

FINANCIAL SECTOR DEVELOPMENT AND TAX REVENUE IN NIGERIA

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Abstract

Estimates of tax potential from the literature suggest that a non-oil tax capacity of 16 to 18 percent of GDP would be optimal for a country with Nigeria's economic structure and per capita income. Unfortunately, Nigeria has one of the lowest revenue-to-GDP ratios when compared with some selected advanced, emerging, and developing economies. The very low tax collection rates in Nigeria are a direct reflection of weaknesses in revenue administration systems and a high level of systemic noncompliance. A pertinent question of concern is can financial sector development promote tax revenue in Nigeria? Financial development could directly increase tax revenues as it facilitates tracking and collection of taxes. To examine this in the context of Nigeria, Eight (8) measures of financial sector development in terms of depth, access, efficiency and stability of both financial institutions and financial markets development from World Bank conceptual 4x2 frameworks of measuring financial sector development was selected. Data on the chosen measures covering the period 1993–2017 were obtained. Error Correction Model (ECM) and Granger Causality techniques were applied on the data. The results revealed that, in overall, financial sector development promotes tax revenue in Nigeria. Specifically, access to and depth of financial institutions development are major determinants of revenue collection in Nigeria, followed by depth and stability of financial market development. The paper concludes that if Nigeria's financial institutions and financial markets are well developed, in terms of access, depth, and stability, then businesses and tax payers will use them to conduct their transactions. In turn, the tax collecting authorities can obtain valuable information from these institutions on taxpayers' income and assets and this will facilitate tax revenue generation.

Keywords: *Financial Development, Access, Depth, Efficiency, Stability, Tax revenue, Nigeria*

INTRODUCTION

Recent empirical work shows that internationally, there is a tipping point in the relationship between tax capacity and growth. A minimum tax-to-GDP ratio of 12.75% is associated with a significant acceleration in the process of growth and development, and likely with changes in social norms of behavior and state capacity (Gaspar et al., 2016). Taxation is not an end in itself, but an instrument for advancing citizens well-being as part of a well-functioning state. Tax is a core part of state-building and constitutes a visible sign of the social contract between citizens and the state, enshrining the principle of revenue-for-service.

Estimates of tax potential from the literature suggest that a non-oil tax capacity of 16 to 18 percent would be optimal for a country with Nigeria's economic structure and per capita income levels (Fenochietto 2013, IMF 2017). Unfortunately, Nigeria has one of the lowest revenue-to-GDP ratios when compared with some selected advanced, emerging, and developing economies. Between 2011 and 2017, a sharp decline in oil revenues led to consolidated government revenues falling from 17.7 percent to 5.1 percent of GDP. During this period, non-oil revenue stayed relatively stable at about 3 and 4 percent of GDP, although with an accelerating decline in 2016 - 2017. In particular, the corporate income tax (CIT) decelerated by 0.1 percent of GDP and value added tax (VAT) by 0.2 percent of GDP relative to 2011 (IMF International Survey on Revenue Administration ISORA, 2016).

According to ISORA (2016) report, Nigeria's tax structure when compared with those of selected sample of advanced, emerging, and developing economies employed in the survey, Nigeria raised the least revenue of all comparators and at 5.3 percent of GDP in revenue in 2016 and was significantly below the sample's 22 percent of GDP average. In most of the other countries, excises duty alone raise 3.6 percent of GDP.

More often, the key factors put forward as influencing tax revenue included complexity and arbitrariness of the tax system, the extent of bureaucracy and regulations, and the incidence of corruption and rent-seeking behaviour. Developing country economies also faced difficulties in raising tax revenue due to large size of their agriculture sectors, small tax bases, high degree of informality and mono-revenue base (Loayza 1996).

Without undermining the importance of any of these factors, our focus in this paper is on another quite different factor that has received rather less consideration namely, the level of financial sector development. Financial sector development may indirectly or directly influence tax revenue in several ways. First, financial sector development may lead to economic development. Hence, expansion of taxable economic activities, which in turn, increases direct tax revenue. Second, economic growth brings prosperity and boosts the demand for goods and services which raises new investments. As a result the income tax base will increase which

contributes to direct tax revenues. Third, both financial development and economic growth might discourage the spread of shadow economy and boost tax revenues. Finally, financial development could directly increase tax revenues as it facilitates tracking and collection of taxes.

