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C O N T E N T S

RESEARCH PAPERS

1. Adedayo Emmanuel Longe, Folake Adenola,
   Adewale Musliudeen Balogun,
   Shehu Muhammad
   Asymmetric and Non-Asymmetric Impact
   of Real Effective Exchange Rate on Trade in Nigeria ........................................ 259

2. Patricia Iyore Ajayi,
   Adedayo Emmanuel Longe,
   Oladayo Ayokunle Omitogun,
   Shehu Muhammad
   Oil Price Shocks and Energy Consumption in Nigeria ....................................... 275

3. Emmanuel Olajide Adebayo
   Trade Trend and Sustainable Development in Nigeria ........................................ 294

4. Olawunmi Omitogun,
   Farouq Adekunle Akanni,
   Adedayo Emmanuel Longe,
   Adewale Balogun
   Disaggregated Government Expenditure
   and Education Enrolment in Nigeria ................................................................... 309

5. Intan Nurpratiwi,
   Syamsurijal Abdul Kadir,
   Yunisvita Yunisvita
   Factors that Influence Wages Differences in Formal Sector
   on Male and Female Workers in Palembang City .................................................. 327

REVIEW PAPERS

6. Dilruba Pashayeva
   Directions for Improving the Tax Administration
   and Tax Control Under Modern Conditions
   in the Republic of Azerbaijan .................................................................................. 344
ASYMMETRIC AND NON-ASYMMETRIC IMPACT OF REAL EFFECTIVE EXCHANGE RATE ON TRADE IN NIGERIA

Adedayo Emmanuel LONGE¹, Folake ADENOLA², Adewale Musliudeen BALOGUN³, Shehu MUHAMMAD⁴

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JEL F10, F31

Abstract

The trend of trade in Nigeria has been a major concern in the economy over the years. The trend has been traced to the risk furnished by the unstable nature of the real effective exchange rate of the naira on traders. On this note, the study investigates the asymmetric and non-asymmetric impact of the real effective exchange rate on trade in Nigeria using secondary data from 1980 to 2017. The study adopts both ARDL and NARDL technique to analyse the data. From the ARDL estimate, it was revealed that the real effective exchange rate has a significant negative impact on trade services in Nigeria. For the NARDL estimates, the findings show that there is an insignificant negative impact of both negative and positive changes in real effective exchange rate on trade in Nigeria. The implication of this is that non-asymmetric real effective exchange rate is a significant determinant of trade in Nigeria. The study therefore recommends that there is a need to devise strategic policies that will aid trade (most especially export) in Nigeria to enhance the currency value to other major countries of the world. Therefore, diversification of the export base product objective of the Central Bank of Nigeria current administration is supported by this study.

Key words:
Trade services, real effective exchange rate, ARDL, NARDL.

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1. Introduction

In most developing countries, stability of macroeconomic variables, finances and price is of utmost priority to the government. In Nigeria, the government through the Central Bank of Nigeria prioritizes stability of its aggregate economy, price and financial sector as a target for sustainable economic growth. The growth of the economy has been on the downside against its population due to circumstances warranted from its trade imbalance and global economic development trends. The economy is currently exposed to global output instability which is having a negative impact on its current account balances and affects the exchange rate of the Nigerian currency to other currencies of the world. In the last five years, it is part of the objectives of the Central Bank of Nigeria (CBN) to preserve the domestic macroeconomic stability and financial stability, promote payment infrastructure, increase access to credits, manage the floating exchange rate in the economy and aid the value of the Nigerian currency via diversification of the economy’s export base product. All these objectives are primarily to stabilise price and exchange rate and promote the acceptance of local trade in the world market space.

One of the biggest challenges faced by traders (both domestic and foreign traders) - mostly in developing economies - is the unstable value of their currency and it is majorly considered by all trading investors. In Nigeria, the value of the naira has been unstable with different government regimes, which is as a result of different economic policies adopted. Some researchers argue that there is no specific pattern trade balance follows in the short-run after devaluation (Gupta-Kapoor & Ramakrishnan, 1999; Bahmani-Oskooee, Mohsen & Alse, 1994 & Bahmani-Oskooee & Kantiapong, 2001). According to Krugman and Obstfeld (2001), exchange rate instability has two side effects (Price and Volume) on trade balance. The price effect makes import more expensive to foreigners and causes domestic exportations to be cheaper to foreign buyers in the short run. Volume effect has more effect in the long-run on trade balance. The volume effect corrects the effect in the short run in favour of the trade balance in the long run if the Marshall-Lerner condition holds.

Exchange rate in Nigeria affects various macroeconomic variables such as inflation rate, consumption, investment, unemployment, balance of trade, among others. Its impact has been verified and still remains an ongoing discussion in the literature front. The nature of trade in Nigeria is mixed. The country is found active on both the export and import side of trade. On the export side, Nigeria’s larger percentage of export products is oil, seconded by agricultural produce and other sectors sharing the balancing percentage. The volatility in the price of oil exposes its currency value to
devaluation risk which discourages investors to trade in the country’s currency. On the import side, the economy consumes more imported goods (petroleum products, consumer goods among others) which adds value to other countries currency appreciate against its local currency. The role of the exchange rate on the two sides is key as it determines Nigeria’s revenue from the export side and the commodity prices (consumer price index) from the import side and in general investment returns to investors. Also, the unstable price of Nigeria’s major export product (Oil) influences the exchange rate through the current account balances (Longe et al., 2019). It has been noted that investors make decisions on different notes depending on their expectations on the exchange rate regime. On this note, we considered it important that there is a need to understand the asymmetric and non-asymmetric impact of real effective exchange rate on trade balances in Nigeria. This contributes to the existing literature on trade determinants.

The rest of the study is partitioned into four sections. Section two gives extensive details of the literature review. Section 3 presents the methodology and data source of the study. Section 4 anchors the empirical analysis and section five concludes and provides recommendations from the findings.

2. Literature Review

The study considered two most important theories of exchange rate and trade nexus which are the Marshall-Lerner theory and the J-Curve theory. The Marshall-Lerner theory states that exchange rate depreciation will cause trade balance improvement if the elasticity of the exports and imports sum in the long-run is unity. The J-curve theory is more focused on the income from exports. The J-curve effect states that depreciation of exchange rate can cause a decline in the current account balances in the short-run if trade demand (export) is inelastic. Based on these theories, Šimáková (2014) empirically analysed the impact of exchange rate development on bilateral trade between the Czech Republic and its trade partners exploring the J-curve pattern and using quarterly data spanning from 1997 to 2012. The Johansen co-integration model was used to estimate the long-run link and error correction model for the short-run analysis. It was argued from the result that no clear impact of exchange rate volatility on trade flows in the country. Smallwood (2019) built on the recent literature by using the flexible multivariate DCC-GARCH model to analyse the uncertainty of the exchange rate effect on bilateral export growth in China’s ten largest export markets. Using sample data from 1994 to 2017, the findings showed that exchange rate uncertainty has no impact on trade with the United States, which strongly contrasts a robust finding of trade deterring impacts for almost all remaining
countries. Nicita (2013) investigated the impact of exchange rate misalignments on trade and how it affects government decisions regarding trade in 100 countries for 10 years. The study results support a recent literature view in the light that exchange rate misalignment is important and the short-term exchange rate volatility is generally not a serious concern, its effect is substantial and undervaluation of the currency promotes exports and restricts imports.

Dogru, Isik and Sirakaya-Turk (2019) analyzed the extent to which currency depreciations and appreciations affect the United States (U.S.) bilateral tourism trade with Canada, Mexico and the United Kingdom (U.K.). Their results show that depreciation of the U.S. dollar subsequently improves the U.S. trade balance with all three trading partners. However, while the appreciation of the U.S. dollar deteriorates the U.S. bilateral tourism trade balance with Canada and the U.K., it does not ultimately affect the U.S. bilateral tourism trade with Mexico in the long term. These results provide evidence contradicting the J-curve theory, supporting the postulations of the ML condition. Tunc, Solakoglu, Babuscu and Hazar (2018) used the newly launched Exporter Dynamics Database of the World Bank to analyse the risks involved in external exchange rate volatility and trade flows between countries. They found a strong positive impact of external exchange rate risk on trade flows (export) in the countries studied, but more effective in the advanced countries, countries with low bilateral exchange rate volatility and countries in which the export is carried out by a small number of firms.

Serenis and Tsounis (2013) carried out a sectoral analysis of export performances between 1990:q1 and 2012:q1 as a result of exchange rate volatility in Croatia and Cyprus. The VECM model was employed for the analysis. It was confirmed from the analysis that there is a significant negative impact of exchange rate volatility on one country (Croatia). Serenis and Tsounis (2014) for a set of three African countries (Malawi, Morocco and South Africa) examined the effect of exchange rate volatility to aggregate export from 1973Q1 to 1990Q1 with a Vector Error Correction Method adopted. Their result propounded a negative significant impact of exchange rate volatility on aggregate export for all the countries sampled. In MINT (Mexico, Indonesia, Nigeria and Turkey) countries, Asteriou, Masatç and Pilbeam (2016) used GARCH model, ARDL bounds test and Granger Causality test to analyse both the nominal and real effective exchange rate, long-run relationship and short-run relationship between exchange rate volatility and international trade. Their study shows that except for Turkey, there is no long-run relationship among the variables, in the short-run a significant causal link exist between the variables for the economy of Indonesia and Mexico, while a unidirectional causal link from international trade to exchange rate volatility and for Turkey, no causal link. Bahmani-Oskooee
and Gelan (2018) took a sample of 12 African countries to examine the impact of exchange rate volatility on their trade flows while adopting the bounds-testing approach to estimate the long-run and short-run relationship. It was submitted from the findings that in the short-run, exchange rate volatility affects most of the countries sampled and there is a restriction of the long-run effect on the exports of five countries and on the imports of only one country. In Turkey, Tatliyer and Yigit (2016) used VECM and VAR Granger Causality test within the framework of Toda-Yamamoto to explain the short-run and long-run relationship between exchange rate volatility and foreign trade. Their findings depicted that exchange rate volatility has a positive effect on foreign trade in the long-run, but does not exist in the short-run.

Oloyede and Essi (2017) used monthly data and VAR model to test the impact of exchange rate on exports and imports in the economy of Nigeria. They observed from their analysis that the exchange rate has a positive insignificant impact on imports, while it exceeds a negative insignificant impact on exports in Nigeria. These findings are contrary to economic theories which state that a fall in exchange rates causes importations to fall. Umoru and Oseme (2013) used Nigeria data to test the J-curve effect using the Vector Error Correction Methodology (VECM). The results reveal a cyclical relationship between trade balance and real exchange rate depreciation of Nigerian currency (naira). Their findings also negate the short-run deterioration of trade balance by shocks in real exchange rate by the J-curve hypothesis in Nigeria. Eke, Eke and Obafemi (2015) within the period of 1970 to 2010 examined the effect of real exchange rate on trade balance in Nigeria using the Error Correction Method (ECM). Their analysis showed that the exchange rate during the period under study showed a significant negative influence on trade balance in Nigeria. The implication of this is that the devaluation of the Nigerian currency does not necessarily lead to improvement in the trade balance in Nigeria. Micheal and Emeka (2017) tested the Marshall-Lerner (ML) condition for nominal exchange rate shock effect on trade balance in the context of Nigeria using data spanning from 1980 to 2015 using VECM. The result shows that a nominal exchange rate has a positive insignificant impact on trade balance in Nigeria. This therefore implies that the Marshall-Lerner condition does not hold in the Nigerian economy. Aliyu (2010) quantitatively checked trade performances in the economy of Nigeria as a result of some fundamental variables (the naira exchange rate volatility, the US dollar volatility) using quarterly data and adopting VECM. The study findings show that the naira exchange rate volatility decreased non-oil exports by 3.65%, while the same estimate for the US dollar volatility increased export of nonoil in Nigeria by 5.2% in the year 2003. Dickson and Andrew (2013) investigated the risk effect of the exchange rate on
international trade in Nigeria using the Ordinary Least Squares (OLS) econometric technique to evaluate the data used from 1970 to 2010. The study confirmed that exchange rate volatility is insignificant in explaining import balances, but significant and positive with respect to exports. Ajinaja, Popoola and Ogunlade (2017) also used OLS to analyse the impact of exchange rate, gross domestic product and foreign direct investment on export performances using data spanning from 1982 to 2015. It was observed that gross domestic product, exchange rate and foreign direct investment positively impact export performances in Nigeria with the period covered. An Autoregressive Distributed Lag (ARDL) method was adopted by Bicudo and Azu (2018) to examine the effect of bilateral exchange rate fluctuation on China-Nigeria bilateral trade. The report reveals that Nigeria’s import from China reacts negatively to increases in real bilateral exchange rate, while its export to China reacts positively in both the short-run and long-run, but more effective in the short-run. However, considering a third country’s (Japan) bilateral trade effect, it was observed to reduce the prominent negative reaction of Nigeria trade with China and the Japan trade with Nigeria serves as a threat to the China’s market. Senadza and Diaba (2017) adopted Pooled Mean Group (PMG) to analyse the effect of the volatile nature of exchange rate regimes on trade in eleven Sub-Sahara African countries between 1993 and 2014. The study reveals an insignificant impact of exchange rate volatility on imports, while a negative impact in the short-run was found for exports, and a positive impact on both imports and exports in the long-run.

Notably, among the literature reviewed, none - to the best of our knowledge - has considered both symmetric and asymmetric impact of real effective exchange rate on trade in Nigeria using both Autoregressive Distributed Lag (ARDL) and Nonlinear Autoregressive Distributed Lag (NARDL) model. The studies reviewed have contradicting results because of the differences in the countries studied, method employed and data scope used. This study therefore expands the literature scope through its objective.

3. Method and Data Used

Tunc et al. (2018) model is adapted for this study. The model considered the impact of exchange rate risk on international trade by incorporating other variables such as GDP, relative consumer price index, bilateral nominal exchange rate, bilateral nominal exchange rate between country pairs, external exchange rate volatility for exporting country in the model. For the purpose of this study, we consider a unit model of real effective exchange rate impact on trade in Nigeria. The unit model is stated as:
\[ T_t = f(ER_t) \] (1)

\( T_t \) represents trading flow at time while \( ER \) represent real effective exchange rate at time. The traditional theory of testing the existence of longrun cointegration among variables by Engle (1982), Engle and Granger (1987) recognised the representation of variables dynamic relationship as an error correction model (ECM) if the variables strictly obeyed the order of integration I(1). Pesaran and Shin (1999) argument however superseded this submission by arguing that variables are cointegrated if obeyed I(0) or I(1) and can be analysed using ARDL model based on ECM. They further argued that ARDL model is more suitable for determining cointegration existence among variables with small time scope. Therefore, from the assertion if trade (T) and Exchange rate (ER) conforms with I(0) or I(1) and are cointegrated, we can consider the ECM based on ARDL (ARDL-ECM) as follows:

\[ T_t = \theta + \tau T_{t-i} + \theta ER_{t-i} + \sum_{q=1}^{m} \sigma \Delta T_{t-k} + \sum_{q=1}^{n} \delta \Delta ER_{t-k} + \varepsilon_t \] (2)

From equation 3, \( \theta \) is the slope of the model, \( n \) and \( m \) are the optimal lag, \( q \) is the number of lag identified. \( \sigma \) and \( \delta \) are the coefficients of the variables in the short-run, while \( \tau \) and \( \theta \) are the variables long-run coefficients. \( \varepsilon_t \) is the error correction model at a time lag length. Model (3) can be used to estimate the long-run and the short-run relationship between trade and exchange rate. Following the objective of this study, the changes in the nature of the value of the country currency to other major currencies of the world (given the definition of real effective exchange rate according to the World Bank) are likely to have asymmetric and nonlinear impact on trade flow in shortrun and longrun in Nigeria. Therefore, it is important to have a model that represents the asymmetric and nonlinear relationship between exchange rate and trade flow in Nigeria. Shin, Yu, & Greenwood-Nimmo (2013) developed a NARDL that permits positive and negative partial sum decompositions to investigate asymmetric relationship in shortrun and longrun. We adopt this model to detect the asymmetric pass-through effect of exchange rate on trade flow in Nigeria and we arrived at the negative \( \Delta ER_t^- \) and positive \( \Delta ER_t^+ \) exchange rate partial sums by decomposing \( ER_t \).

\[ ER_t^- = \sum_{j=1}^{t} ER_t^- = \sum_{j=1}^{t} \max(\Delta \delta_j, 0) \] (3)
\[ ER^+_t = \sum_{j=1}^{t} ER^+_j = \sum_{j=1}^{t} \max(\Delta_{O,j}, 0) \]  

Where \( ER^-_t \) and \( ER^+_t \) are partial sum processes of negative and positive changes in \( ER_t \). We introduce \( ER^-_t \) and \( ER^+_t \) into the symmetric ARDL \((m,n)\) model in (4). The model is restated as:

\[
T_t = \theta + \tau T_{t-i} + \theta^+ ER^+_{t-i} + \theta^- ER^-_{t-i} + \sum_{q=1}^{m-1} \sigma \Delta T_{t-k} + \sum_{q=1}^{n-1} \delta^+ \Delta ER^+_{t-k} + \\
+ \sum_{q=1}^{n-1} \delta^- \Delta ER^-_{t-k} + \varepsilon_t
\]  

(5)

Where \( m \) and \( n \) are the optimal lag of the dependent variable (trade) and the independent variables (positive and negative changes of exchange rate). The study goes further to test the long-run cointegration relationship between the variables using the ARDL bounds test procedure suggested by Pesaran, Shin, and Smith (2001). The joint null of the modified F-test is, \( \rho = \theta^+ = \theta^- \). Therefore according to Long and Liang (2018) the long-run non-asymmetric can be tested by \(- \frac{\rho}{\theta^+} = - \theta^-\), while the short-run asymmetric can be tested with a standard wald test of the joint null hypothesis

\[
\sum_{i=0}^{n-1} \delta^+_i = \sum_{i=0}^{n-1} \delta^-_i \quad for \ i = 1, 2, ..., n - 1
\]  

(6)

The data used for this study includes the ratio of trade to GDP proxy as ‘\( T \)’ in the model and Real effective exchange rate index \((2010 = 100)\) is proxy as ‘\( ER \)’. All the data used were sourced from the World Development Indicators (WDI) (2018). The data used spans through 1980 to 2017.

4. Data Analysis

Given the simplicity of the study model, the variables are subjected to some preliminary tests such as correlation, descriptive statistics, unit-root tests and ARDL bounds test to understand the behavioural pattern of the variables over the years studied.
Correlation and Descriptive Statistics

The correlation test is a bivariate analysis for checking the linear association between variables and their directions. As documented, ±1 values of the correlation result implies a perfect linear association among the variables but on differentiated by their signs (positive(+) of negative(-)). From the correlation result, it was revealed that there is a perfect negative significant linear association between real effective exchange rate and trade services in Nigeria. This implies that the non-asymmetric impact of real effective exchange rate on trade services can be expected to be significantly negative.

From the descriptive statistics, the result reveals that the variables averagely change by 32.67 units and 153.27 units for trade (T) and real effective exchange rate (RE) over the years and fall within their minimum and maximum values. The implication of this is that trade and exchange rate changes over the years have been within expected values. The standard deviation figures imply 12.84 units and 120.60 units for T and RE respectively. This implies that T is less volatile to shocks compared to real effective exchange rate. This is because the real effective exchange rate for Nigeria is determined by many factors among which the most important are oil price and agricultural produce that mark the major determinants of Nigeria current account balances that determine the value of its currency. The skewness test checks the asymmetric statistical distribution of the variables. The result showed that T has a long tail to the left, while RER has a long-tail to the right. This implies that the variables are not normally distributed as trade is negatively skewed, while real effective exchange rate is positively skewed. Kurtosis which measures the peakedness of the variables distribution showed that none of the variables has a univariate normal distribution. Trade was platykurtic in nature with values less than 3, while real effective exchange rate has a leptokurtic value as it value is greater than 3. From an investment interpretation of leptokurtic values, real effective exchange rate of Nigeria currency is highly risky in trading with. This confirms the extreme volatility of the variable in its standard deviation value and its abnormal distribution from the Jarque-Bera statistics result. For trade, its platykurtic value from an investment interpretation implies that trade is attractive in Nigeria given its endowment, but can be interrupted by the risky nature of the country’s real effective exchange rate. This is also confirmed by its less volatile standard deviation value and normally distributed result verified by the insignificance probability value in the Jarque-Bera Statistics. The result is presented below in Table 1.
Correlation and Descriptive Statistics Results

<table>
<thead>
<tr>
<th>Correlation Test</th>
<th>T</th>
<th>RER</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>1</td>
<td>----</td>
</tr>
<tr>
<td>ER</td>
<td>0.535</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(0.001)*</td>
<td>----</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Descriptive Statistics</th>
<th>T</th>
<th>RER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>32.67</td>
<td>153.27</td>
</tr>
<tr>
<td>Median</td>
<td>34.32</td>
<td>99.58</td>
</tr>
<tr>
<td>Maximum</td>
<td>53.28</td>
<td>531.82</td>
</tr>
<tr>
<td>Minimum</td>
<td>9.14</td>
<td>48.92</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>12.84</td>
<td>120.60</td>
</tr>
<tr>
<td>Skewness</td>
<td>-0.37</td>
<td>1.67</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>2.12</td>
<td>4.94</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>2.09</td>
<td>23.55</td>
</tr>
<tr>
<td>Probability</td>
<td>0.35</td>
<td>0.00*</td>
</tr>
<tr>
<td>Observations</td>
<td>38</td>
<td>38</td>
</tr>
</tbody>
</table>

*Note:***,**,** implies significance level at 1%, 5% and 10% respectively.

Source: Authors (2019).

