Credit Risk, Capital Adequacy and Operating Efficiency Of Commercial Banks in Kenya

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ABSTRACT: *Commercial banks play an important role as financial intermediaries for savers and borrowers in an economy. All sectors depend on the banking sector for their very survival and growth. Operating efficiency for banks is therefore essential for a well-functioning economy. The banking sector in Kenya has grown tremendously over years in terms of numbers, size and profitability. Despite growth in the sector, challenges still remain, market risk, credit and operational risk posses a major challenge. Kenyan commercial banking is not the largest supplier of credit yet the largest in terms of assets in the financial services industry. Guided by operational efficiency theory, this study aimed at examining the effect of bank specific performance indicators, credit risk and capital adequacy on the operating efficiency of commercial banks in Kenya. Specifically, we sought to establish the effect of bank specific credit risk ratios (Net charge off to gross loans ratio, loan loss provision to total loans ratio, loan loss provision to equity, loan loss reserves to equity ratio) and capital adequacy ratios (Core capital ratio, risk-based capital ratio, total capital ratio and equity capital to total assets ratio) on their operating efficiency. The study adopted an explanatory research design and analysed the panel data using Fixed Effects Regression. The results of the study indicated that the previous year operational efficiency and risk based capital ratio positively and significantly affected the bank's operating efficiency. From the regression results, the overall R^2 of 0.4135 was derived, meaning that 41.35% of banks operational efficiency is as a result of credit risk and capital adequacy measures. This implies that the history of a firm's performance will definitely influence how a firm moves forward in an effort to streamline its operational strategies. Banks should seek mechanisms to improve their risk based capital ratio in order to improve operating efficiency and remain competitive in the market.*

KEYWORDS: *Commercial Banks, Operating Efficiency, Credit Risk, Capital Adequacy*

I. INTRODUCTION

Commercial banks in Kenya play an important role as financial intermediaries for savers and borrowers. According to Kenya Credit Providers Association (KCPA) commercial banks in the country disbursed over US$10 billion in loans. Non-formal financial institutions served the remainder of the loans market. These included credit union/SACCOs, which disbursed US$2 billion in loans, and micro finance institutions (MFI), which managed only US$300 million (KCPA, 2010). Oloo (2009) described the banking sector in Kenya as the bond that holds the country's economy together. Sectors such as the agricultural and manufacturing virtually depend on the banking sector for their very survival and growth. Operational efficiency is narrowly defined as the ability to deliver products and services cost effectively without sacrificing quality. It can also be defined as what occurs when the right combination of people, process, and technology come together to enhance the productivity and value of any business operation, while driving down the cost of routine operations to a desired level(Shawk, 2008). The end result is that resources previously needed to manage operational tasks can be redirected to new, high-value initiatives that bring additional capabilities to the organization. Relatively firms that are more efficient tend to maintain more stable levels of output and operating performance compared to their industry peers (Mills and Schumann 1985).

Banks operate efficiently by directing society's savings toward those enterprises with highest expected social returns and monitoring them carefully after lending society's scarce resources. In contrast, banks that simply operate with waste and inefficiency will slow down economic growth and reduce society's welfare (Athanasoglou *et al*, 2008). Efficiency in intermediation of funds from savers to borrowers enables allocation of resources to their most productive uses. The more efficient a financial system is in such resource generation and in its allocation, the greater its contribution to productivity and economic growth (Beck, *et al.* 2000). Management of operations has been usually a secondary concern, partly because it has been considered, for some reason, to be less critical to profitability (Said, 2012).

