

Credit Risk, Liquidity and Operating Efficiency for Low and High Market Share 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 of the economy virtually depend on the banking sector for their very survival and growth. Operational efficiency is the ability to deliver products and services cost effectively without sacrificing quality. The Kenyan banking sector has grown tremendously over years in numbers, size and profitability. Despite growth in the sector, challenges still remain, market risk, credit risk and operational risk poses a major challenge. Kenyan commercial banks are yet to adopt a model that managers and any interested party may use to determine the level of operating efficiency. Guided by the efficiency theory, this study examined the effects of bank specific performance indicators, credit risk and liquidity on operating efficiency for low and high market share banks in Kenya. The study adopted an explanatory research design using panel data. Secondary data was obtained from annual financial statements and reports of 43 commercial banks operating in Kenya for the period 2005 - 2011. Data was analyzed using fixed effects regression model. Statistical significance checked by an F- test of the overall fit and t-tests of individual parameters. The results indicated that previous year's operating efficiency and credit risk proxy by loan loss provision to total equity ratio was significant while liquidity proxy by interbank ratio was insignificant in explaining operating efficiency. The overall R^2 of 0.4861 was derived meaning that 48.61% of banks operational efficiency is as a result of the study variables. This implies that the history of a firm's performance influences how a firm moves forward in an effort to streamline its operational strategies. Further, there exist structural statistical differences between low and high market share banks. Banks should seek on mechanisms to improve on these variables in readiness to improve operating efficiency and remain competitive in the market.

Keywords: *Commercial Banks, Operating Efficiency, Credit Risk, Liquidity, Market share*

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 of 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. According to CBK, 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 liquidity 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 liquidity on operating efficiency of low and high market share commercial banks in Kenya.

Theoretical considerations

This study was guided by the economic efficiency theory, the modern theory of financial intermediation and the liquidity transformation hypothesis, the regulatory and efficient market-monitoring hypothesis, and the efficient structures and price 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, 2012). 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) 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).

According to the modern theory of financial intermediation, an important role of banks in the economy is to create liquidity by funding illiquid loans with liquid demand deposits (Diamond 1984, Ramakrishnan and Thakor, 1984). More generally, banks create liquidity on the balance sheet by transforming less liquid assets into more liquid liabilities. Kashyap et.al, (2002) suggested that banks may also create significant liquidity off the balance sheet through loan commitments and similar claims to liquid funds. Liquid banks may be more efficient in the sense that, all other things being equal, an efficient bank can produce more output part of which includes liquid and other assets. According to Gorton and Huang, (2002), banks and banking systems that produce more liquidity than others perhaps can be viewed as both more 'liquidity efficient' and also less risky.

Liquidity transformation hypothesis postulates that bank deposits may be seen as credit agreements that present high liquidity and a low risk and which are founded on their sources attracted by the bank. Banks transform the deposits made mostly for short term into medium and long-term credits. This non-correlation between the due dates of attracted deposits and the due dates of the granted credits may lead to the emergence of liquidity risk for the bank; but the larger the bank's portfolio of assets and liabilities the lower the risk for breach of obligations. From the above literature, banks that create more liquidity are more efficient than those that create less liquidity hence a positive relationship between liquidity and operating efficiency of banks.

According to Gorton and Winton (1998), Altunbas et al (2007), any empirical approach that is used to model the relationships between liquidity 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 conducts of bank

managements on making credit decisions. The regulators encourage banks to increase their capital to commensurate with the amount of risk taken by the 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 efficiency structures and price hypothesis posits that the relationship between market structure and performance of any firm is defined by the efficiency of that firm. In cases where a firm is highly efficient relative to the competitors, the firm can maximize profit by maintaining its current size and pricing strategy or by reducing prices and expanding its operations (Berger, 1995). If the firm chooses to expand its operations, it will eventually gain market share and thus, concentration will be a consequence of efficiency. The relative market power hypothesis postulates that firms with large market share and well-differentiated products will be able to exercise market power when pricing their products and earn super normal profits. However, more market power in the loan market increases bank risk as high interest rates on loans result in the default of loan customer and aggravate moral hazards incentives of borrowers to shift into risks. Highly concentrated banking market

motivate institutions to accept more risk as they believe that they are too big to fail and that they are explicitly or implicitly protected by the government safety net. This argument was well supported by empirical studies that confirmed that the risk of bank failure rises in more concentrated markets (Boyd *et al.*, 2006; Nicolo and Loukoianova 2007).

