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# FDI, Human Capital and Economic Growth: Evidence from Nigeria

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## Abstract

This paper investigates the impact of foreign direct investment (FDI) and human capital on economic growth in Nigeria. The study utilizes the Autoregressive Distributed Lag (ARDL) model of cointegration covering the period 1975 to 2014. The findings reveal that FDI and human capital have no direct effect on the growth of the Nigerian economy over the sampled period in the long-run. However, when we interact FDI and human capital, the effect is positive and significant. This suggests that in Nigeria, human capital would positively encourage FDI and that taken together; it would significantly and positively impact the economic growth of the country. The findings suggest that in order to boost output through FDI, Nigeria would need to improve the educational situation in the country by increasing the level of funding especially in the research, development and innovations.

**Keywords:** FDI, human capital, economic growth, ARDL

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## 1. INTRODUCTION

Governments across the globe have been trying over the years to lift their countries out of economic depression, some with success and many others without achieving the desired goal (Ibrahim, 2015; Jenkins and Thomas, 2002; and Lipsey, 2000). However, irrespective of performance, various governments have realized the need to focus interest on facilitating the flow of foreign direct investment (FDI), which is thought, will be adequate to motivate the generation of employment as well as positively contribute to their economic progress (Nkechi, 2013). This is important so as to be able to minimize the gap between a nation's GDP and foreign and domestic savings. In the same vein, Jenkin and Thomas (2002) have indicated that FDI is crucial to foster economic growth by enlarging the flow of foreign exchange as well as by optimizing local savings and total output. Conceptually, FDI is thought to provide direct investment into an economy by a foreign investor through startup initiatives, merger or takeover of host country's viable business enterprises. FDI, therefore, could provide part of a country's foreign resource inflows in the form of capital, ICT, advanced management skills, and access to a larger share of the global market (Offiong and Atsu, 2004). All these resources can significantly impact on host country's economic and productive capabilities (Adelakun, 2011; Olatunji *et al*, 2014; Chindo *et al* 2015 and Salami and Oyewale, 2013).

In the case of Nigeria, the various state and federal governments have been putting efforts to create a friendly economic environment for FDI even though the trend of inflow of foreign capital and direct business investments have greatly been on the decline, especially over the past five years, largely due to the concentration of efforts in boosting the oil and gas industry to the neglect of the other sectors (Mojekwu and Ogege, 2012). Generally, policies and strategies of the Nigerian government in the area of foreign direct investments are delineated by two key objectives. These are the need for sustainable economic growth; and generation of employment (Ajayi, 2006; Offiong and Atsu, 2014; and Doguwa *et al*, 2014). Like most developing and even developed nations, Nigeria's

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main source of per capita output is rooted in the volume and efficiency of its production and marketing strategies (Adelakun, 2011). This is because growth in per capita output is an important element of economic growth and development. In other words, the inauguration of sound and sustainable economic strategies would depend on the efficiency and innovative creativity of the workforce. In the case of Nigeria, issues relating to non-optimal development of human capital, which are largely rooted in inappropriate development, division and distribution of skilled manpower, and poor system of remuneration, have hindered the full utilization of avenues that can attract the needed quantity of foreign direct investment capital inflows (Mojekwu and Ogege, 2012).

Although FDI is beneficial to recipient countries, its effects have not been felt widely due to relatively insignificant level of foreign direct investment to Africa, when compared with other regions, such as Latin America and Asia. The issue of an underdeveloped human capital in Nigeria which is noticeable from the level of school enrolment affects the inflow of FDI. In theory, human capital is said to be a key factor in absorbing technological spill overs and a poor human capital can be translated into a low level of economic growth because the benefits of technological transfers through foreign direct investment cannot be adequately captured. Many studies only investigate the role of FDI in fostering economic growth of a host economy. However, majority of the studies conducted on the role of other factors on the link between foreign direct investment and economic growth have neglected Africa in general and Nigeria in particular. In addition, the relationship between FDI and economic growth in Nigeria and how it relates to the role of human capital is yet unclear, and that recent evidence shows that the relationship may be country and period specific (Adawo, 2011; Olatunji, *et al* 2014 and Ayanwale, 2007).