The importance of operating efficiency for banks was put into evidence by a study done on Indian scheduled commercial banks (Siraj and Pillai 2011). Its findings were that key determinants of operational efficiency were affected by the global financial crisis. This reinforces the need to understand the drivers of operational efficiency for proper risk management in commercial banks. Whilst the Kenyan banking sector is the largest in terms of assets in the financial services industry, it is not the largest supplier of credit (KCPA, 2010). The performance of the banking industry in Kenya has improved tremendously over the last decade, since only two banks have been put under CBK statutory management compared to 37 bank-failures between 1986 and 1998 (Mwega, 2009). However, in the same period the level of interest rates have remained high implying an attempt by commercial banks to pass their inefficiencies to consumers. This could be attributed to the inability to push their operational costs downwards. Despite the growth in the Kenyan banking sector, the sector still faces many challenges with respect to management of risks that banks are exposed to. Operating efficiency was one of the most critical risks faced by financial institutions in Kenya and Kenyan banks are yet to adopt model-based approaches in assessing their operating efficiency (CBK, 2011a). Risk-taking is an inherent element of banking and, indeed, profits are in part the reward for successful risk taking in business. However, excessive or poorly managed risk can lead to losses and thus endanger the safety of a bank's deposits. The management of financial institutions should recognize measure, monitor and control the overall levels of risks undertaken. Sound risk management systems enable managers to take risks knowingly, reduce risks where appropriate and strive to prepare for a future that cannot be predicted with absolute certainty.

A few studies on the Kenyan banking sector have addressed issues of corporate governance, evolution of e banking and profitability among others. However, no study has examined operating efficiency of commercial banks in Kenya, yet it is paramount for the sector to operate efficiently. Analysis of the effect of credit risk and capital adequacy on operating efficiency is intended to offer an insight to managers on one of the approaches to risk management in the banking sector. This paper examines the effect of credit risk and capital adequacy on operating efficiency of commercial banks in Kenya.

II.   THEORETICAL CONSIDERATIONS

This study was guided by the economic efficiency theory and the regulatory and efficient market-monitoring hypothesis. The economic efficiency theory states that firms should achieve their output at the lowest possible cost per unit produced. According to this theory, optimal production can be achieved by economies of scale. Thus, in the short run, maximum operational efficiency is attained at the level of output at which all accessible economies of scale are taking advantage of such efficiency. In the long run, lifting the capacity of existing systems can increase the optimal level of productive efficiency (Zerbe, 2001; Said, 2011). There are two perspectives of economic efficiency theory; allocative (price) efficiency criteria that states that for banks to operate at efficient level, then all bank products have to be priced optimally. This will in turn reduce unfair competition in the market and reduction in interest rate spreads. The productive efficiency (technical efficiency) which takes place when the business employs all of its resources efficiently, producing the most output from the least input (Sathye, 2001; Barr, et al 2002; Saad & El-Moussawi, 2009; Said 2012).The regulatory and efficient market-monitoring hypothesis states that regulators encourage banks to increase their capital to commensurate with the amount of risk taken by banks.

This may be achieved through efficient market monitoring, mechanisms that will call for increase in capital when capital positions are deemed inadequate (Calomiris and Kahn, 1991; Berger, 1995). Thus, an important factor contributing to a positive relationship between capital adequacy and credit risk management to banks efficiency relates to the actions of regulators and supervisors (Shrieves and Dahl, 1992; Jacques and Nigro, 1997; Aggarwal and Jacques, 1998; Editz et al., 1998). Banks could respond to regulatory actions forcing them to increase their capital by increasing asset risk (Kahane 1977, Koehn and Santomero, 1980 and Kim and Santomero, 1988). The need to control the high incidence of loan default occasioned by increased lending activities was a popular motive for reforms in financial systems in developing economies. The statutory minimum capital adequacy ratio for commercial banks in Kenya is 12%, which is measured by the ratio of Total Capital to Total Risk Weighted Assets (CBK, 2011). According to Gorton and Winton (1998) and Altunbas et al (2007), any empirical approach that is used to model the relationships between capital and credit risk also needs to take account of bank efficiency. Harley (2011), states that government should regulate investment policy for banks for them to be more efficient and be globally competitive. According to Ezeoha (2011), sound regulatory structures ensure adherence to laid down rules, guide the corporate governance behaviors of banks, and specially moderate the conduct of bank managements.