Unit Root Test

The unit root test is used to investigate the long-run mean reversion of the variables (trade and real effective exchange rate). For the purpose, we used the standard Augmented Dickey Fuller (ADF) and Phillip-Perron (PP) test to have a robustness check of the stationarity level of the variables. For each case, the optimal lags were selected automatically using the Scharwz Information Criterion (SIC). The results of these tests are dynamic. For trade, ADF test shows non-stationarity at both levels and first difference, while for PP, trade (T) was stationary. For real effective exchange rate (RER), stationarity was found after first differencing for both ADF and PP at 5% significance level. The implication of this is that there is unit root problem and the variables are only mean reverting in the long-run after first differencing. Therefore, there is a need to test the existence of long-run cointegration among the variables. See Table 2 for the result.
A. E. Longe, F. Adenola, A. M. Balogun, S. Muhammad. Asymmetric and Non-Asymmetric Impact of Real Effective Exchange Rate on Trade in Nigeria

Table 2

Unit Root Result

<table>
<thead>
<tr>
<th>Variables</th>
<th>ADF</th>
<th>PP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level</td>
<td>First Difference</td>
</tr>
<tr>
<td>T</td>
<td>-3.14</td>
<td>-2.86</td>
</tr>
<tr>
<td>RER</td>
<td>-1.95</td>
<td>-4.14**</td>
</tr>
<tr>
<td>CV 1%</td>
<td>-4.23</td>
<td>-4.32</td>
</tr>
<tr>
<td>CV 5%</td>
<td>-3.54</td>
<td>-3.58</td>
</tr>
<tr>
<td>CV 10%</td>
<td>-3.20</td>
<td>-3.23</td>
</tr>
</tbody>
</table>

Note: *, **, *** implies significance level at 1%, 5% and 10% respectively.
Source: Authors (2019).

ARDL Bounds Test

The ARDL bounds test verifies the long-run cointegration among the variables. The model is symmetrically tested. From the result, a long-run cointegration existence was found at 5% level of significance. This implies that we can proceed to estimate the symmetry long-run and short-run relationship between the trade and real effective exchange rate in Nigeria. Also, we tested the asymmetric model for long-run cointegration relationship among the negative and the positive periods of real effective exchange rate and trade in Nigeria. We found a long-run cointegration at 10% significance level. This also gives a confidence to also estimate the long-run and short-run relationship between positive and negative real effective exchange rate and trade in Nigeria. The result is presented in table 3 below.

Table 3

ARDL and NARDL Bounds Test Results

<table>
<thead>
<tr>
<th>F-Statistics</th>
<th>Asymmetric Model</th>
<th>Non-Asymmetric Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Decision</td>
<td>Decision</td>
</tr>
<tr>
<td>k</td>
<td>10&amp;II @5%</td>
<td>10&amp;II @10%</td>
</tr>
<tr>
<td>8.47</td>
<td>6.56 - 7.30</td>
<td></td>
</tr>
<tr>
<td>5.20</td>
<td>4.19 - 5.06</td>
<td></td>
</tr>
</tbody>
</table>

Source: Authors (2019).
ARDL Estimate for the Symmetry Model

From the ARDL estimate result, findings show that there is a significant negative relationship between real effective exchange rate and trade services in Nigeria. That is, a percentage change in the real effective exchange rate of the naira to other major countries currencies causes approximately 13.599% and 28.873% reduction in trade services in the short and long-run respectively. The implication of this is that the naira rate to other currencies of the world has not been encouraging for both export and import trade services in Nigeria. The estimate error correction model result proves that real effective exchange rate is capable of correcting 47.1% of trade services deviation in the short-run back to equilibrium in the long-run.

Table 4

ARDL Estimate

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\Delta(LRER_{t-1})$</td>
<td>-13.599</td>
<td>-2.384</td>
<td>0.023</td>
</tr>
<tr>
<td>$ECM_{t-1}$</td>
<td>-0.471</td>
<td>-3.823</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Long Run Coefficients

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LRER</td>
<td>-28.873</td>
<td>-2.280</td>
<td>0.029</td>
</tr>
</tbody>
</table>

Source: Authors (2019).

NARDL Estimates

Negative and and positive changes in the real effective exchange rate of the naira have an insignificant negative impact on trade services in the short-run and long-run. In the short-run, periods of negative and positive changes in the real effective exchange rate of the naira causes an insignificant 1.425 unit and 0.319 unit decrease in trade services respectively. In the long-run, there is a respective fall of 3.578 units and 0.800 units in trade services caused by periods of negative and positive changes in the real effective exchange rate of the naira. The error correction model confirms that the dynamic nature of the independent variables (negative and positive changes of real effective exchange rate) are capable of correcting approximately 39.8% of trade services shift from the short-run equilibrium back to equilibrium in the long-run.
Table 5

NARDL Estimate Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>∆(RER\text{c}^-)</td>
<td>-1.425</td>
<td>-0.112</td>
<td>0.911</td>
</tr>
<tr>
<td>∆(RER\text{c}^+)</td>
<td>-0.319</td>
<td>-0.012</td>
<td>0.991</td>
</tr>
<tr>
<td>ECM\text{c}\text{t-1}</td>
<td>-0.398</td>
<td>-2.967</td>
<td>0.006</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Long Run Coefficients</th>
<th>Coefficient</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>RER\text{c}^-</td>
<td>-3.578</td>
<td>-0.111</td>
<td>0.912</td>
</tr>
<tr>
<td>RER\text{c}^+</td>
<td>-0.800</td>
<td>-0.012</td>
<td>0.991</td>
</tr>
</tbody>
</table>

Source: Authors (2019)

Our findings are in conformity with most of the existing studies such as: Aliyu (2010), Dickson and Andrew (2013), Eke et al., (2015), Ajijana et al., (2017) and Bicudo and Azu (2018), on Nigeria. These studies noted a negative impact of exchange rate volatility on trade activities in Nigeria. This conformity is as a result of the common trend in the country’s reserve caused by the unstable nature of its major export base product (oil) price. The study deviates from some of the developed countries studies (for example, Tunc et al., 2018) findings. In the study, a positive impact of the exchange rate on trade was noted in the developed (countries). These variances are as a result of the level of development in the countries and stability in their currency appreciation value against the Nigerian currency.

5. Conclusion and Recommendation

The study measures the asymmetric and symmetric impact of the real effective exchange rate on trade services in Nigeria. The Autoregressive Distributed Lag (ARDL) and Non-linear Autoregressive Distributed Lag (NARDL) econometric techniques were employed to analyse the secondary data used spanning through 1980 and 2017. Some preliminary tests were carried out to check the behavioural pattern of the variables in the study and their trend were found to be dynamic through the period under study. The ARDL and NARDL bounds test used in testing the cointegration existence among the variables confirm that there is the existence of long-run cointegration among the variables both for the asymmetric and non-asymmetric model. This study proceeds to estimate the asymmetric and the non-asymmetric magnitude impact of real effective exchange rate on trade services. The results for the
symmetry estimate using ARDL reveals that in the short-run and long-run, the real effective exchange rate of the naira has significant negative impact on trade services. The asymmetric estimate using the NARDL technique reveals that in the short-run and long-run, periods of negative and positive changes in the real effective exchange rate have a negative insignificant impact on trade services in Nigeria. The error correction model for the two models reveals that deviations of trade from the equilibrium in the short-run can be significantly corrected back to equilibrium in the long-run between a range of 39.8% and 47.1% by the real effective exchange rate of the naira considering its periodic changes also.

From the findings the study concludes that the real effective exchange rate is a significant determinant of trade in Nigeria and not the periodic changes. This is evidenced by the panic experienced by traders when the exchange rates of naira to other major currencies of the world changes unfavourably or it is expected to change due to some circumstances that have significant influence on it. It is recommended from the findings that for trade to be encouraged irrespective of the changes in the real effective exchange rates of the naira to other major currencies, there is a need for the government of Nigeria to ameliorate internal policies (such as infrastructural development, trade incentives: tax holidays or exemptions, development finance and export base diversification objective of the Central Bank of Nigeria, among others) that will promote both import and export trade towards bringing appreciation to the exchange rate of the naira to other currencies.

This study can be researched further on in the context of Nigeria by considering the price of oil which is the major external trade means in Nigeria and consumer price index in line with exchange rate impact on trade in Nigeria using a more technical econometric technique.

References


OIL PRICE SHOCKS AND ENERGY CONSUMPTION IN NIGERIA

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JEL Q43, Q48

Abstract

The study investigates the impact of oil price shocks on energy consumption in Nigeria using, Bai-Perron Structural Breaks Test, NARDL approach and VAR model to analyse the data spanning from 1978 through 2016. From the results, in the long and short-run, positive and negative changes in bonny light crude oil price positively impact on energy consumption in Nigeria. The study concludes from these findings that irrespective of changes in the price of oil, oil related energy sources are still considered and this is because of the challenges faced in the development of the country’s energy sector in general. Based on the findings, the study recommends that strategic investment attention should be paid to alternative sources of energy such as the renewables in order to reduce large dependency on oil related energy such as fossil fuels.

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1. Introduction

In the literature, the impact of oil price shocks on macroeconomic variables of oil importing and exporting countries has gained an interesting attention among researchers over the years and diverse findings have emerged as a result of different methods and scope of each study. An uncommon discussion in the literature front is the
relationship between oil price shocks and energy consumption. Seeing that the price of oil varies and is vulnerable to both internal and external shocks: shocks in oil prices predict the level of energy consumption and wealth of countries (most especially oil dependent developing countries such as Nigeria) (Odusami, 2010). Nigeria being an oil exporting country is favoured on its revenue by positive changes in oil price and vice versa. On the other hand, been an importer of refined oil products (premium motor spirit, automotive gas oil, and dual purpose kerosene, among others) the economy is negatively affected when there is an increase in the price of oil, through importers’ willingness to sell at higher prices to cover the additional cost incurred in the production process (Agri et al., 2016). In most developing countries, for example Nigeria, to reduce the cost burden of refined oil products to the end users, subsidy policy was introduced. The subsidy policy however balanced the link between the movement in oil price and oil related energy consumption in the Nigerian economy. The movement in the price of Bonny Light crude oil and oil related energy consumption is illustrated in figure 1.

![Energy Consumption Per Capital (Oil Equivalent) vs Bonny Light Crude Oil Price](image_url)

**Fig. 1. Relationship between Energy Consumption and Bonny Light Crude Oil Price**

*Data Source: WDI and EIA (2017).*

From figure 1, it can be verified that the movement in oil price and energy consumption exhibits the same slope throughout the period, 1978 to 2016. This implies that the variables complements each other.

As mentioned earlier, studies have focused on various impacts of oil price/energy consumption on different economies. Among these studies are Orhewere and Henry (2011), Saibu (2011), Nwosa and Akinbobola (2012), Onakoya et al.,
P. I. Ajayi, A. E. Longe, O. A. Omitogun, S. Muhammad
Oil Price Shocks and Energy Consumption in Nigeria

(2013), Osigwe and Arawomo (2015), & Shahbaz, Sarwar, Wei and Malik (2017) who established that there is a positive correlation between energy consumption and economic growth, while Chai, Zhou, Liang, Xing, and Lai, (2016) argued negative impact of energy consumption on economic growth. On the effect of oil price, the results of Nkomo (2011), Shahbaz et al., (2017), Nwanna and Eyedeyi (2016) & Omitogun, Longe, and Muhammad (2018) support the view that, unstable oil prices distort the growth of oil importing countries especially when it is positive, aids fiscal instability and vulnerability of budget implementation, and it positively contributes to the growth of the oil exporting countries such as Nigeria as revenue rises (Nwanna and Eyedeyi, 2016). Uniquely, Ven and Fouquet, (2016) claimed that oil price shocks are only related to energy markets rather than economic development. On oil price relation with other macro-economic indicators such as current account balances, Foreign Direct Investment and Exchange rate, a significant relationship has also been established (see Longe, Adelokun and Omitogun, 2018; Omitogun, Longe and Ajulo, 2018; and Longe, Muhammad, Ajayi and Omitogun, 2019).

Few studies: Glausre & Lee (2002), Wang (2013), Ebrahim, Inderwildi, & King (2014), and Jobling & Jamasb (2015) on the relationship between oil price and energy consumption argued that oil price shocks is mostly detrimental to oil product importing developing countries as it hampers their personal consumption expenditure and retard their demand for oil products as prices of the product skyrocket. It was also submitted that the effect of oil price shocks on energy consumption in developing countries is a long-run phenomenon, as it takes time for consumers to adjust or react to the occurrence (Saibu, 2011).

In a developing country such as Nigeria, that largely depend on oil as its mainstay, and currently experiencing continuous increase in its population, which calls for more energy demand to sustain their living standard, fluctuations in oil price affect its economic plans. Also, the power sector of the economy which is supposed to provide for the increasing population and increased activities in the economy is faced with severe deficiencies in terms of transmission and distribution of adequate supply. These deficiencies leave energy consumers to other alternatives among which is the oil related means which is common in Nigeria. The oil related means negates the sustainable environment objective. Therefore, a question asked is does the unstable price nature of oil influence the consumption of oil related energy? This study therefore sets out to investigate the impact oil price shocks (positive and negative changes in oil price) on energy consumption in Nigeria.

The rest of the study has four sections. Section two captures the literature review, section three presents the data source and model specification, the analytical
framework is presented in section four, while section five contains summary and conclusion.

2. Literature Review

The theoretical background of most of the empirical studies on the consequences of oil price on energy consumption is guided by notable theories that explore the importance of price and income on individuals’ consumption. Among these theories are; general equilibrium theory (Leon Walras, 1874), relative income theory of consumption (Duesenberry, 1948), life cycle theory of consumption (Modigliani and Ando, 1957), and permanent income theory of consumption (Milton Friedman, 1957). The general equilibrium theory explains the relationship between supply, demand and prices in an economy. The theory is of the opinion that the economy is at general equilibrium if the consumers, firms, industries and all factor services are in equilibrium as they are determined by commodities and factor prices. The relative income hypothesis explains that, consumption of a product is determined by the consumers’ income and not the standard of living. The life cycle theory argued that the consumption and savings of an individual, firm or industry are planned over their life cycle. This they suggest that it helps reduce the risk of losses or spending out of plan. The permanent income theory states that changes in permanent income is what drives consumption rather than the temporary income. They are of the suggestion that consumption is mostly planned on long-term average income changes rather than the present income. They also proposed that changes in consumption are not predictable as they depend on individual expectations. In relation of these theories to the current study, oil prices largely determine consumption decision of oil related energy. Considering the status of the Nigerian power sector, as discussed earlier faced with several challenges, among which are inadequacy in meeting the current energy demand, the profitability ratio of investing in the economy is a major concern to investors. While savings and standard of living is to individual users of oil related energy as they consider their level of income in determining the quantity consumed of the oil related energy products.

Wang (2013) used logistic smooth transition model and noted that in the G7 countries, oil price has a gradual smooth transition effect on personal consumption expenditure, in which 1% increase in oil price results to 0.7410% increase in personal consumption expenditure and 0.0517% increase in adjusted personal consumption expenditure. In Canada and USA, Valadkhani (2014) from his findings using markov-regime switching model and Bai-Perron sequential method established that there is a significant upward shift in the marginal effect of oil prices on consumer energy prices.
since 1999. The implication of this is that a percentage rise in crude-oil prices increases the price of consumed energy. Edelstein and Kilian (2009) employed bivariate vector autoregressive models in the USA and affirmed that an increase in energy price causes changes in expenditure patterns which weakly affects employment and general output. It was further admitted that the rise in energy price causes consumers to lose their purchasing power which leads to a significant adverse effect on a wide array of consumer expectations as well as deteriorating consumer confidence in energy consumed. Odusami (2010) used linear and threshold multivariate autoregressive models the United States. The study confirmed that fluctuations in the prices of oil predict the level of consumption (energy inclusive) and wealth in the future.

Similarly, He et al., (2016) used ridge regression analysis and state-space model in China and concluded from their finding that there is a negative link between energy prices and energy consumption. In the same country, Chai et al., (2016) adopted VAR model with a conclusion that international oil price has a negative significant on energy consumption. Their findings further revealed that the elasticity of international oil price in relation to energy consumption per capita and carbon dioxide emission is 4.31% and 6.51% respectively. In Sweden, Al-tai (2015) noted using vector autoregressive (VAR) model that oil prices do not have a significant effect on household energy consumption.

Glausre and Lee (2002) in Korea used VECM and bivariate causal analysis and established that fluctuations in oil price causes unstable relationship between real GDP and energy consumption and a bidirectional causal relationship between energy consumption and real income. In China, Zhang et al., (2014) argued that an increase in oil price does not really influence household consumption, significantly influence it in the short-run. Deniz (2017) used panel data analysis for oil importing and exporting countries and found out that, volatility in oil price effect on renewable energy consumption in the countries differ, therefore the approach to analyse it for the countries should differ. For 8 OECD countries, Kuper and van Soest (2006) confirmed that the effect of oil price on energy use is asymmetric in nature.

In Nigeria, Saibu (2011) used VECM Granger causality model to detect a unidirectional causal relationship between economic growth and energy consumption, bidirectional causality running from energy consumption to private investment, while there is no causal link running from oil price to energy consumption and private investment in the short-run. This however implies that oil price only has a long-run effect on energy consumption and real GDP in Nigeria. Using same method, Orhewere and Henry (2011) asserted that a unidirectional relationship between gas
consumption and GDP in the short-run and bidirectional causal relationship in the long-run. Osigwe and Arawomo (2015) argued that there is a bidirectional causal link between economic growth and energy consumption, electricity consumption and economic growth, electricity consumption and electricity price and no identifiable causal link between economic growth and energy product prices. Nwosa and Akinbobola (2012) used VAR model and submitted that a bidirectional causal link exists between energy consumption and sectoral output in Nigeria. Therefore, there is need for sectorial energy policies in the economy. Onakoya et al. (2013) using Ordinary Least Squares (OLS) method argued that the energy consumption link with economic growth in Nigeria is positively significant and government should diversify its energy portfolio. Adopting a structural analysis econometric technique, Babatunde (2015) noted different responses of exchange rate to oil price shocks in Nigeria which later influences the purchasing power of refined oil products in the economy. It was observed from the findings that the economy needs a rehabilitation of its refineries to curb this effect.

From the empirical front, it is obvious that lack of consensus on the relationship between oil price, energy consumption and macroeconomic variables is due to the scope, methodology and objective of the existing studies. In the context of Nigeria, the causal link between oil price shocks and energy consumption has been discussed, but a lacking discussion in the literature front is the asymmetric link between oil price shocks and energy consumption in Nigeria. Also, the response of energy consumption to shocks over periods is yet to be discussed. This study however, adopts the Non-linear Auto-regressive Distributed Lag (NARDL) and Variance Impulse Response Factor to examine this phenomenon in the context of Nigeria.

3. Methodology and Data

This study followed the model of Glasure and Lee (2002), &Ven and Fouquet (2016). The model is specified in its linear-linear form as:

\[ E = f(BL, CPI, EXR) \]  \hspace{1cm} (1)

\( E \) is energy consumption, \( BL \) is Bonny Light crude oil price, \( CPI \) is consumer price index, and \( EXR \) is official exchange rate of naira to dollar.

The model is re-specified in an econometric log-log form as;

\[ \ln E_t = \alpha_0 + \beta_1 \ln BL_t + \beta_2 \ln CPI_t + \beta_3 \ln EXR_t + \mu_t \]  \hspace{1cm} (2)

\( \ln E, \ln BL, \ln CPI \) and \( \ln EXR \) implies log form of energy consumption, log form of bonny light crude oil price, log form of consumer price index and log form of
The official exchange rate of naira to dollar, $\alpha_0$ is the intercept of the model, $\beta_1 - \beta_3$ are the coefficients of the estimated parameters, $t$ is time and $\mu$ is the error term.

The study adopts ARDL bounds test to test for long-run co-integration among the variables in-line with Pesaran and Shin (1999) because of its merits over other methods. The merits include; its applicability for variables stationary at I(0), I(1) or combination of both [I(0) and I(1)]. Secondly, the error correction model can be estimated through a simple linear transformation that integrates both the short-run adjustment and the long-run estimate without omitting any long-run information. Also, Pahlavani et al., (2005) and Adom et al., (2012) added that the method provides unbiased long-run estimates even when some variables are endogenised.

To validate long-run co-integration among the variables, the null hypothesis is stated as $H_0: \beta_1 = \beta_2 = \beta_3 = 0$ against the alternative hypothesis of long-run co-integration existence $H_1: \beta_1 \neq \beta_2 \neq \beta_3 \neq 0$. We used the F-statistics as a guide for our decision. If the F-statistics is greater than the Upper bound, we accept the alternative hypothesis that a long-run co-integration exists, if otherwise, we do not have any reason to reject the null hypothesis of no long-run co-integration. If the F-Statistics lies in between, then our result is inconclusive.

