000)	-11.84271(0.0000)
	First Difference	Constant	-5.63(1.0000)	-51.31993(0.0001)
		Constant & Trend	-6.01(1.0000)	-51.58589(0.0001)
Interbank interest rate	Level	Intercept	-1.63(1.0000)	-9.122552(0.0000)
		Trend and intercept	-1.66(1.0000)	-9.041189(0.0000)
	First Difference	Constant	-1.25(1.0000)	-26.65078(0.0000)
		Constant & Trend	-1.26(1.0000)	-26.45570(0.0000)
Size	Level	Intercept	-4.01(0.0004)	-4.602612(0.0002)
		Trend and intercept	-4.90(0.0005)	-5.186600(0.0002)

Author: Researcher (2020)

Result in Table 3 above confirms that null hypothesis for ROA and bank size was rejected. Hence, they are fixed I(0) in the level. Real, nominal and interbank variables, ADF tests statistic failed to discard null hypothesis. The PP test statistic demonstrates that null hypothesis is ruled out and

variables are stationary. ADF test within the first differences in the series demonstrate that null hypothesis did not reject the unit root test within the first differences hence they are non-stationary.

Table 4: ARDL Model output

Dependent Variable: ROA				
Variable	Coefficient	Std. Error	t-Statistic	Probability.*
ROA(-1)	0.807813	0.051104	15.80723	0.0000
Real	0.010213	0.015050	0.678634	0.4984
Real(-1)	-0.000382	0.017188	-0.022243	0.9823
Real(-2)	-0.040503	0.020671	-1.959430	0.0519
Nominal	-0.026182	0.059225	-0.442070	0.6591
Nominal(-1)	0.041617	0.059687	0.697258	0.4867
Nominal(-2)	0.174320	0.052978	3.290443	0.0012
Interbank	-0.032629	0.055876	-0.583951	0.5601
Interbank(-1)	0.039923	0.053951	0.739992	0.4605
Interbank(-2)	-0.187022	0.065801	-2.842228	0.0051
Size	0.670310	0.177433	3.777812	0.0002
Size(-1)	-0.556929	0.179255	-3.106915	0.0023
C	-0.993133	1.198160	-0.828882	0.4085
R-squared	0.800429	Mean dependent var		3.642883
Adjusted R-squared	0.784464	S.D. dependent var		1.749437
S.E. of regression	0.812192	Akaike info criterion		2.498233
Sum squared resid	98.94827	Schwarz criterion		2.744974
Log likelihood	-190.6060	Hannan-Quinn criter.		2.598407
F-statistic	50.13449	Durbin-Watson stat		1.995758
Prob(F-statistic)	0.000000			

*Note: probability values and whichever following tests do not justify for model selection.
Source: Researcher (2020)

Table 5: ARDL Model Analytical examinations outcomes

Test Statistics	LM Version	F Version
A: Serial Correlation	CHSQ (2) = 2.138792[0.0341]	F(1,149)=4.57429[0.0341]
B: Functional Form	CHSQ(2) = 5.044867 [0.0803]	F(2,148)=3.136044[0.0464]
C: Normality	CHSQ (2) = 45.41837[0.0000]	Not Applicable
D: Heteroscedasticity	CHSQ (7) = 22.14039[0.0360]	F(12,150)=1.964757[0.0312]

Source: Researcher (2020)

Table 6: Predictable Long-Run Values

Variable	Coefficient	Standard Error	Test Statistic	Probability
Constant	-0.993133	1.198160	-0.828882	0.4085
ROA(-1)*	-0.192187	0.051104	-3.760698	0.0002
D(Real(-1))	0.040503	0.020671	1.959430	0.0519
D(Nominal(-1))	-0.174320	0.052978	-3.290443	0.0012
D(Interbank(-1))	0.187022	0.065801	2.842228	0.0051
D(Size1)	0.670310	0.177433	3.777812	0.0002

Source: Researcher (2020)

