

**THE IMPACT OF NUMBER OF WORKERS AND DEPOSIT VALUE ON
LABOR PRODUCTIVITY OF DEPOSIT MONEY BANKS IN
NORTHWESTERN NIGERIA**

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ABSTRACT

Countries' economy operates as a system with several subsystems; in Nigeria, one of the most important subsystems is financial sector. It provides employments to a large number of citizens in the country. In addition to the core function of financial intermediation that is being rendered by the sector. Depending on the scale of operation of a firm, increase in number of workers leads to an increase in labor productivity in an increasing return to scale firm, or a decrease in labor productivity in a decreasing return to scale firm or have no effects on labor productivity in a constant return to scale firms. This research is aimed at investigating the effects of number of workers and the impact of deposits on labor productivity of Deposit Money Banks (DMBs) in Northwestern Nigeria. Ordinary Least Squares (OLS) was applied- on Log-Linear model derived from Cobb-Douglas production function- and used for the analysis. The result shows that increase in both number of workers and deposit increase the labor productivity of the banks in the region. Therefore, banks in the region are in the increasing return scale of operations given the fact that increase in the number of workers leads to increase in the productivity of the banks in the region. Hence, DMBs are encouraged to employ more workers and source for more deposits if they are in need of increasing their respective labor productivity.

Keywords. Deposits, Labor Productivity, Northwestern Nigeria, Number of workers, Productivity.

1. INTRODUCTION

Countries' economy operates as a system with several subsystems among the crucial subsystems is financial sector. Countries that have strong financial institutions and strong financial systems are ahead of their counterparts that have weak financial systems, in terms of economic growth and development. A sound financial sector is one of the important sectors that provides voluminous employment to labor and also provides smooth financial intermediation locally and internationally (Craig, 1997). The main purposes of organizational existence are productions of goods and provision of services. Banks do exist to facilitate the function of financial intermediations within the territorial boundaries and also across the international borders (which is service provision), especially, when aiding international trade.

The organizational operations become possible only when they utilize factor input (factors of production) and one of them is labor. It is only when labor, as a factor of production, operates that all other factors get their rewards, without labor operations, no rewards for factor inputs. Consequently, the factor aids in the process of poverty reduction and hence he is the backbone of economic integration in the society (Ernst & Berg, 2009). Labor controls all other factor inputs in the process of production. He operates not only capital (machines) but also manages itself (labor) and the other inputs, in fact without labor all other factor inputs are worthless in the production process.

The Nigerian financial sector has witnessed several structural and operational changes from the early 1990s up to present day (Oluduro, 2015). These include changes from domiciled branch based transactions (account holder could only operate at the branch he opens the account) to inter branch transaction (ability to make transactions outside domiciled branch), from use of books to keep records or manual operations to computer based operations through inter branch connectivity. Meanwhile, in the last decade (2000 – 2010) Automated Teller Machine (ATM) and ATM cards as well as usage of internet banking were all introduced in the sector. All these have implications on labor productivity in the sector.

In Nigerian financial sector, labor has been considered to be highly mobile, he can easily move from one bank to another or even out of the sector. At the same time, labor in the sector can easily be fired and his contract terminated with or without a severance package. These have effects on the job security in the sector and can affect the labor productivity of an ordinary employee in the Nigerian banking industry. Salladarre, Hlaim and Wolff (2011) stressed that job security is very crucial, especially, to permanent workers when choosing their career path. Also, the existence of three scales of operations (increasing, constant and decreasing scale)

made it vague to identify the nature of the effect of the number of workers on labor productivity in the Nigerian financial sector without being empirically tested.

Nigeria is the most populous country in Africa, located in West Africa; it is one of - out of the four- West African Commonwealth Countries (WACC) in the region. During the military regime of General Sani Abacha, Nigeria was divided into six geopolitical zones; North-central, Northeast, Northwest, Southeast, South-south and Southwest. The Northwestern region consists of Jigawa, Kaduna, Kano, Katsina, Kebbi, Sokoto and Zamfara (Falola& Heaton, 2008; Chinweuba, Sunday & Charles, 2014).

The main aim of this research is to empirically investigate the impacts of a number of workers and deposit value on labor productivity of Deposit Money Banks (DMBs) in the Northwestern Nigeria for the purpose of identifying the stage or scale of operations the banks are. Very few studies exist on the productivity of Banks worldwide and in Nigeria. The rest of the paper is as follows. Section two contains literature review while section three explains the methodology used in conducting the research and theoretical framework. Section four presents the results of the paper while section five concludes the research.

