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The Effect of Operational Efficiency as a Financial Distress Factor on Financial Performance on Commercial Banks in Kenya

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Abstract:
Operational efficiency as a financial distress factor arises from maturity mismatches where liabilities have a shorter tenor than assets. This paper aims to analyse operational efficiency as a financial distress factor as well as draw inferences on its relationship with financial performance measured by return on assets (ROA) and return of equity (ROE).The study employed secondary data derived from financial statements of 38 commercial banks for the period 2005-2015(both years included). Generalized Least Square Method was employed. The results indicated that there exists a positive significant relationship between operational efficiency and financial performance. The findings of the study contributed towards enriching the literature on the financial distress of the commercial banks in Kenya and a result provided deeper understanding of operational efficiency as a financial distress factor and its management by the commercial banks in Kenya. The results indicated that operational efficiency has a positive significance as a financial distress factor on financial performance of commercial banks in Kenya, they therefore imply that the management should focus and monitor the operational efficiency of commercial banks in Kenya and ensure higher operational efficiency.

Keywords: *operational efficiency, financial distress factor, commercial banks, financial performance*

1. Introduction

Operational efficiency tends to confirm the notion of increasing competitiveness and improving resource utilization by banks. In the literature on bank performance, operational efficiency is usually used to assess managerial efficiency in banks. Some external factors and characteristics may influence an airport manager's control over operations (Sarkis, 2000). The firm's decision makers should increase the efficiency in using the tangibles assets to generate income (Saleh, 2015). According to Pranowo and Manurung (2010) firm's efficiency measures how productively the firm is using its assets to increase efficiency. Operating ratio is a measure of how well a company sells its stock and the efficiency with which it convert sales into cash. Some examples of operating ratios (activity ratios) include; assets turnover (sales to total assets), stocks turn over, debtor's day (day's receivable outstanding) and working capital to sales ratio. Debtor day shows the average number of days it takes customers to pay for credit sales. Low debtor's day benefits cash flow; an indication for probable saving for positive cash flows.

Olweny and Themba (2011) argued that the relationship between expenditure and profits may appear straightforward implying that higher expenses mean lower profits and vice versa, however this may not always be the case. The reason is that higher amounts of expenses may be associated with higher volume of banking activities and therefore higher revenues. Pranowo and Manurung (2010) suggested that firm efficiency can be measured in terms of its fixed assets turnover ratio, current assets turnover and net worth turnover ratio. These components indicate the firm's viability as well as speed of turning over its assets within the year, which determines the firm's financial distress. Another aspect of financial distress is that it triggers an effective change in the managerial control over the company, pushing the firm to alter its operational strategy in order to raise declined efficiency (Kosikoh, 2014).

This study will use operating expense ratio (OER) and net worth turnover ratio (NWTR) to measure the operational efficiency as a financial distress factor on financial performance. OER will be determined by dividing total operating expenses by Total revenue/Income, if OER is lower, it will be an indicator that there greater efficiency (Jeong & Phillips, 2001).While net worth turnover ratio will be determined by dividing Sales/Revenue/Gross Income by net worth (total assets-total liabilities), the net worth ratio indicates the return that shareholders could receive on their investment in a company. High ratio indicates that a company is funding its operations with a disproportionately high amount of debt and trade payables, this increases the risk of bankruptcy (Kosikoh, 2014). Here the study hypothesizes that:

- Ho: Operational efficiency does not affect financial performance of for commercial banks in Kenya.

The paper is organized as follows: section, section 1, Introduction, section 2, literature review. Section 3 discusses the methodology. The empirical analysis and results are presented in section 4. Section 5 concludes the study and provides recommendation for future studies.

2. Literature Review

2.1. Theory of Efficient Market Hypothesis (EMH)

Operational efficiency deals with the cost of transferring funds. In the theoretical world of perfect capital markets, transaction costs are assumed to be zero and markets are perfectly liquid, implying perfect operational efficiency. According Fama (1973) there three efficiencies in a firm; operational efficiency, locative and pricing efficiency. The basic idea underlying the EMH developed by Eugene Fama in 1970 is that asset prices promptly reflect all available information such that abnormal profits cannot be produced regardless of the investment strategies utilized. Fama (1973) distinguished between three forms of market efficiency based upon the level of information used by the market: weak form, semi-strong, and strong form market efficiency.

The weak form of the EMH stresses that asset prices today incorporate all relevant past information. The semi-strong form of the EMH states that current asset prices fully reflect all available public information (Fama,1973). Public information includes not only information about an asset's past price, but includes all information related to the company's performance, expectations regarding macroeconomic factors, financial distress indicators and any other relevant public information. The strong form of the EMH requires that asset prices fully incorporate more than past and public information. In particular, the strong form of the EMH declares that asset prices reflect private information, i.e. insider information, related to the assets of a specific company.

The implications of the EMH are broad. From an investor's perspective, participants in the stock market should not be able to generate an abnormal profit regardless of the level of information they may possess (Fama,1973).In the literature, the three forms of the EMH are usually used as guidelines rather than strict facts (Fama, 1998). Gill, Singh, Mathur, and Mand, (2014) suggested that in order to survive, prosper and reduce the effects of financial distress; firms have to produce their output from input efficiently.

Operational efficiency therefore, can be used as a proxy for competitive advantage, which affects the firm's current profitability and its future potential performance. This theory reflects efficiency as a key factor in financial performance of an organization, making investment choices by using all the available information reflected in the security prices. Further EMH indicates that poor operational efficiency may be costly to the firm leading to financial distress due to high cash outflows for operational costs and this means that all forms of efficiency; operational, pricing and allocation efficiency are necessary for banks in order to reduce the effects of financial distress.

2.2. Empirical Review

A stream of prior research has used simple financial statement ratios (e.g. asset turnover) as proxies for efficiency to examine the relation between efficiency and performance; these studies show that changes in asset turnover improve forecasts of changes in future profitability (Baik, Chae, Choi, & Farber, 2012).Operational efficiency studies in financial institutions can be used as a tool by managers to improve performance, as long as there is information in the study on the characteristics or identities of the relatively efficient and inefficient institutions (Berger & Humphrey, 2013).

Chortareas, Girardone and Ventouri (2012) investigated the dynamics between bank regulatory and supervisory policies associated with Basel II's three pillars and various aspects of banks' cost efficiency and performance for a sample of European Union's (EU) commercial banks over the period 2000-2006. The study used frontier analysis and traditional accounting ratios to measure efficiency. Findings suggested that interventionist supervisory and regulatory policies such as empowering capital restrictions, fortifying official supervisory powers, private sector monitoring and restricting bank activities, can impede the efficient operation of banks. Chortareas, Girardone and Ventouri (2012) further noted that high operating efficiency reduces the effect of financial distress. Empirical evidence also suggested that banks from countries with more open, competitive and democratic political systems are more likely to benefit from higher operating efficiency levels. From this study, it can be argued that operational efficiency is a key factor of financial distress and financial performance. However, the study of Chortareas, Girardone and Ventouri (2012) was mainly based on a sample of EU commercial banks and findings cannot be generalized for Kenyan banking industry being a developing country.