Larger firms can obtain lower unit cost and higher profits through economies of scale. Brozen (1982), Gale and Branch (1982) argued that the structure of an industry may be due to superior production efficiency of firms. Production efficiency allows firms to increase their market share, thus leading to higher market concentration because of economies of scale and scope.

Competition in the financial sector - especially banks- is of great importance to country's economic growth. The degree of competition in the financial sector results in higher efficiency of financial services, better quality of financial products and improves the degree of financial innovation. The access of firms and households to financial services is influenced by the degree of competition in the financial sector (Classens and Laeven, 2004). Besanko and Thakor (1992), confirmed that governments could achieve the desired economic growth rate by encouraging banking sector competitiveness. An examination of studies related to market structure and competition in banking sector provides unclear factors, which have greater weight in terms of determining bank performance. An efficient banking sector is one that is able to absorb negative shocks and enhance financial system stability.

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)
- = Estimated coefficients
- = Lagged Bank Operating Efficiency (opefflag)
- = Net charge off/ Gross loans (ncoagl)
- = Loan loss prov/ Total loans (llptl)
- = Loan loss prov/ Equity (llpe)
- = Loan loss reserves/ Equity (llrgl)
- = Interbank ratio (ibr)
- = Loans ratio (lr)
- = Net loans to total deposits and borrowings (nltdb)
- X₈ = Liquid assets to deposits (ladstf)
- ε = Error term

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

Methodology

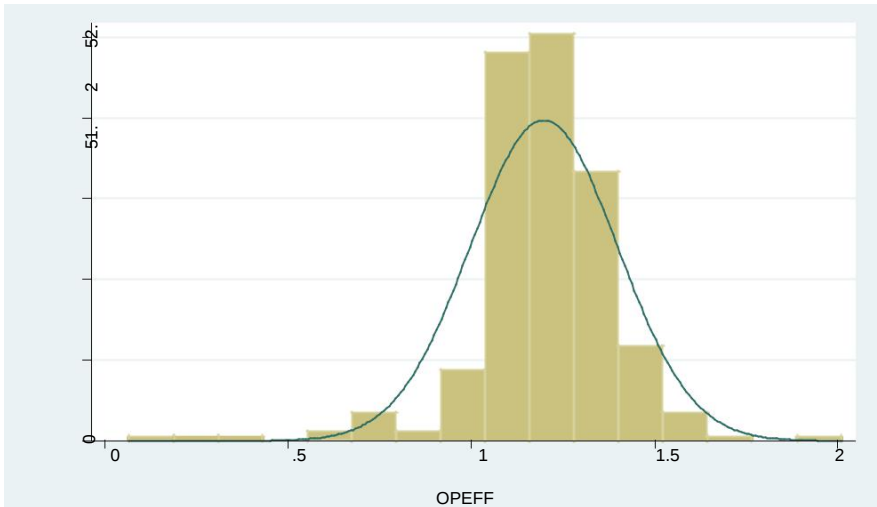
This study used an explanatory approach by using panel research design. Data was collected from 43 commercial banks that were operational in Kenya for seven-year period 2005-2011. Secondary data was retrieved from published financial statements of banks and the respective ratios for credit risk, liquidity and operating efficiency computed from the data retrieved for every year of study. Market share index of banks was also determined for each year of study as the weighted average percentage of each variable to the market average total. The study adopted the formulae, $(0.33 \times \text{percentage of net assets} + 0.33 \times \text{percentage of total deposits} + 0.33 \times \text{percentage of total capital} + 0.01 \times \text{percentage of total number of deposit accounts})$, (CBK, 2011). Banks were classified into either low or high market share using a simple average of market share index of (2.486).

The collected data was analyzed using stata software. Descriptive statistics for panel data, correlation matrix and estimation of panel data were run. Inferential statistics using the Hausman test checks were done 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 performance indicators, credit risk measures and liquidity measures on their operational efficiency. The checks for goodness of fit included coefficient of determination and analysis of the patterns of residuals. Statistical significance was checked by an F- test of the overall fit and t- tests of individual parameters. The t- statistic used to test for the significance of the individual parameters. The coefficient of determination R^2 , where $0 < R^2 < 1$, was used as a measure of the overall fit of the model. The study sought to identify the behavior of the full fixed effects regression output and the reduced optimal model that explains when variables below and above the average market share index are considered in the model.

