

# **EFFECT OF FDI ON INCOME INEQUALITY IN NIGERIA: DOES TRADE OPENNESS MATTER?**

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## **Abstract**

The paper examines the effect of FDI and its interaction with trade openness on income inequality in Nigeria. In doing this, the DOLS estimator is employed to analyse annual time series data covering the period from 1981 to 2015. The study finds that FDI inflows positively affect income inequality. However, the interaction between FDI and trade openness negatively affects income inequality suggesting that greater openness of the economy to international trade would engender reduction of income inequality caused by FDI in the country. Further evidence from the study are that financial system development and economic development are crucial for reduction of income inequality in the country. Based on these, it is recommended that barrier to flow of trade should be cautiously relaxed, the financial system should be developed and effort should be made by the government to set the economy on the path of sustainable development.

**Keywords:** FDI, Income Inequality, Trade Openness, Atkinson, DOLS

**JEL Classification:** F14, F21, F23, F43, O15, O24, P45

## **1. INTRODUCTION**

Apart from low per capita income levels, one of the features of developing countries or less developed countries (LDCs) is wide income gaps prevailing in the economies. Whereas the level of per capita income appears to have been rising in some of the countries (though still low, compared to those of the high and upper middle income countries), income inequality has been quite high and this has been a major concern for governments and development economists (Sundrum, 1974; UNDP, 2013). It has also led to depletion of the middle-class. Lowering the income gap within an economy is a key objective of government, in view of the fact that wide income gaps poses threat to economic growth and national security (Barro, 1999; Shin, 2012)

According to recent World Bank Country Classification by income group, Nigeria is a lower middle income country. Though the level of per capita income of the country is higher than those of most other countries in West Africa sub region, inequality in income in the country has been quite high, as reported by the Global Consumption and Income Project (2019). The rising income inequality may be attributed to myriads of factors including low level of investment (partly responsible for unemployment and underemployment), low level of economic development, etc. (Furceri & Ostry, 2019; Bahmani-Oskooee, Hegerty & Wilmeth, 2008). Inflow of FDI into the key sectors may help increase the level of investment in the country.

However, FDI in Nigeria is concentrated in a few sectors of the economy, particularly the resources (especially the oil and gas) telecommunication and banking sectors. While FDI in these sectors may have contributed to job creation therein, at the same time, it may have engender widening of income gap or income inequality in the country as the remuneration of those employed in the resources sector exceeds that of those employed in other sectors such as agriculture, manufacturing, trade, education, etc.

Whereas previous studies focused on the growth effect of FDI in Nigeria, less attention had been given to the effects of FDI on income inequality in the country. This study contributes to existing literature on the FDI-income inequality nexus by employing the dynamic OLS technique, which is a cointegration regression technique designed to correct the problem of autocorrelation and endogeneity to yield consistent and efficient long run estimates of the parameters of the regression model. In addition to this, the paper contributes to the literature by examining the role of trade openness on the effect of FDI on income inequality in Nigeria; that is whether the effect of FDI on income inequality is dependent on trade openness. The study is motivated to by the need reduce income gaps in the country and set the economy on the path of sustainable development.

For ease of presentation and analysis, the study is structured into 5 sections. Following the introductory section is Section 2, wherein relevant literature is reviewed. The methodology of the study is presented in Section 3. The estimation results are presented in discussed in Section 4. Section 5 contains evidence-based policy recommendations and also concludes the paper.

## **2. LITERATURE REVIEW**

Pan-Long (1995) identified FDI, level of economic development, government role and the significance of the agricultural sector as key determinants of FDI. Choi (2006) estimated a static panel model in a study to investigate the effect of FDI on domestic income inequality using panel dataset covering the period from 1993 to 2002 on 119 countries. The study found that income inequality increases as the stock of FDI (as a percentage of GDP) increases. This suggests that FDI inflows increases income inequality. However, economic growth measured as

increase in the growth rate of real GDP per capita was found to be associated with reduction in income inequality.