The researcher included the second lag values of dependent and independent variable then the model used ARDL (2, 2). The equation is as following:

$$ROA = \beta_0 + \beta_1 * ROA_{t-1} + \beta_2 * RE_t + \beta_3 * RE_{t-1} + \beta_4 * RE_{t-2} + \beta_5 * NO_t + \beta_6 * NO_{t-1} + \beta_7 * NO_{t-2} + \beta_8 * IB_t + \beta_9 * IB_{t-1} + \beta_{10} * IB_{t-2} + \beta_{11} * SIZE_t + \beta_{12} * SIZE_{t-1} + \epsilon_{it}$$

Measured Long-Run Values for Model

The univariate cointegration checks the estimates of the long-run coefficients using ARDL (1, 2, 2, 2, 1) specifications which is given by AIC on Table 6.

The expected coefficients of the long-run relationship are important for size, real, nominal as well as interbank. The assessed coefficient is positive for real, interbank and size and negative for nominal. This indicates that real, interbank and size take a progressive statistically notable influence on ROA at 10% level but nominal takes a negative significant influence on ROA at 10% level. In addition, real, interbank and size have a positive significant association with ROA at the 10%.

The long run model that corresponds to ARDL (1, 2, 2, 1) for the relationship between return on assets and other explanatory variables is written as:

$$ROA = -0.993133 - (0.040503 * RE - 0.174320 * NO + 0.187022 * IB + 0.670310 * SIZE)$$

Table 7: Error Correction Model Estimates

Variable	Coefficient	Standard Error	Test Statistic	Probability
Constant	-0.993133	0.182640	-5.437669	0.0000
D(Real)	0.010213	0.011709	0.872276	0.3845
D(Real(-1))	0.040503	0.012151	3.333214	0.0011
D(Nominal)	-0.026182	0.048920	-0.535193	0.5933
D(Nominal(-1))	-0.174320	0.046255	-3.768688	0.0002
D(Interbank)	-0.032629	0.036232	-0.900556	0.3693
D(Interbank(-1))	0.187022	0.047479	3.939048	0.0001
D(Size1)	0.670310	0.125790	5.328807	0.0000
Cointeq(-1)*	-0.192187	0.032810	-5.857568	0.0000
R-squared	0.319503	Mean dependent var		0.021840
Adjusted R-squared	0.284152	S.D. dependent var		0.947400
S.E. of regression	0.801574	Akaike info criterion		2.449154
Sum squared resid	98.94827	Schwarz criterion		2.619974
Log likelihood	-190.6060	Hannan-Quinn criter.		2.518505
F-statistic	9.038140	Durbin-Watson stat		1.995758
Prob(F-statistic)	0.000000			

Source: Researcher (2020)

5. Interpretation of findings

The results of the ECM indicate that short-run values for size, real, nominal and interbank take 10% significance level. Values of error adjustment term $ecm(-1)^*$ is adverse and its significance is at 10% level. This means that ROA, real, nominal, interbank and size are co-integrated. The ECM coefficient presents nearly 19% of the uncertainty in return on assets remains compensated as a result of the short-run changes within the year.

The result for ARDL specification indicates the presence of long-run relation amongst real, nominal, interbank, bank size and ROA. The ARDL estimations for the long-run coefficients in the specification indicates that the relation amongst ROA, real interest rate, interbank interest rate and size are positive and statistically significant. Consequently, for the assessment period 2003 to 2017 there is significant proof to show that profits earned by listed money-making banks in Kenya have remained linked with market interest rate changes. Nevertheless, the long run coefficients of size is progressive and significant at 10% level showing that size has been associated with return on assets variations that bank size induces economies of scale. Similarly, the correlation between real, interbank interest rates and profitability is positive. This indicates that they are linked with variations of ROA. The value on level of nominal interest within the findings is negative and has a 10% significance.