This study does not investigate the relationship between FDI and economic growth, but it also investigates the role played by human capital development of the host economy in aiding the effects of FDI on economic growth. This study has therefore examined whether FDI affect economic growth from the perspective of human capital development in Nigeria. The aim of the paper is to investigate the channel by which FDI impacts on economic growth in Nigeria. Specifically, this study would like to analyse the importance of human capital channel and how this channel can be a key medium to absorb the benefits of FDI on economic growth. In other words, we will examine the direct and indirect effect of FDI and human capital on economic growth in Nigeria.

Our results show that FDI and human capital do not significantly affect economic growth in the short run. However, in the long-run, human capital is positive and significant while FDI is insignificant. The results do not change when we incorporate the interaction term. In addition, when interacted, both FDI and human capital significantly contribute to the increase in Nigeria's economic growth.

## 2. LITERATURE REVIEW

On the aspect of FDI, Lamsiraroj (2015) has employed a sample of 124 cross-country panel data covering a time span of 40 years (1971-2010) to examine the relationship between FDI and economic growth. Using labour force and trade liberalisation as key variables, he established significant positive relationship between FDI and economic growth. His finding is in agreement with that of Alfaro (2004) who has utilised GDP, human capital, population growth and government expenditure as key variables to conclude that FDI in particular has a significant positive relationship with economic growth. In relation to these studies, Adams (2009) investigated the impact of FDI, domestic investment (DI) and economic growth using OLS and fixed effects for Sub-Saharan African countries (SSA) over the period 1990-2003. His findings revealed that although the flow of FDI has increased for SSA countries, the increase did not lead to a proportionate positive impact of FDI on economic growth.

Ameen (2015) examined the effect of FDI inflows on economic growth in Malaysia from 1975-2010 using higher Multiple Regression analysis (HMR) based on a deducted endogenous growth model. He concluded that FDI inflows supported with positive human capital development contribute strongly to the host country's economic growth. In the same vein, Amin and Khalid (2013) investigate the relationship between foreign direct investment and economic growth from 1994-2012. They found that FDI exerts positive effects on the host country's economic growth.

Utilizing a sample of panel data on 85 countries covering a span of 30 years (1975-2004), Baharumshah and Law (2010) have found no positive relationship between FDI and economic growth. In his study covering a long period (1980-2009) Gui-Dibly (2014) has established mixed results showing a negative relationship between FDI and economic growth within the period 1980-1994 and a positive relationship within the 1995-2009 time spans. He used a sample of panel data on 50 African countries to arrive at his findings. In their study on Nigeria, Adeleke *et al* (2015) have also found that FDI is significantly associated with economic growth. They utilized the OLS method on data covering the period 1999-2013.

With regard to studies on human capital, like FDI it has also been employed as an indicator of economic growth and it is partly dependent on knowledge and performance. From a theoretical perspective, human capital is viewed as investment and expenditure in education and healthcare whether separately or collectively. Cleave, (2015) assessed the role of human capital on the inflows of FDI in sub-Saharan Africa using panel data of 35 countries for a period from 1980-2012. His findings reveal that human capital has a significant influence on FDI.

Adawo (2011) has also examined the impact of human capital formation on Nigeria's sustainable economic growth using annual time series data from 1970-2006. His key finding is that human capital formation at secondary and tertiary school level hardly contribute to economic growth in the long-run. On the whole, the few related studies on the impact of FDI and human capital on Nigeria's economic growth have revealed divergent conclusions and have not provided cogent practical recommendations for policy and decision-making. The findings and recommendations of this work are expected to fill this gap.

Chindo *et al* (2015) have established a positive relationship between human capital, technology and economic growth. There is, however, a gap between their objectives and those of this study. While they utilized human capital and technology as variables, in this study, human capital and FDI were used. Again, this study limited its sampled data to only secondary school enrolments, while the above mentioned study considered both secondary and post-secondary enrolments. The time spans of the two studies are also different.

