

FINANCIAL DEVELOPMENT AND EXPORT DIVERSIFICATION IN NIGERIA: EVIDENCE FROM THE AUTOREGRESSIVE DISTRIBUTED LAG (ARDL) APPROACH¹

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ABSTRACT

The paper empirically investigates the nexus between financial development and export diversification in Nigeria. Using the ARDL approach with annual data covering 1981 to 2015, the findings suggest that financial development is an important requirement for diversifying Nigeria's export base. Specifically, the study indicates that a 1 per cent increase in domestic credit to the private sector would lead to 0.046 per cent increase in export diversification. For a developing economy like Nigeria that is eager to diversify, these findings suggest that government should design macroeconomic policies that would encourage the channelling of more affordable credit to the private sector⁴.

JEL Codes: E44, G20, O16.

Keywords: Financial development, diversification, ARDL, private sector.

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1.0 INTRODUCTION

The strategic contributions of export diversification to economic growth, particularly in developing countries have generated keen interests among policymakers, development practitioners and academia. This is perhaps, due to the increasing emphasis by most developing economies on diversification as a key development strategy. However, this development tends to contrast sharply with the principle of the classical trade theories, which is entrenched on perfect competition, comparative advantage and constant returns to scale (Krugman, 1980). It, therefore, implies that the concept of division of labour and specialisation by countries as propounded by Adam Smith and Heckscher-Ohlin Samuelson seems to have been relegated to the background.

Proponents of diversification hinge their arguments on the adverse effects of volatile market prices through fluctuations in foreign exchange revenue on economic growth. Frequent shocks such as extreme fluctuations in price and quantum of exports affect foreign earnings with severe implications on economic planning, import capacity and investors' confidence among others (Herzer and Nowak-Lehmann, 2005; Dawe, 1996). According to FAO (2004), unstable export earnings have impacted negatively on the income, investment, employment and the overall growth of most developing countries. Diversification helps to distribute investment risks among a broad range of economic sectors which in turn promotes multiple and relatively sustained sources of income. A broadened and diversified export base, therefore, enables countries to maintain stable export receipts that can promote long term economic growth.

Consistent with the endogenous growth theory, export diversification promotes long term growth by increasing returns to scale and through the dynamic spill-over effect (Amin Gutienel de Pinneres and Ferrantino, 2000). Other potential outcomes of export diversification include enhanced production technologies and methods which could be beneficial to other industries through the knowledge spillover channel. Some contributory factors to the knowledge spillover hypothesis include enhanced productivity resulting from improved training and retraining of labour, enhanced information about technology and international markets, improved productivity and a more efficient management system.

Good knowledge of foreign buyers' taste, specifications, quality conditions of delivery and payment arrangement is critical to launching a successful entry to a competitive international market. In satisfying these criteria, local exporters often benefit from foreign purchasers training to help ensure compliance with foreign market requirements. Due to the increasing level of competition at the international market, exporting countries have emphasized mechanisms to adopt efficient quality control measures, standard marketing procedures and adherence to product

specifications. Such a knowledge product of an interactive exporting process could be helpful in developing countries, especially in preparing their products for exports. In this way, an expansion of the composition of the export basket could induce industrialisation (AL Marhubi, 2000).

Financial development plays a crucial role in boosting economic diversification. The role of finance in promoting export activities derives from the intermediation functions of financial institutions. It has been observed that inadequate finances remain a key constraint to the acceleration of Africa's economic diversification programme (Subramanian, 2008; Nakhoda, 2013). A well developed and effective financial institution ranks among critical factors for achieving export diversification.

A large body of literature has examined the nexus between export diversification and economic growth. However, no study to the best of our knowledge has investigated the effects of financial development on export diversification in Nigeria. Nigeria presents an interesting case study not only because of its large population and economic size but also due to the monolithic nature of her economy and the need to diversify her revenue base away from crude oil. Nigeria remains one of the most vulnerable countries to crude oil shocks due to her huge dependence on foreign receipts from oil (Aregbeyen and Fasanya, 2017).

Apart from enriching the literature, an empirical investigation of the impact of financial development on export diversification will provide empirical evidence for guiding trade and overall economic policy decisions. Furthermore, as the most populous and largest economy in Africa, this study would provide useful information to other countries with similar economic fundamentals to design and implement pro-diversification policies. In view of the relevance of diversification to economic growth in Nigeria, this paper interrogates the interplay between financial development and export. The main contribution of our paper is to test whether financial development exhibits any significant effect on diversification.

The paper is organised as follows. Succeeding the introduction, Section 2 presents some stylised facts on export diversification in Nigeria while section 3 reviews relevant literature. In Section 4, we present the econometric method, while empirical findings and discussion are contained in Section 5. Section 6 provides conclusion and policy recommendations.

2.0 STYLISTED FACTS ON EXPORT DIVERSIFICATION IN NIGERIA

Nigeria is naturally endowed with numerous exportable resources. The country ranks globally as the 6th largest producer of crude oil and second in Africa. In terms of

agricultural commodities, Nigeria is the world's largest producer of cassava and third in the production of cocoa in the African continent (Ehinomen and Oguntona, 2012). There are also huge deposits of solid minerals such as gold, copper, limestone, ironore, columbite which can be harnessed for export.

After independence in the 1960s, Nigeria's export basket was dominated by the non-oil sectors with agriculture and solid mineral resources contributing the major share of foreign exchange. Agriculture alone accounted for about 71 per cent of total exports while the share of petroleum was less than 3 per cent. The government also depended heavily on revenues generated from export taxes to finance its developmental activities. Indeed, the first and second national development plans were largely financed by foreign earnings from agricultural exports (Nwanne, 2014).