According to the ARDL estimates real interest rate is positively interrelated with profitability. A coefficient estimate of 0.040503 and the probability value is 0.0519 indicates that the 10% level is significant. This is consistent with Mugabi (2017), he found out that interest rate had a positive correlation using bank's effectiveness and concluded that with advanced interest rate, the higher the business performance.

According to the ARDL estimates nominal interest rate is negatively related with profitability with a coefficient estimate of -0.174320. This means holding everything else constant, a 100% growth in nominal interest rate decreases ROA and the probability value of 0.0012 unveils that it is unfavorable and statistically notable at 10% level of significance in the long run. According to ARDL outcomes it supports the alternative hypothesis where there is significant relationship concerning nominal interest rate and viability of listed money-making banks. The finding of this article is consistent using the findings of Lopez et al. (2018) specified that there is link between anticipated profitability and nominal interest rate in the long-run. Lee (2017) went ahead to explain that nominal interest rate are adjusted in connection with the transformation of anticipated profitability.

According to the ARDL result, interbank interest rate had a positive relation with profitability. A coefficient estimate of 0.187022 and probability value of 0.0051 reveals that it is statistically significant at 10% level of significance. Interbank level of interest relates positively with ROA. This is attributed to the emphasis on relationship amongst banks and this is statistically significant. The result of the research supports working hypothesis of a positive and significant influence on viability of listed money-making banks. The above study outcomes are as well comparable to past research findings done by (King, 2015) who carried out a research and established that higher interest rates, inflation rates and interbank rates decrease the present discounted value of the assets. Sattar & Khan (2014) carried out research and said interest rates, profitability rates and interbank rates considerably impact listed commercial banks interest revenue.

A coefficient estimate of 0.670310 and probability value of 0.0002 reveals that it is statistically important at 10% level of significance and agrees with an alternative

hypothesis. The control of bank size and profitability on return on asset recommends that bank holding more assets tend to earn more returns. In reference to prior empirical evidence this study is consistent with Noor and Ahmad (2010) found out that use of economies of scale by large banks than smaller banks made larger banks attractive and money-making. The outcome implies that larger banks earn higher profit than smaller banks in Kenyan banking business. The result of this article is consistent with the finding of (Damena, 2011).

The researcher picked Irving fisher theory as the anchoring theory in this thesis. According to Irving Fisher, what the creditor receives after giving out credit is never payment but a promise for overheads expected to be done and because there is no inevitability about the future, obligation is that there is declaration that these overheads will be settled. The theory states that real rate of interest is the variance concerning anticipated rise rate and the nominal rate of interest. Findings in chapter four particularly regression analysis and correlation analysis indicates that changes in market interest influence profitability. This concludes that the findings in this thesis conforms to the market interest rates and profitability. The changes in interest rates being positively correlated with subsequent ROA and growth in assets. Profitability is determined by investment in net assets and the rate at which they earn returns, the researcher concludes that variations in interest rates are definitely associated with successive changes in ROA. So, to the extent that variations in nominal rates are due to ups and downs in probable inflation, the researcher appreciates the influence conjectured by Fisher.

Conclusions

The research intended to scrutinize the influence of market interest rates on profitability of listed commercial banks within Kenya. The research used longitudinal data and was carried out to attain the four particular objectives; to explore influence of real level of interest on viability of registered commercial banks at NSE in Kenya; to explore the influence of nominal interest rate on profitability of listed money-making banks within Kenya; to find out influence of interbank level of interest on viability of listed profitmaking banks within Kenya and determine controlling influence of bank size on the relationship between market interest rate and viability of listed money-making banks within Kenya.

This research applied ARDL, descriptive and correlation analyses to search for the influence of market level of interest on lucrativeness of registered banks at NSE found by ROA. The dependent variable in this research was ROA and explanatory variables included real interest rate, nominal interest rate, interbank rate and bank size. The research established that there was significant positive association with real, nominal, interbank and bank size with ROA. Listed commercial bank profitability was as well found to be negatively influenced by nominal interest rate

whereas real interest, interbank rate and bank size influenced profitability positively.