In order to achieve the objective of this study, equation (2) is transformed into a non-linear form and the Non-Linear Auto-regressive Distributed Lag (NARDL) long-run and short-run model were formulated where BL was decomposed into positive and negative period changes

$$\Delta \ln E_t = \delta_0 + \sum_{q=1}^{n} \rho_1 \Delta \ln E_{t-k} + \sum_{q=1}^{n} \rho_2 \Delta \ln BL_t^+ + \rho_3 \Delta \ln BL_t^- + \sum_{q=1}^{n} \rho_4 \Delta \ln CPI_{t-k}$$

$$+ \sum_{q=1}^{n} \rho_5 \Delta \ln EXR_{t-k} + \beta_1 \ln E_{t-1} + \beta_1 \ln BL_t^+ + \beta_2 \ln BL_t^- + \beta_3 \ln CPI_t$$

$$+ \beta_4 \ln EXR_t + \delta ecm_{t-1}$$

(3)

The study recognizes some breaks caused by some shocks through policy implementation and reformulated the NARDL with structural breaks identified.
\[ \Delta \ln E_t = \theta_0 + \sum_{q=1}^{n} \rho_1 \Delta \ln E_{t-k} + \sum_{q=1}^{n} \rho_2 \Delta \ln BL_t^+ + \sum_{q=1}^{n} \rho_3 \Delta \ln BL_t^- + \sum_{q=1}^{n} \rho_4 \Delta \ln CPI_{t-k} \]

\[ + \sum_{q=1}^{n} \rho_5 \Delta \ln EXR_{t-k} + \beta_1 \ln E_{t-1} + \beta_2 \ln BL_t^+ + \beta_3 \ln BL_t^- + \beta_4 \ln CPI_t \]

\[ + \beta_5 \ln EXR_t + \delta \text{ecm}_{t-1} \]

\[ + \sum_{r=1}^{s} B_r \text{Dummy}_{rt} + \epsilon_t \]  \hspace{1cm} (4)

From equation (3 and 4), \( \Delta \) denotes changes in the variables in the short-run, \( n \) is the optimal lag length, \( \epsilon_t \)- error term at time. The parameters \( \rho \) (\( i = 1, 2, 3, 4, 5 \)) are the corresponding long-run multiplier, and the parameters \( \beta = (1, 2, 3, 4, 5) \) are the short-run dynamic of the NARDL model. \( \delta \text{ecm} \) is the parameter estimate of the error correction model. \( \text{Dummy}_{rt} \) is a dummy variable for the break defined as \( \text{Dummy}_{rt} = 1 \) for \( t > T_B \), otherwise \( \text{Dummy}_{rt} = 0 \). \( t \) represents the time period; \( T_B \) is the structural break date where \( r = 1, 2, 3, \ldots, k \) and \( B_r \) is the coefficient of the break dummy.

The study used annual time series data on energy consumption per capita (oil equivalent per capita), official exchange rate (LCU per USS, period average) and Consumer Price Index from World Development Indicators (WDI) (2017) and Oil Prices (WTI and Brent) from BP Statistics (2017) and Bonny Light crude oil price from Energy Information Administration (EIA) (2017). The data spans from 1978 to 2016.

4. Results and Outcomes

It is important taking the pre-estimation analysis of the variables into consideration before estimating the parameters in the study. The pre-estimation tests for this study include the descriptive statistics, correlation test that shows the linear association among the variables under study, and the ARDL bounds test: used to estimate the long-run co-integrating existence among the variables.

Descriptive Statistics

The descriptive statistics shows the behavioural pattern of the variables over the years under study. From the result as presented in table 1, the variables behave within their maximum and minimum values, which implies that the reaction of the variables to policy review within the period under study is not outrageous, nor deviate too much from the expected outcome or equilibrium. The standard deviation result shows that the least volatile variable is energy consumption (InE), while the most volatile
variable to shocks is gross domestic product (InGDP). The Jaque-Bera Statistics also show that the variables are normally distributed. This is confirmed with probability value greater than 10% significance level (See Table 1).

Table 1

Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>InE</th>
<th>InBL</th>
<th>InCPI</th>
<th>InEXR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>2.852</td>
<td>1.536</td>
<td>1.037</td>
<td>1.301</td>
</tr>
<tr>
<td>Maximum</td>
<td>2.902</td>
<td>2.071</td>
<td>2.265</td>
<td>2.404</td>
</tr>
<tr>
<td>Minimum</td>
<td>2.810</td>
<td>1.134</td>
<td>-0.478</td>
<td>-0.262</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.023</td>
<td>0.288</td>
<td>0.926</td>
<td>0.928</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>1.621</td>
<td>3.266</td>
<td>3.997</td>
<td>4.297</td>
</tr>
<tr>
<td>Probability</td>
<td>0.445</td>
<td>0.195</td>
<td>0.136</td>
<td>0.117</td>
</tr>
<tr>
<td>Observations</td>
<td>39</td>
<td>39</td>
<td>39</td>
<td>39</td>
</tr>
</tbody>
</table>

Source: Authors Computation (2019).

Correlation Matrix

The correlation test shows the level of linear association between the dependent and the independent variables. Table 2 presents the results. The result confirms that the independent variables (Bonny Light Crude Oil Price, Consumer Price index and Official exchange rate of naira to dollar) have a strong positive and significant linear association with the dependent variable (energy consumption).

Table 2

Correlation Test

<table>
<thead>
<tr>
<th></th>
<th>InE</th>
<th>InBL</th>
<th>InCPI</th>
<th>InEXR</th>
</tr>
</thead>
<tbody>
<tr>
<td>InE</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>InBL</td>
<td>0.804</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>InCPI</td>
<td>0.837</td>
<td>0.594</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>InEXR</td>
<td>0.822</td>
<td>0.511</td>
<td>0.975</td>
<td>1</td>
</tr>
</tbody>
</table>

*, **, *** implies significance level at 1%, 5% and 10% respectively
While the parenthesis ( ) denotes the Prob. values
Source: Authors Computation (2019).
Unit root test

The study adopts the Augmented Dickey Fuller (ADF) test and Phillip-Perron (PP) test. The unit root tests show if the variables have a unit root problem and if they are mean reverting in the long run. From the results in table 3, the ADF confirmed stationarity of the variables after first differencing, while for PP, only CPI was not stationary at level and first difference. The implication of these results is that the variables are not mean reverting in the long-run, can be concluded that there is unit root problem and there is need to test if there is existence of long-run co-integration among the variables in the study.

<table>
<thead>
<tr>
<th>Variables</th>
<th>ADF</th>
<th>PP</th>
<th>Order of Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level</td>
<td>First Difference</td>
<td>Level</td>
</tr>
<tr>
<td>( \ln E )</td>
<td>-3.137</td>
<td>-4.962*</td>
<td>-2.564</td>
</tr>
<tr>
<td>( \ln BL )</td>
<td>-1.609</td>
<td>-5.427*</td>
<td>-1.790</td>
</tr>
<tr>
<td>( \ln CPI )</td>
<td>-0.862</td>
<td>-3.756**</td>
<td>-0.804</td>
</tr>
<tr>
<td>( \ln EXR )</td>
<td>-1.014</td>
<td>-5.281*</td>
<td>-1.139</td>
</tr>
<tr>
<td>CV 1%</td>
<td>-4.219</td>
<td>-4.227</td>
<td></td>
</tr>
<tr>
<td>5%</td>
<td>-3.533</td>
<td>-3.537</td>
<td></td>
</tr>
<tr>
<td>10%</td>
<td>-3.198</td>
<td>-3.200</td>
<td></td>
</tr>
</tbody>
</table>

*, **, *** implies significance level at 1%, 5% and 10% respectively.

Source: Authors Computation (2019).

ARDL Bounds Test

The ARDL bounds test is primarily to test long-run co-integration relationship among variables. The study tests for using the logarithm form of Bonny Light price without decomposing it to check the periodic effect and the structural breaks is also not accounted in this test. From the result as presented in table 4, there is a long-run co-integration among the variables. This implies that the variables can be estimated.

<table>
<thead>
<tr>
<th>Model for Estimation</th>
<th>F-Statistics</th>
<th>Lower-Upper bound at 5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>( F_E(\ln E_t/\ln BL_t/\ln CPI_t/\ln EXR_t) )</td>
<td>4.62</td>
<td>3.47-4.45</td>
</tr>
</tbody>
</table>

Source: Authors Computation (2019).
Structural breaks test

The structural break test shows 2010 as the break period after decomposing the bonny light oil price into positive and negative changes. This can be traced to the period where the oil price was just gaining its form from the shocks experienced in 2009 (see figure 2 for detailed movement in the oil prices). Table 5 presents the structural break result.

![Trend analysis of Bonny Light, Brent and WTI Crude oil prices](image)

**Fig. 2. Trend analysis of Bonny Light, Brent and WTI Crude oil prices**

<table>
<thead>
<tr>
<th>Country</th>
<th>Break Period</th>
<th>Break Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nigeria</td>
<td>2010</td>
<td>2010-2016</td>
</tr>
</tbody>
</table>

*Table 5*  
Compiled by Authors (2019).

ARDL with Breaks Estimation

The result is interpreted and discussed based on the lag selected automatically by Schwarz Information Criterion (SIC) [4, 0, 4, 4, 4] (See figure 1).
The estimation is done accounting for the break. The break period (2010, identified through the Bai-Perron test) included in the estimation as a dummy variable, shows a positive significant impact in the short-run and long-run. The results show that, in the short-run, positive changes in oil price positively, but insignificantly influence energy consumption in Nigeria. This implies that as the bonny light price changes positively, energy consumption increase by 0.008% insignificantly. Negative changes in bonny light oil price also influence energy consumption significantly in a positive direction. The implication of this is that, negative periods of changes in bonny light price have a significant increasing impact of 0.045%. Consumer price index negatively affects energy consumption at 10% significance level. This implies that, average price of goods and services in Nigeria discourage the consumption of oil related energy in Nigeria by 0.032%. The official exchange rate of naira to dollar in Nigeria also shows a negative link with oil related energy consumption in Nigeria and significant at 5%. This implies that, the rate at which the naira is falling against dollars ($) is not in favour of oil related energy consumption in Nigeria, as it discourages consumption of energy significantly by 0.038%. The error correction result is rightly signed and significant. The implication of the result is that, deviations of energy consumption in Nigeria from the equilibrium in the short-run could be corrected by approximately 85% in the long-run. This also implies that the independent variables (bonny light oil price, consumer price index and exchange rate) are strong determinants of energy consumption in the long-run.

In the long-run, positive and negative changes in the bonny light price positively and insignificantly have an impact on energy consumption in Nigeria. Positive and
negative changes in the bonny light price increase energy consumption by 0.009% and 0.106% respectively. This implies that irrespective of the changes in the price of bonny light in the long-run, oil related energy is still consumed. This is because; energy sources related to oil are the main alternative source of generating power for both households and industries in the Nigerian environment. This therefore leaves the consumers with no choice of considering the energy source. The average price of goods and services in the long-run has a negative significant impact on energy consumption. This means that average price of goods and services in the long-run in Nigeria, reduces the purchasing power of consumers to consider oil related energy as an alternative for consumption by 0.043%. Official exchange rate of naira to dollar in the long-run shows a positive significant impact on energy consumption. This implies that as the value of naira to dollar depreciates further, consumers are still encouraged towards consuming more of oil related energy by 0.069%. This also can be tagged to the no choice effect of alternative energy sources than oil related sources, as other alternatives are expensive to access.

Notably, the NARDL with breaks bounds test result shows a stronger existence of long-run co-integrating relationship among the variables. Therefore, accounting for structural break is very significant in studying oil price and energy consumption nexus in Nigeria. In addition, the diagnostic tests (Ramsey RESET test and Heteroscedasticity test) reveal that the model is well specified and free of heteroscedasticity problem. That is, the variability of the dependent variable used in the study is unequal relating not to the independent variables that predict it.

Table 6

<table>
<thead>
<tr>
<th>NARDL with breaks Estimation Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>ΔBL_{t-1}</td>
</tr>
<tr>
<td>ΔBL_{t-1}</td>
</tr>
<tr>
<td>ΔBL_{t-2}</td>
</tr>
<tr>
<td>ΔBL_{t-3}</td>
</tr>
<tr>
<td>ΔBL_{t-4}</td>
</tr>
<tr>
<td>ΔlnCPI_{t-1}</td>
</tr>
<tr>
<td>ΔlnCPI_{t-2}</td>
</tr>
<tr>
<td>ΔlnCPI_{t-3}</td>
</tr>
<tr>
<td>ΔlnCPI_{t-4}</td>
</tr>
<tr>
<td>ΔlnEXR_{t-1}</td>
</tr>
<tr>
<td>ΔlnEXR_{t-2}</td>
</tr>
<tr>
<td>ΔlnEXR_{t-3}</td>
</tr>
<tr>
<td>ΔlnEXR_{t-4}</td>
</tr>
<tr>
<td>ΔB1_{t-1}</td>
</tr>
<tr>
<td>ECM_{t-1}</td>
</tr>
</tbody>
</table>
Long Run Coefficients

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>$BL_t^+$</td>
<td>0.009</td>
<td>0.691</td>
</tr>
<tr>
<td>$BL_t^-$</td>
<td>0.106</td>
<td>0.166</td>
</tr>
<tr>
<td>$InCPI_t^-$</td>
<td>-0.043</td>
<td>0.001</td>
</tr>
<tr>
<td>$InEXR_t$</td>
<td>0.069</td>
<td>0.019</td>
</tr>
<tr>
<td>$B_1$</td>
<td>0.038</td>
<td>0.018</td>
</tr>
</tbody>
</table>

ARDL with breaks Bounds Test 23.182
Ramsey RESET Test 1.608 0.234
Heteroscedasticity Test 1.387 0.248

Source: Authors Computation (2019).

VAR Model

We also proceed to use the VAR model to examine the response of the dependent variable (energy consumption) to shocks in the core independent variables (positive and negative bonny light crude oil price shocks). Common in studies, the Impulse Response Functions (IRF) is used, but it has been criticized based on its sensitivity to variables ordering (Babatunde, 2015). However, we adopted Generalised Impulse Response Functions (GIRF) for this purpose. We were able to adopt the VAR model because of the variables stationarity at first differencing. The VAR model in this study is specified as:

$$y_t = A_1y_{t-1} + A_2y_{t-2} + \ldots + A_py_{t-p} + \mu_t \quad t = 1, 2, \ldots, T$$

$A_1, A_2, A_p$ and $y_{t-1}, y_{t-2}, y_{t-3}$ are the parameter matrices. $\rho$ is the optimal lag length determined by SIC. $\mu_t$ is the common vector errors. $t$ is the time range.

Figure 3 and 4 implies that, (note: BL1 and BL2 on the graph implies positive and negative changes in oil price respectively) as the positive changes in price increase, energy consumption increases throughout the first 4 periods, it declines throughout the 5th and 6th period and maintains a constant flow through the 7th period to the 10th period. Negative changes in bonny light crude oil price in the first 3 years and 6 months initiated energy consumption to decline, before it adjust back to the steady state point 6 months after the 3rd year. After this adjustment, energy consumption fall below the steady state through throughout the 4th period to 6th period. However, it adjusted back to the steady state equilibrium 6 months after the 6th period and increase instantaneously through 7th period to the 10th period.
Response to Generalized One S.D. Innovations ± 2 S.E.

**Fig. 3 and 4. Impulse Response of Positive and Negative Brent Oil Price**

**Discussion of Findings**

Comparing the study findings to some existing studies, the correlation result conforms with the study of Agri et al (2016) that there is a strong positive corelation between oil price and energy consumption considering Nigeria as a developing country. Against the study of Chai et al., (2016), oil price fluctuations positively impact on energy consumption in Nigeria. This is because, the nature of the economy (China) studied by Chai et al. (2016) is largely different from that of Nigeria. China is a pure oil importing country which is only exposed to external shocks in oil price and the economy is very close to the 5th stage of the Rostow’s growth theory which is stage of mass consumption given the global level of its product acceptability. Therefore expecting a similar findings between Nigeria and such country is inappropriate as Nigeria is found on the both side of the sector (export and import side). This however confirms the findings of Deniz (2017) that impact of oil price shocks differ for oil importing and exporting countries.

The study also confirms a significant link between oil price and energy consumption inline with Al-tai (2015) and more in the short-run (Zhang et al., 2014). Supporting Odusami (2010) and Saibu (2011), the study established that there is a short-run and long-run link between oil price and energy consumption in Nigeria.

However, it can be deduced from the findings that sustainable environment aim in a developing country such as Nigeria remains doubting given the attitude to consumption of a conventional energy (oil related energy) irrespective of the swing of the price of oil. Oil related energy is considered as the easiest to access and still a cheaper means compared to the renewable energy source. Therefore, the findings of
this study give a better understanding of energy interest in terms of consumption amongst consumers.

5. Summary and Conclusion

Albeit, studies have examined the relationship between oil price and energy consumption in Nigeria, but majority has only focused on the causal link between the variables. This study however, different from other studies considers two major issues: the periodic effect of positive and negative oil price shocks on energy consumption in Nigeria accounting for structural breaks and the asymmetric effect of the changes on energy consumption from 1978 to 2016. To analyse the data, Bai-Perron Least Squares Breakpoints test was used to account for the structural break, Non-Linear Auto-regressive Distributed lag was used to analyse the periodic effect of positive and negative oil price shocks on energy consumption and VAR model was used to account for energy consumption response to positive and negative oil price shocks.

The results indicate that, there was a significant break in 2010. Positive and negative oil price shocks positively influence energy consumption in Nigeria in the short-run and long-run, but negative oil price shocks are more significant in the short-run. Consumer price index has a negative significant impact on energy consumption both in the short-run and long-run. Exchange rate negatively influences energy consumption in the short-run, but positively in the long-run. The Impulse Response results showed that positive oil price shocks never caused energy consumption to steady state throughout the periods in the study, while negative oil price shocks show two periods of adjustment to steady state within the periods. It was also noted that, the effects of bonny light and Brent oil prices are similar. This can also be confirmed through the strong correlation in the movement of the prices depicted in fig. 2.

From the findings, the study concludes that oil price shocks differ considering differential effects and the country under study. Given Nigeria as a net exporter of crude oil, the country is also an importer of refined oil products, which exposes its investors needing more dollars to meet the costlier products. The demand for these dollars however reduces the exchange rate power of naira to dollar, which in turn influences the consumer price index. In the process of trying to cover the cost incurred in the refined products buying process, the importers inflate the price of the refined products and leave the consumers with no choice, as the product is the most available and accessible among other alternative energy sources for meeting energy needs. With this, development of the abandoned refineries is needed to reduce the cost incurred through importing refined products. Rehabilitating the refineries would also help the country feel the positive changes in oil price shocks the more in its
growth and development, as more money will be available to develop other strategic sectors (such as renewable energy sectors, agriculture, infrastructural) of the economy rather than spending heavily on subsidy.

References


34. Walras read the first volume of the *Capital*, but probably not the second or third volume, for which there was no French translation at the time (Walras, L., 1990, 448). The editor of *Revue Socialiste* was one of Walras’ best friends, George Renard (1848-1930).


TRADE TREND AND SUSTAINABLE DEVELOPMENT IN NIGERIA

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JEL F10, F31

Abstract

Trade is an activity considered as a medium to growth and development, as well as providing income to both individuals and investors. Given the major objective of investors to make profit and individuals to earn a living, has trade pattern in Nigeria been tailored towards achieving the recent cry for sustainable development? In this regard, this study investigates symmetric and asymmetric impact of trade on sustainable development in Nigeria. The study used data spanning from 1981-2017 and employed ARDL and NARDL econometric techniques for its analysis. From the result, it was confirmed that the symmetric impact of trade trend on sustainable development is negative and insignificant, while the asymmetric impact of both positive and negative changes in trade due to trade policy reviews on sustainable development are positively insignificant. The study concludes from the findings that trade trend in Nigeria does not flow in the direction of sustainable development achievement. Therefore, for sustainable development to be achieved as planned, there is need for the policymakers to consider free trade policies that will accommodate the objectives of sustainable development goals in Nigeria.

Key words: Trade, sustainable development, econometric.

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1. Introduction

Trade in every economy is considered as one of the most prioritized macro-economic variables to policymakers as it contributes significantly to growth and development. Sustainable economic growth and development literally implies specific gro-
wth rate of economic output and welfare that must be maintained in order to avoid jeopardizing future growth and welfare (Kruja, 2013; Economics Online, 2019). However, the bitter fact is that the entire globe is faced with the dilemma of achieving all the three areas of sustainable development which includes: environmental, social and economic. According to the World Economic and Social Survey (2013) the global economy is faced with constant rising income inequality, as records show that about 1 billion people are living in extreme poverty, high volatile production and consumption patterns which further results to enormous economic and social costs that could endanger individual lives.

To curtail the prevalent sustainable development dilemma, notable economists have theoretically and empirically studied the role of trade openness and recommended the abduction of trade openness policies. From the theoretical point of view, David Ricardo among others postulated from his comparative advantage theory that international trade promotes economic welfare and aids efficiencies when countries specialize in the production of goods and services at which they have lower opportunity costs than others. On the empirical front, trade openness is believed to improve the living standard of people in flexible economies, promote efficient distribution of resources and hasten the growth of economies with technological diffusion and knowledge spillover (Freud and Bolaky, 2008; Fetahi-Vehapi et al. 2015).

In Nigeria, the effect of trade openness on sustainable development has become controversial discussion among researchers recently, having much on economic growth. Notable studies such as: Kalu and Agodi (2015), Godslove and Adaku (2018), Ehinomen and Da’silva (2014) discovered a positive effect of trade openness on economic growth in Nigeria, Danlami et al., (2018) argued that trade openness impact is negative and insignificant on economic growth in Nigeria. On economic growth perspective, one could conclude that trade impact is mix given different results from studies.

The positive effect of trade openness on sustainable economic growth and development is explained by Essays, UK., (2018) that trade openness aids foreign direct investment, technology transfer, human capital formation, and reduce poverty and child labour in developed countries, likewise for developing countries. If, on the other hand, negative effect of trade openness on economic growth and development implies that an increase in trade openness could increase inflation and reduce exchange rate; it could also expose a country that exports primary products (for example in Nigeria, crude oil trade) to trade shocks, and make developing countries to be vulnerable to toxic goods and hazardous waste (Keho, 2017; Clapp, 1994).

295
However, given my accessibility to existing studies on trade to the cited studies, none has actually attempted to examine asymmetric link between trade trend and sustainable development in Nigeria given trade policy reviews by the Nigerian government as an attempt to improve its other strategic sector and also promote the use of local products. In achieving this, this study deviates by using the Non-Linear Autoregressive Distributed Lag (NARDL) model to examine this link. This method is unique given its ability to accommodate periodic effects as a result of trade policy reviews in the Nigerian economy.

