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The Relationship between Bank Growth and Profitability, Emperical Evidence from Eac: Panel Data Analysis

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Abstract
The study was aimed to examine the relationship between bank growth and profitability in East Africa Country (EAC) region, the study employed data from four regions using secondary panel data from Bank scope. The findings revealed that the bank growth indicators have substantial impact on profitability of the banks in EAC. In another case Kenya banks were the most efficiency among the banks in EAC, followed by Tanzania, then Uganda and the least was Rwanda. Generally, banking system has been inefficiency with the average score of 95%, implying that 5% input are waste. While the financial performance indicators have noted Uganda to be the best performer, followed by Kenya, then Tanzania and the least was Rwanda, where asset quality, management efficiency and capital adequacy influenced the profitability positively. Liquidity has negatively influenced negatively the profitability of the banks.
Key words: Profitability, Growth, DEA,

1.0 Introduction

Banks indulge in providing the needs of several groups and stakeholder's such as government, private undertakings, public organizations and foreign investments (Xuezhi and Dickson, 2012). Banks play pivotal roles in economic development of the regions through mobilizing savings and investing in different individual and industrial projects. Early study of Schumpeter (1934) noted that banks played great roles in development process. Therefore several reforms must be done to improve banking sectors. The aims of the reform are to increase competition, increase savings, reduce interest rate spread and efficiency of the banks (Dickson and Marobhe, 2012).

East African banks have gone into significant changes of reforms for several years; this was enhanced by the introduction of structural adjustments programmes. With these programes it increased the banking institution across the regions. Ernest and Young report (2013) has showed that the reforms have improved the financial soundness of EAC banks such as increase in bank assets and the reforms have great impact in Kenya compared to the counter parts for example higher share of banking assets being dominated by Kenya (60%), Tanzania (23%), Uganda (13%) and Rwanda (4%).Sub-Saharan report (2012) has indicated that East African region has gone into fruitful growth and accelerated profit in the greatest dimensions, where its profit is estimated to reach 2% greater than the rest of the world.

There is sufficient empirical evidence in the growth of banks in EAC, these includes; increased number of banks, higher level of non-performing loans, increase in banks assets, increase in employments, increase in credit risks, increase in foreign banks entry and formation of domestic banks. Such growth has brought alarming response to central bank of Kenya and Bank of Tanzania where they have introduced the regulatory guidelines to keep pace with bank growth; these regulations are in line with Basel II of the banking supervision.

Banks growth is very important in any economic development of any nation as it enhances the integration of the financial institutions, broadens the capital market, increase technological transformation, increase efficiency and competitive of the banks sectors (Aurangzeb, 2012)

The relationship between bank growth and profitability is not exact; there are so many mixed results with regard to the arguments. Wilson et al (2013) argued that the relationship to be nonlinear with profitability while other scholar such as Berger (1997) found the linear relationship between bank growth and profitability. Therefore, the relationship between bank growth and profitability was established based on multiple regression models and the efficiency of the banks across the region was established based on DEA model.

2.0 Theoretical literature review

2.1 Banking system across the region

The banking system across the region has the following banks:

The banking industry in Kenya is the fourth in Africa behind South Africa, Mauritius and Nigeria. Their growth has been enhanced by cross border linkages and more than 14 branches being set up in the neighboring countries.

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Tanzania banking industry comprised of 48 banks and is heavily dominated by domestic banks and foreign banks. Government ownership has been limited to four smaller fully owned banks and has minority shareholding in the largest 3 banks. Top tier mainly caters to a small group which represents more than 70% of the bank loan. The higher growth in banking sector has been facilitated by smoother and easier regulations for the bank entry. Meanwhile greater unexploited bank opportunities has enhanced the increase in bank growth

Uganda has 25 banks operating in the region and has expanded significantly with new banks emerged since 2005; eleven banks have been licensed since 2005 making a total of 25 banks with more than 14 foreign banks. The growth has been enhanced by increase in network by branches which have approximately reached 390 branches, probably more.

Rwanda has 12 banks which operates in the region, the growth of the banks has been facilitated by the increase in demand for the financial services and rapid economic growth

Table1: classifications of banks according to size

Country	Large banks	Medium banks	Small banks	NBIF	Total
Kenya	6	15	22	0	43
Tanzania	9	20	16	3	48
Uganda	8	6	11	0	25
Rwanda	4	5	3	-	12

Source: author's compilation from various reports

From table1 it is clear that Tanzania is the only country across the region with NBIF which include; TIB development bank, Twiga Bancorp and Tanzania postal banks. These are regulated financial institutions other than microfinance institution.

2.2 Financial structure of the EAC banking system

Ernest and Young report (2013) has showed that Tanzania banking system has an increase in total assets for about 17% , where cash and cash equivalent accounted for about 34%, Government securities about 23%, loans and advances constituted 23% where the greater share of banking assets being dominated by large banks which has accounted 71.5%. The large component of liabilities was the customer deposit which has increased to 79.4% compared to 77.4% in 2011.