On the results above, the researcher resolved that real interest rate, interbank rate and bank size have a positive influence on viability of listed money-making banks within Kenya. Nominal interest rate has a negative influence on viability of listed money-making banks in Kenya as shown by regression model. The link amongst real interest rate, nominal interest rate, interbank rate and bank size were found be linear with ROA. This research also recorded that registered commercial banks at NSE make high profits where more than 91% of all the registered commercial banks' revenues are positive. This is shown by the positive ROA. Finally, this research similarly concluded that real, nominal, interbank interest rate and bank size all have positive correlation with ROA.

Since controlling measures touch on profitability of listed commercial banks, they need to diversify their products and services, increase adoption of technology and innovation to improve on efficiency to get alternative sources of finance. This approach will assist listed commercial banks to supplement profits that they receive from loans that customers and financial institutions borrow.

The demand for credit in Kenya normally decreases when real interest rate increases meaning that the need for loans in Kenya is inelastic and thus in-sensitive to fluctuations. Clients require mitigation of listed commercial banks by Central Bank. CBK must carry out checks continuously and impose fines on banks that accumulate real, nominal and interbank interest rate dishonestly to manipulate Kenyans.

Similarly CBK needs to collaborate with KBA in order to emphasize the need to put in place alternative business gateways for financial institutions. By doing so, commercial banks will earn revenue using non-interest avenues. The result is that there will be decrease in market interest rates since money-making banks will not require to increase interest rates to generate more returns. If the market interest rates are reduced, Kenyans can afford loans hence high businesses and economic development.

Further policy suggestion is that CBK and KBA together with the ministry of national treasury to develop strategies friendly and non-volatile. With these guidelines in place small banks will begin to enjoy economies of scale. In addition, strategies are needed that inspire financial appropriation that target countryside un-banked small businesses.

References

- [1]. Abrar, A. (2019). The impact of financial and social performance of microfinance institutions on lending interest rate: A cross-country evidence. *Cogent Business & Management*, 6(1), 1–21. <https://doi.org/10.1080/23311975.2018.1540072>
- [2]. Adelopo, I., Lloydking, R., Tauringana, V., & Lloydking, R. J. C. (2018). Determinants of bank profitability before, during, and after the financial crisis. *International Journal of*