Banks, other financial institutions and insurance companies supply liquidity to both businesses and consumers by providing different types of payment systems that are essential for noncash transactions. If a country's financial institutions are well developed, transparent and efficient, then businesses and tax payers will use them to conduct their transactions. In turn, the tax collecting authorities can obtain valuable information from these institutions on taxpayers' income and assets. However, in the case of underdeveloped financial institutions, as the size of the underground economy increases, it becomes difficult to collect accurate tax information. Hence, the development of the financial sector may be an important determinant of the tax revenue.

A review of the literature suggests that the impact of financial development on taxation is relatively under investigated in the context of developing countries. Loana (2008) examined this issue, relying largely on cross-sectional and panel data excluding Nigeria. It is well known that, cross-sectional analysis ignores the possible changes over time, while panel data set encompasses both cross-sectional and time-related information. In panel data setting, it is not possible to distinguish the country-specific behavior of the explanatory variables, whilst a country may have distinct features among a group of others. Therefore, any single-country-level time series analysis has its own merit. On the other hand, attention is also drawn to recent country specific studies by Akcay, Sagbas and Demirtas (2016); Akram (2016); and Taha, Colombage, Maslyuk, and Nanthakumar, (2013) which suggests that financial sector development is a strong determinant of tax revenue in Turkey, Pakistan and Malaysia respectively.

It would be important to note here that, both Akcay, et al, (2016) and Taha, et al, (2013) studies employed total value of credit provided by commercial banks to the private sector as a proxy for banking sector financial development, and the stock market index / outstanding private sector bonds as proxies for nonbanking financial development. There are many measures of financial development. The relevance of each measure of financial sector development may be country specific due to differences in political, legal and other institutional differences and the structure of the economy across space and time. The implication of this is that country case studies that use large number of indicators for financial development have significant potential of increasing our understanding of the tax revenue effects of financial development.

This paper therefore proposes a time series approach to study the effects of financial sector development on tax revenues, using (8) measures of financial sector development in terms of depth, access, efficiency and stability of both financial institutions and financial markets development from World Bank conceptual 4x2 frameworks of measuring financial sector development in the context of Nigeria.

The rest of the paper is divided into five sections: Section 2 reviews literatures: conceptual, empirical and theoretical literatures; section 3 present's data and its measurements and the methodology of study. Section 4 reports on empirical findings, and Section 5 concludes

CONCEPTUAL AND EMPIRICAL LITERATURE REVIEW

Concept and Measurement of Financial Sector Development

Financial sector is a set of institutions, instruments, markets, legal and regulatory framework that permit transactions to be made. Financial sector development is concern with overcoming “costs” incurred in the financial system. Financial sector development takes place when financial institutions, instruments, markets, and intermediaries work together to reduce the costs of information, enforcement and transactions (World Bank Global Financial Report 2014).

Measurement of Financial Development

In practice, it is difficult to measure financial development given the complexity and dimensions it encompasses. Empirical work done so far is usually based on standard quantitative indicators available for a longer time period for a broad range of countries. For instance, ratio of financial institutions' assets to GDP, ratio of liquid liabilities to GDP, and ratio of deposits to GDP. However, since the financial sector of a country comprises a variety of financial institutions, markets and products, these measures only serve as a rough estimate and do not fully capture all aspects of financial development.

The World Bank's Global Financial Development Database (2014) developed a comprehensive and relatively simple conceptual 4x2 framework to measure financial development worldwide. This framework identifies four sets of proxy variables characterizing a well-functioning financial system: financial depth, access, efficiency, and stability. These four dimensions are then broken down for two major components in the financial sector, namely the financial institutions and financial markets:

Table 1: Measures of Financial sector Development

	Financial Institutions	Financial Markets
Depth	<ul style="list-style-type: none"> • Private Sector Credit to GDP • Financial Institutions' asset to GDP • M2 to GDP • Deposits to GDP • Gross value added of the financial sector to GDP 	<ul style="list-style-type: none"> • Stock market capitalization and outstanding domestic private debt securities to GDP • Private Debt securities to GDP • Public Debt Securities to GDP • International Debt Securities to GDP • Stock Market Capitalization to GDP • Stocks traded to GDP
Access	<ul style="list-style-type: none"> • Accounts per thousand adults (commercial banks) • Branches per 100,000 adults (commercial banks) • % of people with a bank account (from user survey) • % of firms with line of credit (all firms) • % of firms with line of credit (small firms) 	<ul style="list-style-type: none"> • Percent of market capitalization outside of top 10 largest companies • Percent of value traded outside of top 10 traded companies • Government bond yields (3 month and 10 years) • Ratio of domestic to total debt securities • Ratio of private to total debt securities (domestic) • Ratio of new corporate bond issues to GDP
Efficiency	<ul style="list-style-type: none"> • Net interest margin • Lending-deposits spread • Non-interest income to total income • Overhead costs (% of total assets) • Profitability (return on assets, return on equity) • Boone indicator (or Herfindahl or H-statistics) 	<ul style="list-style-type: none"> • Turnover ratio for stock market • Price synchronicity (co-movement) • Private information trading • Price impact • Liquidity/transaction costs • Quoted bid-ask spread for government bonds • Turnover of bonds (private, public) on securities exchange • Settlement efficiency
Stability	<ul style="list-style-type: none"> • Z-score • Capital adequacy ratios • Asset quality ratios • Liquidity ratios • Others (net foreign exchange position to capital etc.) 	<ul style="list-style-type: none"> • Volatility (standard deviation / average) of stock price index, sovereign bond index • Skewness of the index (stock price, sovereign bond) • Vulnerability to earnings manipulation • Price/earnings ratio • Duration • Ratio of short-term to total bonds (domestic, int'l) • Correlation with major bond returns (German, US)

Source: Adopted from World Bank's Global Financial Development Database (GFDD), 2014.

Since many market frictions exist and laws, regulations, and policies differ markedly across economies and over time, improvements along any single dimension may have different implications for tax revenue. Hence, Eight (8) measures of financial sector development one

each from depth, access, efficiency and stability from both financial institutions and financial markets development from the World Bank measures of financial sector development were selected based on availability of data with respect to Nigeria (see detail in the table 2, under section 3).

Financial Sector Development in Nigeria

The Nigerian financial system is one of the largest in Sub-Saharan Africa, consisting of a fairly diverse array of financial institutions and markets. The Nigeria financial system has evolved over time since independence, changing from foundation phase (1950 to 1970), Expansion phase (1970-1985), Consolidation phase to Reform phase (1986 to 2004). These phases have a clear-cut and well defined focus concerning the evolution of the financial system. For example, the foundation phase focused on the establishment of financial institutions and development of the necessary legislative framework. Expansion phase was geared towards widening of financial activities through the increase in network of branches of financial institutions across Nigeria. The consolidation and reform phases marked eras in which the financial sector was liberalized and some institutions were established to regulate the growing financial sector such as Nigeria Deposit Insurance Corporation (NDIC) in 1988, Security and Exchange Commission (SEC) IN 1979 but amended in 1989.

The financial sector in Nigeria is dominated by the banking sector, specifically, the Deposit Money Banks. The banking sector went through major consolidation, which reduced the number of banks from 89 to 20 and considerably increased capitalization. As a result of consolidation, financial intermediation levels increased significantly: the number of bank branches almost doubled to about 5,800 in 2011, and banks engaged in a range of new activities, including the financing of infrastructure and oil projects, which has previously been out of their reach.

Nigerian capital markets are not fully developed, but the country's Stock Exchange is increasingly active. The Nigerian equity market boomed in 2007 and early 2008 with average return rates of 75 percent, well above those of South Africa and Ghana, but then plunged in the second half of 2008 as oil prices fell and the global financial crisis spread. Reforms, focused on enhance market rules and regulations, promote collective investment schemes and improve shareholder management have however restored some confidence in the market (Adenuga, Ogujiuba and Obiechina, 2011; Ubi and Ebi, 2018).

Concept of Tax and Tax Revenue in Nigeria

Tax is a compulsory levy imposed by the government authority through its agents on income, profit or wealth of individuals, group of persons, and corporate organisations to achieve some developmental goals. Governments require revenue to augment the spending needs to maintain an adequate level of public investment and social services, and taxes constitute the main source of raising revenue in both developed and developing countries. Total tax revenue as a percentage of GDP indicates the share of a country's output that is collected by the government through taxes. It can be regarded as one measure of the degree to which the government controls the economy's resources (Ebi and Ayodele, 2017).