2. LITERATURE REVIEW

The term labor productivity is defined as the total output produced divided by the number of workers or labor force in an organization, the term is unanimous with Average Productivity of Labor (APL) (Tsauni, 2013). In a production process, a combination of labor and capital are used. When more of labor relative to capital is used, it is being termed as labor intensive techniques and when more of capital relative to labor is used, the technique is termed as capital intensive (Mainardes, Funchal & Soares, 2017). They also, perceived innovations in information technology as the major factor affecting labor productivity positively in an organization.

Aggrey, Eliab and Joseph (2010) used Generalized Least Squares (GLS) on firms' level panel data of Uganda, Tanzania and Kenya to identify some factors affecting labor productivity in the mentioned countries. The results show that there exists, heterogeneity among the countries as in Uganda, the proportion of skilled workers and average education are the factors positively influencing labor productivity. While in Tanzania and Kenya, training, the proportion of skilled workers and education of manager are positively influencing labor productivity of the former while average education and training are positively influencing labor productivity of the latter. On the other hand, Al-Mamun, Sohag, Uddin and Shahbaze (2015)

investigated the effects of remittance on domestic labor productivity in 61 top remittance recipient countries of the world using dynamic panel data analysis – Mean Group (MG) on a heterogeneous non-stationary panel with cross-sectional bias. The result shows that remittance has a positive significant impact on domestic labor productivity only for those nations that have an abundant labor force in conjunction with high remittance size. Though, the strength of the impact diminishes after a certain level and also the impact does not hold for those nations who have higher remittance-share of GDP.

In their search for factors affecting labor productivity, Albulescu, Draghici, Fistic and Trusculescu (2016) analyzed the impact of International Organization for Standardization (ISO) quality certification standards on labor productivity of 27 European Union (EU) countries for the period 2000 – 2013 using Two-Stages Least Squares (2SLS) and Generalized Method of Moment (GMM). The results show no evidence of the impact of ISO quality certification on labor productivity in the countries. Amin (2015) analyzed the effects of competition on labor productivity of retail stores in India using Ordinary Least Squares (OLS) and Instrumental Variable (IV). The results indicate the existence of significant positive relationship or impact of competition on labor productivity by which, competition increases labor productivity by as much as 36 percent.

The impact of wages on labor productivity has been weighed, measured and analyzed by Bhattacharya and Narayan (2015) using a dynamic panel data analysis of seven manufacturing industries in India. The results of the analysis show the existence of duo relationships or effects of wages on labor productivity in the industry. A positive influence of wages on labor productivity has been identified in the industries with a high bargaining power of the workers while an inverse influence of wages on labor productivity has been confirmed to be associated with the industries that have a low bargaining power of the workers. Decker, Thompson and Wohar (2009) investigated the effects of population density on labor productivity in the US using a log-linear model derived from Cobb-Douglas production function for the period 1989 – 2000. For the purpose of removing boom effects of the late 1990s, they divided the period into two sub-groups (1989 – 1995 and 1996 – 2000). The results indicate that population density had been positively and significantly contributing to the increase in the labor productivity in the early period but not significant in the second period.

Fallahi, Sojoodi and Aslaninia (2010) analyzed factors affecting labor productivity in the Iranian manufacturing sector using cross-sectional regression models on a sample of 12299 industrial firms. The results of their analysis show that labor

productivity is being positively influenced by wage rates, average fixed capital and orientation of the export, level of education of the labor as well as research and development activities. Kurt and Kurt (2015) investigated the effects of innovation on productivity in Brazil, Russia, India, China and South Africa (BRICS) countries using Panel Vector Auto-Regression (Panel VAR) and it is confirmed by their findings that productivity increments have to do with innovations in all the countries. Li, Chow, Zhu and Lin (2015) analyzed the impact of high temperature conditions on labor productivity in the construction industry in China. The overall result indicates that high temperature environments impose heat stress on the human body and therefore, decreases labor productivity in Chinese construction industry.