2. Empirical Review

On the empirical front, the link between trade openness and economic growth has been widely studied by notable researchers across the globe and lack of consensus has been observed in their findings. In the evidence from developed economies, for instance, Dowrick and Golley (2004) examined the link between trade openness and economic growth using a panel data of 127 countries spanning between 1960 and 2000. Variables observed were analyzed using Ordinary Least Squares (OLS) method. The result shows that trade openness exerts a direct and robust effect on economic growth. Similarly, Fetahi-Vehapi et al. (2015) employed GMM to assess the impact of trade openness on the economic growth of 10 South-East European (SEE) countries. The study realized that trade openness exert a positive and statistically significant influence on economic growth. Also, the study discovered that income per capita determines the growth effect of trade openness on the GDP of an economy. While, Eris and Ulasan (2013) gathered macroeconomic data from 66 countries which include Austria, Canada, Sweden, Switzerland, etc to study the effect of trade openness on economic growth. The variables used in the study were analyzed using Bayesian model averaging. The study argued that trade openness does not have a direct and robust effect on economic growth in the long-run.

Shayanewako (2018) explored the link between trade openness and economic growth in 5 BRICS countries using Autoregressive Distributed Lag (ARDL) bounds test to co-integration and granger causality test. The study noted a long-run co-integration nexus between trade openness and economic growth and a bi-directional causal nexus between trade openness and economic growth. Nasreen and Anwar (2014) investigated the link between trade openness, economic growth and energy consumption using a panel data of 15 Asian countries spanning between 1980 and 2011. The variables observed in the study were further analyzed using panel co-integration and granger causality techniques. The study demonstrated a co-integrating nexus between trade openness, economic growth and energy consumption. On the
other hand, Trejos and Barboza (2014) employed ordinary least square (OLS) method and error correction model (ECM) to assess the nexus between trade openness and output growth in Asia. The study argued that the Asian economic growth is not driven by trade openness, but rather by massive capital accumulation and labour mobilization. Ramzan et al. (2019) examined the effect of trade openness on economic growth using a panel data of 82 countries that covers the period between 1980 and 2014. GMM estimation technique was employed to analyze the data used. The study result indicates that total factor productivity (TFP) development level influences the effect of trade openness on economic growth. Therefore, trade openness positively impact on economic growth for the countries with higher TFP development level, while countries with trade openness in lower TFP development level is believed to harm economic growth.

In emerging and developing economies, Hye et al., (2016) explored the effect of trade openness on economic growth in China using autoregressive lag approach to co-integration and rolling regression model. The study discovered that trade openness has a long-run and short-run positive effect on economic growth in China. On the same page, Ahmad et al. (2017) assessed the effect of trade openness on economic growth in Pakistan using Johansson co-integration approach. The study confirmed that trade openness exercises a positive and significant effect on economic growth in Pakistan. In Cote d’Ivoire, Keho (2017) employed ARDL approach to integration, and Toda and Yomamoto granger causality test to examine the effect of trade openness on economic growth. The study affirmed a positive effect of trade openness on economic growth in the short-run and long-run. Hye and Lau (2015) argued from the study conducted in India using econometric techniques: new endogenous growth model, auto-regressive distributive lag model, rolling window regression method and granger causality test. The study reports that trade openness effect on economic growth is negative.

Ehigiamusoe and Lean (2016) employed ARDL bounds test approach and error correction model to investigate the causal link between financial development, trade openness and economic growth in Ghana, Nigeria and South Africa. The study founds a co-integrating nexus between financial development, trade openness and economic growth. It also noted a causal nexus running from financial development and trade openness to economic growth in the long-run. Similarly, Altaee and Al-Jafari (2015) studied the link between financial development, trade openness and economic growth in Bahrain using VECM Engle-Granger and forecast error variance decomposition. The study indicated a unidirectional causal link running from trade openness and financial development to real GDP growth. Gokmenoglu et al. (2015) analyzed the relationship between international trade, financial development and economic growth
in Pakistan using Johansen co-integration and Granger causality test. The study result reveals existence of a long-run relationship between international trade, financial development and economic growth. Musila and Yiheyis (2015) investigated the effect of trade openness on economic growth in Kenya using Johansen co-integration test and granger causality approach. The study submitted that there is a negative tie between trade openness and economic growth.

Fiorini and Hoekman (2018) obtained panel data consisting of 103 countries spanning between 2010 and 2012 to analyze the effect of services trade policy on sustainable development. The variables used in the study are analyzed using bivariate regression analysis. The study discovered that lower level of service trade restrictions enhances sustainable development. Sohag et al., (2015) used ARDL bounds test approach to co-integration to investigate the dynamic link between trade openness, technological innovation, energy use and economic growth in Malaysia. It was revealed that there is a long-run co-integrating relationship among the variables. For Pakistan, Shahbaz (2012) employed VECM granger causality and forecast error variance decomposition tests to analyze the long-run effect of trade openness on economic growth in Pakistan. The study realized a long-run nexus between trade openness and economic growth. Against this background, Zahonogo (2017) explored the link between trade and economic growth in 42 Sub-Saharan African countries using Pooled Mean Group estimation techniques. The study supports the existence of a Laffer Trade Curve (invented U) and demonstrated that trade openness positively and significantly affects economic growth up to a threshold, and declines.

In Nigeria, employing both non-monotonic modelling and Ordinary Least Squares (OLS) method, Ehinomen & Da’silva (2014) noted a positive relationship between trade openness and output growth in Nigeria. Lawal et al. (2016) used ARDL bounds test approach for co-integration analysis and found a long-run relationship between economic growth and trade openness in the long-run. The study further discovered a causal relationship running from financial development and trade openness to economic growth in both long-run and short-run. Similarly, Saibu (2004) employed Johansen co-integration approach and vector error correction model (VECM) granger causality to analyse long-run co-integration relationship between economic growth and trade openness in Nigeria. The study further revealed a unidirectional causal link running from economic growth to trade openness. Kalu and Agodi (2015) argued using Autoregressive Conditional Heteroscedasticity (ARCH), Generalized Autoregressive Conditional Heteroscedasticity (GARCH) and Pairwise-Granger Causality, that there is a significant relationship between trade openness and economic growth in Nigeria and that economic growth granger-causes trade openness

3. Econometric Method and Data Source

In order to test the effect of trade policy reviews on sustainable development in Nigeria, this study followed and modified Keho (2017) model. The model considered Cobb-Douglas production function which assumed technological progress, labour force, and capital stock as the long-run determinant of economic growth. However, in its model, real per capital GDP was considered as a measure of efficiency for making use of domestic resources for achieving a sustainable growth towards development. This can be specified as:

\[ Y_t = A_t K_t^a L_t^{1-a} \]  \( (1) \)

Where \( Y, A, K, \) and \( L \) is the real economic output, technological progress, capital stock, and labour force, \( \alpha \) denotes elasticity of output with respect to capital, \( 1 - \alpha \) serves as elasticity of output with respect to labour and \( t \) represents time. The model however assumed that trade openness along with other factors aids technological progress, and specified \( A_t \) as:

\[ A_t = \phi TOP_t \delta X_t^p \]  \( (2) \)

Where \( TOP \) is the trade openness and \( X \) represent other factors responsible for technological progress. Therefore, substituting equation 2 into equation 1, we have:

\[ Y_t = \phi TOP_t \delta K_t^a L_t^{1-a} X_t^p \]  \( (3) \)

Re-writing equation 3 in a more conventional form, we have:

\[ Y_t = \beta_0 + \beta_1 TOP_t + \beta_2 K_t + \beta_3 L_t + u_t \]  \( (4) \)

Where: \( Y_t \) is the real GDP at time, \( TOP_t \) denotes trade openness at time, \( K_t \) represents gross capital formation (% of GDP) at time, and \( L_t \) is the labour rate at time. For the purpose of this study, we modified Keho (2017) model by considering a unit-variate model of trade and sustainable development in Nigeria. The model is re-specified as:

\[ AS_t = \beta_0 + \beta_1 TOP_t + u_t \]  \( (5) \)
Where: \( AS_t \) is the adjusted net savings, excluding particulate emission damage (\% of GNI) at time use as a proxy for sustainable development in line with Hamilton and Clemens (1998) computation for sustainable development. This therefore serves as a modification to Keho (2017) model. \( TOP_t \) represent trade openness (\% of GDP) at time. However, the significance of ARDL model over the traditional co-integration approach has been well emphasized in the econometric literature. The ARDL model propounded by Pesaran and Shin (1999) accepts the representation of variables dynamic relationship as an correction model (ECM) if they obeyed \( I(0) \) of \( I(1) \). On this note, the ARDL model for this study is specified as:

\[
AS_t = \omega + \beta_1 AS_{t-i} + \beta_2 TOP_{t-i} + \sum_{q=1}^{p} \rho_1 \Delta AS_{t-i} + \\
+ \sum_{q=1}^{j_1} \rho_2 \Delta TOP_{t-j} + \varepsilon_t
\]

(6)

From equation 6, \( AS \) and \( TOP \) remains adjusted net savings, excluding particulate emission damage (\% of GNI) and trade openness (\% of GDP), \( \omega \) serves as the slope of the model, \( q \) represent the identified lag number, \( \beta_1 - \beta_2 \) are the variables long-run coefficients, \( \rho_1 - \rho_2 \) are the variables short-run coefficients, and \( \varepsilon_t \) is the error correction model at a time lag length. The short-run and long-run nexus between the dependent variable and independent variable can be estimated using the model (6). To analyse the non-linear relationship, this study further transformed the ARDL model into a non-linear form to investigate the impact of trade trends on sustainable development in Nigeria. Equation (6) is re-formulated in non-linear form as:

\[
AS_t = \omega + \beta_1 AS_{t-i} + \beta_2 TOP_{t-i}^+ + \beta_3 TOP_{t-i}^- + \sum_{q=1}^{p} \rho_1 \Delta TOP_{t-i}^+ + \\
+ \sum_{q=1}^{j_1} \rho_2 \Delta TOP_{t-j}^+ + \varepsilon_t
\]

(7)

Where \( \Delta TOP_{t}^+ \) and \( \Delta TOP_{t}^- \) are the partial sum process of positive and negative changes in \( TOP_{t} \) as a result of trade policy reviews.

However, this study analyzed the equation using annual data for the period of 1981 to 2017. The period was determined by the availability of data for the variables
in the model. The data used in this study includes adjusted net savings, excluding particulate emission damage (% of GNI) denoted as ‘AS’ and a proxy for sustainable development. Trade openness (% of GDP) denoted as ‘TOP’ and a proxy for trade. All the data were obtained from World-Bank Development Indicators (WDI) (2018).

4. Data Analysis

In carrying out an empirical analysis, it is a tradition to subject all the data used to a pre-estimation test in order to have a well representing estimation result. The pre-estimation test for this study include: descriptive statistics, correlation test, unit-root test and cointegration test (depending on the unit-root outcome).

4.1. Descriptive and Correlation test

The descriptive statistic helps reveal the behavioural trend of the data used in the study. From the result, it was revealed that the variables mean value (average changes over the period studied) are within their minimum and maximum values. This implies that, despite reviews of trade policies and policy implementation towards sustainable development, the impact on the variables are statistical within the expected region. Among the variables, according to the standard deviation output, adjusted net savings (AS) is more volatile compared to trade openness (TOP). This implies that, sustainability of the environment reacts more to changes in policy than trade. The Jarque-Bera Statistics show that the variables are normally distributed given their probability values are greater than 10% significance level.

The correlation matrix is used to test multicollinearity problem among the variables in the study. From the correlation analysis, trade openness has a weak negative insignificant correlation with sustainable development in Nigeria. The implication of this is that, there is no multicollinearity problem among the variables and there is likely to be a negative realtionship between trade openness and sustainable development in the estimation. The results are presented below;

Table 1.

Descriptive and Correlation Matrix Results

<table>
<thead>
<tr>
<th>Descriptive Statistics</th>
<th>AS</th>
<th>TOP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>-2.450</td>
<td>32.083</td>
</tr>
<tr>
<td>Maximum</td>
<td>18.783</td>
<td>53.278</td>
</tr>
<tr>
<td>Minimum</td>
<td>-34.450</td>
<td>9.136</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>13.026</td>
<td>12.600</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>1.430</td>
<td>1.758</td>
</tr>
</tbody>
</table>
4.2. Unit Root Test

Unit root test checks stationarity status of variables used as a proxy in a study. It also helps test if the variables are long-run mean reverting given the period studied. For this study, the unit root result shows that the variables are stationary at levels and first difference [I(0) & I(1)]. AS is stationary at levels I(0) at 10% significance level and TOP, a denotation for trade openness is stationary after first difference I(1) at 5% significance level. The translation of the result is that the variables have unit root problem and are not mean reverting in the long-run. Through this, there is need to test if the variables have a long-run cointegrating relationship.

Table 2

<table>
<thead>
<tr>
<th>Variables</th>
<th>AS</th>
<th>TOP</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS</td>
<td>0.489</td>
<td>0.415</td>
</tr>
<tr>
<td>TOP</td>
<td>38</td>
<td>38</td>
</tr>
</tbody>
</table>

Source: Compiled by the Author (2019).

4.3. Cointegration test: ARDL Bounds Test

As a result of the the unit-root outcome, the ARDL bounds test is used to test the long-run cointegration relationship among the variables. The test is adopted as it is suitable for variables that have unit root stationary status of I(0) and I(1). The test is adopted for both linear and non-linear model in the study. From the result, there is no long-run cointegration relationship among the variables as the F-Statistics value fall below the lower [I0] and upper [I1] bound class. This implies that only the short-run
estimate of the ARDL result will be reported, while the long-run report is not feasible. The result is presented below.

Table 3

<table>
<thead>
<tr>
<th>Test Statistic</th>
<th>Linear</th>
<th>Non-Linear</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Value</td>
<td>Signif.</td>
</tr>
<tr>
<td>F-statistic</td>
<td>6.48</td>
<td>5%</td>
</tr>
<tr>
<td>k</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>F-statistic</td>
<td>4.74</td>
<td>5%</td>
</tr>
<tr>
<td>k</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Source: Compiled by the Author (2019).

4.4. Parameters Estimation using ARDL and NARDL

The ARDL estimate is used to report the symmetric relationship between trade and sustainable development in Nigeria. From the result, it was informed that trade has 24.7 units positive and insignificant impact on sustainable development in Nigeria. This implies that, one unit changes in trade, results to an insignificant 24.7 units increase in sustainable development. This corroborates with the correlation result in the pre-estimation test. The error correction model result is rightly signed with its negative sign and shows that symmetric trade openness is most likely to correct about 46.6% short-run deviation of adjusted net savings (sustainable development) from the equilibrium in the long-run.

For the asymmetric estimate, the result reveals that positive and negative changes in trade openness as a result of trade policy review in Nigeria both have an insignificant positive impact on sustainable development in Nigeria. The implication of this is that as trade changes positive or negatively, it brings about 31.2 units or 4.2 units insignificant increase in sustainable development. The ECM result is also rightly signed and shows that 38.8% short-run deviation of adjusted net savings from the equilibrium, can be corrected in the long-run by the period effects through trade policy reviews. The results are presented below.
Table 4

<table>
<thead>
<tr>
<th>Variable</th>
<th>ARDL Short-Run</th>
<th>NARDL Short-Run</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>Std. Error</td>
</tr>
<tr>
<td>D(TOP)</td>
<td>0.247</td>
<td>0.191</td>
</tr>
<tr>
<td>ECM_{t-1}</td>
<td>-0.466</td>
<td>0.127</td>
</tr>
<tr>
<td>TOP_i^+</td>
<td>31.181</td>
<td>22.519</td>
</tr>
<tr>
<td>TOP_i^-</td>
<td>4.213</td>
<td>31.426</td>
</tr>
<tr>
<td>ECM_{t-1}</td>
<td>-0.388</td>
<td>0.100</td>
</tr>
</tbody>
</table>

Source: Compiled by the Author (2019).

4.4.1. Discussion of Findings

It should be noted that the study findings corroborates with the submission of Trejos and Barboza (2014) in the Asian countries (a similar developing country such as Nigeria) that trade is not a driven factor of sustainability. Against the findings of Lawal et al. (2016) and God’slove and Adaku (2018) in Nigeria, the study do not support a long-run cointegrating relationship between trade and susatainble development. This may be as a result of the objective of this study which differentiates it from the existing studies findings. The impliaction of the study findings are that: considering the symmetric impact using the ARDL, it can be argued that trade trend generally observed in Nigeria, although positive, but does not significantly trend towards achieving the sustainable development goal as most traders are majorly after profit making, therefore irrespective of the advantages and disadvantages of the trade means, they are willing to trade at the expense of sustainable development. This is also proven while checking the asymmetric link as both the positive and negative trade trends had an insignificant positive impact on sustainable development.

5. Concluding Remarks

In an attempt to contribute to the body of knowledge on trade impact on sustainable development, this study employs both ARDL and NARDL to examine the symmetric and asymmetric impact of trade on sustainable development in Nigeria using secondary data which spans between 1981 and 2017. The study at first subjected the data used to pre-estimation test to understand the behavioural trend of the variables. It was confirmed that the variables are free of multicollinearity.
problem, normally distributed, have unit-root problem and no long-run cointegrating relationship among the variables. The outcome of the pre-estimation test however, initiated the reason for reporting only the short-run symmetric and asymmetric relationship between trade and sustainable development in Nigeria. From the result of both ARDL and NARDL, it was observed that symmetrically, trade impact on sustainable development is positively insignificant. For the NARDL estimate, it was revealed that both positive and negative periods of changes in trade had an insignificant positive impact on sustainable development in the short-run. However, for the two models, the Error Correction Models are rightly signed and confirmed that symmetric form of trade can correct 46.6% changes sustainable development deviation in the long-run, while 38.8% is corrected considering asymmetric changes in trade. From the findings, it can be concluded that trade in Nigeria has not been trending towards supporting sustainable development agenda. In order to have a significant contribution of trade trend, there is need for the policymakers to take into consideration trade policies that will accommodate activities (such as free trade policies on technological developments among others) towards achieving a sustainable development.

It should be noted that the study is limited in its strength of explanatory variables and methodology. The impact check of trade is limited to only sustainable development, which can be further researched on jointly considering sustainable growth and development. The study is also limited in its analytical framework as it uses time-series analysis which can be further expanded to a panel data analysis considering countries in the African Continent or other regions of the world.

References


DISAGGREGATED GOVERNMENT EXPENDITURE AND EDUCATION ENROLMENT IN NIGERIA

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\textbf{JEL F10, F31} \\

\textbf{Abstract}

This study investigates how disaggregated government expenditure has an impact on education enrolment in Nigeria within the period 1980 and 2017. The Autoregressive Distributed Lag (ARDL) was used for the parameters estimation. From the findings, in the short-run, capital expenditure components show a negative insignificant impact on education enrolment except for capital expenditure on social service which was insignificantly positive. For recurrent expenditure model, in the short-run, all the expenditure components had a negative impact on education enrolment, but only recurrent expenditure on economic services was significant. In the long-run, while recurrent expenditure influenced education enrolment negatively, others were positive but insignificant. Capital expenditure model error correction test confirms that the components do not correct education enrolment back to equilibrium in the long-run. For recurrent expenditure, the result reveals that the components correct 0.006% of education enrolment back to equilibrium in the long-run.

\textbf{Key words:} \\
government expenditure, secondary school enrolment rate, ARDL.

1. Introduction

Globally, the role of education in enhancing economic development has been discussed among notable scholars and more emphasis has been made concerning its significance. Noted by Mekdad et al. (2014), education serves as a sustainable route to economic prosperity, combats unemployment, confirms sound foundation of social equity, and promotes awareness and cultural vitality. The provision of quality education improves the quality of human resources which further serves as a major vehicle for national development in all countries of the world (Oriakhi and Ameh 2014). Reference to Adam Smith, economic prosperity relies on the skill, efficiency, and attitude of labour used by the country. However, various economies such as: Japan, Germany, Singapore among others have been able to develop their country due to the will, capacity, and skill of their human resources.

By large, the macroeconomic objective of governments virtually in every economy is based on achieving rapid and sustainable economic growth with price stability (Iyoha 2002). In order to make this happen, the government ensures effective administration of its fiscal policy (which includes taxation and spending) and also establish an institutional framework to formulate suitable policies. According to Igbal (2017) education is the integral part of human capital which serves as a foundation for the growth of any economy. This is because education serves as investment that boost quality and skills of the labour force of an economy, which further increase capacity to produce and lower the unit cost of production. So far in literature, studies such as: Kabuga and Hussaini (2015), Omodero and Azubike (2016), Edame and Eturoma (2014) Dissou et al., (2016) and Appiah (2017) have confirmed the positive link between government spending on education and economic growth in both developed and developing countries.

Despite the importance of government spending on education in promoting productivity in every economy and the UNESCO’s recommendation for governments in Sub-Saharan Africa countries to invest at least 26% of their total budget on education, the annual trend of budgetary allocation to the education sector by the Nigerian government is below 13% over the decades (UNESCO, 2007; Ezekwesili & Micaiah, 2013). As submitted by BudgIT (2018) the trend of budgetary allocation to the education sector between 1999 and 2018 moved asymmetrically, as it moved from its lowest of 4.46% in 1999, reached its peak of 12.46% in 2015 and fell to 7.04% in 2018.