Kenya banking sector has shown a growth of 15% of the total assets where loans and advances accounted 13% and increase in government securities for about 37%, where the liabilities component has shown an increase in customer deposits for 16% and shareholders' funds has increased by 25%. From the balance sheet Uganda show the growth to reach 22% which has been enhanced by loans and advances for about 40% and cash and cash balances with central banks for about 59%. Customer deposit has increased to 23% and shareholders' funds increased to 35%. Rwanda has showed a balance sheet growth of 20% where loan and advances accounted for about 29% and the other assets grew to 40%

2.3 Indicators for bank growth

There is no precise measures of bank growth, however by looking the changes in balance sheet and income statements structure it can entails whether the banking system are at higher level of growth or not. The crucial indicators can be increase in deposit, total assets, and bank liabilities both short term and long term. Long term liabilities are more used once the banks want to expand externally.

Table 2

Changes indicators	Tanzania	Kenya	Uganda	Rwanda	% change all
Cash and cash equivalent	**11**	**43**	**59**	**38**	**151**
Balance with other banks	-23	-26	-8	-34	-91
Investment in government sec	38	37	3	5	83
Loan and advances	23	13	40	29	105
Other assets	21	8	-14	37	52
Total assets	17	15	22	20	74
Customer deposit	**13**	**16**	**23**	**24**	**76**
Deposit from the other banks	57	-12	-27	-1	17
Other liabilities	27	16	22	15	80
Total liabilities	**16**	**14**	**20**	**21**	**71**
Paid up capital	23	14	32	7	76
Retained earnings	16	34	31	12	93
Other	75	21	77	8	181
Total shareholders' funds	**23**	**25**	**35**	**14**	**97**
Interest income	40	51	38	31	160
Interest expenses	76	125	59	42	302
Net interest income	**30**	**24**	**31**	**27**	**112**
Bad debt provision	36	20	153	2	211
Non-interest income	15	7	18	25	65
Foreign exchange gain/loss	5	8	18	30	61
Fees/commissions	24	4	19	44	91
Other income	-31	20	16	-5	0
Gross income	23	18	20	28	89
Non-interest expense	25	15	19	26	85
Operating income before tax	**20**	**20**	**23**	**34**	**97**

Source: author's calculation from the financial statements (2013)

From table 2 Uganda has higher change in cash and cash equivalent, followed by Kenya, Rwanda and the least was Tanzania. The total change was 151% for the bank industry as whole in East Africa, percentage increase in customer deposit was higher in Rwanda, followed by Uganda, then Kenya and the least was Tanzania while the total customer deposit changes was 76%. Change Shareholders' funds were higher in Uganda, then Kenya, Tanzania and Rwanda. Moreover on the aspect of income statement changes Kenya was having higher interest income changes of 51% coupled with interest expenses changes of about 151, then Tanzania, Uganda and the least was Rwanda.

Bank growth across the region has been higher as there is a potential opportunities for growth (BOT, 2011) this has been heighted by the demand for the services. The growth in banking can be internal growth or external growth (Fin cope survey, 2012). The internal growth can be done using the internal sources such as liquid assets and retained earnings where external growth can be done by increasing banks long term debt, otherwise it can increase deposits from the customers.

2.5 Empirical literature review

The scanty of literature review motivated the author to write this paper, many literatures have attempted to survey the determinants of bank profitability and growth as measured in number of total assets has been used to find the relationships, see the following

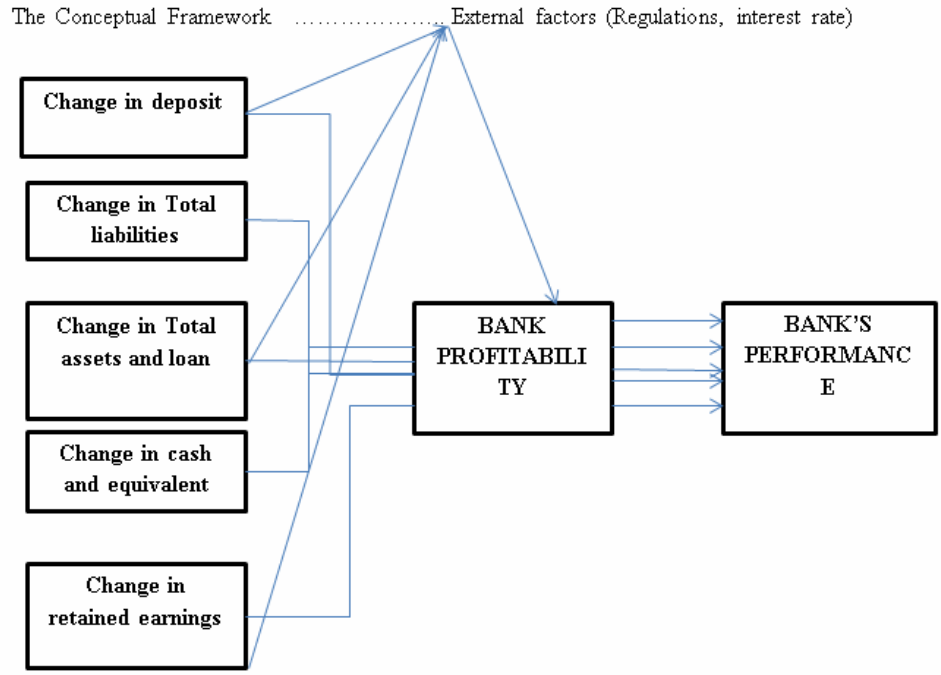
Scholtens et al (2013) measured the relationship between size, growth and profitability of the banks, they found that the changes in bank profitability is subjected to the increase in bank size and profitability and therefore the volatility of banks profit depends on size and growth.Somaudi et al (2012) measured bank growth strategy on profitability of the banks, the key findings was that the bank growth as measured by assets were correlated with bank profitability as measured by ROA.