Ongore and Kusa (2013) concluded that efficiency is one of the key internal factors that determine bank profitability. They argued that operational efficiency is another dimension for management quality(Ongore & Kusa, 2013)(Ongore & Kusa, 2013). The management has the capability to deploy its resources efficiently, income maximization; reducing operating costs can be measured by financial ratios. They further suggested that the ratio of operating expenses to total asset is expected to be negatively associated with profitability. The study did not link operational efficiency as a factor of financial distress and the findings could not be generalized to indicate distress in banking industry.

3. Methodology

3.1. Data Collection

Data on the variables was collected by use of secondary data mainly from financial statements of individual commercial banks in Kenya under study, the data collection covered 11 year period from 2005 to 2015, these period of eleven years was selected for the study in order to establish the changes in commercial bank over time and to base the analysis on as recent data as possible. This could also be important since several prudential banking regulations for financial institutions had been put in place.

3.2. Data Processing

According to Blumberg, Cooper and Schindler (2014)data processing involves editing coding, classification, tabulation and graphical presentation. The study extracted data containing quantitative details from financial institutions, the panel data collected was analysed quantitatively through a mathematical and regression equations and this was solved by using a statistical tool(STATA).

3.3. Regression

Financial performance was regressed against operational efficiency. Other independent variables that were also included in the current study include; liquidity, leverage, asset quality and capital adequacy, the following is a multiple statistical model that determined the effect of operational efficiency and other independent variable on financial performance of commercial banks.

$ROE_{it} = a + \beta_1 LIQ_{1it} + \beta_2 LEV_{2it} + \beta_3 OPE_{3it} + \beta_4 ASQ_{4it} + \beta_5 CAD_{5it} + e$ (Equation 1)

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The current study used operating expense ratio (OER) and net worth turnover ratio (NWTR) to measure the operational efficiency as a financial distress factor on financial performance. OER will be determined by dividing total operating expenses by Total revenue/Income, if OER is lower, it will be an indicator that there greater efficiency (Jeong & Phillips, 2001).While net worth turnover ratio will be determined by dividing Sales/Revenue/Gross Income by net worth (total assets-total liabilities), the net worth ratio indicates the return that shareholders could receive on their investment in a company. High ratio indicates that a company is funding its operations with a disproportionately high amount of debt and trade payables, this increases the risk of bankruptcy (Kosikoh, 2014).

The study used retun on assets(ROA) and return on equity (ROE) as measures for financial performance. ROA is an accounting measure of bank's overall perfromance since its definations is based on net income over total assets of a firm and therefore shows the profit earned dollar of assets, It is an indicator of bank‟s efficiency and a measure of the bank‟s ability to earn rent from its total operations. The ROE, on the other hand, reflects how effectively a bank management is using shareholders‟ investment. It tells the bank‟s shareholders how much the institution is earning on the book value of their investment (Arif, 2012).In fact, ROE is the most important measurement of banking returns because it is influenced by how well the bank is performed on all other return categories, and indicates whether a bank can compete for private sources in the economy. ROE is defined as net income divided by average equity.ROA (return on assets) and ROE (return on equity) as a measure of profitability was expected to have a positive relationship with financial performance since highly profitable banks are more efficient(Wang'ombe, Muturi, & Ngugi, 2016),(Heikal, Khaddafi, & Ummah, 2014)

4. Results and Discussion

4.1. Descriptive Analysis of Operational Efficiency

The two measures used to measure operating efficiency of the banks in this study were operating expense ratio (OER) and net worth turnover ratio (NWTR). Operational efficiency tends to confirm the notion of increasing competitiveness and improving resource utilization. OER was determined by dividing total operating expenses by Total Income, a low OER is an indicator that their greater efficiency.

From the current study in table 1 below, operating expenses for commercial banks increased highly specifically starting year 2010, 2011, 2012, 2013, 2014 and 2015 with 2013 being the highest. According to CBK (2015), the banking sector expenses rose by 16.3 per cent from Ksh. 277.6 billion in December 2014 to Ksh. 322.8 billion in December 2015. This slightly differed with the findings of the current study, however the CBK findings were based on all financial institutions in the banking sector. According to CBK (2015) the increase in total expenses was largely attributed to a rise in loan loss provisions and interest expenses. According to the current study the increase reflects the effect of operational efficiency as financial distress factors on financial performance of commercial banks.

Year	Obs	Mean	Std.	Min	Max
2005	38	0.3347	0.1654	0.0426	0.7193
2006	38	0.3304	0.1457	0.0777	0.5890
2007	38	0.3349	0.1371	0.0926	0.5879
2008	38	0.3549	0.1305	0.0769	0.6119
2009	38	0.3773	0.1613	0.1097	0.7016
2010	38	0.4093	0.3764	0.0851	2.3214
2011	38	0.4345	0.3869	0.0536	2.3942
2012	38	0.5343	0.2155	0.1102	0.9829
2013	38	0.4136	0.1472	0.1145	0.6747
2014	38	0.4352	0.1585	0.0000	0.6697
2015	38	0.4720	0.1478	0.1928	0.7357

Table 1: Operating expenses

The overall mean operating expenses ratio was 0.4028 as shown in Table 2 below. The financial institutions seemed to keep average expenses ratios. The mean quick ratio is very high compared to the mean cash ratio. The overall variation of this ratio was 0.222 which was found to be almost of equal contribution from variations within and between panels which were 0.158 and 0.159 respectively.

		Mean	Std. Dev.	Min	Max	Observations
Operating expenses	Overall	4.028E-01	0.222	0.000	2.394	N=418
	Between		0.159	0.139	0.812	n=38
	Within		0.158	-0.058	1.985	T=11

Table 2: Overall descriptive analysis for operating expenses ratio

The study also measured operations efficiency by the net worth turnover ratio. The net worth turnover ratio was measured as the Sales/Revenue/Gross Income divided by net worth (total assets-total liabilities). The net worth ratio indicates the return that shareholders could receive on their investment in a company.

Year	Obs	Mean	Std.	Min	Max
2005	38	0.4538	0.6320	-2.2096	1.2193
2006	38	0.5661	0.2711	-0.1050	1.2349
2007	38	0.5170	0.2795	-0.1339	1.0064
2008	38	0.5126	0.2871	-0.0118	1.0371
2009	38	-2.1845	15.6190	-89.1759	1.0367
2010	38	0.7035	0.9880	0.0583	6.0569
2011	38	0.5995	0.2981	-0.1116	1.1785
2012	38	0.9359	0.6607	-0.1632	3.3958
2013	38	0.7198	0.3330	-0.0158	1.8817
2014	38	0.8987	1.4721	-0.0966	8.8304
2015	38	0.7295	0.2312	0.3710	1.2915

Table 3: Net worth turnover ratio

The overall mean net worth turnover ratio was 0.6522 as shown in Table 5 below. This ratio is relatively higher than the operational expenses ratio which was also used to measure operational efficiency. The variability of net worth turnover ratio was found to be higher within the panels than between the panels, this is implied by the standard deviation within which was 0.595 while that between was only 0.273.