However, the oil boom of the 1970s caused the gradual neglect of the agricultural sector. With this development, the volume of petroleum exports increased rapidly to 93 per cent of total exports in 1979 while agriculture's share of total exports declined to as low as 5.4 per cent. Due to the monolithic nature of the economy with huge dependence on crude oil exports for foreign exchange, the country's revenue base became increasingly vulnerable. For instance, the oil glut and the resultant crash in the international price of crude oil in the early 1980s caused severe shortfall in government revenue necessitating the introduction of the Structural Adjustment Programme (SAP) in 1986. One of the critical objectives of SAP was to diversify Nigeria's export away from crude oil to the non-oil sector (Nwanne, 2014).

Some of the policies and strategies initiated by the government to achieve export diversification include:

- Export development fund – special financial assistance for exporting firms to promote export activities in the area of research, brand and product development;
- Export expansion grant fund – This was intended to reward exporters that have attained a minimum targeted quantity of exports towards improved performance;
- Duty drawback/suspension scheme – This allows exporters to be exempted from some direct taxes and import duties on raw materials;
- Tax relief and interest income – This incentive exempts interest income accruing to banks from export lending transactions of tax.

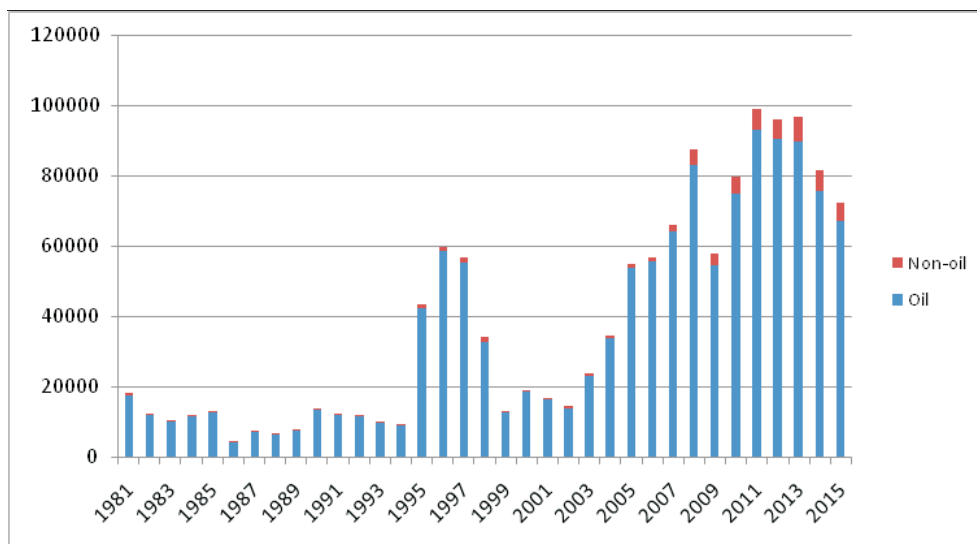
Other steps taken by the government towards the promotion of the nation's export base include the promulgation of the Exports Incentives and Miscellaneous Provisions Decree 18 of 1986, establishment of the Nigerian Export Promotion

Council in 1976 and the Nigeria Export-Import (NEXIM) Bank in 1991 (Adesoji and Sotubo, 2013).

With Nigeria’s return to democratic government in 1999, strategies for stimulating export diversification featured prominently in most of the economic reforms that were launched. One of such economic blueprints was the National Economic and Empowerment Development Strategy (NEEDS). It was launched in 2004, a key thrust of NEEDS dealt with the promotion of an export-led growth strategy that would diversify Nigerian’s foreign exchange earnings away from crude oil. In December, 2010, the government launched the National Vision: 2020 with one of the goals focusing on the exploitation of the non-oil sectors towards increasing their contributions to foreign exchange earnings. Recently, the government launched the Economic Recovery and Growth Plan (ERGP) in February 2017 which also anchored its goal of economic diversification on key growth drivers in the non-oil sector such as agriculture, energy and MSME.

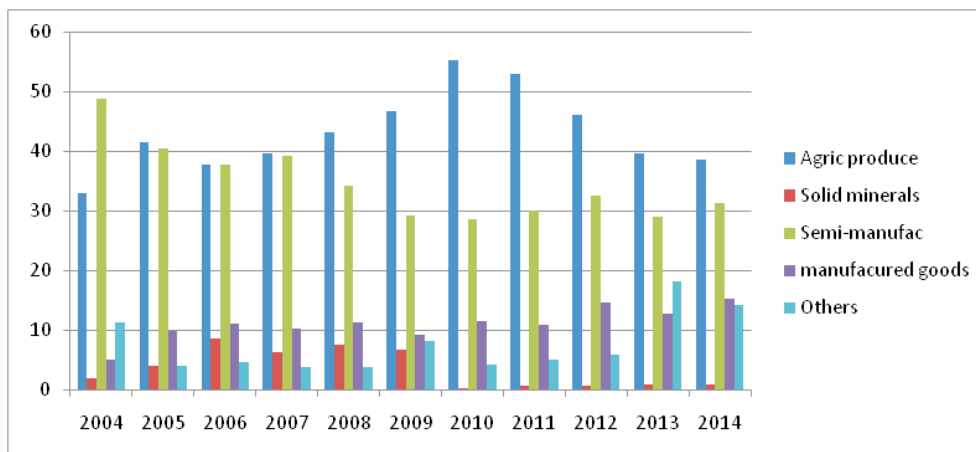
Despite a plethora of past diversification initiatives, the economy remains largely dependent on foreign exchange earnings from crude oil exports. As shown in Figure 1, Nigeria still generates a substantial share of its export revenue from crude oil receipts, indicating a low level of export diversification. Even within the non-oil sector, agriculture dominated the export revenue basket, followed by the semi-manufactured sector (Fig. 2).