Bourke (1989) found that the changes in capital ratios and increase in assets have positive relationship with profitability, assuming that well capitalized banks have ability to grow and found cheaper source of financing with better quality assets , in this aspect the better capitalize banks have the ability to absorb the loan loss and increase the profitability. Berger (1997) stated that the bank growth in terms of capital ratios tends to decrease bankruptcy costs and interest expenses hence increase the profitability, therefore instead of the banks to depends on debenture it can use its own equity for the matter of banks expansion and higher capitalized banks tends to attract several customer deposit because of its future prospect and going concern. Moreover, increase in bank size in terms of increase in total assets have positive association with the profitability, this is true due to the facts

that the increase in bank size in terms of increase in total assets tend to increase economies of scales and increase profitability of the bank. On the other hand, Baross et al (2007) noted that profitability is inversely related to profitability as the increase in banks growth through well diversified portfolio tends to increase information asymmetry and bureaucracy which will lower profitability due to inability to effectively monitor the operations.
Hirtle eta al (2004) measured the profit level in accordance to bank networks, in this context the large and wide network which indicates growth in banking have higher profitability compared to limited network, it is widely perceived when the banks grow in terms of large and wide networks tends to increase the deposit mobilization and loan facility and hence higher growth and higher profitability.
Garcia et al (2012) and Ponce (2010) measured the determinants of bank profitability in Spain; the results indicated that there is higher profit growth in banks having higher proportional of loans total assets, higher customer deposits, efficiency and lower credit risks. In this aspect they argued that higher profitability is to the bank which is capable of holding higher assets in terms of loans. Although there is additional costs of holding higher loan, the bank receive higher profit level, and where there is higher loan, liquidity is the problem thus, banks need to strike to balance between the two, as in theory higher loans means higher profitability.
Angbazo (1997), De young and Rice (2004) and Athanasoglou et al (2008) found that there is positive relationship between quality of the assets as measured by decrease in doubtful assets, decrease in impairment losses decrease in non-preforming loans and increase in receivable. In general the health balance sheet structure and effectiveness of credit administration tends to increase the profitability of the banks.
Claeys and Vennet (2008), stated that the increase in customer deposits and total liabilities of the banks have positive association with the bank's profitability. In this aspect the growth of customer deposit and total liabilities enhance the external growth of the bank through bank branches and deposit is considered the cheapest and the easiest means of the bank financing.

2.6 Conceptual discussion and research gap identifications

Wide range of literature review surveyed has shown that the determinant of banks profitability, where growth has been used as a single independent variable (proxy). There is no study that has attempted to link direct the relationship between bank growth indicators and profitability. Therefore, the study found unfilled gap in the previous surveyed studies. In line of this the study also found the indicators for bank growth to be used as the independent variables which was regressed against the independent variable profitability as measured by the return on asset and return on equity.
The variables used are deposit, shareholders' funds, total assets including loans, and other liabilities excluding deposit. These measure the growth of bank externally where cash and cash equivalents and retained earning measure the growth of the banks internally and how they affect the general profitability of the banks. Macro-economic variables such as inflation, interest and regulatory environment was used as the control variables.



Source: author construction (2013)

3.0 METHODOLOGY OF THE STUDY

The study employed panel secondary data from the Bank scope international database, Bank scope is the reliable source of information as it is used worldwide. In this context the measure of the relationship between bank growth and profitability was evaluated using multiple regression models. The study used financial statements for the two periods from (2011-2012)

The dependent variable was ROA and ROE.

The figure on the dependent variables are subjected to Logarithm in order to make the equation valid (deposit, total liabilities, Loan, Total assets and shareholders' funds) are subjected to; logarithm.

$$y_{it} = a_0 + \sum_{i=1}^{n} B_n X_n + \sum_{i=1}^{n} C_n Z_n + \sum_{i=1}^{n} r_n P_n + D + \mu \quad .....(1)$$

y_{it} Dependent variable, a_0 =Intercept,

$X_n, C_{n,} P_n$ =Independent variables

X_n = (Factors affecting profitability, growth indicators)

C_n =Bank specific factor (in this case interest rate and regulatory environment)

P_n =Macro-economic variable

μ =stochastic error

Bank1: $y_{it} = a_0 + B_1 X_n + C_1 Z_n + r_1 P_n + D + \mu$ .....(2)

Bank 2: $y_{it} = a_0 + B_2 X_n + C_2 Z_n + r_2 P_n + D + \mu$ .....(3)

Bank 3: $y_{it} = a_0 + B_n X_n + C_n Z_n + r_n P_n + D + \mu$ .....(n)

y_{it} =ROA and ROA as a measure of profitability

D = represent dummy variable for bank regulations

Table 3: independent and dependent variables

Independent variables	Sign	Expected sign
Total liabilities	X1	- +
Shareholders fund	X2	+
Total assets	X3	+
Total Loans	X4	-
Interest	C1	+ -
Regulations	C2	+ -

3.1 Measuring the efficiency of the banks across the region

The study used DEA model to measure efficiency of the banks across the region, the BCC model of the DEA method has ability to capture required changeable return to scale, which is closer to the reality. So this research has opted to use the BCC model to evaluate the efficiency of the banks across the region.