Bhandari (2007) estimated a fixed effect model to examine the effect of FDI on income inequalities in transition economies of Eastern Europe and Central Asia during the period from 1990 to 2002. The empirical evidence showed no significant effect of inward FDI on income inequality in the economies. However, an investigation of the effects of FDI inflows on wage income inequality and capital income inequality reveals that FDI inflows positively and significantly affected wage income inequality, while its effect on capital income inequality was found to be negative and statistically significant. These suggest that wage income inequality is worsened by inflows FDI inflows, while capital income inequality is reduced by same.

The study by Mahutda and Bandeji (2008) which involved estimation of fixed effect models to investigate the effect of FDI on income inequality in Central and Eastern European (CEE) countries found that FDI positively affect inequality in the region. Similar study by Mihaylova (2015) also involving estimation of several fixed effect models for investigation of the effect of FDI on inequality in 10 Central and Eastern European (CEE) countries during the period from 1990 to 2012 found that the effect of FDI on inequality depends on the level of education (measured as secondary school enrolment ratio) and the level of development of economies of host/recipient countries. Specifically, as in the study by Mahutda and Bandeji (2008), FDI positively and significantly affect income inequality (that is, it widens the income gap), but the effect of interaction of FDI with education and per capita income (measure of economic development) was found to be negative and significant, suggesting that education and economic development are important factors for FDI to reduce income inequality in the region.

Suanes (2016) examined the effect of FDI on income inequality in 13 Latin American economies. The study investigated the effect of FDI in three sectors of the economy namely the primary, manufacturing and services sectors on income inequality using fixed effect models and first difference generalized method of moment (GMM) and two-stage least squares estimations. The study found positive and significant effects of FDI in the manufacturing and service sectors on income inequality.

Kaulihowa and Adjasi (2017) examined the effect of inward FDI on income inequality in 16 African countries during the period from 1980 to 2013 using the pooled mean group (PMG) estimator. The study found a nonlinear relationship between FDI and income inequality. Inequality is initially reduced by FDI inflows, however, as FDI inflows increase, the effect of FDI on inequality diminishes.

Babatunde (2018) estimated both symmetric ARDL and asymmetric (Non-linear) ARDL models in a study to investigate the effect of FDI on income inequality in Nigeria during the period from 1980 to 2016. The study employed estimates of inequity from the World Income Inequality Database. The study found

that income inequality is reduced by FDI inflows in the short run after a lag of one-year in both the ARDL and NARDL model. The NARDL model indicated that contemporaneously, FDI inflows widen the inequality in the short run. The ARDL and NARDL models also indicated that gross fixed capital formation reduces income inequality in the short run. The long run ARDL result shows that income inequality is reduced by FDI inflow in the long run. The inference from the study is that FDI inflows serve to reduce income inequality in Nigeria in the short-run and in the long run.

Trade openness has been identified as a major determinant of FDI Inflows to an economy. The decision by multinational corporations to set up plants or operations in foreign markets is determined by the level of openness of the foreign market or economy to international trade, and other factors including resource availability, size of domestic market, etc. (Kandiero and Chitiga, 2006; Liargovas & Skandalis, 2012; Brun & Gnangnon, 2017). Where FDI inflows complement domestic investment in an economy, it raises the level of capital formation therein, leading (*ceteris paribus*) to increase in job creation which may engender reduction in income inequality. However, FDI may engender job creation if it flows to the tradable sectors of the economy. From the review of literature, we found that the role of trade openness in the effect of FDI on income inequality has not been investigated. An obvious gap therefore arises in the literature which this study intends to fill.