		Mean	Std. Dev.	Min	Max	Observations
Net worth turnover	Overall	6.522E-01	0.653	-2.210	8.830	N=418
	Between		0.273	0.186	1.488	n=38
	Within		0.595	-1.787	7.995	T=11

Table 4: Overall descriptive analysis for net worth turnover ratio

The overall measure of operation efficiency was a latent factor of both operating expenses ratio and net worth turnover ratio. The latent measure of operational efficiency was found to have an overall mean of 1.11E-9 for all the firms across all the 11 years. Given the very low mean, operational efficiency had a high variability of 0.397 which explains the minimum operational efficiency of -1.494 and maximum of 3.226. The variation was slightly higher within the panels than between the panels. Further the results show an average of a 0.011 with an overall standard deviation of 0.397. This indicates that commercial banks in the sample incur 1% less than their total income.

		Mean	Std. Dev.	Min	Max	Observations
Operational efficiency	Overall	1.110E-09	0.397	-1.494	3.226	N=418
	Between		0.240	-0.438	0.513	n=38
	Within		0.319	-1.103	3.041	T=11

Table 5: Overall descriptive analysis for operational efficiency

4.2. Descriptive Analysis of Financial Performance

Financial performance was considered by the researcher as the dependent variable which the study sought to find out the level of its influence due to distress factors. Financial performance was measured based on the indicators return on assets (roa) and return on equity (roe). Table 6 presents the descriptive statistics for the measure return on equity as the mean roe for each year across the 11 years. Across the period, the maximum annual mean returns on equity ranged from 0.6088 for the year 2011 and 4.644 in 2012. The mean ROE thus seems to have no linear trend against time with means between 0.344 and 0.5251. The mean ROE seems to have low variability of below 0.2 except for 2012 and 2013 that had standard deviations of 0.7588 and 0.6784 respectively.

Year	Obs	Mean	Std.	Min	Max
2005	38	0.3936	0.1828	0.0221	0.9984
2006	38	0.4000	0.1871	0.0475	1.0265
2007	38	0.3776	0.1543	0.0549	0.6747
2008	38	0.3628	0.1563	0.0763	0.6847
2009	38	0.3458	0.13743	0.05563	0.6100
2010	38	0.3444	0.1138	0.1288	0.6402
2011	38	0.3843	0.1249	0.0701	0.6088
2012	38	0.4881	0.7588	0.0221	4.6439
2013	38	0.5251	0.6784	0.1725	4.2266
2014	38	0.3739	0.1536	0.0000	0.7959
2015	38	0.3584	0.1232	0.0514	0.6308

Table 1: Annual Mean Returns on Equity

The overall mean for all the firms for all the years combined was found to be 0.3717. The overall standard deviation of roe was found to be 0.144. The variation of roe is larger across the 38 panels of the banks with a standard deviation of 0.11 as compared to the variation across the years within the panels which was only 0.093. In addition, from the Table 7 the overall mean of ROE of 3.72 per cent and overall standard deviation of 14.4 percent, for between 11 and 9 percent for within is an indication that banks are competing among themselves for making profit however their standard deviations are evident that their profit-making capacity is divergent from each other, this may be as a result of the different levels of financial distress effect on financial performance of commercial banks in Kenya.

		Mean	Std. Dev.	Min	Max	Observations
Roe	Overall	3.717E-01	0.144	0.000	0.998	N=418
	Between		0.111	0.110	0.549	n=38
	Within		0.093	-0.123	0.821	T=11

Table 2: Overall descriptive analysis for ROE

Figure 1 below shows the virtual presentation of the return on equity across the entities for against time for the years 2005 to 2015. The scatter plot of roe against time depicts a distribution with virtual low variability across the years. The plots of the mean roe Plotting the mean ROE for each year, the line shows a trend line curve that doesn't depict any increasing or decreasing trend of mean roe with time implying possible stationarity across time.

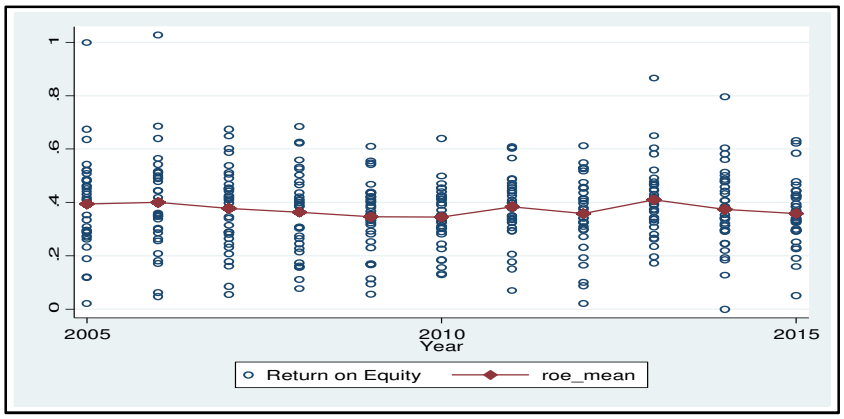

Figure 1: Return on Equity against time

A further analysis used for the performance indicator roe against time was the one way anova to determine if there is a significant difference in mean roe across time. The anova statistics in Table 8 show that the p-value of the F statistic is 0.000 which is less than 0.05. This implies that at 0.05 level, the mean roe is significantly different across time. The differences of roe with time does not necessarily imply a linear trend of mean roe with time.

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	1.450	28.000	0.052	2.931	0.000
Within Groups	5.901	334.000	0.018		
Total	7.350	362.000			

Table 3: ROE One way ANOVA against time

Considering return on assets which was also used to measure the financial performance of the banks, the descriptive statistics results are shown in Table 9. The financial institutions seemed to have lower returns on assets as compared to the returns on equity as seen

earlier. The mean returns on assets ranged between 0.0517 and 0.0604 which were the mean roa for the years 2012 and 2013. This shows a possibility that the financial institutions do not invest a lot in the assets or realise very little returns from investments in assets. The variability of the returns on assets were also very low with all standard deviations ranging between 0.0136 and 0.0245. he minimum possible return on asset realised by a firm in study across the 11 years was 0.000 in 2014 and the maximum possible roa realised by a firm was only 0.1093 which was in 2006.Table 4: Annual Mean Returns on Assets

Year	Obs	Mean	Std.	Min	Max
2005	38	0.0539	0.0214	0.0052	0.0988
2006	38	0.0551	0.0167	0.0221	0.1093
2007	38	0.0535	0.0136	0.0265	0.0795
2008	38	0.0550	0.0166	0.0196	0.0888
2009	38	0.0565	0.0171	0.0258	0.0993
2010	38	0.0538	0.0166	0.0274	0.0908
2011	38	0.0550	0.0161	0.0260	0.0983
2012	38	0.0517	0.0245	0.0014	0.1024
2013	38	0.0604	0.0161	0.0244	0.0995
2014	38	0.0541	0.0172	0.0000	0.0867
2015	38	0.0524	0.0183	0.0054	0.0864

Table 9

Considering the overall mean ROA as shown in Table 10, the financial institutions had a mean return of 0.05469 for all the 11 years jointly. The overall standard deviation was found to be 0.018 which was a contribution of variability between and within panels. Both measures of dispersion for variations between and within panels were found to be low for roa with standard deviations of 0.013 and 0.012 respectively. Low standard deviations imply homogeneity of the banks in regards to the returns on assets realised. This implied that generally all banks had low roe with no banks expected to realise high roa in any of the years. In addition, from the Table 10 the overall mean of ROE of 5.47 per cent and standard deviation 13 percent for between and 12 percent for within is an indication that banks are competing among themselves for making profit however their standard deviations are evident that their profit-making capacity is divergent from each other.

