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An Empirical Analysis of Technical Efficiency in the Gambian Banking Sector

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Abstract: This study evaluates "the Technical Efficiency (TE), Pure Technical Efficiency (PTE) and Scale Efficiency (SE)" of commercial banks and the determinants of efficiency levels in the Gambian banking sector. Data envelopment analysis method and the Tobit regression model were employed to measure a sample of 12 Gambian commercial banks from 2009 to 2017 based on the production approach. The level of overall technical efficiency of the banks was 86.5% in terms of TE, 93.1% in terms of PTE and 92.5% in terms of SE. The results reveal that the banking sector in the Gambia is technically inefficient during the analysis period, due to scale inefficiency rather than pure technical inefficiency. On the other hand, the regression results demonstrate that market power, earnings and GDP have a positive and significant relationship with efficiency measures, while bank size and liquidity have a negative and significant relationship with efficiency measures. The results indicate that the banks have more room to improve their efficiency level, by optimizing their outputs and minimizing their inputs resources.

Keywords: Technical Efficiency, DEA, Tobit Regression, the Gambian Banking

JEL Classification: G2; G21; C67

1. INTRODUCTION

The banking sector in the Gambia has undergone major changes in the last two decades with major financial sector reforms during its structural adjustment program. The current structure of banking industry emerged when the Central Bank of Gambia (CBG) introduced major financial sector

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reforms and a new banking act in 2005, which enabled itself to conduct monetary policy without undue interference from the government with the objective of delivering price stability. The financial reform was introduced to promote financial liberalization, institutional development and enhancing the stability of the financial sector. Following this program change new banks were allowed to enter the industry, leading to a real growth in banking. There were 12 banks operating in the Gambia since 2013, 11 of which is conventional commercial banks (CCBs) and one Islamic bank (IB).

One of the main challenges in the Gambian financial sector is low level of financial intermediation due to commercial banks' large appetite in holding government securities. For this reason the banking sector in the Gambia is labeled as "armchair banking" by some observers, because most banks choose to invest more than half of their financial assets in low-risk, high-yielding government securities, mainly treasury bills and sukuk al-salam **(IMF Country Report No. 18/100)**. The high opportunity cost of not investing in government securities is the main reason for extending credit to consumer s and businesses to dry up. According to the International Monetary Fund (March 2018), "the real private sector credit has not grown in real terms since 2010 and even fallen for the past three years". Banks to some extend focused on three principal activities: aside from investing in government paper they offer short-term trade financing and involve in the foreign exchange market to create fee and commission revenue. **(IMF Country Report No. 18/100).**

The banking sector plays crucial functions in channeling funds between savers and investors, engaging in financing private sector trade and investment. The banks should operate efficiently to effectively play their crucial intermediary role and to stay competitive. The Gambia is a small country with a population of 2.1 million, majority of who do not have bank accounts. Since it does not have capital markets, it is predictable that the entry of new banks would enhance financial inclusion. The upsurge in competition, however, can damage the efficiency level of commercial banks in The Gambia. Indeed, the feebler banks might drip in their efficiency level and naturally exit the industry while the strongest will benefit from improved scale and scope efficiency. Some observers argue that the country is over-banked though no empirical study has been conducted extensively to the outcome of these vicissitudes. Therefore, measuring the efficiency of commercial banks in the Gambia is timely and more relevant. To respond to this need, this study aims to estimate the overall technical efficiency of commercial banks in the Gambia from 2009 to 2017. Also, the study further examines the likely determinants of efficiency such as banks' specific

characteristics and macroeconomic factors (i.e. Profitability and Market Power, Bank's Size, Liquidity, Capital Adequacy, earnings, GDP, and Inflation).

The study is expected to benefit bank managers, customers and investors, governmental supervisory authorities, bank customers, as well as academics. For bank managers, this study will allow them to evaluate the efficiency of their bank compared to best practicing banks among their peers. The evidence on the determinants of efficiency can hint them on maintaining banking performance at the highest level. It will also enhance the customers and investors in their decision-making process. For the governmental authorities, the empirical findings will provide information on the resilience of increasing minimum capital requirements for banks. For academics, this work will certainly contribute to the literature and facilitate comparative analysis or trend analysis in various research works.