Parrotta, Pozzoli and Pytlikova (2014) studied the effects of diversities in labor force on labor productivity using Cobb-Douglas production in Denmark. The results indicate that diversity in ethnicity is one-way inversely or negatively influences firms' labor productivity while diversity in education is two-folds (both positive and negative effects are recorded). Zenka, Slach, Krticka and Zufan (2016) investigated the effects of farmland fragmentation, urbanization economies and farm size structure on agricultural labor productivity in the Czech Republic. The result shows that land-use fragmentation negatively affects the labor productivity of agricultural products, while urbanization economies and farm size have an insignificant effect on agricultural labor productivity. Zhang and Liu (2013) studied the effects of wage on labor productivity of manufacturing enterprises in China for the period 1998 – 2007. The study highlights that strong correlation exists, as wages positively and significantly affects labor productivity of industries. Though, such effect becomes weak after 1990 as the rise in production is far much greater than the rise in wage rate of the manufacturing industries in China. On the other hand, Riley and Bondibene (2016) assessed the effects of National Minimum Wage (NMW) on labor productivity in Great Britain (GB) for the period 1993 – 2013. The result shows that increase in NMW results in an increase in firms' productivity while firms cut the number of their workers but NMW positively influences labor productivity in GB.

3. METHODOLOGY

Data Collection and Sources: The research utilized cross-sectional data through questionnaires distribution to some selected banks branches (First Bank of Nigeria, Guarantee Trust Banks, Union Bank and Zenith Bank Plc.) in two states (Kano and Sokoto) of Northwestern Nigeria. First Bank and Union Bank are selected to represent the old generation banks while Guarantee Trust Bank and Zenith Bank are selected to represent the new generation banks. Also, the selection of Kano in the region is as a result of the state being the center of commerce in the country while Sokoto has a lot of bank branches in the rural areas. A total of 256 questionnaires

were randomly administered to the staff of the mentioned banks in 2016 but only 100 of them were returned and used for the analysis.

Definition of Variables: Financial intermediation is the major function of commercial banks and their output and productivity are physically intangible, being among the services provision organizations. In this research, Average Percentage of the target that is being achieved by branch workers is used as the average productivity of labor which is unanimous with labor productivity. Therefore, the measurement of productivity in this research is based on the percentage of the achievable branch targets (from one to 100 percent). Average deposit mobilizes by branches is used as a proxy of capital in the Cobb-Douglas production function, even though it has been specified as one of the objectives of the study. The other variable is the number of workers in the branch.

Theoretical Framework: The study will best be understood using the traditional theory of production. The argument of this theory is that total output produced is a function of inputs utilized in the process of production. Such inputs include labor, capita, raw materials, etc. Firms employ more labor as long as the total output of the firm increase with the increase in the number of workers and stops employing when the additional worker has no contribution to the marginal output. Base of this, three stages of production exist. Increasing return – where output increase by more proportion than the increase in input (e.g. labor). Constant return – Here the proportional increase in output is the same with the increase in input. Diminishing or Decreasing return – where output decreases when input increases. Hence there is need to investigate which scale of operation the banks are.

The Model of the Research: The production function utilized in this research is the famous Cobb-Douglas production function which can be expressed as follows

$$X = b_0L^{b_1}K^{b_2} \dots \dots \dots (i)$$

where. X is the total output, b_0 is constant (other input rather than labor and capital), L is labor, K is capital b_1 and b_2 are proportions of labor and capital respectively.

Equation (i) represent the production function for total output, to get the Average Productivity of labor or labor productivity the Equation is divided all through by “L” which is labor as indicted in Equation (ii)

$$\frac{X}{L} = \frac{b_0L^{b_1}K^{b_2}}{L} \dots \dots \dots (ii)$$

Set $\frac{X}{L} = Q$ therefore,

$$Q = \frac{b_0 L^{b_1} K^{b_2}}{L} \dots \dots \dots (iii)$$

where Q is the APL or labor productivity, the rest of the variables are as defined in the previous Equations.

Equation (iii) is not linear, therefore, it has to be linearized in order to apply Ordinary Least Squares in its estimation and it can be done by taking the logarithm of both sides.

$$\log Q = \log\left(\frac{b_0 L^{b_1} K^{b_2}}{L}\right) \dots \dots \dots (iv)$$

$$\log Q = \log b_0 + b_1 \log L + b_2 \log K - \log L \dots \dots \dots (v)$$

$$\log Q = \log b_0 + b_1 \log L - \log L + b_2 \log K \dots \dots \dots (vi)$$

$$\log Q = \log b_0 + (b_1 - 1) \log L + b_2 \log K \dots \dots \dots (vi)$$

Set $\text{Log} b_0 = \alpha_0$, $(b_1 - 1) = \alpha_1$ and $b_2 = \alpha_2$

$$\log Q = \alpha_0 + \alpha_1 \log L + \alpha_2 \log K \dots \dots \dots (vii)$$

where. LogQ is the log of labor productivity, α_0 is the constant (factor input other than labor and capital), Log L is the log of number of workers (labor) and logK is the log of Capital (Deposits mobilized as explained earlier).