		Mean	Std. Dev.	Min	Max	Observations
ROA	Overall	5.469E-02	0.018	0.000	0.109	N=418
	between		0.013	0.024	0.080	n=38
	Within		0.012	-0.020	0.092	T=11

Table 5: Overall descriptive for ROA

A scatter plot of returns on assets with time including the plots for mean roa shown in Figure 2 also shows a possible white noise similar to that of roe in Figure 2 rather than a decreasing or increasing trend of roa with time. Both had virtually constant non-increasing trends with uneven decreases and increases across the period. The highest roa is virtually seen to have been in 2013 as it also was with roe. However low the returns of assets were in comparison to the returns on equity, the trends are similar with increases of roa in the same years as the increases realised on roe and drops also in the same years. This implies that the factors influencing and causing improvements in roe could also be the same factors that influence roa.

Figure 2: Return on Assets against time

Considering the similarity in the trend similarity of roe and roa based on the graphical presentations, ROA however showed no significant difference in means across the years. The p-value of the F statistics from the ANOVA shown in Table 11 is 0.610 which is greater than 0.05 implying that at 0.05 level, there is no significant differences in mean roa across time. This could be attributed to the very low amounts of ROA realised by all firms across the years. Table 6: ROA One way ANOVA against time

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	305.082	28.000	10.896	0.904	0.610
Within Groups	4026.634	334.000	12.056		
Total	4331.716	362.000			

Table 11

Considering the overall financial performance of the firms which was measured as a latent factor of the 2 indicators roe and roa, the overall mean financial performance as found to be 0.007 with slightly high variability as compared to the observed components roa and roe. The overall standard deviation of the latent financial performance was found to be 0.229 which was a contribution of a higher variation across panels than within panels. The standard deviation between panels was 0.177 while within the panels the standard deviation was found to be 0.147.

Table 12 shows return of equity (ROE) had an average of 0.03717 with overall standard deviations of 0.144. On the other hand, Table12 also shows that profitability as measured by return on assets (ROA) had an average of 0.05469 with overall standard deviations of 0.018. The minimum ROA within commercial banks was -0.123 indicating some commercial banks reported losses in some years in between 2005-2015. Evidently, ROE was more volatile compared to ROA. This might have been as a result of the effect of financial distress factors to ensure that there are considerable levels of equity in commercial banks. This results are consistent with the studies carried out by Muriithi (2016) who noted that a positive average mean of ROE is an indication that banks are competing among them for making profit however their differing standard deviations of between and within is an evident that their profit making capacity is volatile.

		Mean	Std. Dev.	Min	Max	Observations
Financial Performance	overall	7.776E-03	0.229	-0.732	0.653	N=418
	between		0.177	-0.399	0.338	n=38
	within		0.147	-0.988	0.450	T=11

Table 7: Overall financial performance

Table 13 shows the anova for the overall financial performance measured as an unobserved latent variable from the indicators roa and roe. The anova for financial performance with time shows that financial performance exhibits significantly different means across time at 0.05 level of significance. This is implied by the p-value of 0.000 which is less than 0.05.

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	1474.355	28.000	52.656	33.986	0.000
Within Groups	517.474	334.000	1.549		
Total	1991.829	362.000			

Table 8: Overall performance One way ANOVA against time

Given the differences in mean financial performance with groups of time in years as shown by the analysis of variance, it's key to determine that the differences are not due to an increasing or decreasing trend of financial performance with time. Being the dependent variable, significance in a linear trend of financial performance would imply non-stationarity and the need to de-trend the data before further panel model analysis. To determine whether financial performance exhibits a trend, the study used a unit root test. The stationarity unit-root test was done to confirm whether there is stationary in all panels. The LLC bias-adjusted test statistic $t * \delta = -24.9766$ is significantly less than zero ($p < 0.00005$), so we reject the null hypothesis of a unit-root and favour the alternative that panels are stationary.

	Statistic	p-value
Unadjusted t	-23.5520	
Adjusted t*	-24.9766	0.000

Table 9: Unit-root test for panel stationarity

The current study was in agreement with CBK (2015) report that reported a slight decline in profitability in recent years since commercial banks had of about 0.054 in 2005 but declined to about 0.052 in 2015 mean. According to CBK (2015) banking supervisory report, the banking sector registered improved financial strength in 2015, with total net assets recording an increase of 9.2% per cent. This was attributable to growth in investments and loans and advances, which increased by 23.2 per cent and 15.12 per cent respectively. Despite the improved financial strength, the banking sector registered declined profitability in 2015. The sector recorded a 5.03 per cent decline in pre-tax profits during the year. The decline in profitability in 2015 could be explained by a faster growth in expenses compared to the growth in income. The banks income increased by 9.1 per cent in 2015 compared to a higher increase of expenses of 16.3 per cent. the current study attributes the decline in profitability as the consequences of financial distress factors influencing profitability.

4.2.1. Exploratory Analysis of Financial Performance

According to Yong and Pearce (2013) exploratory analysis summarizes data in graphs so that relationships and patterns can be easily interpreted and understood. It is normally used to regroup variables into a limited set of clusters based on shared variance. Hence, it helps to isolate constructs and concepts. Exploratory factor analysis tries to uncover complex patterns by exploring the dataset and testing predictions and also exploratory tests provide visual impression of the nature of panel data through graphical presentation. Exploratory tests like spaghetti plot graph, box plot and Mean CI plot were used to establish the presence of outliers as presented by figures 4.4 to 4.11.

4.2.2. Return on Equity

Before examining the relationship between financial distress factors and financial performance of commercial banks as measured by return on equity, the study explored the financial performance among different commercial banks in Kenya over the eleven-year period; 2005-2015. The study used the Spaghetti plots, a lowness smoothed plot, box plot and mean plot as shown in Figure 3 to Figure 6.

4.2.3. Growth Trend plot

Before examining the relationship between financial distress factors and financial performance of commercial banks in Kenya, the study explored financial performance as measured by ROE within commercial banks in Kenya in different commercial banks in Kenya over the eleven year period; 2005-2015. According to Figure 3 the result used the empirical growth plots and indicated that there were variations in financial performance among commercial banks of Kenya, however some commercial banks in Kenya had almost the same financial performance with slight variations across the period under investigation. It can also be observed that there was an almost constant performance of other commercial banks in Kenya over a few numbers of years for some commercial banks in Kenya.in addition it can also be observed that some commercial bank's financial performance declined towards 2015. The Growth trend plot concurs with CBK (2015) annual supervisory report which noted that banking sector was on overall rated satisfactory in 2015 as compared to a strong rating which was achieved in 2014.