As a result of the poor and uneven trend in government spending on education in Nigeria, the quality of education has been affected in so many ways. Documented by
Adedigba (2019), firstly, between 10.5 million to 13.2 million children are being denied access to education because of their inability to afford the related expenses in Nigeria. Secondly, teachers are reluctantly motivated (in terms of their salaries) which has resulted into countless strikes in the country. According to BudgIT (2018), about 12 states among the 36 states in the country are owed teacher’s countable months’ salary. Thirdly, the condition of basic education infrastructures (such as: classrooms, chairs, etc.) are very bad. In a report by Kolawole (2018), vocational institutions in Nigeria have collapsed due to abject neglect by government, many schools lack basic equipment for conducive learning, and even libraries in schools lack the needed books, journals and magazines.

However, Adesina and Ojeka (2017) argued that the major problem of the education sector in Nigeria is the skewness nature in the trend of disaggregated government expenditures which is driven by inconsistent rigid policies. In the 1970s, capital expenditure rose immediately after the Nigerian/Biafran war in 1970 and lasted till 1983, so as to achieve the 3R’s (Reconciliation, Rehabilitation, and Reconstruction) that proceed from the war and the need to fund new states created by the Muritala administration. Between 1986 and 1994, recurrent expenditure rises above capital expenditures due to the formulation of the Structural Adjustment Programme (SAP) which aimed at controlling major macro-economic problems (such as: foreign exchange shortages and scarcity of essential commodities and high food cost). Due to the desire of the government to undertake some developmental projects to win the support of people, the capital expenditure trends above recurrent expenditures between 1995 and 1998. Since 1999, more resources have been allocated to service, maintenance of government offices and personnel which causes recurrent expenditure to remain above capital expenditure (Nwosu and Okafor, 2014).

However, having discussed existing literature opinions, this study focusses on the effect of disaggregated government expenditure on education enrolment in Nigeria rather than considering a component of government expenditure as a sole significant factor that influences decisions on school enrolment. This is also important given the level of development in the Nigerian economy where there is high record of uneducated citizens and educated without jobs. Establishing an empirical evidence on the objective of this study serves a significant contribution to government expenditure plans (fiscal policy instrument) and education enrolment (human capital component).

The rest of the study is portioned into four sections. Section 2 discusses the related literatures reviewed, section 3 presents the analytical framework, section 4 handles the empirical results and section 5 presents the conclusion and recommendations.
2. Review of Related Literature

Following the theoretical submissions of Wagner (1883), Samuelson (1954), Peacock and Wiseman (1961) on dynamic factors (such as income, nature and value of commodity, cost of goods) that influence the government expenditure pattern and the endogenous growth theory of Solow (1956), Lucas (1988) and Romer (1990) which recognizes the importance of human capital (education) as a catalyst for development, scholars have gained interest in empirically testing the role of the government expenditure pattern on the education system. However, the neoclassical thoughts on investment by Jorgenson (1963, 1967, and 1971) contradicts these opinions as they see investment to be determined by an optimal capital stock where an investor may decide to invest on technology or humans depending on the option that maximally optimizes its capital stock.

In the developed world, notable scholars have employed various econometric techniques to study the effect of government expenditure on education enrolment. For instance, Mărginean (2014) employed nonparametric Kendall correlation coefficient to examine the effect of public expenditure on education and healthcare in EU countries. The study discovered incongruities in the policies of government spending in the European Countries, while the effect of public expenditure on education and healthcare in EU countries is weak. Murphy et al. (2018) investigated the effect of charging tuition fee on university enrolments, equity and proxies for institutional quality in England. The study demonstrated that the shift of England education from free education system to high fee charges has no significant effect on student enrolment. This implies that Government expenditure on education in England do not have a significant effect on student enrolment. Also, Vergolini and Zanini (2015) examined the effect of financial aid on university enrolment decisions in the province of Trento, North East of Italy using regression discontinuity design. The study revealed that financial aid programmes do not have a significant effect on university enrolment decisions in the province of Trento, North East of Italy.

In the developing countries, Bergh and Fink (2006) used a panel data of 132 countries to explain the effect of public expenditure on primary, secondary and tertiary education enrolment. The study discovered that higher spending on tertiary education does not have a positive link on tertiary education enrolment, while higher spending on primary and secondary education positively influence primary and secondary education enrolment. Craigwell et al., (2012) employed the Panel Ordinary Least Squares method to investigate the effectiveness of government expenditure on education and health care in the Caribbean countries. The study argued that government expenditure on education has no significant effect on primary and
secondary school enrolment. Bihua (2017) employed a multiple-principal framework to study the regional distribution of college enrollment in China. The study claimed that enrollment in higher education in China is largely determined by incentive intensity, administrative control, principal characteristics, and agents’ characteristics.

Anyanwu and Erhijakpor (2007) employed a panel data of African countries spanning between 1990 and 2002 to study the link between education expenditure and school enrolments in Africa. The study noted a closed and consistent nexus between education expenditure and school enrolments in Africa. Neilson and Zimmerman (2014) examined the impact of school construction projects on test scores, school enrollment, and home prices using different-in-different strategy. The study revealed that school construction projects positively influence school enrolment. Gustafsson (2015) employed a data interrogating approach to examine enrolment ratios and related puzzles in developing countries. The study showed that economic data on enrolment ratio in most of the studied countries are not accurate. Mekdad et al. (2014) examined the link between public spending on education and economic growth in Algeria using the Ordinary Least Squares (OLS) method. The study submitted that public expenditure on education positively associates with the economic growth of Algeria. Appiah (2017) examined the effect of education expenditure on per capita GDP in developing countries using GMM estimator. The author noted from the findings that an increment in government education expenditure positively has a positive impact on per capita GDP.

Obi and Cyril (2014) studied the link between government spending and education outcome in Nigeria using Ordinary Least Squares (OLS) technique. The study discovered that public education expenditure is an important factor in promoting human capital development and education outcome in Nigeria. Contrary to their findings, Ogbara et al. (2018) while investigating the impact of public spending on the education sector on poverty level in Nigeria using vector autoregressive (VAR) analysis submitted that government recurrent expenditure in the education sector did not have a significant impact on primary school enrolment and poverty level but directly increase the enrolment of tertiary education rate, while government capital expenditure in education sector increase both primary school and tertiary enrolment rate but could not reduce poverty level. Oluwatobi and Ogunrinola (2011) examined the effect of government expenditure on human development in Nigeria using Error Correction Method. From their findings, physical capital and government recurrent expenditure on human capital positively influence the level of real output. There was a negative nexus between government capital expenditure in human capital and real level of output. The negative link was traced to corruption and misappropriation of
public funds allocated for capital projects such as installation of education and health infrastructures in Nigeria.

Oriakhiv and Ameh (2014) studied the role of government expenditure in developing the education sector in Nigeria using a time series Linear Forecasting Model. The study revealed a long-run significant effect between literacy rate in Nigeria, total government recurrent expenditure on education, total government capital expenditure on education, and economic growth. Omodero and Azubike (2016) employed multiple regression analysis and student t-test to investigate the link between government expenditure on education and economic development in Nigeria. The study demonstrated a positive relationship between government expenditure on education and economic development.

Omitogun and Longe (2017) investigated the impact of human capital investment on school enrolment in Nigeria and Ghana over the period 1986 to 2013. Dynamic heterogeneous panel data techniques were employed to analyse data for the study. Their findings revealed that education and health expenditure had significant impact on school enrolment in the selected countries (Nigeria and Ghana). The study concludes that the role of human capital in school enrolment in the selected countries is significant. A major recommendation from their study was that government in these countries should increase investment in education and health to ensure increase in school enrolment.

Having reviewed accessible related literature, it was observed that few studies have considered the impact of disaggregated government expenditure on education enrolment in the context of Nigeria. Diverse findings have been arrived at due to inconsistency in the method and data span used. This study however fills the gap in literature for Nigeria in form of a robustness check by considering the disaggregated expenditure components impact on education enrolment.

3. Analytical Framework

The neoclassical theory of investment of Jorgenson (1963, 1967, and 1971) is based on the optimal decision of investment. The theory assumed production function to be written in a conventional form as;

\[ Y(t) = F[K(t), L(t)] = AK^\alpha L^{1-\alpha} \]  

(1)

Where \( Y(t) \) is the firm’s output, \( K \) is the capital at time, \( L(t) \) is the labour at time. Assuming profit maximization, the current value of a firm, \( V(0) \) is written as;

\[ \Pi(t) = P(t) Y(t) - s(t) I(t) - w(t) L(t) \]  

(2)
Π (t) is the profit, P (t) is the price of output, s (t) is the price of capital, and w (t) is the wage. To get the optimal capital stock (K) and investment function, equation (1) is differentiated partially which gives;

\[ K^* = \frac{P\alpha Y}{c} \]  

(3)

Where K* - optimal capital output is a function of P – price of output and cost of capital, (c). Therefore, investment is a result of the change in the optimal capital between two periods;

\[ I = \frac{P\alpha Y}{c} - K^* (t - \tau) \]  

(4)

Contrary to the neoclassical, the accelerator theory related to the Keynes view assumes fixed prices in the investment function. Therefore, they assume;

\[ I = \alpha Y \]  

(5)

I is investment, Y is output.

For the purpose of this study, having taking the partial differentiation with respect to K, we recognized K as a disaggregated investment or expenditure by the government in equation 1 and specify our model accordingly:

\[ Y_t = \beta_t + CAD_t + CES_t + CSS_t + CTR_t + \mu_t \]  

(6)

Y<sub>t</sub> implies education enrolment captured as secondary school enrolment rate (%) at time. Secondary school enrolment rate is used because for some employment positions in Nigeria, senior secondary school certificate is the minimum requirement. Therefore, considering it as a proxy for education enrolment is viable. CAD<sub>t</sub> is the capital expenditure on administration at time, CES<sub>t</sub> is capital expenditure on economic services at time, CSS<sub>t</sub> is capital expenditure on social services at time and CTR<sub>t</sub> is capital expenditure on transfer at time, while µ<sub>t</sub> is the error term at time.

The model for recurrent expenditure is presented below as;

\[ Y_t = \beta_t + RAD_t + RES_t + RSS_t + RTR_t + \mu_t \]  

(7)

Y<sub>t</sub> implies education enrolment proxy as secondary school enrolment rate (%) of gross) at time, RAD<sub>t</sub> is the government recurrent expenditure on administration at time, RES<sub>t</sub> is government recurrent expenditure on economic services at time, RSS<sub>t</sub> is government recurrent expenditure on social services at time and RTR<sub>t</sub> is government recurrent expenditure on transfer at time, while µ<sub>t</sub> the error term at time.

Using equation 6 and 7, we specify the ARDL model for the capital expenditure model as;
\[ Y_t = c_0 + \sum_{q=1}^{p} \rho_1 \Delta Y_{t-i} + \sum_{q=1}^{j_1} \rho_2 \Delta \ln(CAD)_{t-j} + \sum_{q=1}^{j_2} \rho_3 \Delta \ln(CES)_{t-j} \\
+ \sum_{q=1}^{j_3} \rho_4 \Delta \ln(CSS)_{t-j} + \sum_{q=1}^{j_4} \rho_5 \Delta \ln(CTR)_{t-j} + \beta_1 Y_{t-i} + \beta_2 \ln(CAD)_{t-i} \\
+ \beta_3 \ln(CES)_{t-i} + \beta_4 \ln(CSS)_{t-i} + \beta_5 \ln(CTR)_{t-i} + \delta ecm_{i-1} + \epsilon_t \]  

(8)

Equation 8 is the ARDL short-run and long run model for capital expenditure components CAD, CES, CSS, and CTR.

\[ Y_t = c_0 + \sum_{q=1}^{p} \rho_1 \Delta Y_{t-i} + \sum_{q=1}^{j_1} \rho_2 \Delta \ln(RAD)_{t-j} + \sum_{q=1}^{j_2} \rho_3 \Delta \ln(RES)_{t-j} + \sum_{q=1}^{j_3} \rho_4 \Delta \ln(RSS)_{t-j} \\
+ \sum_{q=1}^{j_4} \rho_5 \Delta \ln(RTR)_{t-j} + \beta_1 Y_{t-i} + \beta_2 \ln(RAD)_{t-i} + \beta_3 \ln(RES)_{t-i} + \beta_4 \ln(RSS)_{t-i} \\
+ \beta_5 \ln(RTR)_{t-i} + \delta ecm_{i-1} + \epsilon_t \]  

(9)

Equation 9 is the ARDL short-run and long-run model for recurrent expenditure components RAD, RES, RSS, and RTR.

From equations 8 and 9, \( \beta_1 - \beta_5 \) represents long-run multipliers of the variables. \( \rho_1 - \rho_5 \) represents the short-run multipliers of the variables, while the long-run and short-run intercept of the models are \( c_0 \) and \( \theta_0 \) and \( j_1 - j_4 \) as the optimal lags length of each of the variables as revealed in the results.

4. Empirical Results

4.1. Descriptive Statistics

The descriptive statistics result has 37 no of observations. This implies that the data used spans through 37 years. The result is presented in Table 1 for both capital and recurrent expenditure model. From the results, it was observed that changes in the variables are within their minimum and maximum values. This implies that their reaction against unexpected shocks is not too far from equilibrium. However, it can be deduced that averagely, the variables: secondary school enrolment rate, capital expenditure on administration, economic services, social services, and transfer payment, likewise recurrent expenditure on administration, economic services, social services, and transfer payment changes by 31.09%, 10.34%, 10.67%, 10.13%, 10.01%, 10.81%, 10.17%, 10.44% and 11.11% respectively. According to the standard deviation
output among the variables, capital expenditure on social services is the least volatile variable, while education enrolment is the most volatile variable among others. This implies that the secondary school enrolment rate, proxy for education enrolment is expected to react to changes in the pattern of government expenditure (i.e. fiscal policy). The skewness result confirms that secondary school enrolment has a long tail to the right, while disaggregated government expenditure components all have a long tail to the left. This implies that none of the variables is normally skewed. The farthest away from the region is capital expenditure on transfer payment, while the closest to the region is recurrent expenditure on transfer payment. For the kurtosis result, except for capital expenditure on transfer payment which was extremely greater than 3 (platykurtic) with the implication of its high risk as its reason settles more around debt servicing among others, other disaggregate government expenditure components have values less than 3 which implies a leptokurtic nature, concluding that their trend is less risky in the economy. It should be noted that the expenditure components also confirm their skewness direction to the left which identifies capital expenditure on transfer services as the farthest to the origin. Also, secondary school enrolment kurtosis value is close to 3, which implies mesokurtic in nature. The implication of this is that the variable is normally distributed and also confirmed by its skewness which is very close to the origin. All the variables are confirmed to be normally distributed following the Jarque-Bera statistics except for capital expenditure on transfer payment which was found not normally distributed by its probability value less than 5% significance level.

**Descriptive Statistics Results**

<table>
<thead>
<tr>
<th></th>
<th>Y</th>
<th>LCAD</th>
<th>LCES</th>
<th>LCSS</th>
<th>LCTS</th>
<th>LRAD</th>
<th>LRES</th>
<th>LRSS</th>
<th>LRTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>31.09</td>
<td>10.34</td>
<td>10.67</td>
<td>10.13</td>
<td>10.01</td>
<td>10.81</td>
<td>10.17</td>
<td>10.44</td>
<td>11.11</td>
</tr>
<tr>
<td>Median</td>
<td>27.22</td>
<td>10.69</td>
<td>11.22</td>
<td>10.37</td>
<td>10.42</td>
<td>11.16</td>
<td>10.46</td>
<td>10.85</td>
<td>11.03</td>
</tr>
<tr>
<td>Maximum</td>
<td>56.18</td>
<td>11.49</td>
<td>11.72</td>
<td>11.19</td>
<td>11.42</td>
<td>12.11</td>
<td>11.75</td>
<td>11.96</td>
<td>12.67</td>
</tr>
<tr>
<td>Minimum</td>
<td>17.10</td>
<td>8.42</td>
<td>8.82</td>
<td>8.38</td>
<td>0.00</td>
<td>8.95</td>
<td>8.24</td>
<td>8.46</td>
<td>9.53</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>9.24</td>
<td>1.03</td>
<td>1.01</td>
<td>0.88</td>
<td>1.91</td>
<td>1.11</td>
<td>1.18</td>
<td>1.23</td>
<td>0.98</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.90</td>
<td>-0.51</td>
<td>-0.56</td>
<td>-0.29</td>
<td>-4.09</td>
<td>-0.37</td>
<td>-0.30</td>
<td>-0.35</td>
<td>-0.17</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>2.93</td>
<td>1.86</td>
<td>1.62</td>
<td>1.63</td>
<td>21.69</td>
<td>1.68</td>
<td>1.67</td>
<td>1.73</td>
<td>1.79</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>4.99</td>
<td>3.63</td>
<td>4.84</td>
<td>3.41</td>
<td>641.79</td>
<td>3.51</td>
<td>3.27</td>
<td>3.25</td>
<td>2.43</td>
</tr>
<tr>
<td>Probability</td>
<td>0.08</td>
<td>0.16</td>
<td>0.09</td>
<td>0.18</td>
<td>0.00</td>
<td>0.17</td>
<td>0.19</td>
<td>0.20</td>
<td>0.30</td>
</tr>
<tr>
<td>Sum</td>
<td>1150.50</td>
<td>382.71</td>
<td>394.74</td>
<td>374.63</td>
<td>370.37</td>
<td>399.86</td>
<td>376.18</td>
<td>386.10</td>
<td>411.08</td>
</tr>
<tr>
<td>Sum Sq. Dev.</td>
<td>3073.90</td>
<td>37.98</td>
<td>36.84</td>
<td>28.10</td>
<td>131.54</td>
<td>44.55</td>
<td>49.88</td>
<td>54.50</td>
<td>34.34</td>
</tr>
<tr>
<td>Observations</td>
<td>37</td>
<td>37</td>
<td>37</td>
<td>37</td>
<td>37</td>
<td>37</td>
<td>37</td>
<td>37</td>
<td>37</td>
</tr>
</tbody>
</table>

*Source: Authors (2019).*
4.2. Correlation Test

The correlation test checks the linear association between the dependent and the independent variables. The results show that there is a strong positive significant linear association between the independent variables (disaggregated government expenditures), except for capital expenditure on transfer payments and the dependent variable (secondary school enrolment rate). It can also be concluded that there is no multicollinearity problem between the variables as none in association to education enrolment has a value equals 1. The result is presented in Table 2.

**Table 2**

<table>
<thead>
<tr>
<th></th>
<th>Y</th>
<th>LCAD</th>
<th>LCES</th>
<th>LCSS</th>
<th>LCTS</th>
<th>LRAD</th>
<th>LRES</th>
<th>LRSS</th>
<th>LRTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LCAD</td>
<td>0.685</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0.000)*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LCES</td>
<td>0.604</td>
<td>0.964</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0.000)</td>
<td>(0.000)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LCSS</td>
<td>0.714</td>
<td>0.973</td>
<td>0.957</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LCTS</td>
<td>0.231</td>
<td>0.183</td>
<td>0.178</td>
<td>0.180</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0.170)</td>
<td>(0.278)</td>
<td>(0.293)</td>
<td>(0.286)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LRAD</td>
<td>0.745</td>
<td>0.984</td>
<td>0.952</td>
<td>0.972</td>
<td>0.188</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.265)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>LRES</td>
<td>0.743</td>
<td>0.975</td>
<td>0.937</td>
<td>0.971</td>
<td>0.196</td>
<td>0.992</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.246)</td>
<td>(0.000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LRSS</td>
<td>0.753</td>
<td>0.972</td>
<td>0.947</td>
<td>0.968</td>
<td>0.192</td>
<td>0.992</td>
<td>0.983</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.256)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LRTR</td>
<td>0.783</td>
<td>0.962</td>
<td>0.910</td>
<td>0.952</td>
<td>0.238</td>
<td>0.983</td>
<td>0.974</td>
<td>0.980</td>
<td>1</td>
</tr>
<tr>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.157)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: the parenthesis ( ) are the probability values of the variables, while * implies significant level at 1%.

*Source: Author’s (2019).*
4.3. Unit Root Test

The Augmented Dickey fuller (ADF) and Phillips-Perron (PP) test were used. The unit-root test considered the trend and intercept at levels and first difference in the analysis. This is because of the dynamic nature assumption of the data used. From the result, majority of the variables are found to be stationary after first differencing except for capital expenditure on transfer services or payment for both ADF and PP. Recurrent expenditure on transfer services or payment was also stationary at levels for PP at 10% level of significance, but after first differencing for ADF. The implication of the result is that there is a unit root problem among the variables and they are not meant reverting in the long-run. Therefore, there is need to test for long-run co-integrating relationship among the variables before their parameters estimation can be carried out. The result is presented in Table 3.

Table 3

<table>
<thead>
<tr>
<th>Augmented Dickey Fuller</th>
<th>Phillip-Perron</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables</td>
<td>Levels</td>
</tr>
<tr>
<td>Y</td>
<td>-1.657</td>
</tr>
<tr>
<td>LCAD</td>
<td>-0.446</td>
</tr>
<tr>
<td>LCES</td>
<td>-1.762</td>
</tr>
<tr>
<td>LCSS</td>
<td>-3.027</td>
</tr>
<tr>
<td>LCTS</td>
<td>-4.400*</td>
</tr>
<tr>
<td>LRAD</td>
<td>2.828</td>
</tr>
<tr>
<td>LRES</td>
<td>-2.130</td>
</tr>
<tr>
<td>LRSS</td>
<td>-2.929</td>
</tr>
<tr>
<td>LRTR</td>
<td>-3.134</td>
</tr>
</tbody>
</table>

Note: *, **, *** implies significance level at 1%, 5% and 10% respectively.

Source: Authors (2019).