The current study is organized into five sections. Section 2 reviews empirical literature. Section 3 presents the methodology, the data and selection of variables. Section 4 presents the empirical results. Section 5 concludes the study.

2. LITERATURE REVIEW

In the literature, extensive studies are visible on evaluating the efficiency of banks and determinants of the efficiency levels. Measuring the performance of financial institutions has become a great concern among shareholders, bank managers, regulators, and academicians. Therefore, numerous studies have been conducted to estimate efficiency levels of banks by utilizing the non-parametric technique of DEA. A number of these studies concentrated on technical efficiency while others focused on allocative efficiency. DEA technique was first applied in the banking sector by Sherman & Gold (1985) to measure the efficiency of bank branches. Later on, the use of DEA in the banking sector become common in the efficiency literature. For example, Singh & Fida, (2015) examine the level of "technical, pure technical, and scale efficiencies in commercial banks in Oman from 2009 to 2013 by utilizing DEA approach. The authors further examine the determinants of efficiency employing the Tobit regression model. The results indicate that the impact of scale inefficiency in overall technical inefficiency is higher than pure technical inefficiency. Furthermore, the regression results reveal that "bank size" is insignificant, while capital adequacy, profitability, and liquidity have a significant and positive relationship with the efficiency of the banks in Oman.

Tandon *et al.* (2014) studied "technical, technical purity and scale efficiencies" of Indian banks in various categories of ownership for the

period 2009-2012 utilizing the DEA method. Their results show that about 7 of the 44 banks chosen are within the limits of efficiency and are benchmarks for their counterparts. Second step regression analysis was performed employing Tobit regression to examine the determinants of efficiency (that is, asset quality, business by employee activity, capital adequacy, the log of asset size, non-interest income, employee benefits, ownership, and profitability). They find that non-interest income is one of the most important determinants of banking efficiency in India. Balcerzak *et al.* (2017) investigated the efficiency of banking sector operations in EU countries between 2014 and 2015 utilizing the DEA. They found that there was a difference between the efficiency of the banking sector from "old" and "new" EU countries. They also show that there is a clear difference between the efficiency of the banking sector in the EU and the Member States not included in the Eurozone.

Alrafadi, Kamaruddin, & Yusuf (2014) provide a comparative analysis of the performance of 17 Libyan banks over the period 2004 to 2010. Results of their analyses reveal that specialized banks have shown higher technical efficiency than commercial and private banks. Tobit regression results show a positive relationship between banking efficiency and "ROA; the size of operation; capital adequacy; and government-linked banks". Varias & Sofianopoulou (2012) evaluated the efficiency of the largest trading bank operating in Greece during the financial year 2009. Their results show that banks are not fully efficient, which means that ineffective banks have to work hard, especially to increase production and efficiency. The results also show some inefficiencies that are not directly related to institutional profit.

Rahman, Rahim, & Rosman, (2013) examine and compare the efficiency of 63 Islamic banks in the Middle East and North Africa (MENA) and Asia, using DEA. They also assessed the determinants of the efficiency of particular Islamic banks for four years (2006 to 2009) using OLS. They found the major source of technical inefficiency for Islamic banks is the scale of their operations. Generally, Islamic Banks have obtained high scores for their pure technical efficiency, which shows that the bank's management has been able to control costs and effectively use inputs to maximize outputs despite the impact of the scale. The regression analyses results show that country-specific factors, the country's economic situation measured by GDP per capita, have a significant positive impact on "overall technical efficiency (OTE)" while profitability, measured by ROA, has a negative impact.