III. MODEL SPECIFICATION

The following model was used;

$$y = \alpha + \lambda\, y_{-1} + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \varepsilon$$

Where:

Y	=	Bank operating efficiency (opeff)
$\alpha, \lambda, \beta_1 \dots \beta_8$	=	Estimated coefficients
y_{-1}	=	Lagged Bank Operating Efficiency (opefflag)
X_1	=	Net charge off/ Gross loans (ncoagl)
X_2	=	Loan loss prov/ Total loans (llptl)
X_3	=	Loan loss prov/ Equity (llpe)
X_4	=	Loan loss reserves/ Equity (llrgl)
X_5	=	Core capital ratio (cca)
X_6	=	Risk – based capital ratio (trc)
X_7	=	Total capital ratio (tca)
X_8	=	Equity/Total asset ratio (cea)
ε	=	Error term

Operating Efficiency ratio = (Interest income + non-interest income + securities gains)/ (Interest expense + non-interest expense + provision for loan losses + taxes)

IV. METHODOLOGY

This study used an explanatory research design. Panel data was used. .Data was collected from 43 commercial banks out of 44, which existed and had the required data during the entire study period. The study used secondary data, which was retrieved from published statements of accounts of the 43 commercial banks both from the central bank of Kenya and the respective commercial banks for seven-year period 2005-2011. The respective ratios were then computed from the data retrieved from the statements of accounts of the banks. The collected data was analyzed using stata software. Descriptive statistics, correlation and estimation of panel data were done. Inferential statistics using the Hausman test checks were done in order to determine a more efficient model against a less efficient one. The study carried out the fixed effects regression analysis to examine the effects of bank specific credit risk ratios and capital adequacy ratios on operating efficiency.

V. RESULTS AND DISCUSSION

Summary and Descriptive Statistics

The summary statistics of the data showed that the average operating efficiency of all the banks was 1.197 with a minimum ratio of 0.067 and maximum ratio of 2.01. The assumption of linear regression models is that dependent variable has to be normally distributed. To check for the distribution of dependent variable, the histogram of operating efficiency for the period 2005 and 2011 showed normality as described in the bell shaped curve in the histogram of operating efficiency below
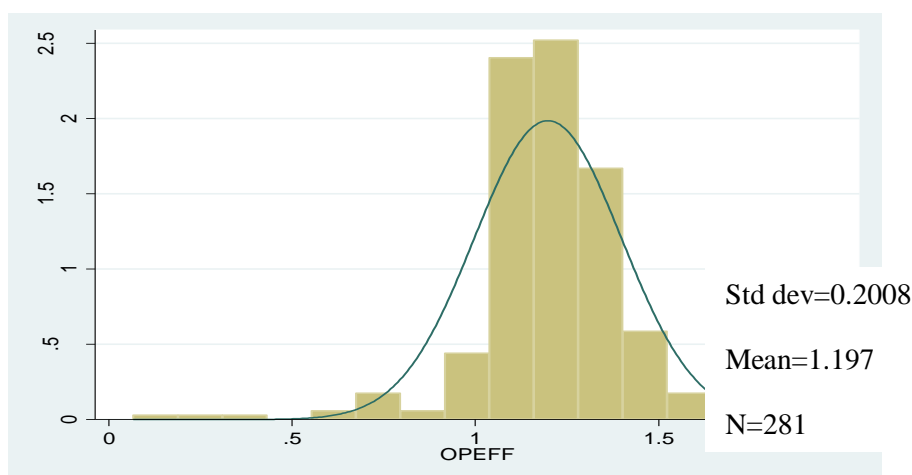

Std dev=0.2008

Mean=1.197

N=281

Figure 1: Histogram of Operating Efficiency

The trend in the annual mean of operating efficiency for the years 2005 to 2011 depicted that there was a gradual upward trend of the annual averages of operating efficiency during the study period. In 2005, the average was about 1.155 while in 2011 the average had increased to 1.18. The correlation matrix showed that there existed multicollinearity between loan loss provision/total loans and net charge off/gross loans (r >0.8). Stata automatically checks for multicollinearity when performing regression and omits the regressor variable in the process. The Hausman test output showed that fixed effect regression analysis was the best model to use than the random effect regression analysis since the p-value was significant (P<0.001)