This research regards each bank as a DMU. So they have the same qualities. The BCC model is as follows:

$$\min \quad \theta - e^T (s^- + s^+)$$

$$s.t$$

$$\begin{cases} \sum_{j=1}^{n} x_j \lambda_j + s^- = \theta X_{0j} \\ \sum_{j=1}^{n} x_j \lambda_j - s^+ = Y_0 \sum_{i=1}^{n} \lambda_j = 1 \\ \lambda_j \geq 0,\ j \in J,\ s^- \geq 0,\ s^+ \geq 0 \end{cases}$$

The "θ"stands for the efficiency value and it ranges from zero to one. Each bank has entries named $X_j = (x_{1j}, x_{2j}, ..., x_{mj})^T$ and entries named $Y_j = (y_{1j}, y_{2j}, ..., y_{mj})^T$ 。 The "s^-" and "s^+" stand for the input redundancy and the output shortage.

The result of the CCR model is the overall technical efficiency value. The result of the BCC model is the pure technical efficiency value. The ratio of them is the scale efficiency value. When the scale efficiency value is one, the return to scale of this DMU is invariant, when the scale efficiency value is less than one, the return to scale of this DMU may be increasing or decreasing. The increasing return to scale means that the investment is not enough while the decreasing return of scale means that the investment is redundant.

The Choice of Inputs and Output

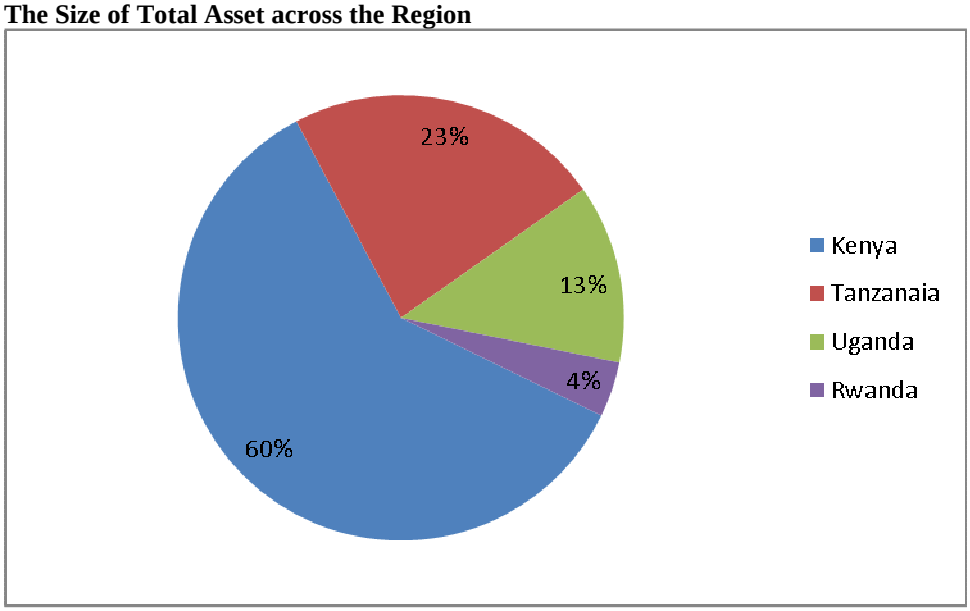
Inputs		Output	
X1	Deposit	Y1	Loan
X2	Total costs	Y2	Investment in securities
X3	Total Liabilities		

4.0 Findings

4.1 Descriptive analysis

EAC region has a total 128 banks excluding Burundi, Tanzania lead the region by having 48 banks, followed by Kenya which has 43 banks, then Uganda which has 26 banks and the least is Rwanda which has 12 banks. The size of Total asset is 72,320 billion where Kenya leads the region by controlling 60%, and then Tanzania 23%, Uganda 13% and the least is Rwanda 4%

The Size of Total Asset across the Region



4.2 The comparative of financial performance of the regions

In this aspect CAEL model was used to make comparison of banks across the region, where CAMEL implies Capital adequacy, Asset quality, Management efficiency, Earnings and Liquidity. This model has been widely used by bank regulators and examiners in evaluating the financial soundness and strength of the bank.

4.2.1 Capital adequacy position

This measures the financial soundness of the banks and ability to withstand shock in long run. Normally it implies the going concern of the bank as it protects the bank against risk

Table 4

Capital adequacy position of banks

	Kenya	Tanzania	Uganda	Rwanda
Total capital to RWAs	24.80%	17.70%	28.01%	21.70%
Core capital to RWAs	22.30%	16.60%	22.90%	19.50%