### 3. DATA AND METHODOLOGY

The relationship between foreign direct investment and human capital is examined using annual time series data for the period of 1980-2014. The data used is obtained from the world development indicators (WDI, 2014). The study employed autoregressive distributed lag (ARDL) approach to cointegration technique. This is used in order to check for the dynamic properties of the variables used and derive the error correction model (ECM) of the ardl specification. The ARDL technique was utilized because of its advantages: it can be applied to the variables irrespective of whether the time series data are purely 1 (0), purely 1 (1), or fractionally cointegrated (Pesaran *et al* 2001). it is also possible and acceptable for different variables to have different lags, which are not possible with the standard cointegration test. Furthermore, both the long-run and the short-run coefficients could be obtained simultaneously although the sample observation is limited (Chindo *et al*, 2015).

The empirical model in this study follows the endogenous growth theory by Romer (1986) and Lucas (1988). The theory is considered to be more relevant and appropriate to provide the theoretical framework for this study because first it tries to underscore the key determinants of economic growth and secondly it can appropriately be applied to an aggregate production function with more than two variables or components. The empirical model is a function of possible determinants of growth which includes FDI and human capital. The empirical model is specified as follows:

$$\ln GDP_t = \beta_0 + \beta_1 \ln K_t + \beta_2 \ln L_t + \beta_3 \ln FDI_t + \beta_4 \ln HC + \beta_5 \ln GE_t + \varepsilon_t \quad (1)$$

where GDP represents real GDP per capita, K indicates physical capital, L represents labour force, FDI represents the foreign direct investment, HC represents human capital and GE represents government expenditure. *t* represents time and  $\varepsilon_t$  is the stochastic error term. To investigate the relationship between FDI and economic growth through human capital development, an interaction term between FDI and human capital (*FDI×HC*) is incorporated in the model. The resulting model is as follows:

$$\ln GDP_t = \beta_0 + \beta_1 \ln K_t + \beta_2 \ln L_t + \beta_3 \ln FDI_t + \beta_4 \ln HC + \beta_5 \ln GE_t + \beta_7 \ln FDI \times HC_t + \varepsilon_t \quad (2)$$

Based on the bounds-testing approach proposed by Pesaran and Smith (1998), Pesaran *et al.* (2001) and Narayan (2005) any long-run relationship may be given by the equation as follows:

$$\Delta \ln GDP_t = \beta_0 + \sum_{i=0}^n \beta_{1i} \Delta \ln GDP_{t-1} + \sum_{i=0}^n \beta_{2i} \Delta \ln K_{t-1} + \sum_{i=0}^n \beta_{3i} \Delta \ln L_{t-1} + \sum_{i=0}^n \beta_{4i} \Delta \ln FDI_{t-1} + \sum_{i=0}^n \beta_{5i} \Delta \ln HC_{t-1} + \sum_{i=0}^n \beta_{6i} \Delta \ln GE_{t-1} + \sum_{i=0}^n \beta_{7i} \Delta \ln FDI * HC_{t-1} + \varepsilon \dots \dots (3)$$

where *n* represents the optimal lag length, *t* is time and  $\Delta$  refers to the first difference of variables by using the coefficient of this error correction model (ECM), the speed of the adjustment will be calculated. This will explain how much time the system will take to return to the long term equilibrium after a random shock and the expected sign will be negative to ensure the convergence. The error correction model (unrestricted) for the ARDL model is specified in the equation below:

$$\Delta \ln GDP_t = \pi_0 + \sum_{i=0}^n \pi_{1i} \Delta \ln GDP_{t-1} + \sum_{i=0}^n \pi_{2i} \Delta \ln K_{t-1} + \sum_{i=0}^n \pi_{3i} \Delta \ln L_{t-1} + \sum_{i=0}^n \pi_{4i} \Delta \ln FDI_{t-1} + \sum_{i=0}^n \pi_{5i} \Delta \ln HC_{t-1} + \sum_{i=0}^n \pi_{5i} \Delta \ln GE_{t-1} + \sum_{i=0}^n \pi_{6i} \Delta \ln FDI * HC_{t-1} + \gamma ECM + \varepsilon_t \dots (4)$$

where the speed of adjustment will be  $\gamma$  and ECM is the residuals which were obtained through the application of the cointegration model. In addition, the coefficient will give the information about the long run relationship among the variables.