Onen & Tunik (2017) measured the efficiency of the Turkish banking sector between 2005 and 2014, during the global financial crisis. Their results show that domestic banks, especially public banks, are more efficient than

foreign banks. Besides, the results show that internal factors are more effective than external factors on bank efficiency. The financial crisis had little effect on the efficiency of banks in managing their financial resources. GDP and inflation have a negative relationship with bank efficiency due to unpredictable inflation and economic growth. Garamu (2016) evaluated "the relative technical efficiency and productivity changes of a panel of 10 Ethiopian commercial banks over the years 2007 to 2011. The results show that on average, the Ethiopian commercial banks are technically inefficient. Inadequate scale contributes significantly to their inefficiency levels. Karimu Tossa (2016) estimated the technical efficiency (TE) of 21 commercial banks in Ghana between 2009 and 2013. The results show that the average TE differs directly from the size of the bank in the upper two quartiles, but big banks do not benefit from the economies of scale compared to small banks. Finally, gross domestic product (GDP) per capita, inflation, credit risk, size, and operating costs have a negative impact on efficiency while market share positively affects efficiency.

Jaabi & Fatty (2018) measure the overall technical efficiency of the commercial banks in the Gambia from 2005 to 2009 using the DEA method. They also studied the influence of bank characteristics on efficiency measures using Tobit's regression model. DEA results show that most Gambian banks are very efficient in PTE, according to VRS, but technically inefficient. The main cause of inefficiency in the Gambia between 2005 and 2009 was the inadequate scale level. Linear regression analysis showed that only bank size was significantly and positively associated with to "overall technical efficiency (OTE), while market power, profitability were negatively related to OTE of commercial banks in the Gambia.

3. METHODOLOGY

This study followed a two-stage analysis by adopting previous studies (Isik & Hassan, 2002; Sathye, 2003; Sufian, 2007). The first stage estimates the overall technical efficiency of commercial banks in the Gambia from 2009 to 2017 by using a non-parametric data envelopment analysis method. OTE is further decomposed to "pure technical efficiency (PTE)" and "scale efficiency (SE)". As "DEA" lacks statistical inference, the study further utilizes the "Tobit regression model" in the second stage to examine the factors that determine the efficiency of banks.

The DEA methodology is a "linear programming technique" to develop efficient frontiers, which are then used to generate relative efficiency measurements. It is used for evaluating the relative performance of a set of firms or Decision Making Units (DMUs) that uses a variety of inputs to produce a variety of outputs. The main objective of DEA is to examine

how efficiently DMUs use the resources available to produce a set of outputs (Charnes, Cooper, & Rhodes, 1978). DEA methodology was proposed by Charnes, Cooper, and Rhodes (1978), in their seminal paper where have evaluated the efficiency of public sector non-profit organizations employing an input orientation and assumption of constant returns to scale (CRS), which is known as "CCR model". The CRS hypothesis only applies when all DMUs operate at an optimal scale. Subsequent studies have examined the assumptions of variable returns-to-scale (VRS). The assumption of VRS was initially presented by Banker, Charnes, and Cooper (1984), which is known as "the BCC model". VRS includes "increasing and decreasing returns-to-scale". By incorporating increasing and decreasing returns-to-scale assumptions into the model, VRS makes it possible to break down "technical efficiency" into "pure technical efficiency (PTE) " and "scale efficiency (SE)". This paper uses CCR and BCC models.

Technical efficiency can be estimated based on an "input-oriented approach" or an "output-oriented approach". Input-oriented approach aims to minimize the amount of input as much as possible at a given level of output, while an "output-oriented approach" maximizes output levels at a given input level (Coelli, 1996). The DEA sets different weights for different companies' inputs and outputs or DMUs so that one company maximizes its efficiency compared to another. The efficiency score for all units range between zero and one, where the DMU achieves a score of will be determined as the best practice unit.