Equation (vii) is the final log-linear (Equation) model derived from Cobb-Douglas production function that is used in this research.

4. RESULTS AND DISCUSSIONS

Table 1 represents the summary of the descriptive statics of the variables used in this research while Table 2 represents the Regression results based on the derived function.

Table 1: Summary of the Descriptive statistics of the variable

Variable	Obs	Mean	Std. Dev.	Min	Max
logQ	100	1.722661	0.2071141	1.290035	1.926857
logL	100	1.20008	0.1730647	0.845	1.462
logK	100	2.6144	0.3949896	1.87	3.47

Source. Authors 2017 using Stata 11

Table 1 shows that 100 observations are analyzed with a mean of 1.72 for LogQ, 1.2 for LogL and 2.61 for LogK. LogL has the lowest standard deviation (0.173) while logK has the highest (0.39).

Table 2: Regression Results

logq	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
logl	0.69651*	0.0950705	7.33	0.000	0.5078213 0.8851987
logk	0.202303*	0.0416551	4.86	0.000	0.1196291 0.284977
_cons	0.3578927*	0.0474664	7.54	0.000	0.263685 0.4521003

Source: Authors 2017 using Stata 11; Note. *Represent 1% level of significance.

To ascertain the strength of the estimated model, post estimation tests were conducted and the results are as follows

Heteroskedasticity Test

Breusch-Pagan tests were conducted to check whether the standard deviation of the errors is constant, the probability results are below five percent which implies that there exists problem of heteroskedasticity in another word, errors are not homoscedastic and therefore, robust regression needs to be run again in order to wither away the problem identified.

i) Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho. Constant variance

Variables. fitted values of logq

chi2(1) = 9.25

Prob>chi2 = 0.0024

ii) Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho. Constant variance

Variables. fitted values of logq

chi2(1) = 7.28

Prob>chi2 = 0.0070

Table 3: Results of Robust Regression

	Robust					
logQ	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
logL	.69651	.1089236*	6.39	0.000	.4803268	.9126932
logK	.202303	.0635612*	3.18	0.002	.0761517	.3284543
_cons	.3578927	.0595636*	6.01	0.000	.2396753	.47611

Source: Authors 2017 using Stata 11; Note. *Represent one percent level of significance.

Table 3 represents the re-estimated robust result to cater for the problem of heteroskedasticity identified, now the errors are homoskedastics and the analyses are done based on the result of the robust regression.

Multicollinearity Test

Variance Inflation Factor (VIF) test was conducted to check the severity of multicollinearity, the result shows that none of the VIF value is up to 10 and therefore multicollinearity is not severe and the variables are good for the estimation.

Table 4: Multicollinearity/VIF test results

Variable	VIF	1/VIF
-----+-----		
logk	5.96	0.167841
logl	5.96	0.167841
-----+-----		
Mean VIF	5.96	

Source. Author's 2017

Joint Statistical Significant (F) Test

F- Test conducted indicated that the variables K and L jointly influence labor productivity with probability less than five percent and are, therefore, retained for further analysis

$$(1) \log l - \log k = 0$$

$$F(1, 97) = 8.39$$

$$\text{Prob} > F = 0.0047$$

Normality of the error terms

For purpose of checking the normality of the error term, the errors (k density) are plotted along the normal density and it is presented in figure 1 below