Fixed Effects Regression with Credit Risk Ratios :

Credit risk ratios as performance indicators in the banks had the following variables; Net charge off/ average gross loans, Loan loss provision/ Total loans and advances, Loan loss provision/ total equity, Loan loss reserve/ gross loans and advances. The output results show that loan loss provision/ total loans and advances was omitted in the model because of multicollinearity. Based on adjusted R square, the model explained about 57 percent of operating efficiency. The overall model was also statistically significant at α=0.05. Therefore, it was concluded that credit risk ratios had a significant impact on operating efficiency of the banks. Individual t-test statistics showed that lagged efficiency was significant at α=0.05, controlling for other variables in the model. All other ratios, Net charge off/ average gross loans (ncoagl), Loan loss provision/ total equity (llpe), Loan loss reserve/ gross loans and advances (llrgl) were not significant at α=0.05. This implies that risk taking is about the management's attitude and bank shareholders should therefore ensure that the agency problems between them and management are minimized. Experienced and superior management should be employed to manage credit risk affairs of banks. Table 1 shows the fixed effect output with credit risk ratios.

Table 1: Fixed Effects Output with Credit Risk Ratios

Fixed-effects (within) regression				Number of obs	=	181	
Group variable: firm1				Number of groups	=	39	
R-sq: within = 0.0712				Obs per group: min =		1	
Between = 0.8890				avg =		4.6	
Overall = 0.5658				max =		6	
				F (4,138)	=	2.64	
corr (u_i, Xb) = 0.7411				Prob > F	=	0.0362	

opeff	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
opefflag	.182008	.0680291	2.68	0.008	.0474938	.3165222
ncoagl	.0765027	.2961792	0.26	0.797	-.5091336	.6621389
llptl	(omitted)					
llpe	-.0485567	.0463573	-1.05	0.297	-.1402191	.0431057
llrgl	.1657657	.4563658	0.36	0.717	-.736608	1.068139
_cons	1.00927	.0833	12.12	0.000	.8445607	1.173979

sigma_u	.13856221	
sigma_e	.0815096	
Rho	.74291923	(fraction of variance due to u_i)

F test that all u_i=0:   F(38, 138) =   3.29   Prob > F = 0.0000

Fixed Effects Regression with Capital Adequacy Ratios :

The specific independent variables within capital adequacy ratios were, Core Capital Ratio, Tier 1 Risk-Based Capital Ratio, Total Capital Ratio and Equity Capital to Total Assets Ratio. The regression equation was not significantly different from zero, p>0.05 at α=0.05. Therefore, we conclude that capital adequacy ratios had no effect on operational efficiency of banks. Based on the individual t-test statistics, the lagged operating efficiency was significant at α=0.05 after adjusting for all other ratios in the model. This implies that banks need not concentrate on capital adequacy as a way of improving their operating efficiency. As also seen in the table, the ratios explain 21 percent of operating efficiency (R-square=0.21). This is consistent with previous findings (Yener et.al, 2007) that the inefficient European banks appeared to hold more capital and take on less risk. Therefore, the CBK should not emphasize on banks increasing their capital levels in order to increase their operational efficiency. Table 2 shows the output of the fixed effects regression with capital adequacy ratios.

Table 2: Fixed Effects Regression Output with Capital Adequacy Ratios

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Fixed-effects (within) regression          Number of obs    =    238
Group variable: firm1                      Number of groups =    43

R-sq:  within = 0.0377                     Obs per group: min =    1
       between = 0.1024                                   avg =    5.5
       overall = 0.2148                                   max =    6

                                           F (5,190)       =    1.49
corr (u_i, Xb) = 0.3030                     Prob > F        =    0.1959
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opeff	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
opefflag	.1494388	.0639059	2.34	0.020	.0233827	.275495
cca	.0310791	.066665	0.47	0.642	-.1004195	.1625776
trc	.2521394	.2005894	1.26	0.210	-.1435288	.6478076
tca	.0001193	.0002498	0.48	0.634	-.0003735	.0006121
cea	-.0429956	.3526698	-0.12	0.903	-.7386467	.6526556
_cons	.9466975	.1175338	8.05	0.000	.7148588	1.178536