To implement the DEA methodology, we predict that there were n BANKs to be assessed. Each uses different input quantities of *j* inputs and produces *i* different outputs, i.e. BANK*r* uses *xjr* quantities of input to produce y_{ir} quantities of output. It is expected that these inputs x_{jr} and outputs y_{ir} are free from negative values, and each BANK has at minimum one positive "input and output value". The CCR model aims to maximize the ratio of weighted outputs for given weighted inputs of the bank under examination. The main purpose, described by α_r , for r^{th} bank is maximized under the constraint that each other bank in the sample cannot go beyond unit efficiency by using the same weights. The Mathematical programming equations can be defined as follows:

$$Max\ \alpha_r = \frac{\Sigma_{i=1}^{t} u_i y_{ir}}{\Sigma_{j=1}^{k} v_j x_{jr}} \tag{a}$$

Subject to the following condition:

$$\sum_{i=1}^{t} u_i y_{ir} / \sum_{j=1}^{k} v_i x_{jr} \leq 1, \tag{b}$$

$$uj,\ vi \geq 0;\ r = 1, \ldots, n \qquad \text{(c)}$$

where: "$j = j^{th}$ input, $j = 1, \ldots, k$; $i = i^{th}$ output, $i = 1, \ldots, t$; $r = r^{th}$ bank, $r = 1, \ldots, n$; α_r = objective measure of efficiency for r^{th} bank; $r = \alpha$ particular bank to be estimated; y_{ir} = the amount of output i from bank r; x_{jr} = the amount of input j to bank r; u_i = weight placed for output i; v_j = weight placed for input j; n = the number of banks; t = the number of outputs; k = the number of inputs".

The fractional linear program of "Constant Return to Scale CRS" can be changed into an ordinary linear program as below

$$Max\ \alpha_r \sum_{i=1}^{t} u_i\, y_{ir} / \sum_{j=1}^{k} v_j\, x_{jr}$$

Subject to:

$$\sum_{j=1}^{k} v_j\, x_{jr} = 1 \qquad \text{(a)}$$

$$\sum_{i=1}^{t} u_i y_{ir} - \sum_{j=1}^{k} v_j\, x_{jr} \leq 0, \qquad r = 1,2 \ldots, n; \qquad \text{(b)}$$

$$uj,\ vi \geq 0, \qquad \text{(c)}$$

$i = 1,2,\ldots\ldots t$, $j = 1,2,\ldots.\ k$ and $r = 1,2,\ldots..n$.

The above solution for the linear programming provides technical efficiency score (α_r) for bank r, where $0 \leq \alpha_r \leq 1$.

Furthermore, the study utilizes "the Tobit regression model" for the second stage of the analysis to determine the factors that influence the efficiency measures. The model is proposed by James Tobin (1958) to describe the association between a censored dependent variable and independent variables. Adopting a simple OLS evaluation procedure on a dependent variable can result in biased estimates in the event of a significant observation position of 1. Tobit model is used due to the censored nature of the dependent variable (Technical efficiency are in the range of 0 to 1) and extreme values of the independent variables which deviate from a normal distribution and highly skewed in nature (Bhatia & Mahendru, 2015; Niazi, 2003).

Tobit model can be described as follows for i^{th} bank:

$$y_i^* = a + \beta 1 Pit + \beta 2 MPit + \beta 3 BSit + \beta 4 TL\_TAit + \beta 5 EQ\_TAit + \beta 6 II\_TAit + \beta 7 GDPit + \beta 8 INFit + uit$$

$$y_i^* = 0\ if\ \ y_i^* \leq 0;\ y_i = y_i^*\ if\ 0 < y_i^* \leq 1;\ y_i = 1\ if < y_i^*.$$

As the dependent variable y_i^* positioned for relative efficiency scores that lie between 0 and 1, it is filtered to the left as in the right. The y_i is a dormant variable and y_i^* is the efficiency scores obtained for an ith bank from the DEA model.

The independent variables in the model are

Profitability (P)	: Net operating income to total equity (ROE)
Market Power (MP)	: Bank deposits to total deposits in the state which the bank operates
Bank Size (BS)	: Natural logarithm of total assets
TL_TA	: Total loan and advances to total assets
EQ_TA	: Equity to total assets
II_TA	: Interest income to total assets
GDP	: Gross domestic product growth rate
INF	: Inflation rate