Different types, forms and classes of taxes exist but the commonest classification in Nigeria is that according to the tax payer categorised as direct or indirect. The direct tax is a levy on personal, corporate income or property. Examples are Personal income tax, company income tax, petroleum profit tax, and capital gains tax. When the imposition is on the price of goods and services, then it is called an indirect tax. Indirect tax is payable on the consumption of products and services associated with import duties/tariffs, export duties, value added tax and excise duties. In Nigeria, the government can emphasize on any one of the tax forms depending on the objective it wants to pursue (Anyaduba, 2004; and Ofoegbu, Akwu and Oliver, 2016)

In Nigeria, different legislations that allow the government tax its citizens and to increase the tax revenue of the country exist. These legislations are the Personal Income Tax Amendment Act 2011, Companies Income Tax Amendment Act 2007, The Petroleum Profit Tax Amendment Act 2004. Others are the Capital Gains Tax Amendment Act 2004, the Value Added Tax Amendment Act 2007 and the Education Tax Amendment Act 2004. The agency of the federal government in charge of the administration and collection of these taxes, (except customs/excise duties) up to April 2007 was the Federal Board of Inland Revenue (FBIR). In 2007, the board was scrapped and replaced by the Federal Inland Revenue Services (FIRS). Despite these tax legislation and major tax reforms and restructuring in Nigeria, Nigeria federally collected revenue has been basically from oil. Specifically, oil revenue constitute on average over 70% of the revenue between 1990 and 2016 (Ebi and Ubi, 2016; Ebi, and Aladejare, (2016), Ofoegbu, Akwu and Oliver, 2016; and Ebi and Ayodele, 2017).

According to IMF (2017), despite successful initiatives to bring in a significant number of new corporate and self-employed individuals were over 530,000 new corporate registrations were made during the first quarter of 2016, indicating a 67 percent increase, these efforts have not delivered expected revenue. Of 1.5 million registered corporations, only 522,000 could be matched (as of May 2016) to any type of data available within the Federal Inland Revenue Service (FIRS), and only 77,000 filed VAT returns in 2016, suggesting an active taxpayers'

population of only 5 percent. For CIT, the active taxpayers were 5.6 percent of the registered taxpayers, while for personal income tax (PIT) they were less than 2 percent. Data on payment compliance is incomplete, but it is generally believed to vary between 15 and 40 percent for VAT.

Empirical Literature Review on Financial sector Development and Tax Revenues

Financial development is associated with different macroeconomic variables in many empirical studies. However, very few studies have examined the relationships between financial development and tax revenue.

Volckaert (2016) conducted a study at the request of the Special Committee of the European Parliament to examine common principles behind financial sector practices that may feature in tax avoidance or evasion. He employed Mechanisms of mismatches in international taxation and financial sophistication; and them exploitation of the qualification of corporate cash flows. The paper issues concrete recommendations that financial institutions, and banks in particular, are well-placed to be solicited in Aggressive Tax Planning (ATP). Banks have access to the significant amounts of capital implied in large scale arrangements, and their network of entities across multiple jurisdictions provides a conduit for these funds. Their ability to tailor often extremely complex financial securities can respond to any conceivable tax planning demand.

Akcay, Sagbasand Demirtas (2016) examined the nexus between financial development (banking and non-banking) and direct tax revenue in a multivariate framework in Turkey for the period 2006 to 2014, using monthly data. They examined the long run equilibrium relationship between financial development and tax revenue using two different co-integration tests namely Johansen and Juselius (1990), and Hatemi (2008). The results of the co-integration tests indicated that direct tax revenue and financial development are co-integrated. Vector Error Correction Model (VECM) was used to investigate the short run and long-run dynamic relationship between financial development and direct tax revenue. The results reveal that banking and non-banking financial development Granger cause direct tax revenue in the long run and that only the banking sector Granger causes direct tax revenue in the short run.

Akram (2016) analyzed the role of financial sector in generating tax revenue in Pakistan, using time series data for the period 1975–2014. He found that, in the long run, the number of bank branches and market capitalization have a positive and significant impact on tax revenue. While credit to the private sector has a bidirectional relationship with tax revenue, public sector credit has an insignificant impact. In the short run, only the number of bank branches and market capitalization has a significant impact on tax revenue in Pakistan.

Taha, Colombage, Maslyuk and Nanthakumar (2013) investigated the causal relationship between financial system activities and direct tax revenue for Malaysia and found that stock market activities Granger causes direct tax revenue.