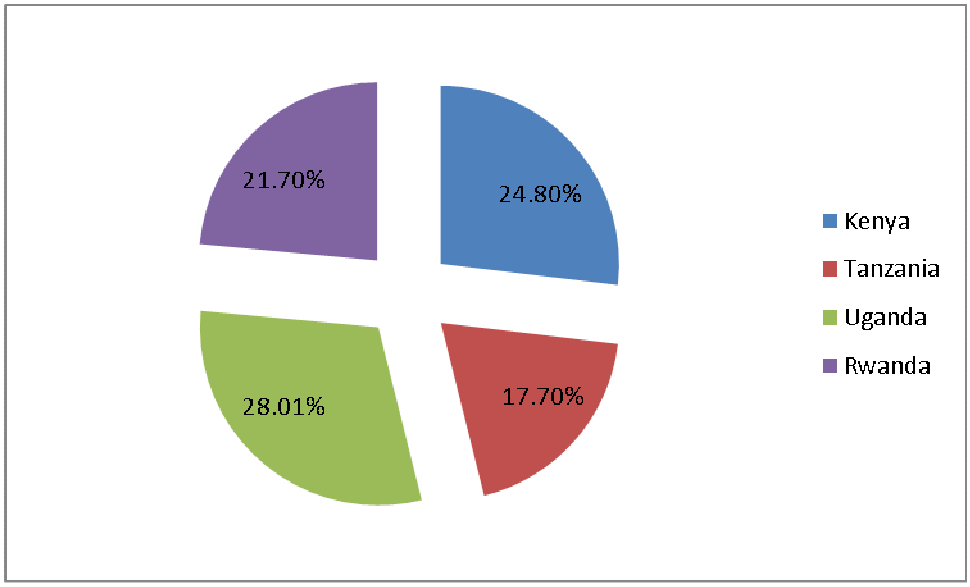


Figure 2: Total Capital to RWAs

Uganda has higher Total capital to RWAs and Core capital to RWAs, followed by Kenya, then Rwanda and the least was Tanzania.in this case it means Uganda is well capitalized banks in the region and Tanzania is least capitalized banks in the region. However, in this capital level goes hand in hand with the magnitude of risk, Ugandan banking system is faced with higher risks of asset defaults e.g more than 50% of loan are expected to be defaulted due to economic stagnation

4.2.3 Asset quality

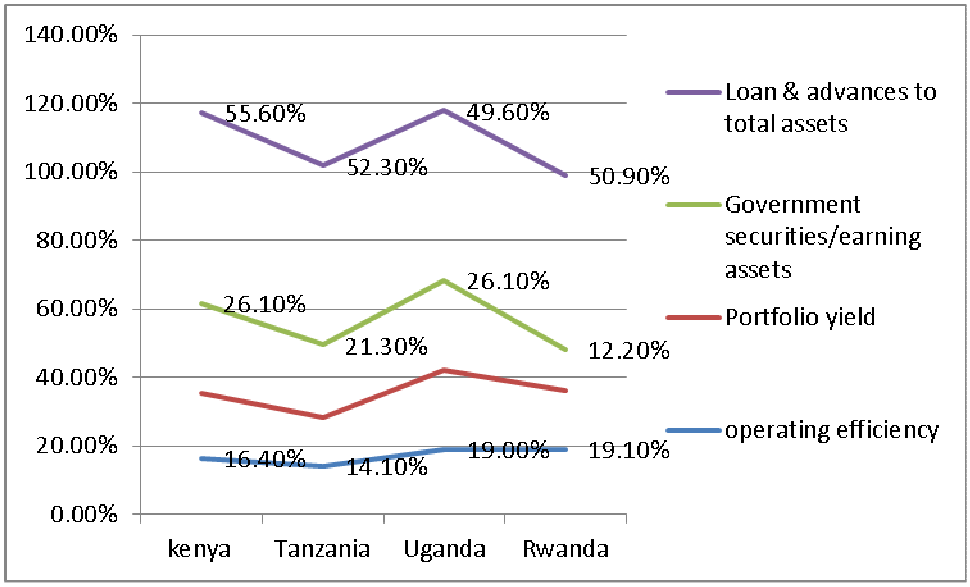
This entails the efficiency and quality of the assets

Table 5 (Asset quality Table)

	Kenya	Tanzania	Uganda	Rwanda
operating efficiency	16.40%	14.10%	19.00%	19.10%
Portfolio yield	19.10%	14.10%	23.20%	16.90%
Government securities/earning assets	26.10%	21.30%	26.10%	12.20%
Loan and advances to total assets	55.6%	52.3%	49.6%	50.9%

With reference to table 5 it has been indicated that Tanzania has the best operating efficiency ratio as the lower the ratio the better is the better, then Kenya, Uganda and the least was Rwanda. Uganda maintained the highest portfolio yield, followed by Kenya, then Rwanda and the least was Tanzania. On other hand Kenya has higher proportional of government securities in relation to earning assets, followed by Uganda, then Tanzania and the least was Rwanda. Meanwhile Kenya maintained higher proportional of loan and advances in relation to total asset, followed by Tanzania, then Rwanda and the least was Uganda