Data and Variables

The current study selected 12 banks out of 14 commercial banks in the Gambia for a period nine years from 2009 to 2017. In order to be included in the analysis a bank must have complete data for nine years. Two banks were not included in the sample since they lacked complete data over the selected period. These are the two banks that withdrew from the sector in 2014. The banks included in this study are 1. Standard Chartered Bank (Gambia) Ltd SCB, 2. Trust Bank Ltd TBL. 3. First International Bank FIB, 4. Guaranty Trust Bank GTB, 5. International Commercial Bank ICB, 6. Arab Gambian Islamic bank AGIB. 7. Platinum Habib Bank (now is Mega Bank Gambia Ltd), 8. Access Bank (Gambia) Ltd, 9. Ecobank (Gambia) Ltd, 10. Banque Sahelo-Saherienne Pour L'investissement Et Commerce (BSIC), 11. Skye Bank (Gambia) Ltd, 12. Zenith Bank (Gambia) Ltd.

A panel secondary data was used in this study, which was extracted from annual reports for individual commercial banks in the Gambia (i.e. income statement and balance sheet) and collected through individual banks websites and central bank of the Gambia. The macroeconomic data is collected from World Bank database.

This study selects bank inputs and outputs based on the production approach under which banks are considered as institutions that use labor and capital resources to offer financial products and services to their clients. The resources consumed, such as labor and operating costs, are treated as bank inputs, while products and services, such as loans and deposits were considered as bank outputs. (Yang & Pollitt, 2009). According to Berger &

Humphrey (1997) production approach assumes that financial institutions (banks) are considered as primarily producing services for account holders such as loan applications, credit reports, cheques or other payment instruments. In this approach, services and products are considered as outputs while the resources are considered as inputs. Since the aim of this approach is minimizing the cost, the input-oriented DEA model was adopted. Following the previous research, the inputs used in this study are Interest Expenses (X1), Personnel Expenses (X2), and Noninterest expenses (X3), while the outputs used are Interest income (Y1) and Noninterest income (Y2) (Onen & Tunik, 2017; Sathye, 2003; Sufian, 2007).

To examine the determinant of efficiency, this study used overall technical efficiency scores from first stage DEA measures as the dependent variable and several bank-specific and macroeconomic factors as independent variables. Based on earlier literature, the following independent variable are selected: Profitability, measured as return on equity (ROE), Market Power, measured as bank's total deposit to total deposits of the banking industry, Bank Size, measured as log of total assets, Total Loan over Total Assets as a proxy for Liquidity, Equity over Total Assets as a proxy for Capital adequacy, Interest Income to Total Asset as a proxy for Earnings, Gross Domestic Product and Inflation.

4. EMPIRICAL RESULTS

The Efficiency of Commercial Banks in the Gambia

In this study, the overall technical efficiency of commercial banks in the Gambia were investigated utilizing the DEA in the first stage and the Tobit regression model in the second stage. Table 1 exhibits the result of the

Table 1: Overall Technical Efficiency in Gambian Banking: 2009-2017

Year	*Sample size*	*Technical efficiency mean of sample CRS*	*Pure technical efficiency mean of sample VRS*	*Scale efficiency mean of the sample*
2009	12	0.912	0.937	0.972
2010	12	0.852	0.921	0.913
2011	12	0.910	0.949	0.960
2012	12	0.839	0.946	0.882
2013	12	0.935	0.962	0.973
2014	12	0.801	0.902	0.881
2015	12	0.794	0.858	0.924
2016	12	0.936	0.963	0.972
2017	12	0.804	0.944	0.850
Mean		0.865	0.931	0.925