Scott and Bojan (2008) examined the role of the financial sector, specifically the role of banks, as a mechanism for tax enforcement and collection in 116 countries over the period 1990-2008. They put the hypotheses that public sector, measured by the tax-to-GDP ratio, co-emerges with the banking sector, measured by deposits-to-GDP, during the course of economic development. Their result point to evidence and supports the hypothesis that tax revenue co-moved with banking sector development during the course of economic development.

Loana (2008) investigated how improved financial sector can lead to more revenue. He used a panel of data from 72 countries for a period 14 years to test the relationship between financial sector quality and different types of tax revenue. He constructed a financial sector indicator that encompasses measures from five areas of the financial system and show that an increase in the quality of financial intermediaries increases total tax revenue and income tax revenue as shares of GDP. The findings suggest that the quality of the financial sector does not affect the revenue collected from sales, property or gift taxes.

The work of Ilievski (2015) considered the financial sector using the stock market sector indicators as a proxy for financial development. It was found that higher stock market and total value traded are associated with more tax revenue. This was documented after using a panel data set of 96 countries over the period 1990-2008. He further stressed that stock markets positively influence government's ability to raise tax revenue after batteries of robustness tests.

Loganathan, Ismail, Streimikiene, Hassan and Zavadskas (2017) examined the dynamic impact of financial development, inflation and economic growth on tax revenue in Malaysia for the period 1970 to 2015, using the Maki's cointegration test with various structural breaks and bootstrap rolling window causality applications. One of their major findings was that, taxation and financial development has unidirectional causality and there was a significant causality running from taxation to financial development, with two sub-periods of predictive power. That an increase in tax collection led to financial development, but, unfortunately, there was no causality predictive power running from financial development to taxation.

METHODOLOGY

Data and Model

The data used in this study are annual data covering the period 1993–2017. The data were obtained from secondary sources such as the CBN Statistical Bulletin (CBN, various issues), National Bureau of Statistics (NBS), Federal Inland Revenue Service (FIRS), The Global

Economy database (2017) and World Banks' World Development Indicators online database. The variables used are presented in Table 2.

Table 2: Variables and their Descriptions

Variable	Description
Tax revenue as a percentage of GDP (TR)	Tax revenue generating capacity of the economy (dependent variable)
Bank Credits to private sector as % of GDP (BC)	Used as indicators of depth of financial institutions development.
Number of banks per 100,000 persons (NB)	Used as indicators of financial institutions development in terms of access
Bank lending-deposit interest rate spread (%) (BLDS)	Used as indicators of efficiency of financial institutions development.
Bank credits as a % of bank deposits (BCBD)	Used as indicators of stability of financial institutions development.
Stock market capitalization as a % of GDP (MC)	Used as indicators of depth of financial markets development.
Stock market value traded without top 10 firms as % of total value traded (MVT)	Used as indicators of financial markets development in terms of access
Turnover ratio for stock market (MT)	Used as indicators of efficiency of financial markets development.
Stock market volatility as a % of GDP (MV)	Used as indicators of stability of financial markets development.

Source: Authors extraction from World Bank's Global Financial Development Database (GFDD), 2014

The choice of the 1993 -2017 and the eight (8) variables each representing depth, access, efficiency and stability of institutions and Markets dimensions of financial sector development is anchored on availability of data.

Recent studies on tax revenue stipulates that, tax revenue (TR) is a function of financial sector development (Taha et al ,2013;Akram ,2016; Akcay, et al, 2016; Loganathan, et al, 2017).

Based on this, and in line with the purpose of this paper which to examine the impact of various dimensions of financial sector development on tax revenue in Nigeria, Thus, the paper specify that:

$$TR = f(BC,NB,BLDS,BCBD,MC,MVT,MT,MV, U) \quad (1)$$

From equation 1, we derive the following reduced-form equation:

$$TR_t = a_0 + a_1 BC_t + a_2 NB_t + a_3 BLDS_t + a_4 BCBD_t + a_5 MC_t + a_6 MVT_t + a_7 MT_t + a_8 MV_t + u_t \quad (2)$$

Where: TR, BC, NB, BLDS, BCBD, MC, MVT, MT and MV are as defined in table 2 above.

u_t is the error term. a_0 is the intercept and a_1 to a_8 are the coefficients of the various financial sector development variables to be estimated.