Figure 1: Volume of oil and non-oil export revenue (\$’million)



Source: CBN Annual Report

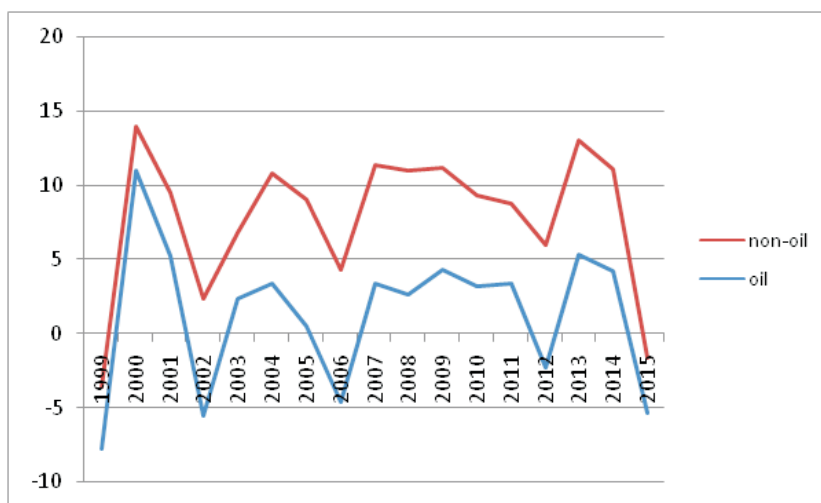
Fig. 2: Shares of components of non-oil export revenue (per cent)



Source: CBN Annual Report

The growth rates of both the oil and non-oil sectors over time are presented in Fig.3.

Fig. 3: Growth rates of oil and non-oil sectors

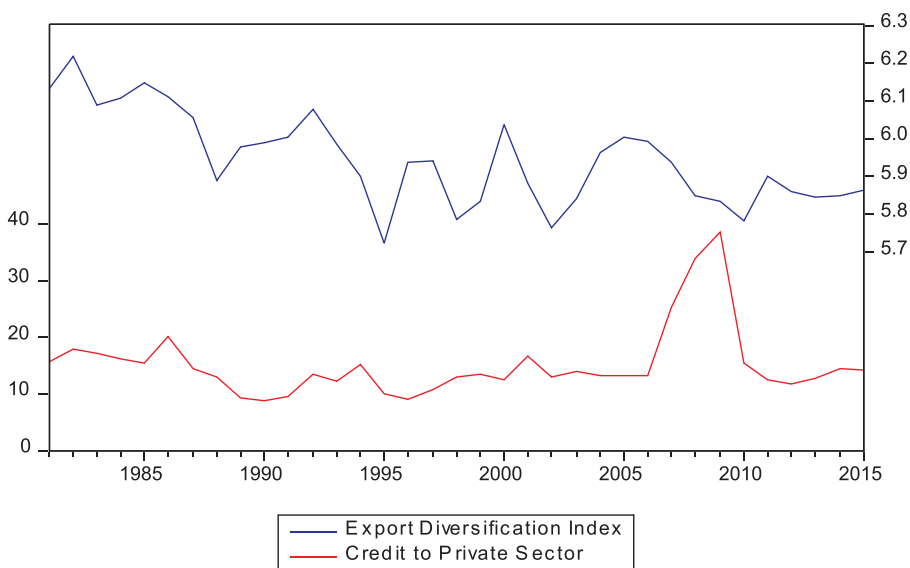


Source: National Bureau of Statistics (various editions)

The slow pace of economic diversification in Nigeria has been attributed to several factors such as policy inconsistency, poor access to finance, huge infrastructural deficit, trade barriers and weak human capital base among others (Kale, 2016). In particular, credit to the private sector ranks high among key requirements for

stimulating economic diversification. In Nigeria, credit flow to the private sector as a ratio of GDP remains abysmally low. Fig. 4 depicts the relationship between the economic diversification index and credit to the private sector. It suggests that the economy recorded relative improvement in the diversification of export items especially from the mid-1990s up to 2010 coinciding with the period of increased credit to the private sector.

Fig 4: Export Diversification Index and Credit to the Private Sector



3.0 LITERATURE REVIEW

Economic development theories based on structural models have provided ample support for economic diversification resulting from the exportation of primary products to manufactured goods as a way of accelerating sustainable growth (Chenery, 1979; Syrquin, 1989). Several channels are identified in the theoretical literature through which economic growth could be induced by export diversification. First, an increase in the number of export commodities or sectors is likely to minimise dependency on a few numbers of commodities. This would address foreign exchange volatilities arising from fluctuations in price and quantity of concentrated basket of products which tend to undermine proper economic planning and limit the capacity for imports (Dawe, 1996).

Secondly, Matsuyama (1992) emphasised the relevance of learning-by-doing through diversification which would in the long-run be beneficial to the exporting country.

These potential benefits could result from the knowledge spillovers in the course of undertaking new production technologies, innovations in management practices and new marketing skills (Amin Gutierrez de Pineres and Ferrantino, 2000).

There are mixed theoretical arguments concerning the effect of financial development on export diversification. Some authors found financial development to have a negative impact on export diversification due to the reluctance of financial institutions to extend credit to new and risky export sectors (Agosin *et al.*, 2009). Other findings indicated to the contrary that economies of countries with well-developed financial markets tend to be more diversified (Manganelli and Popov, 2010). This is justified on the ground that, a more improved financial structure helps to mobilise resources in support of diversified investments leading to broadening of the export basket (Berthelemy and Chauvin, 2000). Increased investment to the most productive sectors at the early stage of a country's development helps to stimulate diversification (Acemoglu and Zilibotti, 1997). However, Krugman (1995) observed that diversification would decline at later stages of development as pecuniary externalities and high cost of trade transactions makes specialisation an attractive option.