- Managerial Finance, 14(4), 378–398. <https://doi.org/10.1108/IJMF-07-2017-0148>
- [3]. Aladwan, M. S. (2015). The Impact of Bank Size on Profitability “An Empirical Study on Listed Jordanian Commercial Banks.” *European Scientific Journal, ESJ*, 11(34). Retrieved from <https://eujournal.org/index.php/esj/article/view/6729>
- [4]. Al-Homaidi, E. A., Tabash, M. I., Farhan, N. H. S., & Almaqtari, F. A. (2018). Bank-specific and macro-economic determinants of profitability of Indian commercial banks: A panel data approach. *Cogent Economics & Finance*, 6(1), 1548072. <https://doi.org/10.1080/23322039.2018.1548072>
- [5]. Bhattarai, Y. R. (2015). Determinants of Lending Interest Rates of Nepalese Commercial Banks. *Economic Journal of Development Issues*, 39–59. <https://doi.org/10.3126/ejdi.v19i1-2.17701>
- [6]. Bikker, J. A., & Vervliet, T. M. (2018). Bank profitability and risk-taking under low interest rates. *International Journal of Finance & Economics*, 23(1), 3–18. <https://doi.org/10.1002/ijfe.1595>
- [7]. Blasques, F., Bräuning, F., & Lelyveld, I. van. (2018). A dynamic network model of the unsecured interbank lending market. *Journal of Economic Dynamics and Control*, 90(C), 310–342.
- [8]. Bod'a, M. (2018). Market power and efficiency as the source of performance in banking: a case study of the Slovak banking sector. *International Review of Applied Economics*, 32(5), 589–619. <https://doi.org/10.1080/02692171.2017.1360845>
- [9]. Bowen, G. A. (2009). Document Analysis as a Qualitative Research Method. *Qualitative Research Journal*, 9(2), 27–40. <https://doi.org/10.3316/QRJ0902027>
- [10]. Brooks, C. (2008). *Introductory econometrics for finance*. 2nd edition. Retrieved from <http://centaur.reading.ac.uk/20460/>
- [11]. Bryman, A., & Bell, E. (2017). *Business Research Methods*. Oxford University Press.
- [12]. Carlos, M. P., & Pérez, A. F. (2018). The impact of the interest rate level on bank profitability and balance sheet structure. *Revista de Estabilidad Financiera*, [object Attr] (Nov). Retrieved from <https://ideas.repec.org/a/bde/revist/y2018i11n6.html>
- [13]. Corbae, D. (2019). *Interbank Trading, Collusion, and Financial Regulation (Thesis)*. Retrieved from <http://gofman.info/Collusion/index.html>
- [14]. Daoud, J. I. (2017). Multicollinearity and Regression Analysis. *Journal of Physics: Conference Series*, 949, 012009. <https://doi.org/10.1088/1742-6596/949/1/012009>
- [15]. Dimand, R. W. (2017). Irving Fisher and Financial Economics: The Equity Premium Puzzle, the Predictability of Stock Prices, and Intertemporal Allocation under Risk. *Journal of the History of Economic Thought*, 29(2), 153–166. <https://doi.org/10.1080/10427710701335885>
- [16]. Eke, F. A., Eke, I. C., & Inyang, O. G. (2015). Interest rate and commercial banks' lending operations in Nigeria: A structural break analysis using chow test. *Global Journal of Social Sciences*, 14(1), 9–22–22. <https://doi.org/10.4314/gjss.v14i1.2>
- [17]. Elaatsch, F. (2003). Nominal rates, real rates, and expected inflation: Results from a study of U.S. Treasury Inflation-Protected Securities. *The Quarterly Review of Economics and Finance*, 43(3), 405–417. [https://doi.org/10.1016/S1062-9769\(02\)00145-X](https://doi.org/10.1016/S1062-9769(02)00145-X)
- [18]. El-Kassem, R. C. (2017). Determinants of Banks' Profitability: Panel Data from Qatar. *Open Journal of Accounting*, 06, 103. <https://doi.org/10.4236/ojacct.2017.64009>
- [19]. Fisher, I. (1930). A Simple Derivation of the Fisher Equation under Uncertainty on JSTOR. Retrieved October 13, 2019, from <https://www.jstor.org/stable/41948267>
- [20]. Fisher, I. (1975). Irving Fisher, Inflation, and the Nominal Rate of Interest. *The Journal of Financial and Quantitative Analysis*, 10(4), 675–685. <https://doi.org/10.2307/2330618>
- [21]. Fowowe, B. (2017). Access to finance and firm performance: Evidence from African countries. *Review of Development Finance*, 7(1), 6–17. <https://doi.org/10.1016/j.rdf.2017.01.006>
- [22]. Gichini, J. W. (2018). Effect of Supplier Development on Performance of Supermarket Chains in Kenya: A Survey of Supermarkets in Nairobi City County CBD. *Strategic Journal of Business & Change Management*, 5(2). Retrieved from <http://www.strategicjournals.com/index.php/journal/article/view/696>
- [23]. Ghosh, A. (2017). How do derivative securities affect bank risk and profitability? Evidence from the US commercial banking industry. *The Journal of Risk Finance*, 18(2), 186–213. <https://doi.org/10.1108/JRF-09-2016-0116>
- [24]. Güney, P. Ö. Telatar, E., & Hasanov, M. (2015). Time series behaviour of the real interest rates in transition economies. *Economic Research-Ekonomska Istraživanja*, 28(1), 104–118. <https://doi.org/10.1080/1331677X.2015.1028240>
- [25]. Gylfason, T. (2017). Negative Interest. *The American Economist*, 62(2), 139–148. <https://doi.org/10.1177/0569434516682714>
- [26]. Han, J.-J., & So, I. (2017). Analysis of the Relationship between Interest Rate and Bank Profitability (in Korean) (No. 2017–32). Retrieved from Economic Research Institute, Bank of Korea website: <https://ideas.repec.org/p/bok/wpaper/1732.html>
- [27]. Hoover, K. D. (2016). The Crisis in Economic Theory: A Review Essay. *Journal of Economic Literature*, 54(4), 1350–1361. <https://doi.org/10.1257/jel.20151338>
- [28]. Keynes. (1946). John Maynard Keynes 1937-1946: The Creation of International Macroeconomics on JSTOR. Retrieved October 13, 2019, from <https://www.jstor.org/stable/3590205>
- [29]. Khan, H. H., Kutan, A. M., Naz, I., & Qureshi, F. (2017). Efficiency, growth and market power in the banking industry: New approach to efficient structure hypothesis. *The North American Journal of Economics and Finance*, 42(C), 531–545.
- [30]. Khan, M. (2010). What Drives Interest Rate Spreads of Commercial Banks in Pakistan? Empirical Evidence based on Panel Data. *SBP Research Bulletin*, 6, 15–36.
- [31]. Khan, W. A., & Sattar, A. (2014). Impact of Interest Rate Changes on the Profitability of four Major Commercial Banks in Pakistan. *International Journal of Accounting and Financial Reporting*, 4(1), 142–154. <https://doi.org/10.5296/ijaf.v4i1.5630>
- [32]. Kiganda, E. O. (2014). Effect of Macroeconomic Factors on Commercial Banks Profitability in Kenya: Case of Equity Bank Limited. *Journal of Economics and Sustainable Development*, 5(2), 46–56.
- [33]. Kim, Y.-Y. (2018). Does monetary policy affect the long-run expectations of non-stationary real interest rates? *Applied Economics*, 50(12), 1342–1361. <https://doi.org/10.1080/00036846.2017.1361012>
- [34]. Kiplangat, C. J. T. (2015). The effects of interest rate spread on non-performing loans in commercial banks in Kenya.