Estimation Strategy

The estimation technique for this study consist of four steps procedures. First, In order to analyse the data, the Augmented Dickey Fuller (ADF) Unit Root test was applied for detecting the stationarity of data whether there is unit root in every variable. Second, since the data becomes stationary at the same order 1(1), (are cointegrated), then Johansen Cointegration Test was used to measure the long term relationship among the variables. Thirdly, in order to find the short-run relationship between financial sector development and tax revenue, Error Correction Model (ECM) was applied, and Fourthly, The Granger Causality Test was applied in order to text if there a bi-directional cause and effect relationship between the various financial sector variables and tax revenue. That is if the variables can cause and affect each other.

RESULTS AND DISCUSSION OF FINDINGS

Unit Root Test Results

Results of the ADF unit root tests in table 3 revealed that, all variables have a unit root in their levels hence all are not stationary. But after first differencing all the variables become stationary, That is, the variables are first-order integrated I(1). The variables not being stationary at levels implies that, the model cannot be estimated in their levels without the risk of obtaining spurious regressions unless they are cointegrated. Therefore, a cointegration test was conducted using the Johansen Trace test.

Table 3: ADF Unit Root Test

Variables	Levels	1 st Difference	Order of integration
D(TR)	-1.547926	-4.918285*	1(1)
D(BC)	-2.251927	-4.091132*	1(1)
D(NB)	-2.387341	-3.543908**	1(1)
D(BLDS)	0.718729	-3.272842**	1(1)
D(BCBDR)	-1.779756	-6.760736*	1(1)

D(MC)	-2.334678	-5.005026*	1(1)
D(MT)	-2.188206	-4.860249*	1(1)
D(MV)	-2.576933	-4.546704*	1(1)
D(MVT)	-1.806340	-3.096557**	1(1)

Table 3...

Source: Extracted from Unit Root Results Provided by E-view Econometric software

Note: Mackinnon critical values for ADF at 1, 5 and 10% levels are -3.752946, -2.998064 and -2.638752 respectively. *, ** and *** means significant at 1, 5 and 10 respectively.

Cointegrating Test Results

The results of the Johansen Trace test are summarized in Tables 4. The tests suggest that there are 3 cointegrating equations. Hence the hypothesis of there is no co-integration relationship among variables was rejected. Thus, the variables are co-integrated, implying that long term equilibrium relationship exists among the variables. The conclusion drawn from this result is that there exists a unique long-run relationship among the explanatory variables in the model.

Table 4: Cointegration Rank Test (Trace)

Hypothesized		Trace		
		0.05		
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.950799	162.8784	95.75366	0.0000
At most 1 *	0.879841	96.61786	69.81889	0.0001
At most 2 *	0.740594	50.00123	47.85613	0.0310
At most 3	0.386104	20.31528	29.79707	0.4017
At most 4	0.282427	9.580807	15.49471	0.3144
At most 5	0.098424	2.279447	3.841466	0.1311

Trace test indicates 3 cointegratingeqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source; Author's extraction from E-view computation

ECM Results for Impact of Financial sector variables on Tax Revenue and Discussion of Findings

According to Engle and Granger (1987), a system of cointegrated variable can be represented by a dynamic Error Correction Model (ECM). Hence, in order to estimate the impact of various dimensions of the financial sector development on tax revenue in Nigeria, ECM was used. The

estimation follows the 'general-to-specific' method in which an overparametrized ECM was estimated first from whence the parsimonious was derived. The result of the overparametrized is however not reported here. Using the information criterion as a guide the overparametrized equations was then reduced to a more preferred specification. The first step was to generate a series of the ECM term using the long-run coefficients then we estimate an OLS regression in first difference of the dependent variable (tax revenue) against each of their regressors (financial development variables). The parsimonious ECM result is presented in table 5.

Table 5: ECM Results for Impact of Financial sector variables on Tax Revenue
(Change in Tax Revenue (ΔTR) is The Dependent Variable)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
$\Delta(BC)$	0.400762	0.220476	1.817711	0.0891
$\Delta(NB)$	4.935078	1.713524	2.880076	0.0121
$\Delta(BLDS)$	0.197597	0.226548	0.872205	0.3978
$\Delta(BCBDR)$	0.102233	0.051335	1.991489	0.0663
$\Delta(MT)$	0.270726	0.095175	2.844506	0.0130
$\Delta(MC)$	0.393150	0.199110	1.974537	0.0684
$\Delta(MV)$	0.086286	0.178772	0.482659	0.6368
ECM(-1)	-0.354151	0.161846	-2.188206	0.0401
C	42.90794	9.141275	4.693869	0.0003
R-squared	0.755778			
Adjusted R-squared	0.616222			
F-statistic	5.415610			
Prob(F-statistic)	0.003034			
Durbin-Watson stat	1.902823			