From a purely private sector perspective, two different theories can be adopted to explain the nexus between access to finance and trade. The first relates to the stage theory in which a firm's depth of international exposure evolves through a sequential and incremental process (Johanson and Vahlne, 1977). According to this viewpoint, a firm's level of incremental involvement in international trade, including exports depends on the level of knowledge and experience it acquires in foreign markets. This would imply that a certain level of knowledge in foreign financial transactions is also required for successful international trade business.

The second approach focuses on the growing literature on export decisions of heterogeneous firms and their accessibility to finance. In both models, firms require enhanced productivity and willingness to incur a degree of sunk cost so as to be able to gain entry to foreign market (Melitz 2003; Roberts and Tybout, 1997; Bernard *et al.*, 2004). Firms' decisions to commence exportation of their products are taken at a certain level of productivity growth. Access to finance at this level is likely to enhance the firm's chance of gaining entry to the export market (El Said *et al.*, 2013).

There are several strands of the empirical literature on export diversification. The first group tests the various quantitative measures of export diversification. In this regard, the three popular measures are the Theil Index, the Herfindall index and the Gini index (Collet *et al.*, 2012; Hausmann and Klinger, 2006; Rodrik, 2008).

The second category of empirical literature deals with the effects of export diversification on economic growth. Most of the empirical studies in this group found export diversification to have a positive impact on growth (Herzen and Norwak-Lehman, 2004; Almarhubi, 2000 and Kee, 2004). Furthermore, some studies have associated increased per-capita income with export diversification (Hesse, 2008; cadot Stauss-Kahn and Carvere, 2011). For instance, Hesse (2008) investigated the effect of export concentration using data from 99 countries. By applying the general methods of moment estimation technique, the author found evidence of a non-linear relationship between export concentration and per capita income. In the case of Cadot et al. (2011), the study found a U-shaped relationship between diversification and per capita income suggesting that as export diversification of sampled countries increases, they tend to transform from low income to middle-income economies. After attaining a certain level of income however, countries tend to concentrate their export baskets. Some studies have also established a positive linkage between the ratio of manufacturing exports to total exports (a proxy for export diversification) and economic growth (Greenway *et al*, 1999; Moreno-Brid and Perez, 2003 and Balaguer and Cantavella-Jorda, 2004).

The third group of empirical literature examined the key determinants of export diversification. Among the studies was Al-Kawaz (2008) who developed an econometric model to ascertain the main drivers of export diversification in a group of five oil-producing countries. Using a pooled weighted least squares regression covering 1991-2001, the result identified factors such as investment, trade openness and strong institutions to have a significantly positive impact on export diversification. On the other hand, inflation was found to inhibit export diversification.

Similar research adopted the general method of moments (GMM) model to determine the key factors affecting export diversification in 161 countries covering 1962-2000 (Agosin et al., 2012). The authors found trade openness and positive terms of trade to have enhanced export concentration and specialisation while human capital development positively impacted on export diversification. Other explanatory variables, such as financial development and real exchange rate volatility failed to have any significant impact on diversification.

More recently, Longmore et al. (2014) investigated the key impediments to diversification in Trinidad and Tobago using data from both the study area and a group of comparable controlateral countries. By employing the dynamic panel general method of moments, findings from the paper showed that access to finance, openness to foreign direct investment inflows and improved business climate positively contributed to export diversification.

The contributions of the financial sector towards export diversification and overall economic growth can be understood within the context of the effective intermediary functions of financial institutions in channelling credit for robust investment in the economy (ADB, 2016).

Empirical works on the nexus between financial development and export diversification are scanty. Among the few was a study involving 28 OECD countries covering 1970-2007 period in which Manganelli and Popov (2010) showed that financial development (measured by private credit to GDP) induces specialisation through the reallocation of investments towards more efficient sectors. El Said *et al.* (2015) also examined the relationship between access to finance and export diversification for sampled SME firms in Egypt. Using a logit model, the paper established that the availability of banking facilities significantly and positively improved the likelihood of an increase in the number of exporters and diversity of export products. Another study by Noureen and Mahmood (2014) examined the role of country-specific determinants of export diversification among the Association of South-East Asian Nations (ASEAN) and South Asian Association for Regional Cooperation (SAARC) member countries. Using a set of panel data analysed through a modified ordinary least squares cointegration model covering 1986-2012, the result suggested that a one per cent rise in financial development could result in 0.000789 and 0.000379 unit increases in export diversification among the sampled countries of SAARC and ASEAN regions, respectively.

In a review of empirical studies by IMF (2014), a deeper financial system (proxied by private credit to GDP ratio) was also identified as a significant positive determinant of export product diversification in developing countries. UNECA and AUC (2007) also underscored the positive impact of access to credit in accelerating the pace of export diversification.

In terms of the theoretical model, the review of recent empirical literature such as El Said *et al.* (2015), Noureen and Mahmood (2014) and IMF (2014) have demonstrated the possibility of investigating the presence of a long-run relationship between export diversification and financial development. To test this relationship, the plausible assumption for the study is represented as

$$EDI_t = f(Z_t, U_t) \quad (1)$$

Where

EDI = Inverse of the Theil export diversification index

Z_t = Vector of financial development variables and other control variables that affect export diversification

U_t = error term

4.0 ECONOMETRIC METHOD

The study applied the autoregressive distributed lag (ARDL) procedure developed by Pesaran, Shin and Smith (2001) covering 1981 to 2015. ARDL is usually preferred to other conventional cointegration tests proposed by Engle and Granger (1987) residual-based approach, Johansen (1988) and Johansen and Juselius (1990) because all these methods require the variables to be integrated of order one. Mixed order of integration such as I(0) and I(1) are not suitable as the interpretation of both trace and maximum eigenvalue test from the Johansen approach would prove difficult (Harris, 1995). Furthermore, I(0) regressors with other variables in a Johansen-type framework has been proved to generate spurious cointegrating relationships in the model (Rahbek and Mosconi, 1999).