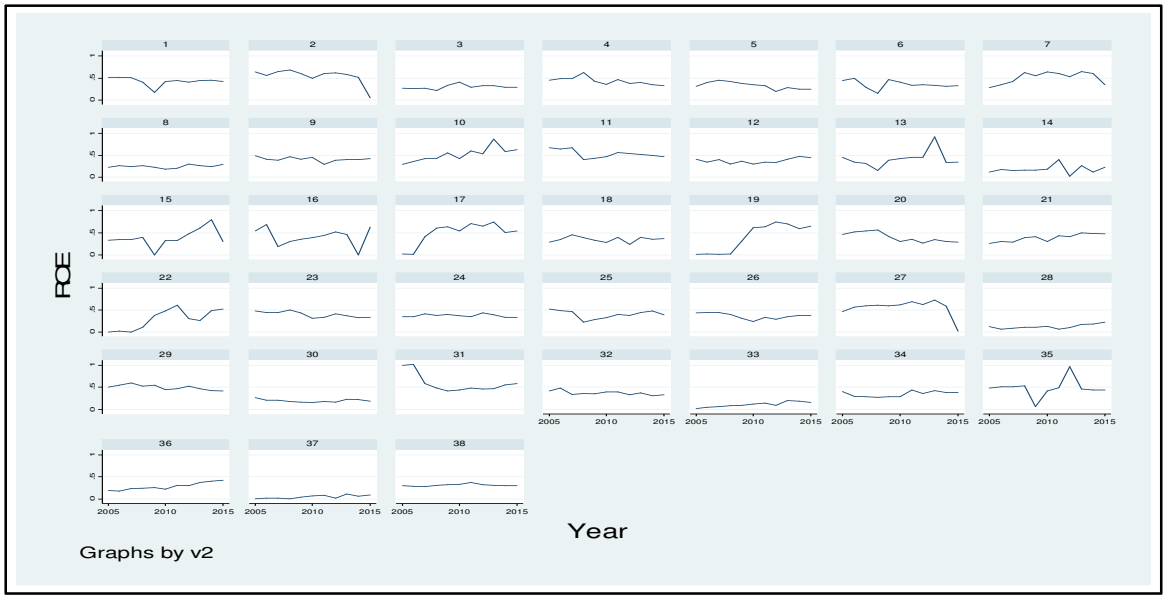

Figure 3: Growth trend plot

4.2.4. A Lowess Smoothed Plot

A lowess smoothed plot of the mean roe with time shows that the return on equity was a decreasing function from the beginning of the period in 2005 followed by a slight increase from year 2010.This shows that return on equity as a financial performance measure must have been influenced by financial distress factors, as a result there was a decrease and later an increase which later started dropping again.

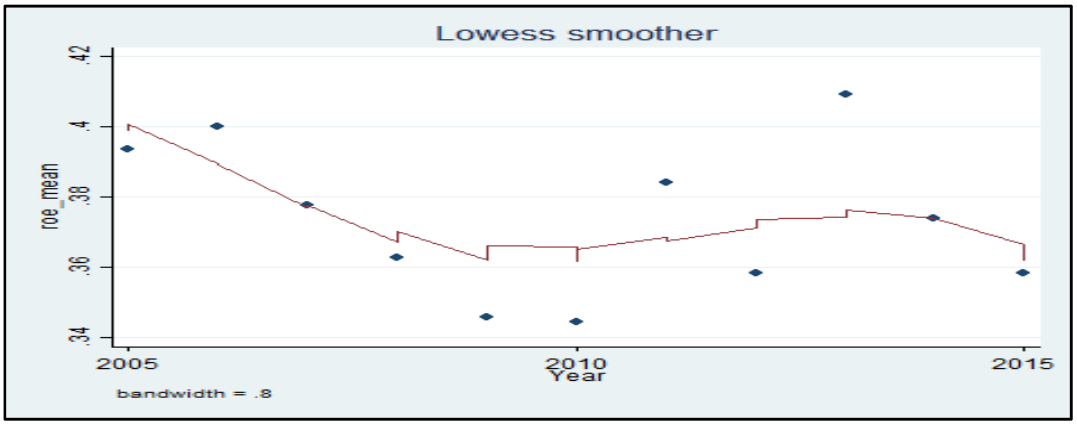

Figure 4: a lowess smoother plot

4.2.5. Box Plot Graph

The line in the box represents the median observation while the whiskers shows the largest and least non-outlier observations the observations near the whisker were the near outliers, while those at the extreme are the far outliers. A plot of box plots over time for the variable return on equity shows varying distributions of roe over time. The roe on the first year shows a distribution skewed to the left. The median is above the center of the box and closer to the upper quartile and the lower tail is longer than the upper tail. The second year 2006 and the last year however are probably skewed to the right; they have the median being below the center and the upper tail longer than the lower. Across the years, roe seem to have varying distributions. In order to obtain a relatively normally distributed data-set, all the potential far-outliers were eliminated.

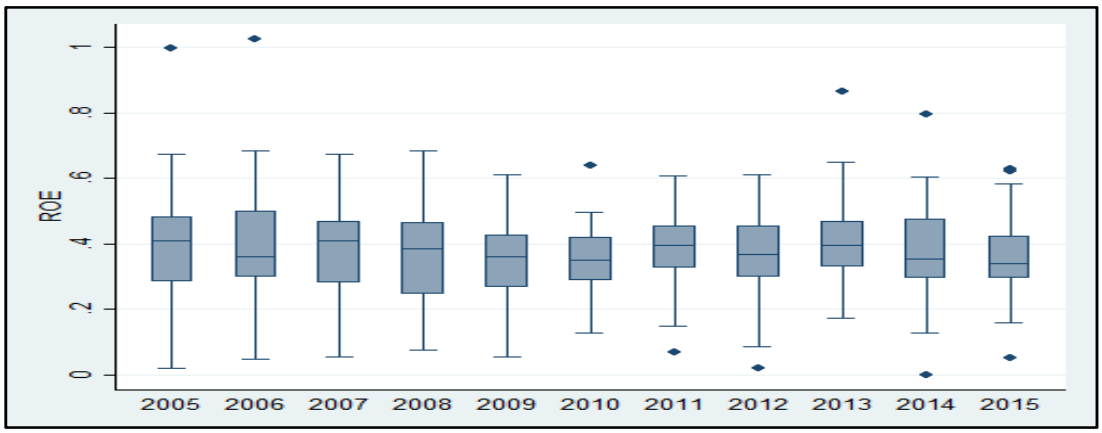

Figure 5: Roe over time box plot

4.2.6. Return on Asset

Before examining the relationship between financial distress factors and financial performance of commercial banks as measured by return on asset, the study explored the financial performance among different commercial banks in Kenya over the eleven-year period; 2005-2015. The study used the Spaghetti plots, a lowness smoothed plot, box plot and mean plot as shown in Figure 8 to Figure 11.