4.4. ARDL Bounds Test

The ARDL bounds test is used for testing the long-run co-integrating relationship existence among the variables having considered the stationarity status of the variables at I (0) and I (1). The test is carried out for capital and recurrent expenditure separately. For the capital expenditure, it was revealed that there is no long-run co-integrating relationship between capital expenditure components and education enrolment. Due to the outcome, it is impossible to report the estimates of the parameters in the long-run. Therefore, only the short-run results were reported.
For the recurrent expenditure model, there is a long-run co-integrating relationship between recurrent expenditure components and education enrolment at 10% confidence level. Therefore, for the model, the short-run and long-run parameters estimates are reported. The results are shown in Table 4.

**Table 4**

**ARDL Bounds Test Results**

<table>
<thead>
<tr>
<th>Variables</th>
<th>F-Statistics</th>
<th>Co-integration</th>
<th>Optimal Lag</th>
</tr>
</thead>
<tbody>
<tr>
<td>$F(Y/\text{LCAD, LCES, LCSS, LCTS})$</td>
<td>1.354</td>
<td>Co-integration</td>
<td>1, 0, 0, 0, 0</td>
</tr>
<tr>
<td></td>
<td>Critical Values</td>
<td></td>
<td>Lower Bounds I(0)</td>
</tr>
<tr>
<td>1%</td>
<td></td>
<td>4.4</td>
<td>Lower Bounds I(1)</td>
</tr>
<tr>
<td>5%</td>
<td></td>
<td>3.47</td>
<td>5.72</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
<th>F-Statistics</th>
<th>Co-integration</th>
<th>Optimal Lag</th>
</tr>
</thead>
<tbody>
<tr>
<td>$F(Y/\text{LRAD, LRES, LRSS, LRTR})$</td>
<td>4.133***</td>
<td>Co-integration</td>
<td>2, 0, 3, 0, 0</td>
</tr>
<tr>
<td></td>
<td>Critical Values</td>
<td></td>
<td>Lower Bounds I(1)</td>
</tr>
<tr>
<td>1%</td>
<td></td>
<td>4.4</td>
<td>5.72</td>
</tr>
<tr>
<td>5%</td>
<td></td>
<td>3.47</td>
<td>4.57</td>
</tr>
</tbody>
</table>

*Note: *** implies significance level at 10%.*

*Source: Authors (2019).*

### 4.5. ARDL Estimation

The results are presented in Table 5. For capital expenditure model, only the short-run results were reported due to absence of long-run co-integrating relationship among the variable confirmed by the ARDL bounds test. From the short-run result, capital expenditure on administration, economic services and transfer services had a negative impact on education enrolment, while capital expenditure on social services impacted positively on education enrolment. It was also revealed that all the variables have an insignificant impact on education enrolment. The error correction model is rightly signed but does not have a significant impact. The implication of this is that capital expenditure components correction of education enrolment deviation in the short-run back to equilibrium in the long-run is insignificant. Therefore, the capital expenditure components pattern in the short-run can be argued that they are not
channeled in the direction that will facilitate improved education enrolment and also in the long-run for Nigeria.

For recurrent expenditure model, it was observed from the result that all the expenditure components have a negative impact on education enrolment in Nigeria. It was noted that only recurrent expenditure on economic services was significant at 5%, other recurrent expenditure components were insignificant. In the long-run, except for recurrent expenditure on economic services which has a negative impact on education enrolment, other components have a positive impact and all were strongly insignificant. This implies that in the long-run the trend of recurrent expenditure components has no significant value to add to education in Nigeria and also in the short-run. The error correction model result is wrongly signed and also insignificant. This proves that the independent variables do not in any way correct deviations in education enrolment from short-run equilibrium back to equilibrium in the long-run.

Table 5
ARDL Estimate for both Capital and Recurrent Expenditure Model

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coeff</th>
<th>Std Error</th>
<th>t-stat</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCAD_t</td>
<td>-0.118</td>
<td>3.311</td>
<td>-0.036</td>
<td>0.972</td>
</tr>
<tr>
<td>LCES_t</td>
<td>-0.558</td>
<td>2.505</td>
<td>-0.223</td>
<td>0.825</td>
</tr>
<tr>
<td>LCSS_t</td>
<td>3.798</td>
<td>3.239</td>
<td>1.172</td>
<td>0.251</td>
</tr>
<tr>
<td>LCTS_t</td>
<td>-0.094</td>
<td>0.309</td>
<td>-0.304</td>
<td>0.763</td>
</tr>
<tr>
<td>ECM_t−1</td>
<td>-0.096</td>
<td>0.167</td>
<td>-0.573</td>
<td>0.571</td>
</tr>
</tbody>
</table>

Recurrent Expenditure Model

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coeff</th>
<th>Std Error</th>
<th>t-stat</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>LRAD_t</td>
<td>-7.351</td>
<td>6.015</td>
<td>-1.222</td>
<td>0.234</td>
</tr>
<tr>
<td>LRES_t</td>
<td>-6.845**</td>
<td>2.788</td>
<td>-2.455</td>
<td>0.022</td>
</tr>
<tr>
<td>LRSS_t</td>
<td>-0.597</td>
<td>3.482</td>
<td>-0.172</td>
<td>0.865</td>
</tr>
<tr>
<td>LRTR_t</td>
<td>-4.536</td>
<td>4.912</td>
<td>-0.923</td>
<td>0.365</td>
</tr>
<tr>
<td>ECM_t−1</td>
<td>0.006</td>
<td>0.147</td>
<td>0.042</td>
<td>0.967</td>
</tr>
</tbody>
</table>

Note: SR and LR denote short-run and long-run respectively. ** implies 5% significance level.

Source: Author’s (2019).
It was observed that there were disparities between this study findings and findings of related literature reviews. However, the disparities are noted to be as a result of the difference in the level of development between the countries. For example, while Neilson and Zimmerman (2014), Mekdad et al. (2014) and Appiah (2017) found a positive relationship between government expenditure and education enrolment, this study negates the findings in the context of Nigeria standing on the facts backed up with its findings that the pattern of expenditures in the Nigerian economy does not in any way enhance education enrolment. Against findings from this study, Raza et al. (2017) was of the opinion that rather than government expenditure, gender and socio-economic disparity and Sánchez and Singh (2018) considered human wealth and higher education access as significant determinant factors of education enrolment which this study does not consider. For the long-run positive significant impact found in the context of Nigeria by Oriakh and Ameh (2014), Omodero and Azubike (2016) and Omitogun and Longe (2017), this study argues against the findings that there is no long-run significant impact of government expenditures on education enrolment in Nigeria.

5. Conclusion and Recommendations

The study basically set aside to investigate the impact of government expenditure on education enrolment in Nigeria within the time frame 1980 and 2017. The study does not only consider the Nigerian expenditure pattern, but considered expenditure components. The expenditure components are capital and recurrent expenditures. These components were further disaggregated to check the impact of each line expenses (administration, economic services, social services and transfer payment) on education enrolment. To analyse the data used, the Autoregressive Distributed Lag (ARDL) econometric model was used for the analysis. Prior to the estimations, the data were subjected to behavioural checks (such as descriptive statistics, correlation test, unit root test and long-run co-integration test) for the period covered. The pre-estimation shows that the data nature are dynamic, without multicollinearity problem, there is absence of an unit-root problem after first differencing and for long-run co-integrating relationship: there was no long-run co-integrating relationship for the capital expenditure model, while there was a long-run co-integrating relationship among the variables for the recurrent expenditure model. The pre-estimation test gave some level of confidence in estimating the parameters of the model. From the estimation result, it was found out that in the short-run, expenditure components for both capital and recurrent expenditure model had a negative impact on education enrolment, except for capital expenditure on social
services which was positive and recurrent expenditure on economic services significant at 5%. However, in the long-run, for the capital expenditure model, it was impossible to estimate the long-run result because of the absence of long-run co-integrating relationship among the capital expenditure model variables. In the long-run for recurrent expenditure model, all recurrent expenditure components had a negative insignificant impact on education enrolment in Nigeria.

From the findings, the study concludes that empirically it is not well representative enough examining the impact of a component of government expenditure on education enrolment. The reason for this is that, considering the disaggregated components, different findings from the existing studies were noted. This study, however, could be seen on one side as a robustness check of the findings of the existing studies. In the context of Nigeria, the pattern of government expenditures towards development plans as claimed does not in any way encourage education enrolment in the Nigerian environment. The study recommends that to revamp the need of education enrolment to all, there is need for policies to be unified at channels through which the benefits of education enrolment can be availed to today and unborn generations as it is in developed countries such as the United States, United Kingdom among others through addressing the socio-economic decay in the education sector of Nigeria and there is need to have programmed policies that will monitor the pattern of government spending towards meeting the primary goal.

End Notes


References


FACTORS THAT INFLUENCE WAGES DIFFERENCES IN FORMAL SECTOR ON MALE AND FEMALE WORKERS IN PALEMBANG CITY

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JEL J31, J24, L25, J2

Abstract

The purpose of this study is to know and find out which factors are the most dominant in influencing the wages of male and female workers and to find out whether or not there are differences in the parameters of the independent variables between men and women in formal sector in Palembang City. This research used in this study is primary data in the form of questionnaires or questions that are asked directly to respondents from 6 industrial companies at risk with 164 respondents consisting of 104 male respondents and 60 respondents from the total population 211 people. Data analysis methods used are different test analysis and multiple regression analysis. The results showed that male respondents on education, working hours, work experience had a positive and significant effect on the wages of male workers while age had no effect on the wages of male workers while female respondents showed that education, age and risk had a positive effect and significant effect on the salary of women workers. While work experience and working hours have a positive and not significant effect on the salary of women workers. Then for the different parameters test results showed that education, age, working hours and work experience have different parameters between men and women while for risk there is no difference between men and women. The results of the study, the government of Palembang city can make a strategy to control the distribution of wage occurs and make a policy. Policies that are made are not only standard policies to increase the productivity of women, but also policies that promote justice between men and women in recruitment and workplace.

Key words:

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1. Introduction

Differences in labor wages by gender are still a topic of discussion and problems in every country in the world, one of which is in Indonesia. Differences in labor wages by gender are differences in the average wages that occur between men and women or differences that show female workers' wages are lower than men. According to Vakulenko and Leukin (2017) said that women's wages are lower than men's occur in almost all countries in the world, and the difference in wages occurs in all wages patterns both daily, weekly, and monthly and occurs in almost all non-agricultural sectors and manufacturing sectors separately.

World Economic Forum (2015) conducted an evaluation in 145 countries in the world with consideration of participation in the fields of economy, health and education to measure and see differences in wages between genders. The results reveal that no country has succeeded in erasing wage differentials between genders (Henigusnia, 2014). The difference in gender wages in Indonesia itself is still a problem that is often discussed. The problem of wage differentials in Indonesia is still confronted by the problem of the labor force, which is large of low quality due to low levels of education.

Apart from that the high labor force participation rate in Indonesia is not followed by high productivity as well, so that those who work often get low wages and incomes (Ananta, 1990). There are significant inequalities in the application of wages in Indonesia. It can be proved by looking at and using data from the National Secretariat of 1996, 1999, 2002 and 2004 which showed that factors that cause disparities to occur, one of which is due to differences in characteristics in terms of employment (Primana, 2006). This wage difference also occurs in provinces and cities in Indonesia, namely South Sumatra. The difference in gender wages in the province of South Sumatra according to BPS (2017) continues to increase every year is evidenced in 2013 the difference in wages by gender only amounted to 0.20% and in 2017 increased to 0.29%. the difference in wages between genders in South Sumatra has a direct impact on one of the cities, Palembang.

The average wage rate for female workers in Palembang in 2013-2017 though the increase was 23.69%, but was still far higher than the increase in the wages of male workers, which was 30%. So, the ratio of women's wages to males decreases from 73% to 69%. The lowest female wage ratio occurred in 2014, which was 62% (Pusdatinaker, 2018). This, of course, raises some characteristic factors that cause the difference in the application of wages. Based on the explanation above, this study aims to analyze the influence of education, age, working hours and work experience of male workers and women's wages on the formal sector in Palembang.
2. Literature Review

According to Jacobsen (2004), the low wage of female workers compared to male workers is due to differences in human capital, namely Education. Because education is one of the important factors in developing human resources (Tarmizi, 2012). According to the theory of human quality capital, education and training can not only improve one's knowledge but also improve skills, thereby increasing work productivity.

Borjas (2016), older workers will earn more income, because they are enjoying result of investment and in the end the curve shows the level of income received by workers slower in line with the development of time spent by workers, then age affects it. This income is also caused by several factors that influence it, namely young workers usually have limitations in terms of skills and experience so that the marginal product produced will be much lower than older workers and someone who works at a job at risk will receive a higher wage that higher than someone who works in a job that has no risk at all. Someone who has work experience will receive higher and higher wages than someone who has no work experience at all. Furthermore, these working hours greatly affect the level of wages received, if the wage offered is high, the hours of work to be provided by workers also increase, which means that the more wages provided by employers, the more hours of work to be provided by workers (Hennigusnia, 2014). In general, a person will work if the wage level in the labor market is equal to or higher than the reservation wage, which is the minimum wage that encourages the owner of the workforce to enter the labor market by offering several of hours of work (McConell, 2015).

Becker (1995) states the differences in the application of wages between women and men workers can also be caused by the choice of workplaces. Another study conducted by Susilowati (2005) showed that differences in wages by gender are more due to the choice of place of work. The results of research conducted by Oaxaca (1973) revealed that the gender gap between wages was largely influenced by factors of education, health problems, work experience and migration. Firdaus (2011) found that differences in endowments caused wage differences or determinants of wage rates between men and women in the formal and informal sectors.

Ismail and Jajri (2012) in their observations in Malaysia found that the difference in wages or income received by the workforce was caused by race, human capital and job characteristics say that workers who receive training, higher education will be able to receive higher salaries when compared to uneducated workers as well as workers who have more work experience for the various sectors of the work it does.
Likewise with Tanzel and Bircan (2010) indicates that the working sector has an influence on the gap in revenue determination received. Which is the case of the Turkish state showed or described someone working in the public sector will be much greater received remuneration in terms of money compared to someone working in the private or special sector.

Miswar (2018) analyzed wage levels in Aceh showed that education, the employment sector and working hours have a positive effect on the wage levels of workers in Aceh, which in this study education refers to the length of time a person experiences education. Another study conducted by Susilowati (2015) showed that wage differences by gender were mostly caused by family role constraints then he also said that differences in the application of labor wages were greatest in the agricultural sector while the smallest occurred in the non-agricultural sector in a state of normal employment status. According to Adireksombat and Sakellarion (2010) said that the wage gap between genders in Thailand is most dominant due to discrimination factors (factors that cannot be explained significantly) when compared to endowment factors namely education, age and employment status and also found that the level of gender inequality in the labor market increased each year from 1991 to 2007 or for the past 16 years. Picchio (2006) in his research which aims to estimate the gap in obtaining wages between workers viewed from their employment status in Italy, using household data in 2002 through income welfare surveys showed that workers with honorary status will receive lower income compared to with workers who are permanent employees.

Analysis by Ruhiat (2008) using Sakernas 1998 data stated that in general, the wages of female workers are still below the wages of male workers, where the wages of female workers whose status is employees or laborers only get wages of 29.6% to 90, 22% compared to the wages of male labor as well as later. Kapsos analysis (2008) based on data from the Bangladesh Bureau of Statistics shows that the income received by women per hour is only 21% than men and the difference that is distinguished by age, education, industry, work, and geographical location is only 15.9% affect the gender wage gap. A study done by Lamazi (2018) revealed that the variable hours of work, education levels, and non-agricultural sectors have a significant influence on women's income in South Sumatra. Then the non-agricultural employment variable has a negative effect on the wages received by women workers, suggesting that the wages received by women working in the non-agricultural sector will be lower than the wages of women working in the agricultural sector. Furthermore, the status variable and having children under five did not significantly influence the wages of female workers in South Sumatra.
Reshid (2016) in his study of university graduates in Sweden in the period 1996-2012 revealed that the role of job mobility and the chosen occupation greatly affected the level of wages to be received, this led to a wage gap between genders. Then the study also found that this gender wage gap had increased over the past 10 years when entering the labor market which is equivalent to a gender gap in annual wage growth of 1%. Furthermore, research conducted by Jacob (2006) using the Oaxaca Blinder decomposition analysis concluded that the labor wage gap could not be explained even though control had been carried out with variables thought to affect the application of labor wage levels, namely: employment, industry, workers and job’s characteristics.

Berardi (2013) states that work experience as a classic determinant of wages is in line with expectations, namely to increase wages significantly. Marital status does not significantly influence wages in the informal sector but is significant in the formal sector and gender and regional origin do not significantly affect wage levels. Furthermore, research done by Hossain and Haque (2015) found that education, age, gender and place of work had a significant effect on differences in daily wages and annual wages received by workers in Bangladesh. Study done by Hafid (2014) showed that the number of hours worked, the work system and the number of dependents had a positive effect on the level of nominal wages received by textile workers and their derivatives. Whereas the length of service, education, and gender do not affect the nominal wage level received by textile industry workers.

Study conducted by Ghazali, Wahyuddin, and Trisnawati (2012) showed that the variable position, company location, employment status and age significantly influence wage levels. While experience, education level and gender do not significantly influence wage levels in the public sector. Then, study done by Bhattarai and Winiewsky (2002) found that age, gender, and length of the school were the most significant factors affecting the level of wages received by workers in the United Kingdom. While the vocational qualification factor does not have a significant effect on wage levels.

3. Conceptual Framework

Based on the literature review and previous studies, the framework of this study is shown in the following figure:
Figure 1 is a research plan to be followed in analyzing the factors that influence wages in formal sector on male and female workers in Palembang city. Based on the literature review, the hypotheses constructed from this research are:

1. H1: Education has a positive and significant effect on the wages of male and female workers formal sector in Palembang city.
2. H2: Age has a positive and significant effect on the wages of male and female workers formal sector in Palembang city.
3. H3: Working Hours has a positive and significant effect on the wages of male and female workers formal sector in Palembang city.
4. H4: Working Experience has a positive and significant effect on the wages of male and female workers formal sector in Palembang city.
5. H5: Risk has a positive and significant effect on the wages of male and female workers formal sector in Palembang city.

4. Model and Method Analysis

This study was conducted in Palembang city, as the object of study were male and female workers who worked in the formal sector. According to BPS criteria the formal sector has 2 employment statuses, namely permanent workers / employees /
laborers and workers assisted by permanent workers. The problems to be examined are the factors that influence the difference in the wages of male and female workers, including: education, age, working hours, work experience, and risks that are suspected to affect the wages of formal sector male and female workers in city Palembang city. The data used is primary data in the form of questionnaires or questions directly asked respondents directly related to the production process, while secondary data came from BPS (Statistics Indonesia) of South Sumatra in 2018 and the Directory of Large and Medium Industrial Company in South Sumatra Province in 2018.

The number of respondents in the study came from 6 industries at risk as seen from the tools and materials used in Palembang city with the total of 164 respondents consisting of 104 male respondents and 60 female respondents from a total population of 211 people. Data collected used a survey method with proportional random sampling technique. Then the method used is the parameter difference test method and the multiple regression analysis method separately for male and female respondents. The model used is as follows:

1. Different parameter test analysis
   This model is used to find out whether or not there are differences in the parameters of the independent variables between men and women. The equation model for the different parameter tests is as follows:

   \[ U = \alpha_0 + \alpha_1 D_L + \alpha_2 P + \alpha_3 D_L P + \alpha_4 U m + \alpha_5 D_L U m + \alpha_6 J K + \alpha_7 D_L J k + \alpha_8 P K + \alpha_9 D_L P k + \alpha_{10} R s + \alpha_{11} D_L R s + e \]  
   (1)

   Where: \( \alpha_1 - \alpha_{11} \) = Regression coefficient; \( \alpha_0 \) = Kontanta; \( U \) = Wage; \( D_L \) = The dummy variable is 1 for men and 0 for women; \( P \) = Education; \( D_L P \) = dummy multiplied by education; \( U m \) = Age; \( D_L U m \) = dummy times age; \( J K \) = Working hour; \( D_L J k \) = dummy multiplied by work hours; \( P K \) = work experience; \( D_L P k \) = dummy times work experience; \( R s \) = Risk; \( D_L R s \) = dummy multiplied by risk; \( e \) = error term.

2. Multiple regression analysis
   This model is used to look at factors that influence wages of female workers and wages of male workers. The econometric equation model is as follows:

   \[ U^L = a_0 + a_1 P + a_2 U m + a_3 J K + a_4 P K + a_5 R s + e \]  
   (2)

   \[ U^P = a_0 + a_1 P + a_2 U m + a_3 J K + a_4 P K + a_5 R s + e \]  
   (3)

   Where: \( U^L \) = wages for men; \( U^P \) = wages for women; \( P \) = education; \( U m \) = Age; \( J K \) = Working hour; \( P K \) = Work experience; \( R s \) = risk; \( e \) = confounding variable.

   Age is the age of the respondent or worker stated by the date, month and year of birth. Education is the highest and last education completed by the respondent meas-
ured in years. Work experience is the difference in age with the age of education completed. Working hours are the number of hours worked by a person excluding rest hours and working hours used for things other than the main job. Risk is a dummy variable where when it is assumed in carrying out the work there is a risk of 1 and when the work is done does not open opportunities for injury not at risk 0.