Figure3: Asset quality



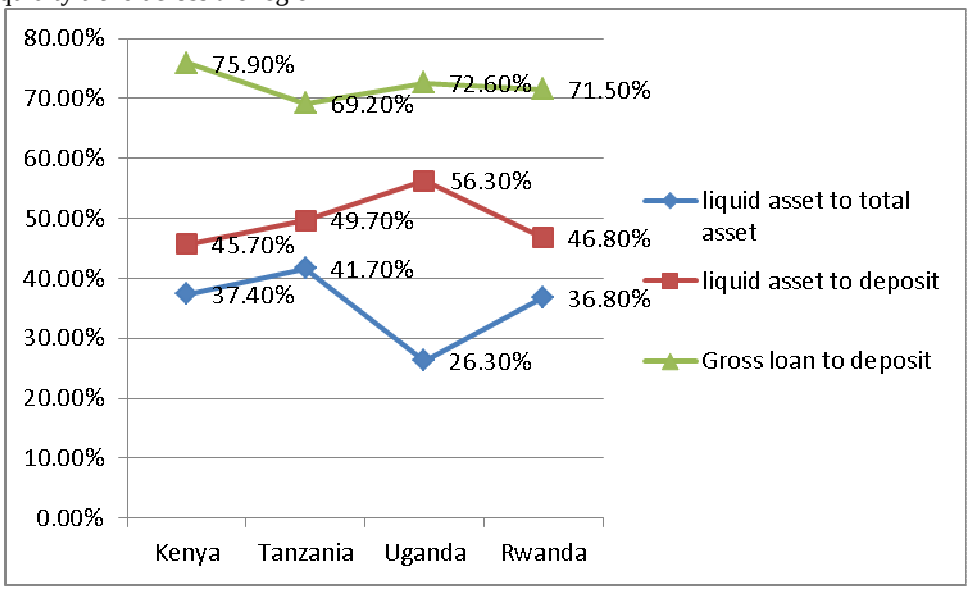
4.2.4 Liquidity position

This shows ability of the banks to pay short term obligation once they fall due, liquidity position enhance strong working capital base. In general the region has higher liquidity level where Uganda has highest liquidity of liquid asset to deposit, followed by Tanzania, then Rwanda and the least was Rwanda. In another aspect liquid asset to total asset was higher Tanzania, then Rwanda and the least was Kenya. Gross loan to deposit was higher for Kenya followed by Uganda, then Rwanda and the least was Tanzania.

Table 6: Liquidity of the bank in East Africa

	Kenya	Tanzania	Uganda	Rwanda
Liquid asset to total asset	37.40%	41.70%	26.30%	36.80%
Liquid asset to deposit	45.70%	49.70%	56.30%	46.80%
Gross loan to deposit	75.9%	69.2%	72.6%	71.5%

Figure 4: liquidity trend across the region



4.2.4 Earning position

In this case Uganda is the profitable area as the profitability indicators was higher compared to the other region. Higher profitability gives confidence to the stakeholders on the future investments for the banks.

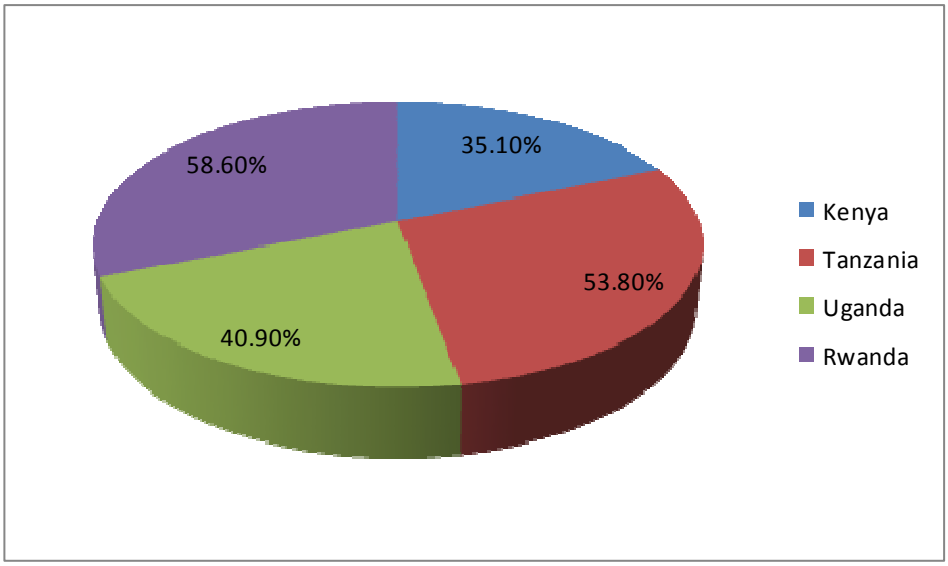
Table 7: Earning position

	Kenya	Tanzania	Uganda	Rwanda
ROA	3.50%	1.80%	3.90%	2.90%
ROE	23.10%	14.10%	23.10%	14.20%
Margins	8.70%	8.60%	13.30%	10.60%

4.2.5 Management efficiency

In this category management is evaluated to see how it is efficiency, in this aspect costs in each region was used as an indicator of control. The control on management capacity in most cases is non-interest expenses to total income. In this analysis Kenya has highest management efficiency, followed by Uganda then Tanzania and the least was Rwanda. In this case management ability to control costs (overheads) in relation total income was higher in Kenya compared with other regions.

Figure 5:Non-interest Expenses to Gross Income



4.2.6 General Ranking of the financial performance of the EAC countries

With reference to table 3, Uganda performed best with regard to the financial indicators, followed by Kenya and then Tanzania and the least was Rwanda

Table 8: Ratio analysis ranking

Financial performance indicator	Kenya	Tanzania	Uganda	Rwanda
Capital adequacy	2nd	3rd	1st	4th
Asset quality	2nd	1st	3rd	4th
Liquidity	2nd	3rd	1st	4th
Earnings	2nd	3rd	1st	4th
Management efficiency	1st	3rd	2nd	4th
Average ranking scores	1.8	2.6	1.6	4
Position	2nd	3rd	1st	4th

Source: author's manipulation

4.2.7 The factors that have influenced the performance of the banks in EAC region.

In this aspect the indicators of performance capital adequacy was regressed against the performance indicator (ROA), to examine which has greatest lead to the increase or decrease in performance of the banks in the region. The independent variables were Liquidity, Capital adequacy and Management efficiency and asset quality.