In contrast, the ARDL has the advantage of the ease of application to variables with mixed order of cointegration such as I(0) and I(1) (Pesaran and Pesaran, 1997). Secondly, the ARDL approach can be applied to a small sample size (Pesaran *et al.* 2001).

4.1 Data and Measurements

Data used for the study were collected from multiple sources. Data series on export diversification index were sourced from the IMF database. As indicated earlier, three key indicators of diversification identified in the literature are the Theil index, Herfindhal index and the Gini index (Cadot *et al.*, 2013). For this study, we have chosen to adopt the Theil index. The Theil Export Diversification Index is computed by employing trade data and it is a synthetic measure of both the ‘extensive’ and ‘intensive’ margins of diversification.

The overall Theil index is calculated as the sum of the intensive and extensive components. The extensive Theil index is calculated

$$TB = \sum k (N_k/N) (\mu_k/\mu) \ln(\mu_k/\mu),$$

where k represents each group (traditional, new, and non-traded), N_k is the total number of products exported in each group and μ_k/μ is the relative mean of exports in each group.

The intensive Theil index for each country/year pair is:

$$TW = \sum_k (N_k/N) (\mu_k/\mu) \left\{ (1/N_k) \sum_{i \in I_k} \ln(x_i/\mu_k) \right\}.$$

where x represents export value.

In line with Anne (2016), our choice is based on the possibility of decomposing the Theil index into an intensive margin and extensive margin. While the intensive margin accounts for existing product lines; the extensive margin accounts for new product lines. Secondly, the study benefits from the readily available IMF database on Theil export diversification index. A higher value of export diversification index indicates high concentration implying a less diversified economy (IMF, 2016). Therefore, we computed the inverse of the Theil index, which implies a direct measure of export diversification. That is, the higher the inverse of the Theil index; the more diverse are the exports (Sannasse *et al.* 2014); Songwe and Winkler, 2012).

The data for credit to the private sector, real effective exchange rate, gross fixed capital formation, population and trade openness were sourced from the World Bank database while inflation and lending rate data were drawn from the Central Bank of Nigeria database.

The most common measure of financial development in the literature is private credit to GDP (Altowaim, 2016; Agosin *et al.*, 2009; Longmore *et al.*, 2014). It indicates the quantum of bank loans in relation to the economic output provided to the private sector. With regards to the control variables, it is theoretically hypothesised that gross fixed capital formation (GFCF) could be a proxy for the level of investment in the economy (Dioquino and Abouellial, 2015). Investment has been found to be one of the key determinants of diversification in developing economies (ECA, 2007; Harsman, Hwang and Rodrik, 2007). Due to its potential to expand the capacity of the economy, GFCF is expected to increase export diversification. Trade openness is another control variable, proxied by the sum of exports and imports relative to GDP. Theoretically, trade liberalisation could be argued to promote specialisation in the exports of commodities in which developing countries have a comparative advantage (Reinert, 2007). This assertion was supported by Agosin *et al.*, (2009) who found a negative impact of trade openness on diversification. However, a study by Cadot *et al.*, (2007) established a significantly positive impact of trade liberalization on export diversification.

The population tends to enhance economic diversification. It accounts for an increased labour force that could be employed in the production of a more diversified export basket (Jetter and Hassan, 2012). As the population of the country grows, it is

likely to discover and venture into the production and export of new products (Klinger and Liderman, 2006; Chandra *et al*, 2007). Other control variables included in the model to account for the impact of macroeconomic factors on export diversification are inflation, lending rates and exchange rate (Al-Kawaz, 2008).

4.2 Model Specification

Given the above-stated advantages of the ARDL approach with particular reference to its accommodation for small sample size and variables with mixed order of integration, the study adopted the ARDL approach to examine the relationship between export diversifications and financial development in Nigeria. Several key steps are involved in estimating the ARDL. The first step involves the examination of the existence of cointegration using the bounds testing procedure (Pesaran and Pesaran, 1997; Pesaran, Shin and Smith, 2001).

The ARDL framework is specified below:

$$\begin{aligned} \Delta EDI_t = & \alpha_0 + \sum_{i=1}^p \alpha_1 \Delta EDI_{t-1} + \sum_{i=1}^p \alpha_2 \Delta CPS_{t-1} + \sum_{i=1}^p \alpha_3 \Delta GFCF_{t-1} + \sum_{i=1}^p \alpha_4 \Delta \ln POP_{t-1} \\ & + \sum_{i=1}^p \alpha_5 \Delta \ln REER_{t-1} + \sum_{i=1}^p \alpha_6 \Delta MLR_{t-1} + \sum_{i=1}^p \alpha_7 \Delta OPEN_{t-1} + \sum_{i=1}^p \alpha_8 \Delta INF_{t-1} \\ & + \sum_{i=1}^p \gamma_1 EDI_{t-1} + \sum_{i=1}^p \gamma_2 CPS_{t-1} + \sum_{i=1}^p \gamma_3 GFCF_{t-1} + \sum_{i=1}^p \gamma_4 \ln POP_{t-1} \\ & + \sum_{i=1}^p \gamma_5 \ln REER_{t-1} + \sum_{i=1}^p \gamma_6 MLR_{t-1} + \sum_{i=1}^p \gamma_7 OPEN_{t-1} + \sum_{i=1}^p \gamma_8 INF_{t-1} + \varepsilon_t \end{aligned}$$

Where:

- EDI = export diversification index;
- CPS = credit to private sector;
- GFCF = gross capital fixed formation;
- POP = population;
- REER = real exchange rate;
- MLR = maximum lending rate;
- OPEN = trade openness; and
- INF = inflation.