- [35]. Lee, J. (2017). Does Size Matter in Firm Performance? Evidence from US Public Firms. *International Journal of the Economics of Business*, 16(2), 189–203. <https://doi.org/10.1080/13571510902917400>
- [36]. Li, Y. (2017). Interest rates and financial fragility. *Journal of Economic Dynamics and Control*, 82(C), 195–205.
- [37]. Lopez, J. A., Rose, A., & Spiegel, M. (2018a, October 2). Bank performance under negative interest rates. Retrieved from VoxEU.org website: <https://voxeu.org/article/bank-performance-under-negative-interest-rates>
- [38]. Lopez, J. A., Rose, A., & Spiegel, M. (2018b, October 2). Bank performance under negative interest rates. Retrieved from VoxEU.org website: <https://voxeu.org/article/bank-performance-under-negative-interest-rates>
- [39]. Mohajan, H. (2018, December 10). Qualitative Research Methodology in Social Sciences and Related Subjects [MPRA Paper]. Retrieved March 7, 2019, from <https://mprapaper.uni-muenchen.de/85654/>
- [40]. Montes, C. P., & Pérez, A. F. (2018). The impact of the interest rate level on bank profitability and balance sheet structure. *Revista de Estabilidad Financiera*, [Object Attr] (NOV). Retrieved from <https://ideas.repec.org/a/bde/revist/y2018i11n6.html>
- [41]. Moulton. (1918). *Commercial Banking and Capital Formation: III* on JSTOR. Retrieved October 13, 2019, from <https://www.jstor.org/stable/1821994>
- [42]. Mugabi, S. P. (2017). Influence of Interest Rates Determinants on the Performance of Commercial Banks in Kenya. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 6(2), 121–133.
- [43]. Muhammad, F., Mohamad, A. A. S., Hussin, M. Y. M., & Razak, A. A. (2012). Does Islamic Interbank Rate Influence Bank Characteristics and Economic Cycle in Malaysian Monetary Transmission? *Asian Journal of Finance & Accounting*, 4(2), 131–143. <https://doi.org/10.5296/ajfa.v4i2.1813>
- [44]. Muhindi, A. K., & Ngaba, D. (2018). Effect of Firm Size on Financial Performance on Banks: Case of Commercial Banks in Kenya. Retrieved from <https://ir-library.ku.ac.ke/handle/123456789/18501>
- [45]. Musawa, N., & Mwaanga, C. (2017). The Relationship between Interest Rate and Stock Market Index in Zambia –A Cointegration Analysis. *International Journal of Finance and Accounting*, 6(5), 154–158.
- [46]. Mushtaq, S., & Siddiqui, D. A. (2017). Effect of interest rate on bank deposits: Evidences from Islamic and non-Islamic economies. *Future Business Journal*, 3(1), 1–8. <https://doi.org/10.1016/j.fbj.2017.01.002>
- [47]. Mutunga, D., & Owino, E. (2017). Moderating Role of Firm size on the relationship between Micro Factors and Financial Performance of Manufacturing Firms in Kenya. *Journal of Finance and Accounting*, 1(2), 14–27.
- [48]. Ngure, I. M. (2014). The Effect of Interest Rates on Financial Performance of Commercial Banks in Kenya | School of Business. Retrieved October 13, 2019, from <https://business.uonbi.ac.ke/index.php?q=node/10276>
- [49]. Noah, A., Jacolin, L., & Brei, M. (2018). Credit Risk and Bank Competition in Sub-Saharan Africa (No. 2018–27). Retrieved from University of Paris Nanterre, *EconomiX* website: <https://ideas.repec.org/p/drm/wpaper/2018-27.html>
- [50]. Nyapara, E. A. (2012). The relationship between interest rates and profitability of commercial banks in Kenya (Thesis, University of Nairobi). Retrieved from <http://erepository.uonbi.ac.ke/handle/11295/13249>