4.2.7. Growth Trend Plots

The current study also explored return on assets within commercial banks in Kenya over the eleven-year period; 2005-2015. According to Figure 5 the result used the empirical growth plots and indicated that there were variations in return on assets among commercial banks in Kenya, however some commercial banks had almost the same return on assets with insignificant variations over the eleven years. In addition, it can also be observed that a few number of commercial bank's return on assets remained constant with an indicator of increase towards 2015. However, some commercial bank indicated a decline especially between 2010 and 2015.

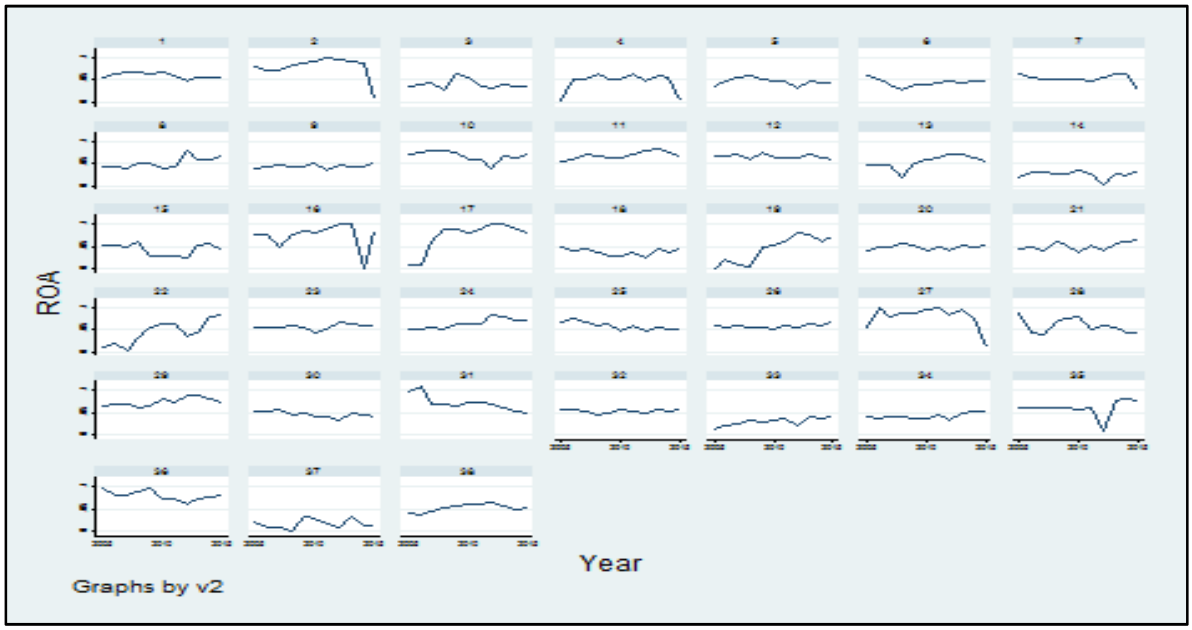

Figure 6: Growth Trend plots

4.2.8. A Lowess Smoother Plot

A lowess smoothed plot of the mean roa with time shows that the return on assets was an increasing function from the beginning of the period in 2005 followed by a slight decrease from about the year 2013.

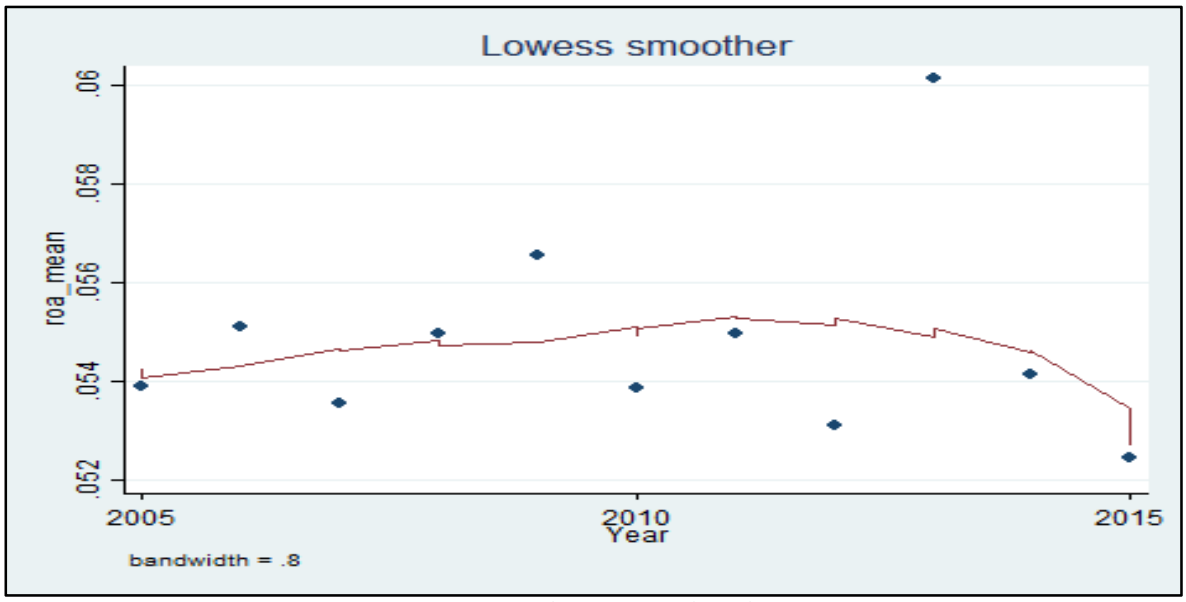

Figure 7: A lowess smoother plot

4.2.9. Box Plot Graph

A plot of box plots over time for the variable return on equity shows slightly varying distributions of roa over time. The distributions across time are similarly not seemingly skewed on either direction but are of varying ranges. The roa across the years shows non-skewed distributions. The medians are all about the centers of the boxes except for the year 2009 that has a median well below the center of the box implying a possible distribution skewed to the right. Across the period though, the interquartile ranges are of varying sizes.

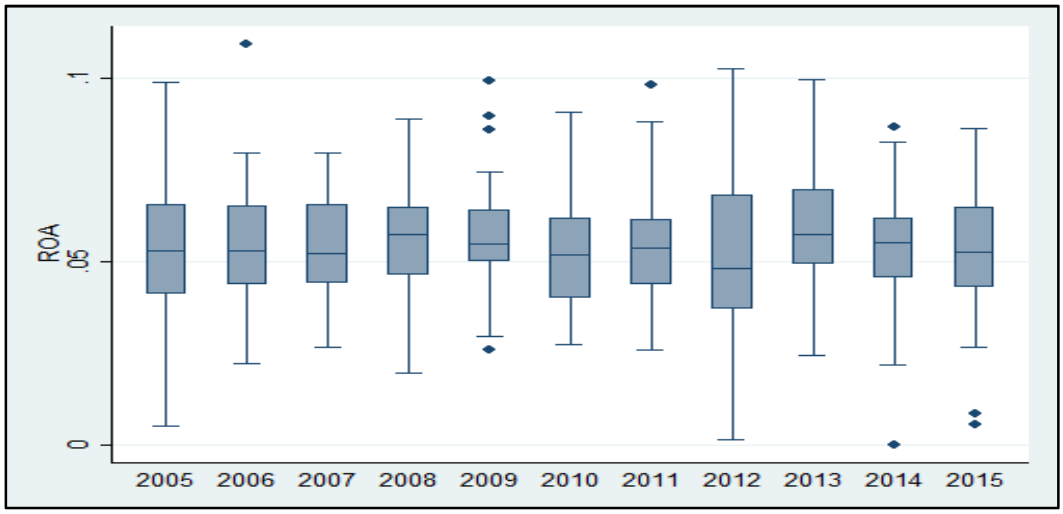

Figure 8: Roe over time box plot

4.3. Inferential Analysis

The aim of the study was to determine the influence of operational efficiency as a financial distress factor on financial performance of commercial banks in Kenya. Christiano, Rostagno and Motto (2010) argued that factors are score cards on the financial performance of an organization that reflects forces that may cause financial distress and financial performance fluctuations.