The expressions from to on the right side of Eq. (2) represent the long-run relationships between export diversification and the explanatory variables while α_1 to α_8 represents the short-run relationships.

An estimation of the long-run relationship between export diversification and financial development involves several major steps. First, we estimate Eq. (2) by means of ordinary least square (OLS) method while the existence of a long-run relationship among the variables would be tested using the F-test.

The null hypothesis for Eq. (3) is represented as:

$$H_0 = \gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = \gamma_5 = \gamma_6 = \gamma_7 = \gamma_8 = 0$$

This implies the non-existence of a long-run relationship between the variables.

Conversely, the alternative hypothesis is stated as:

$$H_1 = \gamma_1 \neq \gamma_2 \neq \gamma_3 \neq \gamma_4 \neq \gamma_5 \neq \gamma_6 \neq \gamma_7 \neq \gamma_8 \neq 0$$

The F-statistics is then compared with the upper bound critical values developed by Pesaran *et al*, (2001) and Narayan (2005). Any of the three scenarios may occur. First, the null hypothesis of no cointegration is rejected if the computed F-statistics is larger than the critical value of the upper band. This implies the existence of a long-run equilibrium relationship among the variables in the model. In the second scenario, the hypothesis of no cointegration is accepted if the lower critical bound exceeds the calculated F-statistic. The third scenario returns an inconclusive test if the computed F-statistic lies between the upper and the lower critical bounds.

The second step involves the estimation of a long-run relationship through the use of the selected ARDL model by considering the Hannan Quinn Criterion, Akaike Information Criterion (AIC) and Schwarz Criterion (SBC). In the third step, the error correction is estimated as follows:

$$\begin{aligned} \Delta EDI_t = & \beta_0 + \sum_{i=1}^p \lambda_i \Delta EDI_{t-1} + \sum_{i=1}^p \varphi_i \Delta CPS_{t-1} + \sum_{i=1}^p \omega_i \Delta GFCF_{t-1} + \sum_{i=1}^p \Theta_i \Delta \ln POP_{t-1} \\ & + \sum_{i=1}^p \rho_i \Delta \ln REER_{t-1} + \sum_{i=1}^p \gamma_i \Delta MLR_{t-1} + \sum_{i=1}^p \Lambda_i \Delta OPEN_{t-1} \\ & + \sum_{i=1}^p \Gamma_i \Delta INF_{t-1} + \alpha ECM_{t-1} + U_t \end{aligned}$$

The result of the error correction model shows the speed of adjustment back to long-run equilibrium following a short-run shock. In ensuring the goodness of fit of the model, some diagnostics tests were carried out. These include the tests for serial correlation, normality and heteroscedasticity. A further test to confirm the stability of the long and short runs estimates was also conducted using the cumulative (CUSUM) and cumulative sum of squares (CUSUMSQ).

5.0 EMPIRICAL RESULTS

As a motivation for further empirical analysis, we conduct a preliminary assessment of the relationship between financial development (CPS) and export diversification (EDI) using correlation analysis. Though the correlation coefficient of 0.36 indicates a weak relationship, it shows a positive association between CPS and EDI, suggesting that economic diversification increases with enhanced financial development. Fig. 3 also supports the existence of a positive relationship between the two variables indicating that an increase in financial development is associated with an increase in export diversification. It should be noted, however, that correlation is only indicative and not a confirmation of any causal relationship between variables. The summary statistics for all the variables in the model is shown in Table 1.

Table 1: Descriptive statistics

Variables	CPS	EDI	GFCF	INF	LGPOP	LGREER	MLR	OPEN
Mean	12.80	0.17	12.72	20.28	8.07	2.08	21.26	51.12
Median	10.92	0.17	11.97	12.17	8.07	2.00	21.34	53.03
Maximum	36.89	0.17	35.22	72.84	8.26	2.74	36.09	81.81
Minimum	5.92	0.16	5.46	0.22	7.88	1.70	10.00	21.15
Std. Dev.	6.51	0.00	6.41	18.98	0.11	0.28	5.91	16.6
Skewness	1.91	-0.21	2.01	1.54	0.02	0.91	0.07	-0.23
Kurtosis	7.08	2.25	7.44	4.31	1.82	2.66	3.09	2.07
Jarque-Bera	45.64	1.07	52.27	16.33	2.03	4.95	0.04	1.55
Probability	0.00	0.59	0.00	0.00	0.36	0.08	0.98	0.46

Before proceeding to test the presence of cointegration among the variables, a test was carried out to confirm the order of integration of each of the variable using the augmented Dicker-Fuller (ADF) and the Kwiatkowski–Phillips–Schmidt–Shin (KPSS). Results of the unit root test are shown in Tables 2 and 3. According to the results, the variables are of mixed order, that is $I(1)$ and $I(0)$ thereby allowing us to proceed with the ARDL approach.

Table 2. ADF unit root tests results for stationarity of the variables

Variable	Level	First Difference	I(d)
EDI	-4.125**	-	I(0)
CPS	-	-5.174*	I(1)
GFCF	-4.691*	-	I(0)
LGPOP	-4.050**	-	I(0)
LGREER	-	-3.987*	I(1)
MLR	-	-6.336*	I(1)
OPEN	-	-5.720*	I(1)
INF	-	-5.422*	I(1)

Notes: * and ** indicate statistical significance at 1per cent and 5 per cent levels respectively while I(d) denotes order of integration

Table 3. KPSS unit root tests results for stationarity of the variables in the equation

Variable	Level	First Difference	I(d)
EDI	0.612**	-	I(0)
CPS	-	0.50*	I(1)
GFCF	-	0.485*	I(1)
LGPOP	0.150**	-	I(0)
LGREER	-	0.103**	I(1)
MLR	-	0.105**	I(1)
OPEN	0.673**	-	I(0)
INF	-	0.439**	I(1)