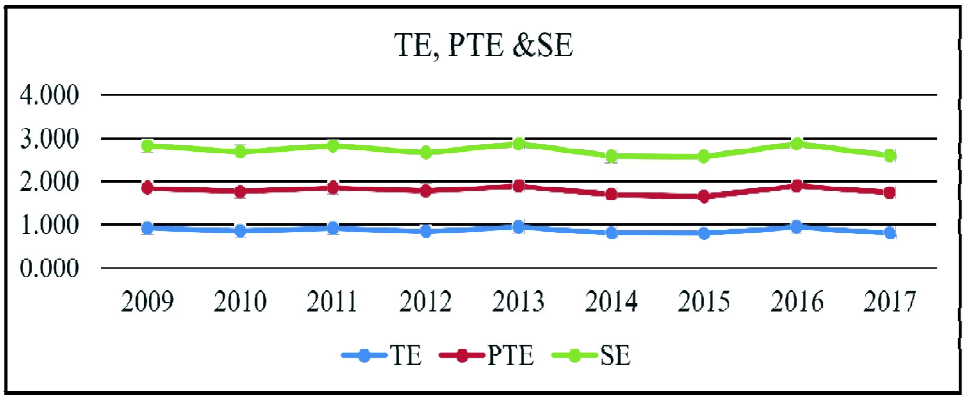
overall technical efficiency of commercial banks in the Gambia, i.e. technical efficiency (CRS-BCC model), pure technical efficiency (VRS-BCC model), and scale efficiency under the "production approach".

Table 1 shows the means of TE under the assumption of Constant Return to Scale (CRS), and PTE and SE under the assumption of Varýable Return to Scale (VRS), for individual years. The mean TE under the assumption of CRS ranges between 79.4% (2015) and 93.6 % (2016), and the mean of TE for the selected period is 86.50%. This indicates that banks in the sample could have used 13.50% fewer inputs, to produce the existing level of output. In other words, over the sample period, it is noted that on average the banks were 13.50 percent (100-86.50) technically inefficient. Therefore, the highest performance for "the banking sector in the Gambia" was recorded in 2016 while the lowest performance in terms of TE recorded in 2015. Since the banks were operating under CRS, much of their technical inefficiency was attributed to input wastage. However, under the assumption of VRS, the PTE mean ranged between 85.80% and 96.30%. Similarly, with the same assumption, the average SE score changed between 85.0% and 97.3% between 2009 and 2017. VRS ranking is achieved by checking the size of the bank scale.

The highest score for the average SE was recorded in 2013 according to the production approach, while the lowest mean of SE score was in 2017. Overall, the results show that the banking sector in the Gambia is technically inefficient due to scale. This indicates that banks need to improve their scale level. Meanwhile, the banking sector shows improvement in "pure technical efficiency", which indicates that the banks were able to control their operational cost. These results are somewhat in line with the results of earlier studies of African banking sector. For example, Jaabi and Fatty (2018) measure the relative efficiency of Gambian commercial banks for the period of 2005-2009. Their results show that most of the banks are fully efficient under the assumption of a variable return to scale (VRS) but inefficient under the assumption of constant return to scale and scale efficiency. Muvingi and Hotera, (2015) find that under the assumptions of CRS and VRS, the average technical efficiency scores for the commercial banking sector in Zimbabwe are 70.95% and 81.5%. The average scale efficiency for commercial banks operating in Zimbabwe is 73.7%. Garamu (2016) shows that, on average, Ethiopian commercial banks were relatively technically inefficient, while scale inefficiency takes the leading contribution to the source of inefficiency. Mataba and Aikaeli (2016) established that most community banks in Tanzania were inefficient. Yannick, Zhao, and Belinga (2016) reveal that Ivorian banks do not operate efficiently in terms of loan

allocation. Karimu Tossa (2016) indicated that there were more technically inefficient banks in Ghana than there were technically efficient ones. Said, (2013) argues that, on average, Islamic banks in other MENA countries and North Africa are relatively technically inefficient. These findings imply that banking system in Africa is still underdeveloped thus, there is a need for improvement. Figure 1 presents the OTE of commercial banks in the Gambia from 2009- 2017.

Figure 1: Overall Technical Efficiency in Gambian Banking: 2009-2017



Determinants of Banking Efficiency in the Gambia

The second stage of this study examines the determinants of banking efficiency in the Gambia. After obtaining TE, PTE and SE scores using the DEA in the first step, these efficiency scores are regressed against a set of variables by employing Tobit regression. In the Tobit regression model, all efficiency values such as technical efficiency (CRS) and pure technical efficiency (VRS) are used as dependent variables, bank-specific characteristics, and macroeconomic factors used as independent variables.