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 and standard deviation of 0.2008. 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 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 removes the effect of time invariant characteristic from the predictor variable so that the predictor's net effect is assessed (Baltagi 2008).

Average Market Share Index Trend

The bar graph in Figure 4.4 indicates the average market share index trend of low and high market share banks for the year 2005 to 2011. The graph clearly shows that the average market share index of high performing banks was extremely higher compared to low market share index banks during the study period. The trend was almost constant across the years.

Figure 2: Annual Average Market Share Index Trend Determination of Optimal Combination of Proxy Variables

To determine the optimal combination of proxy variables for each category of the independent variables, credit risk and liquidity, various tests of different combinations of proxy variables together with their dummy variables were run in bid to establish the most optimal combination that would well explain the



dependent variable. According to this study, the optimal model is the model that statistically gives the best combination of proxy variables for credit risk and liquidity that may be used to explain operating efficiency of banks. The proxy variables for credit risk were net charge off/ gross loans (ncoagl), loan loss prov/ total loans (llptl), loan loss prov/ equity (llpe) and loan loss reserves/ equity (llrgl). The proxy variables for liquidity included, interbank ratio (ibr), loans ratio (lr), net loans to total deposits and borrowings (nltdb) and liquid assets to deposits (ladstf)

Table 1: Optimal Fixed Effects Output for Low and High Market Share Banks

Fixed-effects (within) regression	Number of obs	=	190
Group variable: code	Number of groups	=	40
R-sq: within = 0.1957	bs per group: min =		1
between = 0.6569	avg =		4.8
overall = 0.4861	max =		6
corr(u_i, Xb) = 0.4863	F(5, 145)	=	7.06
	Prob > F	=	0.0000

opecff	Coef.	Std. Err.	t	P> t	[95%
Conf. Interval]					
opecfflag +	.0731624	.1357806	2.19	0.030	
.0158311	.3050361	.1357806	-4.93	0.000	
llpe	-.6697227	.000015	0.08	0.934	
-.9380875	-.4013578	.1764052	5.05	0.000	
ibr	1.25e-06	.000019	-0.54	0.592	
-.0000285	.000031	.0900916	11.81	0.000	
dllpe	.8913709				
.5427131	1.240029				
dibr	-.0000102				
-.0000477	.0000273				
_cons	1.063579				
.8855165	1.241641				
sigma_u					
sigma_e	.08423715	(fraction of variance due to u_i)			
rho	.66720953				

F test that all u_i=0:	F(39, 145) =	2.75
Prob > F =	0.0000	

As shown in Table 1, the predictors explain approximately 49% overall of the variations in the bank operational efficiency. The forecast power of the model is almost average as predictors explain about half of variations in the model. Overall, the regressors predict the change in bank operating efficiency as shown by the model p-value, $p = 0.000 < 0.05$, implying that the model is strongly fitted. From the output table, the result indicate that the operating

efficiency of a firm today significantly influences its operating efficiency a year later as indicated by the p-value = $0.030 < 0.05$. As shown by the coefficients, a unit increase in operating efficiency leads to a 0.16 increase in a bank operating efficiency in the succeeding year.

Credit risk proxy by loan loss provision to total equity significantly influences operating efficiency as indicated by the p-value = $0.000 < 0.05$. As shown by the coefficients, a unit increase in loan loss provision to total equity ratio leads to a 0.67 decrease in bank operational efficiency. Credit risk proxy by loan loss provision to total equity significantly influences operating efficiency of high market share banks as indicated by the p-value = $0.000 < 0.05$. However, as shown by the coefficients, a unit increases in loan loss provision to total equity ratio leads to 0.891 increases in operating efficiency for high market share banks. This implies that credit risk proxy by loan loss provision to total equity is negatively significant in influencing operating efficiency for low market share banks but positively significant in influencing operating efficiency for high market share banks. This result is in agreement with the arguments of Saunders et al., (1990) and Kwan, (1997) that agency problems between management and shareholders may also affect the relationship between credit risk and operational efficiency of banks. Risk taking is about the management's attitude, bank shareholders should therefore ensure that the agency problems between them and management are reduced at all costs. Experienced and superior management should be employed to manage credit risk affairs of banks.