Inferential analysis was the basis behind which conclusions were drawn for the study objectives. The techniques used for this analysis were to determine the level of influence that operating efficiency has on the dependent variable; being financial performance. The techniques involved bivariate analyses between independent variable and the dependent variable.

For inferential analysis, statistical models were fitted to determine the influences and relationships. The models fitted considered that the data collected was panel data consisting of both cross sectional a time series components. The data contained cross sections consisting of 38 entities a time period of only 11 years. Each of the entities of the data had information required for all the 11 years implying that the panels were strongly balanced. The general form of the model structure adopted was of the form given by the following equation;

$Y_{it} = \beta + \beta_1 X_{it} + \varepsilon_{it}$ ……. Fixed effect {equation 4.1}

Or

$Y_{it} = \beta + \beta_1 X_{it} + \mu_{it} + \varepsilon_{it}$ ……Random effect {equation 4.2}

Where X_{it} is the predictor variable and Y_{it} is the dependent variable. Equation 4.1 the fixed effect model assumes homogeneity of estimates across entities and that the independent variable that influence performance vary over time but have a fixed effect across the entities. The study fitted both the fixed and random effect models basing on ordinary least squares and further tested the appropriate model to be adopted.

4.3.1. Bivariate Analysis of Operating Efficiency and Performance of Commercial Banks

To determine the influence of Operating efficiency on how commercial banks perform in Kenya, bivariate analysis models were fitted and the Haussmann specification test used to determine the appropriate bivariate model for operating efficiency and performance is shown in Table 15. The chi-square statistic for the Haussmann test was established to be equal to 59.43 with a p-value of 0.000 that is less than 0.05. This entails that the fixed effect model is the appropriate model.

	(b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
Operating efficiency	0.172	0.327	-0.155	0.020

Table 15: Haussmann specification; bivariate model with Operating efficiency as predictor

Chi2(1) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 59.43, Prob>chi2 = 0.000

The results of the fixed model are presented in Tables 16 and Table 17 presenting the model summary and coefficients estimates respectively. The analysis shows that the panels were strongly balanced for this bivariate analysis as shown by the number of observations per group. The minimum maximum and average numbers of observations per groups were all equal to 11 while the data had a total of 418 observations used in this analysis considering 38 groups of entities implying strongly balance panels. The R^2s within, between and the overall R^2 are 0.0152, 0.5956 and 0.2206 respectively. The R^2 is generally the variation of the dependent variable performance that is explained by the variation of the predictors in the model. In this model, The R^2 within is the goodness of fit measure for the individual mean de-trended data which disregards all the information between groups in the data. The anova statistics measures the general significance of the model. The p-value of the F statistic to the model shows is 0.000 which is less than 0.05 implying that the estimated parameters in the model are at least not equal to zero. This implies that Operating efficiency have an influence on performance of commercial banks.

Model Statistics					Panel Observations				
R-sq:	Within	=	0.0152			Number of Obs		=	418
	Between	=	0.5956			Number of groups		=	38
	Overall	=	0.2206						
anova	F(1,674)	=	5.02			Obs per group:	min	=	11
	Prob > F	=	0.0257				avg	=	11
	corr(u_i, Xb)	=	0.5076				max	=	11

Table 16: Model Summary Fixed-effects within group variable entity; operating efficiency

The coefficient of operating efficiency for this one predictor model was found to be significantly greater than 0. This confirms the significance of the influence of operating efficiency ratios on performance of commercial banks. The estimated coefficient of operating efficiency was found to be (β=0.172, t= 2.240, p-value= 0.026). The P-value is less than 0.05 implying that at 0.05 level of significance, the estimated coefficient is deemed significant. Sigma_u is the standard deviation of residuals within groups while Sigma_e is the standard deviation of the overall error term. Rho is calculated from sigma_u and sigma_e and gives the intra-class correlation. Form the table, the intra-class correlation is 0.531 implying that 53.1% of the variance is due to the differences across panels. The estimated coefficient of operating efficiency here implies that a unit increase in operating efficiency ratios would causes the levels of performance to increase by 9.333 units.

	Coef.	**Std. Err.**	**T**	**P>t**
Operating efficiency	0.172	0.077	2.240	0.026
Constant	0.009	0.008	1.040	0.300
sigma_u	0.166			
sigma_e	0.156			
Rho	0.531			

Table 17: Coefficients table; fixed effect model with operating efficiency as predictor

4.4. Diagnostic Tests

4.4.1. Time Fixed Effects

A joint test could be carried out to determine if dummies for all years are equal to zero, if they were then no time fixed effects was needed (Torres, 2007). Results in Table 18 shows the test results for time fixed effects. The p value (0.0000) is less than 0.05 indicating that there are no significant time affects and therefore no need to introduce dummy variables.

The study further performed tests on the fixed effect model fitted to ensure that the model meets the assumptions of OLS regression that was used. The tests are important to ensure the reliability of the model fitted before testing hypotheses and drawing conclusions from the model. The study being a fixed effect model, the model was fitted based on the assumption of fixed effects on the entities which is what is tested. Further to the fixed entities the researcher tested for time fixed effect on the model. For this, dummy variables for each of the 11 years were generated and a model fixed effect model fitted including the dummy years variables. Finally, a test was done on the model to determine whether the effects of the dummy years are all jointly equal to zero. The analysis yielded results below for the F statistic and its P-value which was found to be greater than 0.05. This implies that there is no time fixed effect required for the model. All coefficients of time are jointly equal to zero.

4.4.2. Cross-sectional Dependence

The multivariate model fitted for this study was found to exhibit cross-sectional dependence thus violating the assumption of cross-sectional independence. This was tested using the Breusch-Pagan Lagrangian multiplier test for cross-sectional independence that uses a chi-square statistic as shown in Table 18. The p-value of the chi-square is 0.000 which is less than 0.05 implying cross-sectional dependence.

4.4.3. Heteroscedasticity

The study tested the null hypothesis that the variances of the error term were equal for all time periods. A Wald chi-square test was used to test for group wise homoscedasticity. The null hypothesis tested was rejected at 0.05 level of significance due to the p-value of the chi-square statistics that was found to be 0.000 denoting presence of heteroscedasticity and violation of group wise homoscedastic error terms.