The findings have reported that management efficiency, asset quality and capital adequacy have positive influence on the performance of the banks. Increase in management efficiency enhance the investments potential and increase in performance level, on other hand increase in capital lead to future prospects and growth of the banks. The increase in asset quality increase the profitability of the banks, asset quality is the greatest indictor for the performance of the banks, the increase in quality of the loan in industrial projects and individual level

accelerate profitability potential. The liquidity level has indicated the negative relationship in the sector, the increase in liquidity tends to lower the profitability of the bank, this is due to the fact that liquidity has the cost of maintaining, therefore the increase tends to lower the profitability, in general banks need to strike balance between high liquidity and lowest liquidity level. With this balance the bank can be able to maintain higher growth level and profitability. All factors have been statistically significance.

Table 9: Regression results (The factors that affect the profitability using financial indicators)

Fixed Effect Model for bank profitability

. xtreg Roa cap liqu assetq, eff, size, fe robust

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Fixed-effects (within) regression           Number of obs      =        32
Group variable: bankcode                    Number of groups   =         4

R-sq:  within = 0.8899                      Obs per group: min =         8
       between = 0.9890                                    avg =       8
       overall = 0.7645                                    max =       8
corr(u_i, Xb)  = 0.5553                     Prob > F           =    0.0000

                                (Std. Err. adjusted for clustering on bankcode)
------------------------------------------------------------------------------
             |               Robust
         nii |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         cap |    .894848    .109128     8.20   0.000     .5886072    1.013397
         liq |  .-8547023   .1675887    -5.10   0.000     .3398727    .9669145
       asset |   .7634493   .2219459     3.44   0.003    -.1083179    .7199865
   efficienc |   .5365566   .1192348     4.05   0.001    -.2124124    1.324761
       _cons |   1621.812   690.3902     2.35   0.007    -37.96826    3527.812
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4.3 The relationship between bank growth and profitability

The findings of the study have reported the relationship between bank growth and profitability do exist. The indicators for the independent variables (Bank growth) have been statistically significance at 5% level in influencing the profitability of banks in East Africa.

To start with total liabilities which excludes deposit has significantly increase bank growth, in this case when there is an increase in liabilities tends to increase the bank expansionary in this case the long term liabilities are have been used by the banks to increase the bank size through increase in bank branches and other expansion of the capital nature where the short term liabilities have been used to finance the working capital requirements. The findings are in tandem with Claeys and Vennet (2008) that showed in increase in liabilities and deposit tends to increase the profitability of the banks. Other studies have shown negative relationship between bank profitability and long term liabilities, this is due to the facts that because higher debt level tends to lower profitability due to interest payments. Also deposit as the other form of bank liability has confirmed a positive relationship with profitability significantly at 5% level of significance. This is due to the facts that the increase in deposit tends to increase the bank profit through loan issuance and it is a cheap and a reliable source of bank finance.

On the other hand, the shareholders fund has shown a positive relationship with the profitability. Shareholders fund is the prominence fund as an equity finance which is safer source of finance, this form of finance does not involves the payment of interest; therefore it tends to increase profitability when the bank expands and open more investment potential which in return generate profit. Dividend which is to be payable to the shareholders is optional in exceptional to preferential divided which is mandatory to be payable, therefore a well-capitalized banks tends go in hand with profitability increase as it attracts potential depositor because of the lower bankruptcy costs. However, Berger (1995) argued that the well capitalized banks tend to be safer and less risky and hence, they have lower profitability because of the lower risk. It can be pointed out the higher the risk the higher the investment return and that's why bank with higher credit risk tends to have higher profitability (Athanasoglou et al, 2005).

Moreover, the findings have reported a positive relationship between bank size and profitability and it was statistically significance at 5% level. The theory suggest that the increase in size of the banks in total asset tends

to have more monopoly and increase higher interest charges to the customer and hence higher profit, while on the other hand the increase in size may motivate the banks to charge lower interest charges due higher enjoyments of economies of scale. Other authors have reported the negative relationship between profitability and assets especially liquid assets, liquid assets are assumed to have lower return and finally affect profitability potential (Bourke, 1989). Moreover as a special kind of the asset of the bank has shown a positive relationship, this portrays that the increase in loan tends to increase the profitability of the bank. Loan is the most valuable asset and it is associated with higher credit risk and the findings were statistically significance at 5%.
Bank regulations and interest have revealed to have negative relationship between them and profitability. It was presumed that the relaxation and easier bank regulations will foster increase in bank performance, but the findings reported negative relationship. Interest rate depicted negative relationship as the increase in interest rate reduce demand for loans, therefore higher interest spread reduce profitability of the banks although the results was not statistically significance.