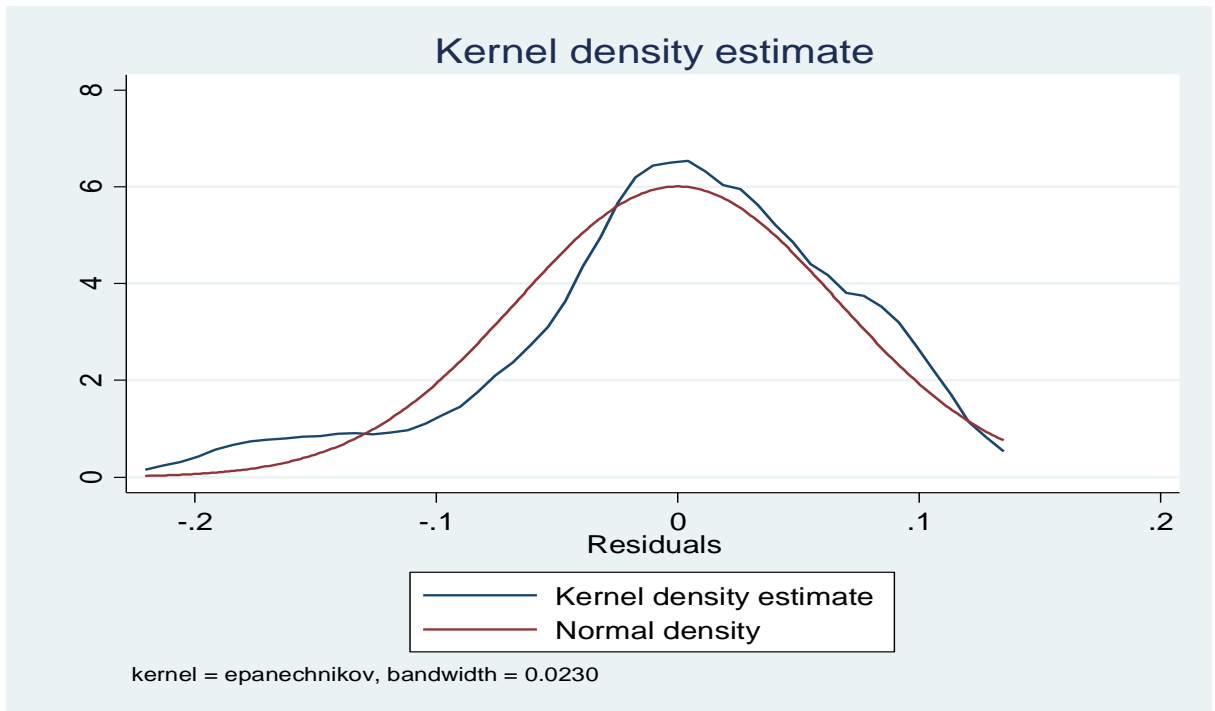


Figure 1: K density estimate of the error term

Discussion of Results and Findings

OLS was applied to a log-linear model derived from Cobb-Douglas production function for the purpose assessing the impacts of number of workers (Labor) and deposit (Capital) on labor productivity of banks in Northwestern Nigeria. The F test shows that the model is fit as the included independent variables are jointly significant, at one percent level, in explaining labor productivity in the study cluster. Also, the estimations were done twice as a result of the heteroskedasticity discovered in the first estimation which necessitated the need to conduct robust estimation. It was re-estimated again with robust standard error and this cleared the heteroskedasticity issue. The model is free from multicollinearity given the estimated VIF values are below 10. Also, all the variables included are strongly statistically significant.

Number of workers (labor): This variable is statistically significant at one percent and it is positively influencing labor productivity of banks in the cluster of study. In fact, increase in one out of 100 workers will increase the labor productivity by nearly 0.7 percent. This implies that banks in Northwestern Nigeria are in a stage of increasing returns in terms of the scale of operation.

Deposit Value: This variable was used in place of capital and it is -not only- statistically significant at one percent- but also increases labor productivity of banks in Northwestern Nigeria. Specifically, an increase in deposit by one percent will increase the labor productivity by 0.2 percent.

5. CONCLUSION

This study investigates the impact of number of workers and deposit volume on labor productivity of banks in Northwestern Nigeria. Cross-sectional data were sourced and OLS was applied on a log-linear model derived from Cobb-Douglas production function. The result shows that all the variables are statistically significant at one percent. Also, increase in the number of workers (labor) increases labor productivity which implies that banks are in a stage of increasing scale of operation in the region based on the data used. Secondly, any additional deposit will also increase labor productivity as seen in the results.

Therefore, based on the estimated result, it has been recommended that banks should employ more workers and source for more deposit provided that they are in need of increasing their labor productivity in the region. This study suggests investigating the impact and effect of branch location (population density) and branch connectivity (technology) on labor productivity of banks in Nigeria.

The study was able to provide information on the impact of number of workers and deposit volume on labor productivity, however, the following three issues serve as limitations of the study. Out of seven states in the region, data were gathered only from two states (Kano and Sokoto). There are 109 branches of the four banks in the entire region during the data collection period, but only 20 bank branches, five from each bank were used in the process of data collection. About 60 percent of the questionnaires distributed were not returned

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