### 3. METHODOLOGY

#### 3.1. MODEL AND ESTIMATION PROCEDURE

This study builds on the model developed by Pan-Long (1995), with some modification. In doing this, income inequality was regressed on FDI and the interaction between FDI and trade openness. Other variables which serve as control variables including the level of financial development and economic development were also incorporated in the model. Inclusion of financial development is in line with the studies by Kappel (2010), Park and Shin (2015), Chen and Kinkyo (2016), Isah and Hamzat (2017), and Nguyen, Vu, Vo and Ha (2019) which identify financial development as a factor affecting income inequality. Inclusion of economic development is line with Pan-Long (1995) and Ram (1997) which identify economic development as a factor affecting income inequality. Thus, the model was specified in functional form as:

$$\text{INEQ} = f(\text{FDI}, \text{FDI} * \text{TOPEN}, \text{FINDEV}, \text{RGDPPC}) \quad [1]$$

Where INEQ = income inequality. For this we used the Atkinson (1975) index instead of the GINI index used by previous studies. The choice of this measure of income inequality was informed by the fact that it improves on the GINI index by allowing for “varying sensitivity to inequalities in different parts of the income distribution” (De Maio, 2007, p.851). The Atkinson index ranges

between 0 and 1, with 0 being the state of perfect equality of income distribution. Thus, higher values of the index signify more unequal distribution of income.

FDI = Net FDI inflows as a percentage of GDP; FDI\*TOPEN = interaction between FDI and trade openness measured as total trade as a percentage of GDP; FINDEV = Financial development, measured as domestic credit from the financial sector as a percentage of GDP; RGDPPC = Level of economic development, measured as real GDP per capita.

The econometric specification of the model is presented as:

$$INEQ = \beta_0 + \beta_1 FDI + \beta_2 FDI * TOPEN + \beta_3 FINDEV + \beta_4 \ln(RGDPPC) + \varepsilon \quad [2]$$

The variables are as previously defined. The  $\beta$ s are the long run parameters to be estimated, and  $\varepsilon$  is the error term.

The *a priori* expectations are:  $\beta_1 < 0$ ,  $\beta_2 < 0$ ,  $\beta_3 < 0$ ,  $\beta_4 < 0$ . All the explanatory variables are expected to reduce income inequality in the country. Inflow of FDI to various sectors of the economy is expected to boost output/income and raise the level of employment therein, thereby leading to reduction in income inequality, especially where the sectors are opened to international trade. The level of financial development measured as credit extended by the financial system (as a percentage of GDP) is also expected to reduce income inequality as this will boost investment level, income and employment. Improvement in the level of economic development measured as RGDPPC is also expected to reduce income inequality, all things being equal. This is in consideration of the fact that various factors that enhance RGDPPC such as infrastructural development, capital accumulation, human capital development, etc. are critical factors for reduction of income inequality. Thus the more developed the economy is, the more the distribution of income will tend to equality.

This dynamic OLS estimator proposed by Stock and Watson (1993) was employed for the analysis. The estimator which is a robust single equation estimator corrects for regressor endogeneity (peculiar with cointegrating relationships) by inclusion of leads and lags of first differences of the regressors. It also corrects for serially correlated errors (residuals) by a generalized least squares (GLS) procedure to provide optimal estimates of cointegrating regressions. Furthermore, the technique improves on the classical (ordinary) least squares (OLS) by coping with small sample and dynamic sources of bias (Al-Azzam and Hawdon, 1999).

The cointegrating (DOLS) model is specified as:

$$INEQ = \beta_0 + \beta_1 FDI + \beta_2 FDI * TOPEN + \beta_3 FINDEV + \beta_4 \ln(RGDPPC) + \sum_{j=-k}^p (\theta_1 \Delta FDI_{t-j}) + \sum_{j=-k}^p (\theta_2 \Delta FDI * TOPEN_{t-j}) + \sum_{j=-k}^p (\theta_3 \Delta FINDEV_{t-j}) + \sum_{j=-k}^p (\theta_4 \Delta \ln RGDPPC_{t-j}) + \mu_t \quad [3]$$

p and k respectively represents length of lag and lead of each explanatory variable. These are incorporated in the model to correct the probable problem of endogeneity.  $\mu$  is the residual term.