Table 10: Regression results Table

Model 1:ROA					**MODEL ROE**			
Variable	β	Std Error	t Stat	P-value	β	Std Error	t Stat	P-value
Shareholders' funds	0.943	0.193	4.885	0.000	0.831	0.156	5.326	0.000
Total liabilities	0.761	0.124	6.137	0.000	0.655	0.124	5.282	0.000
Deposit	0.152	0.080	1.900	0.000	0.111	0.025	4.440	0.000
Total assets	0.836	0.352	2.375	0.002	0.771	0.283	2.745	0.000
Loan	0.271	0.047	5.765	0.001	0.162	0.046	3.522	0.000
Interest rate	-0.098	0.153	-0.636	0.531	0.058	0.123	0.466	0.646
Regulations	-0.847	0.865	-1.979	0.338	-0.209	0.697	-0.299	0.767
R-square		***0.791***			***0.687***			
Adj.R-square		***0.693***			***0.560***			
F-statistic		***7.036***			***6.263***			
Sig. F		***0.000***			***0.000***			

Table 11: Correlation matrix

Variables		ROA1	ROE	Liabilities	Deposit	Loan	T.asset	Interest	Regulation
ROA	r	1							
	sig.								
ROE	r	0.078	1						
	Sig.	0.973							
Liabilities		.384**	0.084**	1					
	Sig.	0.000	0.000						
Deposit	r	0.584*	0.239	0.093	1				
	Sig.	0.003	0.0.002	0.257					
Loan	r	0.304*	.249**	-0.024	-0.412**	1			
	Sig.	0.001	0.002	0.768	0.000				
T.asset	r	0.574	0.425	0.367	-0.907	-0.087**	1		
	Sig.	0.004	0.190	0.123	0.467	0.003			
Interest	r	.456**	0.278	0.234	-.656**	0.789**	0.047	1	
	Sig.	0.000	0.222	0.170	0.000	0.001	0.012		
Regulation	r	-.440**	.367*	0.221	-0.077	.234*	0.333	-0.231	1
	Sig.	0.005	0.01	0.230	0.349	0.001	0.123	0.080	

* Significant at the 0.05 level (2-tailed)

4.6 Measuring Technical efficiency

The technical efficiency across the region was almost inefficiency, using the inputs of deposit, total asset and total cost, the region was inefficiency in producing output loans and investments in government securities. The efficiency level was 95% meaning that more than 5% was implying input wastes. In all region of EAC Kenya lead by producing the technical efficiency of 96% followed by Tanzania which produces a technical efficiency of 95%, then Rwanda which produces technical efficiency of 94% and the least was Uganda which produces a technical efficiency of 93%.

Table 12: Mean country efficiency

Country	Kenya	Tanzania	Uganda	Rwanda
Efficiency	**0.9641895**	**0.945429**	**0.930832833**	**0.935264333**

Table: Showing means efficiency of the banks across the region

Kenya		**Tanzania**		**Uganda**		**Rwanda**	
Bank	**Efficiency**	**Bank**	**efficiency**	**Bank**	**efficiency**	**Bank**	**Efficiency**
KCB _13	1	Barclays _1	1	Stanbic _25	0.942346	Access_37	0.999733
KCB _19	1	Barclays _7	0.870184	Stan Chart _26	0.963396	BCR _38	0.829034
Barclays_14	0.99827	Citibank_ 2	0.879453	Barclays _27	0.867401	Ecobank_3 9	0.977391
Barclays_20	0.887594	Citibank_ 8	1	Crane _28	0.936656	BPR KCB_40	0.845599
Co – op _15	1	CRDB _3	0.929534	Cantenar y _29	0.941077	BOK_41	0.899733
Co – op _21	1	CRDB _9	0.987734	DFCU _30	0.935422	Kcb_42	0.842314
Equity _16	1	Exim _4	0.988443	Stanbic _31	0.923794	Access_43	0.999291
Equity _22	0.845053	Exim _10	0.934696	Stan Chart _32	0.888761	BCR _44	1
STD _17	1	NBC _5	0.938144	Barclays _33	0.919759	Ecobank_4 5	0.967422
STD _23	0.961308	NBC _11	0.930415	Crane _34	0.897655	BPR KCB_46	0.862655
CfC_18	0.908593	NMB _6	0.927846	Cantenar y _35	1	BOK_47	1
CfC_24	0.969456	NMB _12	0.958699	DFCU _36	0.953727	Kcb_48	1
Average	**0.9641895**		**0.945429**		**0.930832833**		**0.935264333**

5.0 Conclusions

This paper examines the relationship between bank growth and profitability of the banks in EAC, the findings noted that the bank growth indicators are key variables in determining bank growth. The independent variables total liabilities and deposit, total assets and loan, and shareholders' funds are positively related with bank profitability while bank regulations and interest rate are negatively related with bank profitability. In another case Uganda has been the best performer in terms of financial performance, followed by Kenya, then Tanzania and the least was Rwanda where capital adequacy, asset quality and management efficiency affect profitability positively but liquidity has negatively affect the profitability. All banks financial performance across the region under study was above the regulatory requirements. In context of Bank efficiency Kenya maintained higher level of efficiency, followed by Tanzania, then Rwanda and the least was Uganda, therefore the study confirms that that even when there is higher banking financial performance does not guarantee its higher efficiency level as evidence by Ugandan banks.

Bank regulators should re-examine the interest rate and bank regulation policies as they negatively affect the performance of the banks and this will accelerate profitability potential.

Positive initiative that has been done across the region such as the introduction of credit reference bureau and agency banking will accelerate bank growth together.

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