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sigma_u | .15866294
sigma_e | .11554484
    Rho | .6534518   (fraction of variance due to u_i)
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F test that all u_i=0:   F (42, 190) =   2.73   Prob > F = 0.0000

Fixed Effects Regression with Combined Variables

The results of the combined variables showed that, the entire model explains 41.35 percent of variations in operating efficiency. Further, the previous year's operational efficiency and risk based capital ratio were significantly different from zero at $\alpha = 0.05$. This implies that the history of a firm's performance will definitely influence how a firm moves forward in an effort to streamline its operational strategies. Similarly, the significance of the risk based capital ratio implies that commercial banks should maintain adequate liquid reserves to protect the firm, their investors and the economy as a whole. This confirms the placement of risk – based capital requirements by the regulators to ensure that banks have enough capital to sustain operating losses while maintaining a safe and efficient market as advocated by Calomiris and Kahn, 1991; and Berger, 1995. It is therefore important for the central bank to ensure full compliance with the minimum risk based capital requirements by commercial banks. Other ratios, net charge off/ gross loans, loan loss prov/ total loans , loan loss prov/ equity, loan loss reserves/ equity, core capital ratio, total capital ratio and equity to total asset ratio were not significantly different from zero. Table 3 shows the output results of fixed effects regression with combined variables.

Table 3: Fixed Effects Regression with Combined Variables

R-sq: within = 0.1445				Obs per group: min =	1	
between = 0.3141				Avg	= 4.6	
Overall = 0.4135				max	= 6	
				F(8,134)	= 2.83	
corr(u_i, Xb) = 0.3745				Prob > F	= 0.0062	

Parameters	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Operating efficiency lag	0.2573178	0.070938	3.63	0.000	0.1170148	0.3976208
Net charge off/Gross loans	0.0416664	0.2902521	0.14	0.886	-0.5324017	0.6157346
Loan loss prov/Total loans	0	(omitted)				
Loan loss prov/Equity	-0.019726	0.0463971	-0.43	0.671	-0.1114912	0.07204
Loan loss reserves/ Equity	-0.816306	0.6717076	-1.22	0.226	-2.144827	0.512214
Core capital ratio	0.090167	0.0652736	1.38	0.169	-0.0389325	0.219267
Risk -based capital ratio	0.4676	0.1638851	2.85	0.005	0.1434636	0.791736
Total capital ratio	0.000464	0.0002499	1.86	0.065	-0.0000301	0.000958
Equity/ Total asset ratio	-0.641403	0.3252955	-1.97	0.051	-1.284781	0.001975
_cons	0.820738	0.1218558	6.74	0.000	0.5797281	1.061747

VI. SUMMARY AND CONCLUSIONS

This study investigated the effects of credit risk and capital adequacy measures on operating efficiency of commercial banks in Kenya. The results show that previous year's operational efficiency, credit risk and capital adequacy measures combined explain about 41.35% of the bank's operating efficiency. Further, risk based capital ratio positively affect operating efficiency of the banks. The other ratios did not affect operating efficiency of the banks. Based on adjusted R square, credit risk ratios explained about 57 percent of operating efficiency. The overall model was also statistically significant at $\alpha=0.05$. Therefore, the credit risk ratios had a significant impact on operating efficiency of the banks, which implies that in a bid to minimize credit risk, banks should ensure that the agency problems between shareholders and management were minimized, at the same time, experience and superior management should be employed to manage credit risk affairs of banks. Based on the individual t-test, all other ratios except lagged operating efficiency were not significant at $\alpha=0.05$. Capital adequacy measures alone had no effect on operation efficiency. The ratios explained 21 percent of operating efficiency (R-square=0.21). This implies that banks need not concentrate on capital adequacy as a way of improving their operating efficiency. Further, the CBK should not emphasize on banks increasing their capital levels in order to increase their operational efficiency. Capital adequacy was the least important variable in explaining the variability in operating efficiency of banks among the two.

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