- [51]. Nzioka, P. K. (2013). The relationship between firm size and financial performance of commercial banks in Kenya (Thesis, University of Nairobi). Retrieved from <http://erepository.uonbi.ac.ke/handle/11295/58967>
- [52]. Oduor, J., Sichei, M. M., Tiriongo, S. K., & Shimba, C. (2014). Working Paper 202 - Segmentation and efficiency of the interbank market and their implication for the conduct of monetary policy (Working Paper Series No. 2106). Retrieved from African Development Bank website: <https://ideas.repec.org/p/adb/adbwps/2106.html>
- [53]. Olweny, T., & Shiphoo, T. M. (2011). Effects of Banking Sectoral Factors on the Profitability of Commercial Banks in Kenya. Retrieved October 16, 2019, From */Paper/Effects-Of-Banking-Sectoral-Factors-On-The-Of-Banks-Olweny-Shiphoo/d2b0d261c3ccb484cb1faaab0b1b43ed62f16e6e*
- [54]. Ozcelebi, O., & Yildirim, N. (2017). Impacts of short-term interest rates on stock returns and exchange rates: Empirical evidence from EAGLE countries. *The Journal of International Trade & Economic Development*, 26(2), 228–255. <https://doi.org/10.1080/09638199.2016.1232747>
- [55]. Salteh, H. M., Nwidobie, B. M., & Ghanavati, K. (2015). Capital Structure and Financial Performance in Nigeria. *International Journal of Business and Social Research*, 5(2), 21–31. <https://doi.org/10.18533/ijbsr.v5i2.710>
- [56]. Samad, A. (2015). Determinants Bank Profitability: Empirical Evidence from Bangladesh Commercial Banks. *International Journal of Financial Research*, 6(3), 173. <https://doi.org/10.5430/ijfr.v6n3p173>
- [57]. Sattar, A., & Khan, W. A. (2014). Impact of Interest Rate Changes on the Profitability of four Major Commercial Banks in Pakistan. *International Journal of Accounting and Financial Reporting*, 4(1), 142–154. <https://doi.org/10.5296/ijaf.v4i1.5630>
- [58]. Saunders, M. N. K., Lewis, P., & Thornhill, A. (2012). *Research Methods for Business Students* (6 edition). Harlow, England ; New York: Financial Times/ Prentice Hall.
- [59]. Scannella, E. (2016). Theory and Regulation of Liquidity Risk Management in Banking (SSRN Scholarly Paper No. ID 2721364). Rochester, NY: Social Science Research Network.
- [60]. Sergey, D., Alexandra, B., Pavel, T., & Elena, S.-M. (2017). The Effect of Interest Rates on Economic Growth (No. wpaper-2017-300). Gaidar Institute for Economic Policy.
- [61]. Sherif, V. (2018). Evaluating Preexisting Qualitative Research Data for Secondary Analysis. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, 19(2). <https://doi.org/10.17169/fqs-19.2.2821>
- [62]. Topak, M. S., & Talu, N. H. (2017). Bank Specific and Macroeconomic Determinants of Bank Profitability: Evidence from Turkey. *International Journal of Economics and Financial Issues*, 7(2), 574–584.
- [63]. Toroitch, C. J. (2017). Effects of Interest Rates Stability on Kenya's Economic Performance. *Strategic Journal of Business & Change Management*, 4(2).
- [64]. Urbschat, F. (2018, July 9). The Good, the Bad, and the Ugly: Impact of Negative Interest Rates and QE on the Profitability and Risk-Taking of 1600 German Banks [Doc-type:workingPaper]. <https://doi.org/https://doi.org/10.5282/ubm/epub.56535>
- [65]. Wambari, K. D., & Mwangi, D. M. (2017). Effect of Interest Rates on the Financial Performance of Commercial Banks in Kenya. *International Journal of Finance and Accounting*, 2(1), 19–35.
- [66]. Were, M. (2014). What factors drive interest rate spread of commercial banks? Empirical evidence from Kenya. *Review*