5. Results

The initial analysis results in this study are about the frequency distribution of each variable studied based on field research in the formal sector according to gender. The distribution is the distribution of respondents according to education, age, working hours, work experience, risk and wage levels as follows:

Table 1

<table>
<thead>
<tr>
<th>Education (Years)</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 years (Graduate of SMP)</td>
<td></td>
<td>10 (9,62%)</td>
<td>18 (30%)</td>
</tr>
<tr>
<td>12 years (Graduate of SMA)</td>
<td></td>
<td>62 (59,62%)</td>
<td>36 (55%)</td>
</tr>
<tr>
<td>15 years (Graduate of Diploma/ University)</td>
<td></td>
<td>32 (30,77%)</td>
<td>9 (15%)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>104 (100%)</td>
<td>60 (100)</td>
</tr>
</tbody>
</table>

*Source: Field Research Results.*

Table 2

<table>
<thead>
<tr>
<th>Age Group (Years)</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-25</td>
<td></td>
<td>10 (9,61%)</td>
<td>7 (11,67%)</td>
</tr>
<tr>
<td>26-35</td>
<td></td>
<td>44 (42,30%)</td>
<td>20 (33,33%)</td>
</tr>
<tr>
<td>36-45</td>
<td></td>
<td>30 (28,84%)</td>
<td>27 (45%)</td>
</tr>
<tr>
<td>≥ 45</td>
<td></td>
<td>20 (19,23%)</td>
<td>6 (10%)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>104</td>
<td>60</td>
</tr>
</tbody>
</table>

*Source: Field Research Results.*
Factors that Influence Wages Differences in Formal Sector on Male and Female Workers in Palembang City

**Table 3**  
Distribution of Respondents by Working Hours

<table>
<thead>
<tr>
<th>Working Hours/Weeks</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 40 hours</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>More than 40 hours</td>
<td>104 (100%)</td>
<td>0 (0%)</td>
<td>60 (100%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>104 (100)</td>
<td>60 (100)</td>
<td></td>
</tr>
</tbody>
</table>

*Source:* Field Research Results.

**Table 4**  
Distribution of Respondents According to Work Experience

<table>
<thead>
<tr>
<th>Work Experience (Years)</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>6 (5.76%)</td>
<td>3 (5%)</td>
<td></td>
</tr>
<tr>
<td>11-20</td>
<td>39 (37.5%)</td>
<td>13 (21.67%)</td>
<td></td>
</tr>
<tr>
<td>21-30</td>
<td>25 (24.03%)</td>
<td>29 (48.33%)</td>
<td></td>
</tr>
<tr>
<td>≥ 30</td>
<td>34 (32.69%)</td>
<td>15 (25%)</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>104</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

*Source:* Field Research Results.

**Table 5**  
Distribution of Respondents by Risk

<table>
<thead>
<tr>
<th>Risk</th>
<th>Jumlah</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>At risk</td>
<td>56 (53.85%)</td>
<td>31 (51.67%)</td>
<td></td>
</tr>
<tr>
<td>No risk</td>
<td>48 (46.15%)</td>
<td>29 (48.33%)</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>104 (100%)</td>
<td>60 (100%)</td>
<td></td>
</tr>
</tbody>
</table>

*Source:* Field Research Results.
Table 6

Distribution of Respondents by Wage Level

<table>
<thead>
<tr>
<th>Wage / monthly rate (Rp)</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.500,000.00 – 2.000,000.00</td>
<td>- (0%)</td>
<td>5 (8.33%)</td>
</tr>
<tr>
<td>2.100,000.00 – 3.000,000.00</td>
<td>42 (40.38%)</td>
<td>30 (50%)</td>
</tr>
<tr>
<td>3.100,000.00 – 4.000,000.00</td>
<td>36 (34.62%)</td>
<td>21 (35%)</td>
</tr>
<tr>
<td>4.100,000.00 – 5.000,000.00</td>
<td>18 (17.31%)</td>
<td>4 (6.67%)</td>
</tr>
<tr>
<td>5.100,000.00 – 6.000,000.00</td>
<td>8 (7.69%)</td>
<td>- (0%)</td>
</tr>
<tr>
<td>Total</td>
<td>104 (100%)</td>
<td>60 (100%)</td>
</tr>
</tbody>
</table>

Source: Field Research Results.

Based on the above table regarding the distribution of respondents based on education, age, working hours, work experience, risk and wage levels it is known that for male and female respondents the highest school education is 59.62% for men and 55% for women. Then the distribution of respondents by age shows that the age of men is at most 26-35 years which is 44 people (42.30%), while for female respondents, the most are 36-45 years old that is equal to 27 people or 45 percent. Furthermore the respondents' distribution based on working hours said that both male and female respondents worked more than 40 hours per week, so this concluded that respondents in the formal sector worked above normal working hours.

Distribution of respondents based on work experience shows that male respondents have the most work experience ranging between 11-20 years which is equal to 37.5% (39 people), whereas for female respondents the most have work experience ranging from 21-30 years which is equal to 48.33% or 29 people. Furthermore, the distribution of respondents according to risk shows that both male and female respondents work the most at risk compared to those who are not at risk, amounting to 53.84% or as many as 56 people for men and as many as 31 people and by 51.67% for female respondents. Finally, the distribution of wage levels for both men and women has the most wages ranging from Rp. 2,100,000.00 to Rp. 3,000,000.00 per month.
5.1. Econometric Analysis

Table 7

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-statistic</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Konstanta</td>
<td>-59126,704</td>
<td>-2.944</td>
<td>0.004</td>
</tr>
<tr>
<td>DL</td>
<td>-12041,538</td>
<td>-2.822</td>
<td>0.005</td>
</tr>
<tr>
<td>Education</td>
<td>127929,532</td>
<td>3.085</td>
<td>0.002</td>
</tr>
<tr>
<td>DL Education</td>
<td>25009,869</td>
<td>5.291</td>
<td>0.000</td>
</tr>
<tr>
<td>Age</td>
<td>24223,631</td>
<td>2.349</td>
<td>0.020</td>
</tr>
<tr>
<td>DL Age</td>
<td>3084,556</td>
<td>3.194</td>
<td>0.002</td>
</tr>
<tr>
<td>Working Hours</td>
<td>42190,309</td>
<td>2.890</td>
<td>0.004</td>
</tr>
<tr>
<td>DL Working Hours</td>
<td>16956,063</td>
<td>2.311</td>
<td>0.022</td>
</tr>
<tr>
<td>Work Experience</td>
<td>13387,941</td>
<td>2.576</td>
<td>0.011</td>
</tr>
<tr>
<td>DL Work Experience</td>
<td>22855,522</td>
<td>2.346</td>
<td>0.001</td>
</tr>
<tr>
<td>Risk</td>
<td>347621,666</td>
<td>2.578</td>
<td>0.011</td>
</tr>
<tr>
<td>DL Risk</td>
<td>6489,272</td>
<td>1.207</td>
<td>0.229</td>
</tr>
</tbody>
</table>

Source: SPSS Processed Results.

Based on the results of different test parameters of men and women show that the parameters between men and women are different or there are differences for all variables except risk variables because seen from the significance value for all variables namely education, age, working hours and work experience are in below 0.05 or 5% (<0.05) while the risk variable is above 0.05. The difference in education variables between men and women is caused by the lack of opportunities for women to pursue higher education and the production level and ability of women who are considered lower than men. Then for the age variable there is a difference due to female workers in their 20-30s married, pregnant, and having children decided to stop working with the reason to take care of the family and when they return workers will receive a salary at the initial point like new workers, while men will continue to work until reaching the age of retirement so that the salary received will continue to grow.

Furthermore, for the variable hours worked, there are differences in parameters due to the decision of workers to choose to add or break down working hours. In general, women usually consider leisure as a normal item because it is prioritized for household needs. Whereas men consider leisure as inferior goods because as the head of the family must meet the needs of the family. The different parameters of work experience between men and women are caused by different work experiences due to the type of experience. Usually men have experience of practical training and general training while for women only have experience of general training caused by their
physical weakness. Meanwhile, the risk variable does not have different parameters because if men and women work in the same place, the risks they face will be the same.

Table 8

Results of Estimation of Multiple Linear Regressions for Male Respondents

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-value</th>
<th>Std Error</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>152,939</td>
<td>4,271</td>
<td>35,809</td>
<td>0,000</td>
</tr>
<tr>
<td>Age</td>
<td>27,308</td>
<td>1,441</td>
<td>18,955</td>
<td>0,153</td>
</tr>
<tr>
<td>Working Hours</td>
<td>59,146</td>
<td>1,945</td>
<td>30,414</td>
<td>0,055</td>
</tr>
<tr>
<td>Work Experience</td>
<td>36,243</td>
<td>2,040</td>
<td>17,769</td>
<td>0,044</td>
</tr>
<tr>
<td>Risk</td>
<td>354,110</td>
<td>2,176</td>
<td>116,776</td>
<td>0,032</td>
</tr>
</tbody>
</table>

Kontanta = -711,683 D-W Hitung = 1,827
R-Square = 0,658 F-Statistik = 40,377
R-Square Adjusted = 0,641

Source: Processed Results of SPSS, 2019.

Table 9

Results of Estimation of Multiple Linear Regressions for Women Respondents

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-value</th>
<th>Std Error</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>127,929</td>
<td>3,678</td>
<td>34,780</td>
<td>0,001</td>
</tr>
<tr>
<td>Age</td>
<td>24,223</td>
<td>2,144</td>
<td>11,296</td>
<td>0,037</td>
</tr>
<tr>
<td>Working Hours</td>
<td>42,190</td>
<td>1,282</td>
<td>32,910</td>
<td>0,025</td>
</tr>
<tr>
<td>Work Experience</td>
<td>13,387</td>
<td>1,104</td>
<td>12,131</td>
<td>0,275</td>
</tr>
<tr>
<td>Risk</td>
<td>347,621</td>
<td>2,399</td>
<td>144,888</td>
<td>0,020</td>
</tr>
</tbody>
</table>

Kontanta = -59,126 D-W Hitung = 2,050
R-Square = 0,551 F-Statistik = 19,997
R-Square Adjusted = 0,510

Source: Processed Results of SPSS, 2019.

Then based on the results of the regression that has been done, the simultaneous equation model can be formulated as follows:

\[ U^L = -711,683 + 152,939P + 27,308Um + 59,146JK + 36,243PK + 354,110Rs + e \]
\[ U^P = -59,126 + 127,929P + 24,223Um + 42,190JK + 13,387PK + 347,621Rs + e \]
Based on the calculation results F obtained a value of 40,337 for male respondents and 19,997 for female respondents. So that it can be concluded that the independent variables for both men and women together influenced the dependent variable. Then the results of processing found that the value of the coefficient of determination for male respondents by 66% and for women by 55% which means that the variables of education, age, hours of work, work experience by 55% for women and 66% percent for men and the rest 34% for men and 45% for women are explained by other variables not included in the regression model.

5.1.1. The effect of education on the wages of male and female workers

The results of the estimation of the regression equation show that the education variables for female and male workers have a positive and significant effect on the wages of male and female workers. This can be seen from the coefficient values of 152.939 and 127.929, respectively. And for the value of t-count for each respondent of 4.271 and 3.678 is greater than the t-table for men for 1.659 and t-table for women for 1.670 (t-count > t-table). The significance of this educational variable is in accordance with research conducted by Miswar (2018); Firdaus (2011); Primana (2006) and Oaxaca (1973) which stated that a person's income is a reflection of individual choice of investment in education and training because the wage level is determined by investment in human capital in which if one's education increases, the wages to be received will also increase.

5.1.2. Effect of age on the wages of male and female workers

Based on the results of estimation obtained that age for male workers has a positive and not significant effect on the wages of male workers as seen from the coefficient value of 27.308 and the value of t-count smaller than t-table (1.441 < 1.659). Whereas for female workers, it shows that age has a positive and significant effect on the wages of female workers as evidenced by a coefficient value of 24,223 and a t-test value greater than t-table (2,144 > 1,670). The significance of the age variable in male respondents is not following the theory, but the significance of the age variable in female respondents is in accordance with the theory that the marginal revenue from efficiency of quality of human capital which initially rises, then decreases as the working age increases. Because young workers usually have limitations in terms of skills and work experience so that the marginal product produced will be much lower than older workers (Borjas, 2016).
5.1.3. Effect of working hours on the wages of male and female workers

The estimation results of the equation show that working hours have a positive and significant effect on the salary of male workers. This can be seen from the t-value greater than t-table (1.945 > 1.659). Whereas for female workers it was shown that working hours had a positive and not significant effect on the wages of female workers because the t-count was smaller than t-table (1.282 < 1.670). The significance of the working hour variable in male respondents is consistent with the theory and research conducted by Firdaus (2011); Blinder (1973) and Sugiharso (1990) which stated that the preferences of individual workers could affect the level of wages earned was highly dependent on the hours worked by the worker.

5.1.4. Effect of work experience on the wages of male and female workers

Regression results for work experience differ between men and women in which for men the work experience variable has a positive and significant effect on the wages of male workers, as evidenced by a coefficient value of 36,243 and a t-test value greater than t-table (2.040 > 1.659). Whereas for women, it showed that the work experience variable had a positive and not significant effect on the wages of female workers, as seen from the t-count value which was smaller than t-table (1.104 < 1.670). The significance of the work experience variable in men is in line with the hedonic theory which states that one of the causes of wage differences is the difference in experience that workers have. Because according to Tarmizi (2012) work experience is reflected by workers who can work elsewhere before so that the more work experience gained by workers will make these workers more trained and skilled in carrying out their work. However, this situation is inversely proportional to women, which shows that work experience does not make women workers more skilled.

5.1.5. Effect of risk on the wages of male and female workers

The results of the regression equation show that risks for both men and women have a positive and significant effect on the wages of male and female workers with coefficients of 354,110 and 347,621, respectively. Then the t-value of the risk of male and female respondents is greater than t-table, namely (2.176 > 1.659) and (2.333 > 1.670). This result is in accordance with the hedonic theory and Wellschmied (2016) which states that the source of the difference in the level of wages of workers includes 2 aspects namely diverse aspects of work and diverse aspects of workers.
6. Conclusions

Based on the results of the study showed that male respondents on education, working hours, work experience and risk have a positive effect on the wages of male workers and age have a positive and no significant effect on the wages of male workers. Meanwhile the female respondents showed that education, age and risk had a positive and significant effect on the wages of female workers while working hours and work experience had a positive and no significant effect on the wages of female workers. Then for the different parameter test results showed that education, age, working hours and work experience have different parameters between men and women while for risk there is no difference between men and women. Some suggestions that can be offered are Palembang city government can make strategies to control the distribution of wage that occurs and make a policy. Policies that are made are not only standard policies to increase women's productivity, but also create policies that promote justice between men and women in recruitment and workplaces so that the welfare of male and female workers can be increased.

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DIRECTIONS FOR IMPROVING THE TAX ADMINISTRATION AND TAX CONTROL UNDER MODERN CONDITIONS IN THE REPUBLIC OF AZERBAIJAN

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Abstract

The main indicator of the formation of economic policy of the state in the context of globalization is timely payment of taxes to the state budget. In this regard, tax administration and tax control are aimed at collecting taxes at a specific time and directing them to the state budget. Improving the tax administration in the modern conditions is one of the most important issues. The purpose of this article is to investigate the gaps in the area of tax administration and improvement of tax control in order to improve the state budget of the Republic of Azerbaijan and identify ways to prevent those. Although great efforts have been made in this area over the past 30 years, there are still gaps. This article will also show how important changes and innovations have been made in the state's tax policy in recent years in the area of tax administration and tax control.

Key words:
State budget, tax administration, tax control, tax policy, Republic of Azerbaijan


1. Introduction

One of the key priorities set out in the Strategic Roadmap for the National Economic Perspectives of the Republic of Azerbaijan, approved by the Decree of President Ilham Aliyev dated December 6, 2016, is to further strengthen the government's leading role in creating a favorable business environment. As part of that
priority, the Azerbaijani government intends to strengthen the institutional framework of the business environment. In particular, the development of a free competition mechanism and reducing the role of the human factor in business-to-business relations has been considered as the main principle of increasing efficiency, accountability and transparency. Another function of the state is to enter into free trade agreements to provide access to foreign markets, to provide technical regulation and the formation of a national standardization system in line with international standards. At the same time the government is expected to continue to work to increase mutual trust and transparency between taxpayers and tax authorities, and to increase efficiency in the business environment through an optimal tax burden policy. One of the key steps here is to promote an effective tax system and tax administration (Aliyev, 2016)

Tax administration is the management of tax legal relations with the direct participation of special state bodies to carry out certain state financial and economic policies. The mechanism of tax administration is a set of legislative, internal discipline rules and rules of conduct for each participant of these legal relations in a particular area of public administration (Tax Code Of The Republic Of Azerbaijan, 2000).

Reducing the dependence of the Azerbaijani economy, especially on oil revenues, which are the main source of budget revenues, requires fundamental changes in tax administration and tax control, which are part of it. Thus, with the decline in oil revenues, there is a greater likelihood of tax offenses in other key sectors of the economy, and a worsening of intergovernmental relations, as well as a sharp drop in budget revenues. This gap cannot be solved simply by toughening or easing budgetary legislation. Thus, there is an inseparable relationship between tax legislation, the methodology for its application and the management of the tax system as a whole.

Improvement of the tax system in Azerbaijan should be directed, first and foremost, at the preservation of optimal business relations with the state. This is largely due to the results of the work done with the taxpayers through the administration of the Ministry of Taxes. One of the most important issues here is the organization of work with large taxpayers, which provide 80% of the state budget. In recent years, positive dynamics in this area has been linked to the activities of large taxpayers and an independent tax administration - the Department of Large Taxpayers. All nuances of the administration of large taxpayers are governed by the relevant regulations and guidelines of the Ministry of Taxes or methodical instructions.
The analysis in the article shows that tax administration is one of the activities of tax authorities to ensure that taxes and duties are included in the country's budget system. Deficiencies in tax administration increase the likelihood of irregularities in tax revenues, which can lead to a dramatic reduction in tax revenues. Successful tax administration will improve the investment climate and ensure the rights and legitimate interests of both citizens and legal entities.

Studies show that a modern tax administration system should provide:
- Increase in the collection of taxes and fees for the full and timely budgeting of all levels;
- Reduction of the taxpayer's costs and taxes and fees
- Maximum comfort for them when performing payment tasks - creation of conditions;
- For enterprises operating under the same economic activity to adhere to the principle of justice for all economic agents who create equal conditions;
- Reduction of the state's tax control expenses.

The tax system in Azerbaijan is the next step in the tax reform aimed at developing the tax administration. As a result, their research will allow us to formulate a unified concept for the development of tax administration and more modern social and economic development of our state. The Tax administration is one of the key areas in the development of tax relations in the context of Azerbaijan's economic reform (Vakilov, 2013a).


The object of the article is the tax administration considered in the process of interaction between the tax authorities of Azerbaijan and the taxpayers.

The subject of the article is the reciprocal economic relationship between economic entities and tax administration in the taxation process.

This method used systematic methodologies, observations, economic statistics, comparative and marketing analysis techniques that were considered acceptable for this type of article research.

2. Theoretical - methodological theories of tax administration and tax control

The tax administration, as an organizational and management system for the implementation of tax relations, includes the functions, forms and methods that will be used to ensure full access to Azerbaijan's budget system. It should be noted that the
economic literature has no general understanding of the composition and content of the functions of tax administration. Some authors give different combinations of functions that are not sufficiently developed to express the fundamentals of tax administration (Vakilov, 2013b). At the same time, tax administration as an economic category is characterized by the features that reveal its essence and its internal content. On this basis we can assume that the essence of tax administration as a form of management passes through the following functions: forecasting, accounting, control, regulation, forcing.

Table 1

<table>
<thead>
<tr>
<th>Taxation administration functions</th>
<th>Content and forms of administration</th>
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| Forecasting                       | • tax potential of the economy assessment  
|                                   | • short-term tax revenues forecasting |
| Accounting                        | • taxpayer registration and state registration;  
|                                   | • reporting and processing  
|                                   | • registration of taxes and surcharges  
|                                   | • monitoring of tax debts and their payment by taxpayers |
| Control                           | • control over timely receipt of tax payments  
|                                   | • tax audits  
|                                   | • tax inspection materials implementation  
|                                   | • tax audit |
| Regulation                        | • changes in terms of tax payments (extended or expired, investing tax credit)  
|                                   | • debt restructuring  
| Forcing                           | • for tax legal violations sanctions (tax; administrative) |


All of these functions are inextricably intertwined, and their interaction transforms tax administration into a holistic system. This is explained by the fact that the legislation and the rights and powers to control the observance of the existing legal norms in the tax sphere are defined by the legislation. Tax control is the main mechanism of tax administration. Tax control is a function and element of state and financial management, special area of activity of the state executive power, local self-government, other authorities and officials. In other words, tax control is the achievement of such a level of compliance with tax discipline by using appropriate forms and methods of subjects with the appropriate authority and competence to
focus on the creation of an effective tax system that excludes or minimizes the violation of tax legislation. The purpose of tax control is to ensure the timely and complete inclusion of all taxes and payments provided by the legislation to the state budget and extra-budgetary funds, while ensuring effective tax administration aimed at protecting the balance of public and taxpayer interests. Thus, the contents of tax control include not only control over the expectation of tax legislation, but also the identification of economic entities that falsify information about their activities, assessing the accuracy of these data, and obtaining more accurate information based on indirect (computational and analytical) methods of tax deductions (Samadzade, 2010). As you can see, there are differences between tax administration and tax control based on the subject-object structure, purpose and functional characteristics, implementation principles and methods (Vakilov, 2013b).

3. Tax control at the current stage of development of the tax system influence of mechanisms on increasing tax revenues analysis

As a result of large-scale reforms, complex measures implemented and successful implementation of programs aimed at specific goals in the country, the formation of tax services meeting modern international standards has been achieved in our country (Vakilov, 2015).

The article presents the SWOT - matrix for the synthesis of external and internal factors influencing the development of Azerbaijan's tax system and the most important factors underpinning strategic management decisions.