Source: Author's extraction from E-view computation

From the parsimonious ECM result presented in table 5, the coefficients of the variables and its sign are used to judge the size and direction of the impact of the various financial variables on tax revenue, while the t-statistics/probability values are used for examining the level of significance of the impacts. Accordingly, the result revealed that, the number of bank branches (NB) which is an indicator of the access to financial institution development is a major determinant of generating tax revenue in Nigeria, given that it has the largest coefficient of 4.935078 and was significant at below 10% level of significance (precisely about 1.2%) as shown by its a probability value of 0.0121. Bank credit to the private sector (BC) as a measured

of the depth of financial institution development is the second major determinant of generating tax revenue with a coefficient of 0.40007 and significant at about 8.9% level of significance. Therefore, by expanding access and depth of financial institutions, there is potential for generating tax revenue in Nigeria. This result supports the empirical findings of Scott and Bojan (2008); Akram, (2016); and Volckaert (2016) that the number of bank branches and bank credits have a positive and significant impact on tax revenue.

The study also finds that depth of financial market development captured by stock market capitalization as a % of GDP (MC) and the Turnover ratio for stock market (MT) used as indicator of efficiency of financial markets development were third and fourth important determinants of tax revenue in Nigeria among other financial sector variables used in this study. Their coefficients were 0.393150 and 0.270726 and were significant at 6.8% 1.3% level of significances respectively. This supports the findings of Taha et al (2013) and Ilievski (2015) who underlines the importance of stock market activities and suggests that the government should offer incentives for investment in the equity market so that stock markets flourish and generate more revenues.

Bank lending-deposit interest rate spread (%) (BLDS) as a measure of efficiency of the financial institutions development, Bank credits as a % of Bank deposits (BCBD) which measure the stability of the financial institutions development and Stock market volatility as a % of GDP (MV) which captured stability of the financial market were all positive in their relationship with tax revenue in Nigeria. While BCBD was significant at about 6.6%, BLDS and MV were insignificant in their impacts on tax revenue in Nigeria. Stability of the financial institutions implies that in the period of financial instability or crisis, the tax bases contrast and therefore the level of taxpayers' compliance is reduced. This is in tandem with the findings of Reinhart and Rogoff (2009), that financial crises reduce tax revenues.

From the result in table 5, the coefficient of error correction ECM (-1) was negative and significance. This further confirms the existence of a stable long-run relationship among the variables. The size of the coefficient of the error correction term represents the speed of adjustment. It shows that, following a shock, approximately 35.5 percent of the adjustment toward long-run equilibrium is completed after a year.

The adjusted R-squared of 0.616222 shows goodness of fit and that about 61.6% of variation in tax revenue can be explained by the explanatory variables in the model. The F-statistics value of 5.415 and its probability value of 0.003 shows the overall/joint significance of all the financial development variables in determining tax revenue. Hence, in overall, the development of both financial institutions and financial markets in terms of their depth, access efficiency and their stability play a significant role in tax revenue generation in Nigeria.

Causality Tests Result

Granger causality test was applied to check the direction of causality between tax revenue and the various financial development measures. The results which are summarized in Table 6, confirms unilateral causality running from bank credits to the private sector (BC), number of bank branches (NB), Bank credits as a % of Bank deposits (BCBD), stock market capitalization as a % of GDP (MC) and the Turnover ratio for stock market (MT) to tax revenue, in view of their F-statistics and probability values which were significant at below 10% level of significance. Thus, there is unilateral causality running from both financial institutions and financial markets to tax revenue. This is evidence that financial sector development especially, Access, depth and stability of financial sector promotes tax revenue in Nigeria.

There was no case of bidirectional causality or relationship between the various indicators of financial sector development and tax revenue. This is also an indication of no possibility of simultaneity biasness in the linear ECM results discussed above.