- of Development Finance, 4(2), 73–82. <https://doi.org/10.1016/j.rdf.2014.05.005>
- [67]. Wilson, I., Huttly, S. R. A., & Fenn, B. (2006). A Case Study of Sample Design for Longitudinal Research: Young Lives. *International Journal of Social Research Methodology*, 9(5), 351–365. <https://doi.org/10.1080/13645570600658716>
- [68]. Wu, H., & Liang, D. T. China's productivity performance revisited from the perspective of ICTs. , *VoxEU.org* § (2017).
- [69]. Xiao, D., & Krause, A. (2017). Balancing Liquidity and Profitability Through Interbank Markets: Endogenous Interest Rates and Network Structures (SSRN Scholarly Paper No. ID 3078611). Retrieved from Social Science Research Network website: <https://papers.ssrn.com/abstract=3078611>
- [70]. Yin, Z., Yu, Y., & Huang, J. (2018). Evaluation and evolution of bank efficiency considering heterogeneity technology: An empirical study from China. *PLOS ONE*, 13(10), e0204559. <https://doi.org/10.1371/journal.pone.0204559>
- [71]. Zambom, A. Z., & Kim, S. (2017). A nonparametric hypothesis test for heteroscedasticity in multiple regression. *Canadian Journal of Statistics*, 45(4), 425–441. <https://doi.org/10.1002/cjs.11333>
- [72]. Zeitun, R., & Tian, G. (2007). Capital structure and corporate performance: evidence from Jordan. *Australasian Accounting, Business and Finance Journal*, 1(4), 40–61. <https://doi.org/10.14453/aabfj.v1i4.3>