Despite insignificant, the liquidity of a firm as proxy by interbank ratio had positive influence on firm operating efficiency. Notably, a unit increase in interbank ratio leads to a 0.00000125 increase in firm operational efficiency. The same applies to operating efficiency for high market share banks except that a unit increases in interbank ratio leads to a 0.0000102 decrease in firm operational efficiency. This implies that liquidity proxy by interbank ratio has insignificant influence on both low and high market share banks. This result is inconsistent with the arguments by Kashyap et.al. (2002), Gorton and Huang (2002), that banks that are liquid may be more efficient in the sense that an efficient bank can produce more output part of which are liquid and other assets. This implies that the CBK should not emphasize the minimum liquidity ratio for banks in order for them to increase their operational efficiency.

Summary and Conclusions

This study investigated the effects of credit risk and liquidity performance measures on operating efficiency of commercial banks in Kenya. The results showed that previous year's operational efficiency, credit risk and liquidity performance measures combined explain about 48.61% of the bank's operating

efficiency. The overall variability in the operating efficiency was explained significantly as shown by the model p-value, $p = 0.000 < 0.05$, implying that the model was strongly fit. Lagged operating efficiency was positively significant at $p\text{-value} < 0.05$. This implies that operating efficiency of a firm today significantly influences its operating efficiency a year later and that, the history of a firm's performance will definitely influence how a firm moves forward in an effort to streamline its operational strategies.

Loan loss provision to total equity was the best proxy for credit risk influencing operating efficiency. The ratio was statistically significant in influencing operating efficiency at $p\text{-value} < 0.05$. However, loan loss provision to total equity was negatively significant in influencing operating efficiency for low market share banks but positively significant in influencing operating efficiency for high market share banks. Loan loss provision to total equity ratio shows the proportion of loan loss that is provided for during the year to total equity capital. Low ratios imply high quality of loan portfolio provided by the banks. Low market share banks are therefore encouraged to reduce on their levels of loan provisions in order to improve their efficiency. High market share banks may be because of their large size in terms of equity capital, providing for loan loss may still have small impact on equity capital as opposed to small banks with low or average amount of equity capital. The bottom line is that experienced and superior management should be entrusted with credit risk management affairs of banks. Further to that, risk taking is about management's attitude, bank shareholders therefore should ensure that the agency problems between them and management are reduced at all costs. This will go a long way towards reducing the level of nonperforming loans and hence reduction on loan loss provisions.

Interbank ratio was found to be the best proxy for liquidity influencing operating efficiency of banks. This was because apart from the ratio being insignificantly influencing operating efficiency; its contribution to changes in operating efficiency was minimal compared to other liquidity proxy ratios that were considered for the study. Interbank ratio was still statistically insignificant in influencing operating efficiency for both low and high market share banks. This implied that liquidity of a bank is not critical in determining operating efficiency of a bank. The interbank ratio indicates the position of a bank in terms of a bank being a net placer or borrower of funds in the market place. A ratio greater than 100 implies that the bank is a net placer rather than borrower of funds. Whichever way the bank is, it does not affect its operational efficiency significantly. Finally, the study revealed that there existed significant structural

differences between low market share banks and high market share banks, as dummy loan loss provision to total equity ratio was significant in explaining operating efficiency. This means that the size of a bank in terms of market share is important in determination of bank's operating efficiency.

Policy Recommendations

The findings of the study add some new understanding of the literature on the banking sector in the economy with reference to the Kenyan banking sector. This study identified a measurable relation between the effective ratios and operating efficiency. The optimal model revealed that, the higher the operating efficiency the more stable a bank is. Stability of commercial banks is critical in any economy because other sectors heavily rely on them for their banking and other related services. The study has attempted to provide a model that bank managers and CBK may apply in determining the operating efficiency for banks and the sector at large. A model for operating efficiency of banks will go a long way in assisting bank managers to evaluate and attempt to minimize risks that banks are exposed to. Bank managers should pay close attention to the variables that are indicators of growth in operating efficiency and are included in determining operating efficiency.

Banks should avoid reckless lending that would increase the level of unsecured credits in banks' portfolio that eventually may lead to increased levels of non-performing loans. Banks should also ensure that the agency problems between shareholders and management are minimized. Managerial efficiency is paramount for increase in operational efficiency of a bank. Experienced and competent management should be allowed to manage credit risk affairs of banks. The study further recommends that banks should work hard to expand their market share through opening of branches and increase in the customer deposits. By doing this, they will increase their operational efficiency through economies of scale and increase their earnings efficiently.

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