Table 2 displays Tobit regression results on the relationship between independent variables and efficiency scores, under the production approach. The results disclose a positive and significant relation between the coefficients of market power (MP) and interest income (II_TA) and TE scores, implying that the banks with greater market share and higher interest income have higher technical efficiency scores. On the other hand, the results show that size (BS) and Loans to assets (TL_TA) ratio coefficients are significant and negatively associated with TE scores. Other bank specific variables and macroeconomic variables do not yield significant effect on technical efficiency level.

Table 2: Determinants of banking efficiency in the Gambia from 2009 to 2017

	CRS (TE)		*VRS (PTE)*		*SE*	
	Coefficient	*Prob.*	*Coefficient*	*Prob.*	*Coefficient*	*Prob.*
C	1.8655	0.0030	1.8777	0.0001	1.6393	0.0015
P	-0.0147	0.8722	0.0436	0.5454	-0.0609	0.2381
MP	**0.8263**	**0.0687***	**0.7595**	**0.0372****	0.0179	0.5501
BS	-0.0831	**0.0596****	**-0.0643**	**0.0664***	-0.0357	0.2961
TL_TA	**-0.1891**	**0.0801***	-0.0914	0.2776	**-0.0411**	**0.0111***
EQ_TA	-0.0055	0.9701	0.0183	0.8762	-0.0383	0.6862
II_TA	0.9250	0.0109**	0.0643	0.0230**	0.0792	0.0005***
GDP	0.0078	0.1426	0.0016	0.6976	**0.0056**	**0.0928***
INF	0.0096	0.6841	0.0140	0.4592	-0.0046	0.7615
M.D.V	0.8646	0.9312	0.9251			
SD Dep. Var	0.1853	0.1442	0.1182			

*(***; **; *)= Significant at 0.01; 0.05 and 0.10 levels respectively*

P= Return on Equity, MP= Market Power, BS=Bank Size measured by log of total asset. TL_TA= Total loan to total asset, EQ_TA = Equity to Total asset, II_TA= Interest Income to Total asset. GDP= Gross Domestic Product. INF= Inflation. M.D.V = Mean of Dependent Variable, SD Dep.Var= Standard Deviation Dependent Variable.

The results in Table 2 also illustrate that market power (MP) and interest income (II_TA) have a significant (5% level) and positive relationship with PTE, while bank size (BS) is negatively related to PTE (at the 10% level). When we use the scale efficiency (SE) as dependent variable in the regression model, coefficients on market power and size variables are no longer statistically significant. Interest income and GDP variables on the other hand are positively related with SE variable, while loan to asset ratio exhibits negative relationship with scale efficiency levels.

5. CONCLUSION

The objective of this study is to examine the technical efficiency of 12 commercial banks operating in the Gambia between 2009 and 2017, using two-stage procedures. The study utilizes DEA methodology in the first stage to analyze the overall technical efficiency of commercial banks. In the second state the Tobit regression model is employed to investigate the determinants of the efficiency of the banks. The Tobit model uses DEA scores as the dependent variable and banks specific and macroeconomic factors as independent variables. The independent variables used in this study are return on equity (ROE) as a proxy to profitability, market power (MP), the logarithm of total assets as a proxy of bank size (BS), total loan to a total asset (TL_TA) ratio as a proxy for liquidity, equity to total asset ratio

(EQ_TA) as proxy for capital adequacy, interest income to total asset (II_TA) ratio as a proxy for earnings, Gross Domestic Product (GDP) and inflation (INF). The empirical results show that on average, Gambian commercial banks were relatively technically inefficient. Scale inefficiency takes the leading contribution to the source of inefficiency rather than pure technical inefficiency, indicating that Gambian banks were able to manage their financial resources efficiently during the study period. On the other hand, Tobit regression analysis demonstrated that the market power, earnings and GDP are significant and positively related to OTE, while Size and liquidity are negatively and significantly related to OTE. The findings of this study are expected to encourage bank managers to manage the resources of their banks effectively, and it will provide insights to policymakers for improving and optimizing the usage of valuable resources in commercial banks. Also, it will open more doors for academicians to venture into doing more research on the efficiency of the banking sector in the Gambia.

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