Table 6: Pairwise Granger Causality Tests Result

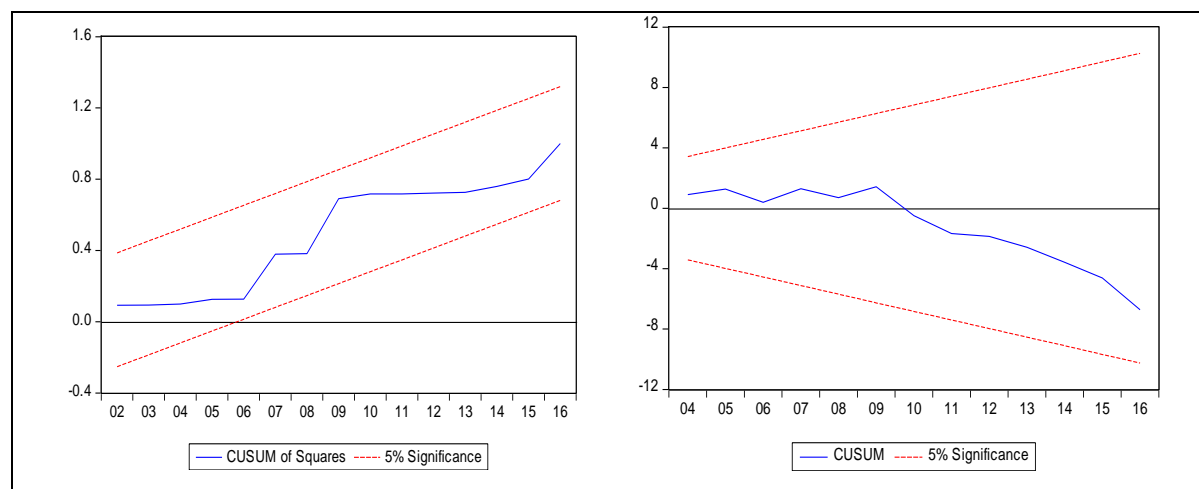
Null Hypothesis:	Obs	F-Statistic	Prob.
BC does not Granger Cause TR		3.90088	0.0403
TR does not Granger Cause BC	22	2.06235	0.1578
NB does not Granger Cause TR	22	3.03010	0.0749
TR does not Granger Cause NB		1.51257	0.2486
BLDS does not Granger Cause TR	22	0.28810	0.7533
TR does not Granger Cause BLDS		1.23473	0.3157
BCBDR does not Granger Cause TR	22	3.45274	0.0552
TR does not Granger Cause BCBDR		0.01247	0.9876
MC does not Granger Cause TR	22	2.69234	0.0964
TR does not Granger Cause MC		0.93888	0.4104
MT does not Granger Cause TR	22	3.37963	0.0581
TR does not Granger Cause MT		1.12692	0.3471
MV does not Granger Cause TR	22	0.65399	0.5326
TR does not Granger Cause MV		0.27462	0.7632
MVT does not Granger Cause TR	22	0.47226	0.6315
TR does not Granger Cause MVT		0.51816	0.6047

Source; Author's extraction from E-view computation

Test of Stability of the Model

The stability in the coefficients of the estimated model (ΔTR) is checked using a cumulative sum (CUSUM) and a cumulative sum of squares (CUSUMQ) stability tests that employ recursive residuals. The plots of CUSUM and CUSUMQ statistics from the ECM estimation are depicted in Figure 1. Since the two statistics are confined within the 5% critical bounds, the estimated coefficients in the error correction model are stable over the analysis period, and therefore results can be used for policy recommendations.

Figure 1: CUSUM and CUSUMQ Plots for Test of Stability of the Model



CONCLUSION

The paper examines the effect of financial sector development on tax revenue in Nigeria and the aspects/dimensions of financial sector development that is most important/faster in stimulating tax revenues in Nigeria. Eight (8) alternative measures of financial sector development in terms of depth, access, efficiency and stability of both financial institutions and financial markets development from World Bank conceptual 4x2 frameworks of measuring financial sector development was selected. Annual data covering the period 1993–2017 were obtained from various sources. Error Correction Model (ECM) and Granger Causality techniques were applied on the data.

The results revealed that, in overall, financial sector development promotes tax revenue in Nigeria. Specifically, access to and depth of financial institutions development are major determinants of revenue collection in Nigeria, followed by depth and stability of financial market development. Arising from the results, the paper concludes that if Nigeria's financial institutions and markets are well developed, with good access, transparent and stable, then businesses and tax payers will use them to conduct their transactions. In turn, the tax collecting authorities

can obtain valuable information from these institutions on taxpayers' income and assets vis-à-vis increase in tax revenue.

Further Studies should focus on the relationship between financial sector development and the various tax components in Nigeria. Especially VAT revenue which still remains the lowest in Nigeria.

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