**Table 2**

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Opportunities</th>
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<tr>
<td>1. Availability of a unified legislative framework for the implementation of flexible and effective tax policy</td>
<td>1. Ability to provide taxpayers with the majority of tax services available internationally</td>
</tr>
<tr>
<td>2. Adjusting tax rates and rates to international level</td>
<td>2. Availability of basic risk management elements</td>
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<tr>
<td>3. Creating an attractive tax environment for business activities</td>
<td>3. Possibility of training specialists in the field of retraining personnel in tax authorities</td>
</tr>
<tr>
<td>4. Fair distribution of tax burden between separate categories of taxpayers</td>
<td>4. To provide full state support for the development of the tax system</td>
</tr>
<tr>
<td>5. Availability of a technological base with a wide range of technical capabilities</td>
<td>5. The importance of tax reform among government priorities</td>
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348
D. Pashayeva. Directions for Improving the Tax Administration and Tax Control Under Modern Conditions in the Republic of Azerbaijan

<table>
<thead>
<tr>
<th>Weaknesses</th>
<th>Threats</th>
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<tr>
<td>6. Significant educational potential in the tax field</td>
<td>6. Development of the infrastructure of tax authorities as a result of implementation of international projects in the Republic</td>
</tr>
<tr>
<td>7. Availability of information-tax center, tax system development and strategic documentation system in the Republic</td>
<td>7. Availability of strong international contacts in the tax field</td>
</tr>
<tr>
<td>8. Being one of the leading countries in the world for the implementation of the e-registration system</td>
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<tr>
<td>9. Formation of modern tax administration institutions</td>
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<tr>
<td>10. Implementation of uniform control over tax payments by tax authorities</td>
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</tr>
<tr>
<td>1. Relatively low level of compliance with tax obligations</td>
<td>1. Continuation of volatility in oil prices</td>
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<tr>
<td>2. Insufficient level of use of the existing tax potential.</td>
<td>2. Weakening of economic activity of taxpayers</td>
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<tr>
<td>3. Preference for more fiscal functions, poor use of economic functions</td>
<td>3. Tax-legal risks associated with tax payments</td>
</tr>
<tr>
<td>4. Lack of qualitative statistical reporting and information</td>
<td>4. Changes in foreign market situation and foreign economic constraints</td>
</tr>
<tr>
<td>5. Low tax literacy</td>
<td>5. Availability of cash payments</td>
</tr>
<tr>
<td>6. Weakness of corporate governance</td>
<td>6. There are still administrative gaps that lead to an increase in tax evasion and the development of the secret economy</td>
</tr>
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Source: From author's own comments and reviews.

The synthesis of external and internal environmental factors using the SWOT -matrix is evaluating the impact of each of the factors on a group of factors. As a result, more important factors, such as complex effects, will have a longer chain of linkage factors.

4. Assessment and improvement of tax administration efficiency in Azerbaijan

At present, one of the main tasks of the state in Azerbaijan is to achieve reliable tax relations with taxpayers through the implementation of successive tax reforms in accordance with the current state of the economy, the establishment of a tax system that stimulates the overall economic development of the country and, above all, the manufacturing industry (Vakilov, 2016a). In the modern era, improving the tax administration, in line with the goals set by state policy in economic development and tax relations, is seen as a means of reducing the tax burden. The effectiveness of taxation depends on:
for the state - increasing tax revenues through the development of tax base and tax revenues;
for businesses - getting the maximum possible income from tax deductions;
for the population - obtaining sufficient income to pay tax payments and to pay taxes at the expense of the state (Kluwer, 2017).

The demand for taxpayer services and the level of provision of these services in the Republic of Azerbaijan has increased significantly in recent years. First of all, the tax authority increased the choice of services, which led to an increase in the number of requests sent by the public. Second, the number of taxpayers has increased significantly. In general, the progress made in the Azerbaijani economy over the past 10 years is the main reason for the growing demand for employment and entrepreneurial services (https://www.taxes.gov.az, statistics 2010-2019).

So the author believes that the following indicators can be taken as criteria for evaluating the Ministry of Taxes: voluntary compliance; efficiency; increase in the total number of registered taxpayers; increase in the average tax revenue collected for each tax officer; increase in interest rate adjustments as a result of audits; a reduction in the cumulative amount of tax collection problems, such as the annual tax rate; the cost of compliance; a decrease in the average time / hours spent by taxpayers in order to comply with their tax obligations.

The activities of the Ministry and, as a consequence, the tax administration can lead to increased efficiency. In the context of enhancing tax administration efficiency there is a need to continue the tax reform and further improve the tax administration, which is due to the following factors:

- to increase mutual trust and transparency between taxpayers and tax authorities;
- creation of favorable conditions for entrepreneurs;
- determining the real tax potential in line with the sustainable growth rates of the national economy (Lymer, Oats, 2018).

Although the activities of tax officials in the Ministry of Taxes are regularly monitored using both quantitative and qualitative criteria, the tax administration needs to be assessed as a whole. In my opinion, it is advisable to take the following measures to improve tax administration in the country: to increase the focus on administrative and regulatory instructions and oversight functions of the VN headquarters, to relieve the tax authorities of their duties; make certain adjustments to its organizational structure and procedures to ensure that the central office is not entrusted with the appeals department after the initial appeals to the authorities making complaints about the Ministry of Taxes.
In order to strengthen the tax administration, many new provisions have been added to the Tax Code, while amendments have been made to facilitate the exchange of information between tax authorities and taxpayers. The changes made under the tax updates to the law of January 1, 2019 are as follows:

Table 3

<table>
<thead>
<tr>
<th>New provisions and changes added</th>
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<tbody>
<tr>
<td><strong>Before</strong></td>
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<tr>
<td>- The notice or other document previously sent to the taxpayer must be signed and stamped by the head (deputy) of the tax authority</td>
</tr>
<tr>
<td>- Mobile tax audits may include activities of the taxpayer for income, property, road and land taxes for no more than the last 3 calendar years, and no more than 3 years of taxpayer activities, including the year in which other tax audits have been conducted</td>
</tr>
<tr>
<td>- In case of temporary loss of ability by the head of the taxpayer (under the mobile tax inspection) or an individual entrepreneur, the normal taxation shall be suspended</td>
</tr>
<tr>
<td>- In the event of failure to file a complaint to the court within 30 calendar days from the date of receipt of the relevant notice by the taxpayer on taxes, interest and financial sanctions applied by the tax authority, the tax authority has applied to the bank to pay debts to the state budget</td>
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New additions:
- According to the draft law, general principles of taxation, rules for tax payment (excluding sources of payment), rights and obligations of taxpayers and state tax authorities, as well as other participants of tax relations, form and methods of tax control, violation of state tax legislation, provisions concerning the appeal of tax authorities and actions of their officials) will also apply to the mandatory state social insurance and unemployment insurance.
• The object of the financial leasing will be fixed and considered as movable and immovable property related to fixed assets. In addition, only legal entities and individual entrepreneurs can act as lessees under a finance lease agreement.

• Insurers and reinsurers must provide information to legal entities, insured reinsured assets owned by legal entities, their affiliates and representative offices to the tax authorities by the end of the quarter.

• According to the new changes, the following information should be indicated on the check box.
  - note that the receipt is not transferred to the electronic information system of the body, which is determined by the relevant executive authority;
  - Quick Reference Code of Goods (Quick Response Code)

• In the event that the minimum investment amount is not invested, and the investment promotion document is annulled, the tax exemptions from the date of implementation of the investment project, except for the payment of interest on taxes, are paid by the state tax return, is performed.

• Documents (their copies) shall be deemed to be duly delivered when sent (delivered) by the tax authority to the taxpayer in accordance with one of the following forms:
  a) in the case of personal donation to the taxpayer (his authorized representative);
  b) 5 working days from the date of posting when mailing by postal communication to the address of the legal entity-taxpayer as the last address in the state registration documents or in the registration documents of the natural person who is the taxpayer;
  c) after sending electronically to the electronic office within 3 working days from the date of sending electronically.

When the documents are submitted in person, they are provided to the taxpayer (his authorized representative) in a manner that confirms the date of issuance.

• The list of decisions made by the tax authority following the results of the review of the mobile tax inspection materials will be expanded and include the decisions to maintain the previous tax inspection decision, to cancel or amend the previous decision or to make a new decision (Tax Code of The Republic of Azerbaijan, 2019).

The main activities of the Ministry of Taxes are to ensure tax revenues to the state budget, to expand the tax base, to carry out effective tax administration and tax control, and to correct tax records based on changes in the tax legislation.

According to the media from the Ministry of Taxes of the Republic of Azerbaijan, the “shading” of the significant part of the “shadow economy” turnover and the
advancement of the economy in relation to the reduction of the tax burden and the introduction of new tax privileges. As a result, there has been a significant increase in tax revenues, both in predictions and in comparison with the same period last year. The growth rate of tax revenues in January-May of this year (8.3%) was the nominal GDP growth rate (2.8%), while the growth in tax revenues from the non-oil and gas sector (16.1%) exceeding the nominal growth rate (7.7%). Sustainable growth in the number of active payers, including active VAT payers, registered facilities (businesses), a reduction in cash payments, the number of hired workers and payroll, as well as high-income sectors of the economy. Significant increase in specific weight in total tax revenues is a positive factor in tax revenues (https://www.taxes.gov.az/statistics 2019).

Tax Income:
In January-May, 2019, the Ministry of Taxes deployed 3 billion 139.3 million manat to the state budget, the forecast was fulfilled by 110.1 percent, which is 8.3 percent or 239.9 million manat more than in the same period of the previous year. Funds collected:

69% of paid taxes fell to the non-oil sector, 31% to the oil and gas sector. Increase in tax revenues in the non-oil sector was 13.8 percent compared to the forecast, and 16.1 percent (299.7 million manat) compared to the same period last year (https://www.taxes.gov.az, statistics 2018-2019).

The share of the non-state sector in total tax revenues increased by 76.8%. Tax revenues from the private sector of the non-oil sector increased by 17.6 percent, its share in tax revenues from the non-oil sector was 77.3 percent, and its share in total tax revenues was 53.3 percent (https://www.taxes.gov.az, statistics 2018-2019).

Tax revenues from the regions increased by 18.6 percent in January-May 2019, while the share of the regions in the total tax revenues increased by 9.8 percent (https://www.taxes.gov.az, statistics 2019).

Registered taxpayers:
As of June 1 of the current year, the number of active taxpayers increased by 13.1% compared to the same period of the previous year and amounted to 452,242. During the reporting period, the number of active VAT payers increased by 40% and reached 21,394. As of June 1 of the current year, the number of active legal entities increased by 18.1% compared to the same period of the previous year to 71,930 and the number of active individuals increased by 12.2% to 380,312 (https://www.taxes.gov.az, statistics 2018-2019).

During the same period, the number of active VAT payers increased by 33.9 percent to 17,610 and the number of active VAT payers increased by 78.2 percent to 3,784. As of June 1, 2019, the number of active assets (economic entities) increased
by 14.2 percent compared to the same period of the previous year and reached 145,377 (https://www.taxes.gov.az, statistics 2018-2019).

5. Increasing tax audit efficiency as an important direction of increasing tax control

Each audit plan should be in place and management should ensure that the auditors strictly adhere to their performance on time. As with some large taxpayers, there are numerous cases where an audit is not sufficiently complete within the time limits set by the Code (Tax Code Of The Republic Of Azerbaijan, 2019). These are the constraints that undermine the quality of inspections and, in some cases, lead to more frequent inspections. Ideally, an audit should be a "single check" that checks all taxes during one visit, and avoids the need for additional checks within the tax period or other specified time parameters (Voorhees, 2019). As a result of our audit investigations, the author's opinion is that the following suggestions can lead to increased effectiveness of the audit process:

- non-audit of the head office of the Taxpayer Audit Office at the headquarters, instead focusing on the development of audit policies and procedures and ensuring that these procedures are properly implemented in the mobile offices;
- analysis of workload and organizational issues;
- identification of objective methodology for selection of works for mobile audits based on risk management;
- conducting training to improve the quality of audits;
- clarification of the provisions on the frequency of audits in the Tax Code;
- making it possible for a single audit to become a normal practice, i.e. a coordinated review of the firm and all relevant entities or businesses;
- definition of the program of consideration of cases;
- preservation of precedent and historical practices obtained from previous inspections, and the publication of inspectors for their benefit and guidance in future work (Simon James, Christopher Nobes, 2018). These can also be referred to as Audit Instructions;
- making efforts to encourage the delivery of materials (cases) for criminal investigations.

6. Ways to build confidence in the tax system in the creation of an effective tax administration

One of the main objectives of the Government of Azerbaijan is to adapt to the most advanced international standards and to provide most of the tax services used in
the developed countries (Melville, 2018). Therefore, measures are being taken to provide an effective and fair tax and enforcement system that encourages private sector development and business registration and has well-defined, consistent tax rates. Taking into account the importance of the tax system and its management for a favorable business environment, reforms have been made in the country to facilitate tax payments for businesses. The plan is to continue reforms to improve the tax system and administration in order to enhance transparency between the taxpayer and the tax authority, as well as identify the tax potential to promote sustainable economic growth (Voorhees, 2019). In order to move in that direction, a fair tax rate will be assessed, taking into account the tax burden on other companies and the value chain tax for all operations. Also planned is to analyze and evaluate possible reforms to clearly define and forecast tax liabilities in the country in order to forecast financial obligations that are necessary for business entities. In other words, in accordance with these reforms, tax incentives will be considered to encourage the registration of business entities and to expand the tax base (Nelson, Healy, 2018). In addition to the ongoing reforms, it is expected to regularly evaluate the impact of different tax rules on stimulating economic activity, promoting the development of priority sectors and attracting foreign investment. In order to successfully implement reforms, the role of other factors, in addition to tax administration, will be analyzed and adjusted appropriately in the process. The tax system provides for an analysis of opportunities to invest in industries that support economic development by stimulating differentiated companies in economic growth and job creation through government programs (Schaffer, Turley, 2000). One of the main priorities provided by the Strategic Roadmap for the production of consumer goods for small and medium-sized businesses in the Republic of Azerbaijan is the improvement of inspections and licensing mechanisms for SMEs and the continuation of tax reforms (Vakilov, 2016a).

The measures can be grouped as follows:

1. Monitoring and evaluation of SME inspections.
3. Continuing incentive tax reforms in the SME sector.
4. Improvement of licenses, formation of a mechanism for the recognition of international licenses.
5. Further simplification of the process of accessing SMEs to appropriate utilities.
6. Unified certification system for SME creation.
In order to reduce the number of inspections in small and medium-sized businesses, and to increase the competitiveness of these entities, audits conducted here will be involved in monitoring and evaluation. In addition, there are plans to investigate the impact of inspections on small and medium-sized businesses, and to consider the possibility of increasing the duration of inspections in this area and to develop appropriate proposals. There are also plans to take some additional measures and make decisions to improve inspections for small and medium-sized businesses. Initially, it is planned to expand the use of the principles of risk-based inspections for SMEs, as required by the legislation, to optimize the number of inspections. In other words, the number of mobile inspections for SMEs will be reduced and an electronic inspection method will be used (Vakilov, 2016b).

The plan is to continue tax reforms in order to improve the business environment in the country and to focus on small and medium-sized businesses. The optimal level of tax rates of the Ministry of Taxes consultation with the involvement of SMEs, business associations, and public organizations is also important to identify and ensure the dynamic development of SMEs. One of the main points of Azerbaijan's tax policy is raising salaries as well as the legalization of its turnover by SME entities. (Musayev, Kalbiyev, Huseynov, 2002). As a result of the implemented reforms:

- Further optimization of inspections conducted by government agencies in SMEs;
- Creation of more favorable conditions for the dynamic development of SMEs;
- Limiting the number of mobile tax inspections conducted by SMEs,
- Implementation of the electronic audit method. Sustainability of tax reform,
- Increase in the competitiveness of SMEs, in particular, will have a positive impact on the sustainability of newly established enterprises,
- Encouraging the opening of representative offices of foreign companies in the country,
- More favorable conditions for investment in the non-oil sector of the economy.

The key performance indicators of the event will include:

• Limit the number of inspections conducted by government agencies;
• Optimize the tax burden for SME entities;
• Improve and enhance the e-tax audit. Expected risks include the negative impact of the number and depth of inspections on the development of SMEs, the failure of the tax policy to meet the interests of SMEs, and the lack of interest in legalizing the turnover and wages of SMEs.

The law exempted the Ministry of Taxes for tax deductions for tax frauds and applied financial sanctions to stimulate entrepreneurship, create a favorable business environment and optimize the tax burden, increase the economic activity of taxpayers. Two of the tax debts, as required by law deletion of the type is expected:
1. Interest determined due to untimely taxation of the taxpayer;
2. Financial sanctions for violations of tax legislation.

Improvement of tax administration is not only about legislation, it is also necessary to change the ideology and culture of the relationships between tax authorities and taxpayers. In recent years, the Tax Ministry of the Republic of Azerbaijan has established administrative procedures for the activities of tax authorities, for example, the registration of legal entities and individuals as private entrepreneurs, information services, despite the establishment of functional relationships with taxpayers and the establishment of partnerships with taxpayers and so on, need to be improved (Tax Code of the Republic of Azerbaijan. 2019).

7. Conclusion and Recommendations

As a result of the tax reforms in our country, significant progress has been made in tax administration and tax control. Thus, tax evasion was minimized and timely tax payments were provided to the state budget through an automated electronic tax administration system. On the basis of these indicators, statistical analysis of net positive tax increases compared to previous years was conducted. The fact that the tax administration plays a direct role in ensuring the economic well-being of the country's economy proves the importance of timely tax collection. Therefore, both tax relations participants and taxpayers, as well as those responsible for the area, should help each other in tax collection. In this regard, on November 27, 2018, at the plenary session of the Milli Majlis, a bill on amendments to the Tax Code and the Law was adopted. During the discussion of the draft law "On Amendments to the Tax Code of the Republic of Azerbaijan", the chairman of the Committee on Economic Policy, Industry and Entrepreneurship, Ziyad Samadzadeh, pointed out a significant reduction in tax burdens.

The Former Minister of Taxes, current Minister of Economy Mikayil Jabbarov said that the main proposal in the project was the reduction of taxes from non-oil and private sector citizens, the implementation of a single tax administration of individual income tax and social insurance payments.

Professor Elshad Mammadov, a professor at the Azerbaijan State Economic University (UNEC), told the media that there was a need for serious reforms in this area as there were problems with Azerbaijan's tax administration and tax policy. According to him, on the one hand, the tax burden is reduced. On the other hand,
there is a need for a serious change in the tax burden structure. Unfortunately, there are problems with the structure of the tax burden in Azerbaijan. That is, the tax burden on legal entities and businesses needs to be gradually reduced and serious tax differentiation should be achieved. That is, a progressive tax policy should be implemented.

The professor believes that there is also a need to make significant changes in the types of taxes: We must gradually move away from tax mechanisms that impede economic activity such as value-added tax (VAT). And we need to achieve a more progressive tax policy. Because of the structure and essence of VAT, this type of tax seriously hampers the development of business activity. On the other hand, VAT is a type of tax with inflation in it. That is, the application of VAT directly contributes to the growth of inflation expectations and real inflation. Therefore, the implementation of a more progressive tax policy is one of the most important issues.

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✓ Title – clearly and precisely stated, relatively short.
✓ Abstract – it must resemble a summary and include the objectives of the research, methodology and results;
✓ Key words – precise and sufficient, not more than five.
✓ Introduction – it should state the objectives of the research and the relevance of the scientific problem; it should review the condition of the issue and review references; it should also give the theoretical framework of the research, lead to research questions and hypotheses.
✓ Methodology and data – the methods used should be correct and include also appropriate references on similar, already published methods. The data shown must come from reliable sources.
✓ Results and outcomes (conclusions) – the results should be presented clearly and elaborated correctly; they must show a better way of using the data. Conclusions must be significant, valid and supported by proofs.
✓ Bibliographic sources (references).

Formatting:

The papers suggested for publishing must meet the following technical requirements:

✓ Manuscripts typed in Word for Windows, font - Times New Roman, font size – 14 pt, line spacing – 1.5 lines.
✓ Size of tables and charts – not larger than A4. The numeration of tables and charts should be consecutive in the wording of the paper. The use of colour charts, graphs and pictures are not accepted. All tables, figures, charts and images should be editable.
✓ Margins in cm: top – 2.5, bottom – 2.5, left – 2.5, right – 2.5.
✓ The title should be typed in caps, without abbreviations (font - Times New Roman, font size - 14 pt, line spacing - 1.5 lines, Bold – Center).
✓ At the right top corner above the title it is typed EconLit index in JEL (Journal of Economic Literature) classification system.
✓ After the title articles must include an abstract (10-12 lines) and up to 5 key words. The abstract and the key words should be written in Bulgarian and English (for articles in Bulgarian) and only in English for the articles submitted in English.
✓ Listing the used sources and citations is done in compliance with the Harvard short reference system (See examples of description and citation). The Quoted sources of a scientific research paper should be at least 20 and transliteration is obligatory. Footnotes are not recommended, except when necessary. If so-called “notes” need to be used, they should be indexed with Arabic numerals and are explained at the end of the article, before the references.

✓ The papers should be written without any handwriting and crossing out words, in good Bulgarian and, respectively, English.

After the article is received, it is edited language- and style-wise. As for the Language the editor makes insignificant corrections since it is supposed that the papers are written in good Bulgarian and English. The articles in English can be returned for another check by the author. Authors confirm the suggestions for changes in style or mark what they disagree with.

Acceptable size of manuscripts:

- for articles – from 16 to 20 pages;
- for micro articles, reviews and abstracts of dissertation papers - up to 10 pages.

Articles submitted for publishing must be original and not published before or in the process of reviewing and preparation for publishing in other publishing houses. Editors have the right to make insignificant editing corrections on the manuscript. After an article is accepted, authors must declare an agreement and give the publishing house the exceptional right for publishing. Authors can use the article or part of it in their future work without permission from the publishing house, but this would require citing the original article.