Notes: * and ** indicate statistical significance at 1per cent and 5 per cent levels respectively while I(d) denotes order of integration

Table 4. ARDL(1, 2, 0, 2, 2, 1, 2, 0) model results

Variable	Coefficient	Std. Error	t-Statistic	Prob
EDI(-1)	-0.368278	0.219069	-1.681108	0.1209
CPS	0.000358	0.000158	2.265974	0.0446
CPS(-1)	-0.000237	0.000200	-1.184227	0.2613
CPS(-2)	0.000506	0.000188	2.688412	0.0211
GFCF	-0.000920	0.000309	-2.978097	0.0126
LGPOP	-16.72499	7.375885	-2.267522	0.0445
LGPOP(-1)	45.16547	15.03087	3.004848	0.0120
LGPOP(-2)	-28.37364	8.202389	-3.459192	0.0053
LGREER	0.002883	0.003350	0.860770	0.4077
LGREER(-1)	0.009475	0.004649	2.037926	0.0663
LGREER(-2)	-0.003960	0.002503	-1.582289	0.1419
MLR	-2.59E-05	0.000118	-0.218691	0.8309
MLR(-1)	0.000200	0.000125	1.592376	0.1396
OPEN	-1.84E-07	5.86E-08	-3.140212	0.0094
OPEN(-1)	-2.47E-07	7.86E-08	-3.143894	0.0093
OPEN(-2)	1.61E-07	1.01E-07	1.593592	0.1393
INF	5.05E-05	2.92E-05	1.733030	0.1110
C	-0.448764	0.185231	-2.422727	0.0338

Diagnostic tests:

Adjusted R-squared = 0.718852; F-stat = 5.211274

(Prob=0.004060); DW=2.675873

Serial correlation: $X^2 = 4.674288$ (Prob=0.4005)

Linearity = 2.101 (Prob=0.0518)

Heteroscedasticity: $X^2 = 1.896293$ (Prob=0.1331)

CUSUM=Stable; CUSUMSQ=Stable

Next, we conduct the F-statistics and in line with the suggestion of Peseran and Shin (1999) and Narayan (2004) for small and annual sample size, we restricted our maximum number of lags to two. Results of the F-statistics for the cointegration test alongside the critical values are presented in Table 5. According to the results, the computed F-statistic (F-statistic = 3.22) exceeds the upper bound critical value of 3.21 at the 5 per cent significance level, using the restricted intercept and no trend. This result suggests that we cannot accept the null hypothesis of no cointegration at the 5 per cent level of significance. It, therefore, implies the existence of cointegrating relationship among the variables.

Table 5. F-Statistic showing the cointegrating relationship

Test Statistic	Value	Lag	Significance level	Bounds Critical Values	
				I (0)	I (1)
F-Statistic	3.22	2	1%	2.73	3.9
			5%	2.17	3.21**
			10%	1.92	2.89

** denotes significance at 5 per cent level.

As the next step, we estimate Eq. 3 based on the ARDL co-integrating method to get the long-run estimates of the regressors. In order to estimate the coefficients of the level of variables, we were mindful of the various criteria such as the AIC, Hannan Quinn Criterion and SIC.

Tables 6 and 7 present the results of the long-run and short-run estimates. Results show that financial development (proxied by credit to the private sector) is significant and positive in line with a priori expectation. Credit to the private sector (CPS) has a coefficient of 0.00046, implying that a 1per cent increase in credit allocation to the private sector would result in 0.046 per cent increase in export diversification in the long run. The result is statistically significant at 5 per cent level. This means that credit availability is an important determinant of export diversification as producers would rely on affordable finance to expand their investment portfolios. Progressive enhancement in the development of the financial sector increases the efficiency of intermediation function (Creane, Goyal, Mobarak and Sab, 2004). This result is consistent with findings by Manganeli and Popov (2010) and Nourreen and Mahmood (2014), which indicate that economies of countries with well-developed financial markets tend to be more diversified. It is also consistent with the work carried out by Acemoglu and Zilibotti (1997) in which the provision of more credit led to the diversification of investments in a variety of export products thereby resulting in enhanced economic growth. Similarly, an increase in credit supply to the private sector was estimated to induce export revenue through diversification and strengthen economic growth (Rwanda, 2011). It however contrasted with findings by Altowaim (2016) and Agosin (2009).

Some important control variables that were included in the model are gross fixed capital formation (GFCF), population (LPOP), real exchange rate, maximum lending rate, inflation and trade openness (OPEN). Trade openness indicated a negative and

statistically significant relationship with export diversification. This implies that as a country shows more openness to international trade; it tends to have a more concentrated basket of exports and therefore discourages diversification. The result agrees with some previous studies by (Omgba, 2014; Kamuganga, 2012 and Agosin *et al*, 2011). It, however, disagrees with Alaya (2012) in a study of 12 the Middle East and North Africa countries where the results suggest a positive impact of trade openness on export diversification.

The coefficient of gross fixed capital formation (domestic investment growth rate) indicates a negative and significant impact on export diversification contrary to a priori expectation. The result is, however consistent with the findings by Bebczuk and Berrettoni (2006) who found a positive relationship between the rate of investment and export concentration. A likely explanation could be that since investment in diversified export production remains largely a private business initiative, private firms as rational economic agents would like to focus more on specialisation in few sectors of comparative advantage rather than diversifying into seemingly new and risky sectors. The result, however, contradicts findings by Habiyaremye and Ziesemer (2006) which indicated that infrastructure investment promotes export diversification in Africa.