Estimation of the model was preceded by examination of the times series properties of the variables to ascertain whether or not they contain unit root. The Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests for unit root were employed for this. This was followed by the test for long run relationship, that is, the cointegration test. For this, the Johansen procedure involving the trace and maximum Eigen-value test was employed.

### 3.2. DATA AND SOURCES

Data for the study are annual time series data spanning the period from 1981 to 2015. This scope was dictated by data on Atkinson index whose last observation as computed by the Global Consumption and Income Project (GCIP) was for 2015 as at the time of the research. This may be considered a limitation of the study. Data on other variables were obtained from the World Bank’s World Development Indicators (2018).

## 4. RESULTS AND DISCUSSION

The results of various estimations including the unit root test, cointegration test and the model are presented and discussed in this section.

### 4.1. UNIT ROOT TESTS

The results of unit root tests involving the ADF and the PP tests are presented in Table 1.

*Table 1. Unit Root Test*

ADF Unit Root Test Results							
Variables	Levels			First Difference			d*
	t-stat.	Critical value (5%)	Inference	t-stat.	Critical Value (5%)	Inference	
INEQ	-1.665	-3.548	NS	-6.022	-3.553	S	1
FDI	-3.141	-3.548	NS	-8.089	-3.553	S	1
FDI * TOPEN	-2.853	-3.548	NS	-5.547	-3.563	S	1
FINDEV	-0.890	-3.563	NS	-5.650	-3.563	S	1
Ln(RGDPPC)	-1.221	-3.558	NS	-3.993	-3.553	S	1
PP Unit Root Test Results							
Variables	Levels			First Difference			d*
	t-stat.	Critical value (5%)	Inference	t-stat.	Critical Value (5%)	Inference	
INEQ	-1.558	-3.548	NS	-7.573	-3.553	S	1
FDI	-3.061	-3.548	NS	-21.531	-3.553	S	1
FDI * TOPEN	-2.853	-3.548	NS	-24.352	-3.553	S	1

FINDEV	-1.866	-3.548	NS	-7.329	-3.553	S	1
Ln(RGDPPC)	-2.852	-3.548	NS	-3.993	-3.553	S	1

*NS = Non-stationary; S = Stationary*  
*Source: Estimations using EVIEWS 9.*

The results from both tests indicate that the variables are non-stationary at levels, but stationary at first difference. In spite of these, there is the possibility for a linear combination of the variables to be stationary at level. If this is the case, then the variables will be said to be cointegrated.

#### 4.2. COINTEGRATION TEST

The Johansen approach to cointegration test was employed to test for long run relationship. The results of the test are presented in Table 2.

**Table 2. Johansen Cointegration Test**

<b>Unrestricted Cointegration Rank Test (Trace)</b>				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.663	76.690	69.819	0.013
$\leq 1$	0.463	40.809	47.856	0.195
$\leq 2$	0.334	20.308	29.797	0.402
$\leq 3$	0.185	6.875	15.495	0.592
$\leq 4$	0.004	0.120	3.841	0.729
<b>Unrestricted Cointegration Rank Test (Maximum Eigenvalue)</b>				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.663	35.881	33.877	0.029
$\leq 1$	0.463	20.500	27.584	0.308
$\leq 2$	0.334	13.433	21.131	0.413
$\leq 3$	0.185	6.755	14.265	0.519
$\leq 4$	0.004	0.120	3.841	0.729

*Trace test indicates 1 cointegrating eqn(s) at the 0.05 level Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level \* denotes rejection of the hypothesis at the 0.05 level \*\*MacKinnon-Haug-Michelis (1999) p-values*

*Source: Estimations using EVIEWS 9.*

Both tests (trace and maximum-Eigenvalue) test indicate existence of 1 cointegrating equation at the 5% level. Thus it could be inferred from these results that long run relationship exists between the dependent variable and the explanatory variables.