A plot of the mean predicted distrubance terms shows that the mean disturbances vary in expectation over time. Them mean disturbances are above zero for mos of the years thought they drop below zero in the years 2011 and 2012. The confidence intervals of the disturbance terms are also of varrying ranges implyng varying standard deviations and thus changing variances the confidence intervals of the distubance in 2005 is well shorter compared to the confidence inervals in the years 2010, 2011 and 2014 in. Non-constant variances in the disturbance terms implyies a possible problem of heteroscedasticity of the errors. A further statistical test would be required to test the significance of heteroscedaticity of the residuals.

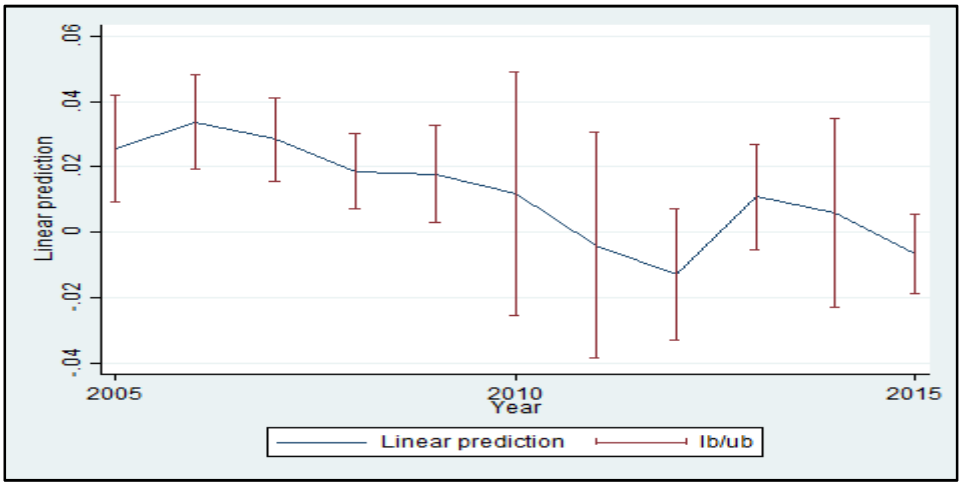

Figure 9

4.4.4. Serial Correlation

Another assumption of OLS regression is the non-serial correlation of the error term. The consistency of the fitted model with the non-serial correlation assumption was also tested. A Wooldrige test was used which is test for the existence of first order autocorrelation in panel data. This test is done by computation of an F-statistic to test the null hypothesis that there is no existence of first order autocorrelation. The p-value of the f-statistic was found to be 0.198 which is greater than 0.05 implying that the disturbance term of the multivariate data fitted does not exhibit first order autocorrelation.

4.4.5. Normality Tests

The normality test used the Jacque Bera approach for normality test which is based on the consideration that a Gaussian distribution of the error terms should have a mean of 0.000, a skewness of 0.000 and a kurtosis of 3. The Jacque Bera approach tests the deviation of the skewness from 0.000 a Kurtosis from 3 using a chi-square statistic. The p-values of the chi-square statistics for both u and e were found to be greater than 0.05 implying normality in both cases.

Test	**Test statistic**	**P-value**
Time fixed effect ()	F (10, 315) = 1.45	Prob > F = 0.1567
Cross-sectional dependence (Pearson's test)	P= 2.665,	Pr = 0.0077
GroupWise Heteroskedasticity	Wald chi2 (33) = 1491.65	Prob>chi2 = 0.000
First order autocorrelation in Panels (Wooldridge test)	F (1, 38) = 1.729	Prob > F = 0.198
Joint test for Normality on e (Jacque Bera)	Chi2(2) = 3.18	Prob > chi2 = 0.204
Joint test for Normality on u (Jacque Bera)	Chi2(2) = 192.96	Prob > chi2 = 0.051

Table 10: Diagnostic tests

4.5. Hypothesis Testing

The final multivariate GLS fitted model was considered better model compared to the OLS model which violated the assumptions. The GLS model taking care of the violations was considered a more robust model and was used to test the hypotheses of the study.

- H_{03}: Operating efficiency has no influence on financial performance of commercial banks in Kenya.

It was found according to the fitted GLS model, the p-value of the t-statistic for the estimated coefficient of operating efficiency is 0.000 which is less than 0.05. The null hypothesis was rejected at 5% significance level and a conclusion drawn that operating efficiency has a significant influence on performance of commercial banks in Kenya.

The findings of the current study agree with findings of Chortareas, Girardone and Ventouri (2012) based on a sample of EU commercial banks found that high operating efficiency reduces the effect of financial distress. Klingenberg, Timberlake, Geurts and Brown (2013) based on manufacturing firms in developed countries, found out that there was a positive relationship of operational efficiency and financial performance but there was no link of operational efficiency and financial distress as a factor of financial performance of Kenyan banking industry. Ongore and Kusa (2013) also found out that efficiency is key internal factors that determine bank profitability and efficiency is negatively associated with profitability.

5. Summary, Conclusion and Recommendations

5.1. Summary

5.1.1. Effect of Operational Efficiency on Financial Performance of Commercial Banks in Kenya

The third objective of the study was set to establish whether operational efficiency as a financial distress factor affects the financial performance of the commercial banks in Kenya. Operating efficiency was found to have an influence on performance of commercial banks in Kenya. According to the findings, operating efficiency which was measured in terms of operating expense ratio and net worth turnover ratio was found to have overall means of 0.403and 0.652 respectively for the 2 indictors across entities across years. The overall measure of operating efficiency was found to have a positive influence on performance of commercial banks in Kenya. The final combined generalised least squares model results showed a significant positive coefficient of operating efficiency in the model (B = 1.448, z= 34.54, p= 0<0.05) implying that operational effeciency is the most significant financial distress factor influencing financial performance by 144.8% for commercial banks Kenya.

5.2. Conclusions and Recommendation

The current study objectively determined the influence of operating efficiency on financial performance of commercial banks in Kenya. From the results of the analysis conducted by the study and hypothesis tested, it was concluded that operating efficiency has a significant positive financial distressing effect on the financial performance of commercial banks in Kenya. From the current study there was a positive relationship between operational efficiency and financial performance the results indicated the highest effect of operational efficiency as a financial distress factor on financial performance, this meant that high operational efficiency influenced high profitability of commercial banks, this operational efficiency include proper management of routine expenditure, proper levels of staff costs and other expenses that are incurred in operations of commercial banks. Therefore, these results imply that the management should focus and monitor the operational efficiency of commercial banks in Kenya and ensure higher operational efficiency. The regulator should ensure that regulatory prudential guidelines on operational efficiency are adhered to in order to protect the interest of the investors.

6. Suggestion for Further Study

This study analyzed the effect of financial distress factors on the financial performance of commercial banks. It is therefore recommended that future studies be carried out on the effect of financial performance on operational efficiency as financial distress factor of commercial banks in Kenya.

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