Real exchange rate (LGREER) as a control variable is found to have a coefficient of 0.0061 and is significant at 5 per cent level. It implies that a 1 per cent increase in real exchange rate will lead to a 0.06 per cent increase in export diversification. The implication of the positive coefficient of LGREER variable is that an appreciated exchange rate tends to undermine the concentration of exports basket on a few items and therefore encourage export diversification. This finding seems to be contrary to economic thinking that a devalued exchange rate tends to promote export diversification. It has been argued that any reasonable increase in the REER above the equilibrium level may unduly hurt a country's level of international competitiveness, and therefore undermine its export-led diversification policy (Bose, 2014; Wondemu and Potts, 2016; Elbadawi, 1998 and Rodrik, 2008).

Population exhibits a positive and statistically significant relationship with export diversification in line with a priori expectation. This implies that an increase in the population of a country tends to enhance the labour population which would be employed as factor inputs for producing diverse products for exports (Parteka and Tamberi, 2011; Jetter and Hassan, 2012).

The non-statistical significance of lending rate and inflation suggests that these two variables may not be important determinants of export diversification in Nigeria.

Table 6. Long-run estimates of ARDL

Dependent variable: Inverse of Theil export diversification index				
Regressors	Coefficient	SE	T-statistics	Prob.
CPS	0.000458**	0.000157	2.916735	0.0140
GFCF	-0.000672*	0.000190	-3.536059	0.0047
LGPOP	0.048856*	0.014409	3.390732	0.0060
LGREER	0.006138**	0.002777	2.210115	0.0492
MLR	0.000127	0.000119	1.065570	0.3094
OPEN	-0.000002*	0.000001	-3.130414	0.0096
INF	0.000037	0.000023	1.640852	0.1291
C	-0.327977	0.138907	-2.361134	0.0377

*denotes significance at 1 per cent.

**denotes significance at 5 per cent.

Table 7 shows the results of the short-run estimates. The coefficients of the short-run model have the same signs with that of the long-run. However, only credit to private sector is significant at 5 per cent in the short run. This suggests that export diversification is impacted strongly by financial development at both the long run and the short run. The key outcome of the short-run dynamics is the computed coefficient of the error correction model (ECM). The coefficient for the error correction is significant and negative in line with a priori expectation, indicating that the cointegrating relationship among the variables is established. The ECM_{t-1} coefficient indicates the speed of adjustment to the long-run equilibrium position after a short run shock. From our result, about 58 per cent of the disequilibria of the last year's shock to export diversification would adjust within the current year back to attain equilibrium level.

Table 7. Short-run estimates of ARDL

Dependent variable: "Inverse of Theil export diversification index				
Regressors	Coefficient	SE	T-stat.	Prob.
Δ CPS	0.000380	0.000170	2.240620	0.0467
Δ GFCF	0.000149	0.000173	0.861646	0.4073
Δ LGPOP	-5.478046	8.465370	-0.647112	0.5308
Δ LGREER	0.003482	0.004214	0.826377	0.4262
Δ MLR	-0.000007	0.000117	-0.057116	0.9555
Δ OPEN	-0.000000	0.000000	-1.095116	0.2969
INF	0.000042	0.000034	1.257936	0.2345
ECM_{t-1}	-0.584722	0.217772	-2.685022	0.0212

The relevant diagnostic tests and the results are reported at the lower part of Table 4. According to the p-values, the model has no evidence of serial correlation and heteroscedasticity. Also, the model is linear while the CUSUM and CUSUMSQ statistics fall within the critical bound, implying the stability of all the coefficients in the error correction model (see appendix).

6.0 SUMMARY AND POLICY IMPLICATIONS

High dependence on foreign export earnings from crude oil sales continues to render Nigeria's economy vulnerable to frequent shocks. The diversification of the country's export base, therefore, remains a viable strategy towards sustained growth and development. As identified in the literature, access to finance plays a strategic role in accelerating export diversification. It is against this backdrop that the paper investigated the financial development and export diversification nexus in Nigeria.

The present study is an attempt to interrogate the impact of finance on export diversification in the case of Nigeria throughout 1981 to 2015.

Using the ARDL approach, the findings of the study suggests that financial development is a significant requirement for diversifying Nigeria's export base. Specifically, a 1 per cent increase in domestic credit to the private sector would lead to 0.046 per cent increase in export diversification in the long run. Therefore, increasing credit to the private sector can be regarded as an important approach to boost export diversification in Nigeria. Other control variables that showed significant contributions to export diversification include population and trade openness.

The empirical evidence provided by this study has important policy implications for a developing economy like Nigeria that is strongly desirous of diversifying her economy. The findings suggest that some policies may be more effective than others in encouraging diversification. For instance, policies that channel more affordable credit to the private sector tend to increase export diversification while trade openness is associated with export concentration. This implies that government should design policies that deepen financial intermediation in order to expand the number of export sectors.

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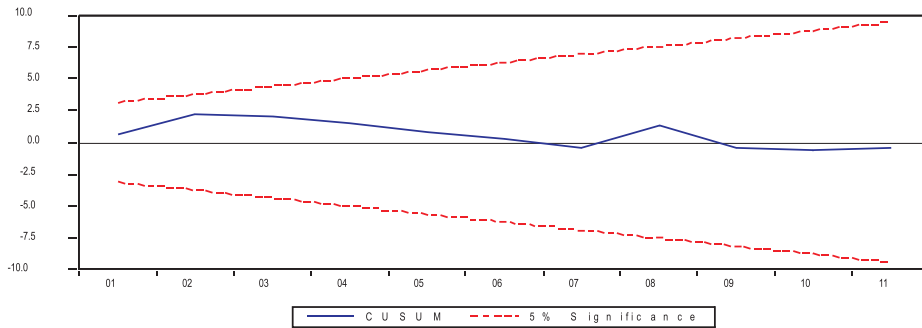
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Appendix: Graph of CUSUM and CUSUMSQ

Plot of Cumulative Sum of Recursive Residuals



Plots of Cumulative Sum of Squares of Recursive Residuals