#### 4.3. MODEL ESTIMATION

The result of estimation of the specified long run model using the DOLS approach is presented Table 3.

**Table 3. DOLS Model Estimation Results**

Dependent Variable: INEQ
Method: Dynamic Least Squares
Included Observations: 32 after adjustments

Variable	Coefficient	t-statistic	Prob.
FDI	0.141	9.235	0.000
FDI*TOPN	-0.003	-7.346	0.000
FINDEV	-0.011	-10.081	0.000
LOG(RGDPPC)	-0.170	-7.222	0.000
C	2.036	12.556	0.000
R <sup>2</sup> = 0.942; Adj. R <sup>2</sup> = 0.881; Long-run variance = 0.000			

Source: Estimations using EViews 9.

Contrary to *a priori* expectation, the coefficient of FDI is positively signed and highly significant at the 1% level. This indicates that FDI inflows raises or widens income inequality in the country in the long run. This may be attributed to the fact that the bulk of FDI that flows into the economy are concentrated in a few sectors such as the oil and gas, banking and telecommunications and those employed in these sectors typically earn more than the remunerations of those employed in other sectors which attract less FDI such as education, transportation, agriculture, manufacturing etc. The finding corroborates evidence from previous studies such as Choi (2006), Bhandari (2007), Mahutda and Bandeji (2008), Suanes (2016) which found that FDI positively affects income inequality. However, the coefficient of interaction between FDI and trade openness is negatively signed in conformity to *a priori* expectation, and significant even at the 1% level. This suggests that with greater openness of the economy to international trade FDI could be attracted to more sectors of the economy resulting in expansion of economic activities and output of the sectors, leading to increase in employment and improvement in wages both of which could ultimately reduce inequality in income.

The effect of financial development on income inequality is also negatively signed as expected and statistically significant at the 1% level. The implication of this finding is that improvement in the level of development of the financial system which manifests in increase in the amount of credit extended by the financial sector to the private sector of the economy will mitigate income inequality in the country in the long run, as improvement in credit, all things being equal engenders improvement in investment leading to expansion in output and with sustained aggregate demand, there could be improvement in remunerations, and this could attenuate income inequality in the country. The observed negative effect of financial development on income inequality corroborates Kappel (2010), Chen and Kinkyo (2016), Isah and Hamzat (2017), and Nguyen, Vu, Vo and Ha (2019) which found that financial development reduces income inequality in the long run.

The sign on the coefficient of real GDP per capita is negative as expected, and significant at the 1% level. This implies that the level of economic development as measured by real GDP per capita is also a significant determinant of income inequality: economic development reduces income inequality in the long run. This is in sync with the evidence from Pan-Long (1995) which also found that economic development mitigates income inequality.



## 5. CONCLUSION AND RECOMMENDATIONS

The effect of FDI inflows on income inequality with particularly reference to the role of openness of Nigeria's economy to international trade has been investigated using a recent cointegration regression technique which accounts for autocorrelation and endogeneity. The effects of financial development and economic development on income inequality were also examined. The study found that FDI inflows worsen the income inequality problem in the country. However, with greater openness of the economy to international trade, inflow of FDI could reduce income inequality. Financial development and economic development were also found to be key factors for reduction of income inequality in the country. In view of the empirical evidence, to ensure FDI reduces income inequality in the country, it is recommended that barriers to international trade should be cautiously relaxed (as this would enhance the attractiveness of the economy to inflow of FDI to its various sectors, leading to job creation and reduction in inequality). Furthermore, to reduce income inequality in the country, the financial system should be developed to enable financial institutions therein extend more credit to the private sector. There is also need by the government to intensify efforts to place the economy on the path of sustainable development as this has the potential to reduce income inequality in the country in the long run.

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