#### 4. RESULT AND DISCUSSION

The unit root test for all the variables were conducted to identify the order of cointegration of the variables by using the augmented Dickey–Fuller (ADF) and Phillips–Perron test (PP) tests. The results of the unit root tests show that all the variables are stationary at first difference which indicates that all the series are, integrated at the same order; I (1).

The cointegration result presented in Table 1 shows that both Model 1 and 2 are cointegrated as the calculated F statistics values (5.350 and 9.648) based on the optimum lags selected exceed the upper bound of the critical bounds table developed by Narayan (2005) at 1% for model 1 and 5% for model 2, respectively. Therefore, the results agree to the long run relationship between the variables in the two models. This allows for the estimation of the short-run error correction model and the long run coefficients.

Table 1. The Bounds Test Results for Model 1 and Model 2

Models	F Statistic	Level of Significance	Bounds test critical values	
			I (0)	I (1)
Model 1	9.648[0.000] <sup>a</sup>	1%	3.800	5.643
		5%	2.797	4.211
		10%	2.353	3.599
Model 2	5.350[0.002] <sup>a</sup>	1%	4.045	5.898
		5%	2.962	4.338
		10%	2.483	3.708

Note: Based on Narayan Table Case III (Narayan, 2005)

<sup>a</sup>Denote Model 1 and 2's cointegrated F statistics with their corresponding critical bond values, respectively

Table 2 presents the long-run and short-run equations for Model 1. The long-run result discloses that FDI is positive but not significant. The result clearly indicates that FDI has no direct impact on growth in Nigeria. This finding confirmed that of Ali and Abdullahi (2015 for the same sample country. The result also substantiate the findings of Baharumshah & Law, (2010) and Durham (2004) who among others, reported similar result and have discovered that FDI has no direct impact on growth. The direct impact of FDI in Nigeria in the short-run is also negative and insignificant. Labor and capital are positive and significant at the 1% level which is in accordance with the endogenous growth theory mentioned briefly in previous section.

The long-run results in Table 2 also reveal that human capital is insignificant. This also suggests that human capital by itself does not have a significant impact on growth in the long-run period. In contrast, the short run result discloses that human capital has a negative but significant impact on economic growth at the 10% level. To be specific, a 1% increase in human capital would lead to a -0.220% decrease in economic growth. The result confirms the findings of Shobande (2014) who reported a negative relationship between human capital and economic growth in Nigeria. Government expenditure is also positive and significant in the long-run.

Table 2. The estimated Long-Run and short-run Coefficients Based on Schwarz Bayesian Criterion for Model 1 (Without Interaction)

Regressors	Coefficients	T-Ratio[Prob]
The long-run results		
LFDI	-0.004	-0.215[0.831]
LK	0.307	5.457[0.000]***
LLF	7.995	8.241[0.000]***
LHC	0.058	1.492[0.149]
LGE	0.146	6.406[0.000]***
Constant	-24.091	-4.059[0.000]***
The short-run results		
dLFDI	-0.004	-2.115[0.834]
dLK	0.234	5.224[0.000]***
dLLF	14.087	3.011[0.001]***
dLHC	-0.220	-1.889[0.069]*
dLGE	0.182	6.468[0.000]***
dCONST	-19.151	-4.462[0.000]***
ECM (-1)	-0.795	-2.500[0.018]**
Adjusted R <sup>2</sup>	0.986	
Durbin-Watson statistics	1.961	

Note: LRGDP = Dependent Variable; Lag lengths are 2, 0, 2, 2, 1, 1 selected based on SBC

Note: \*Significant at 10% level. \*\* Significant at 5% level. \*\*\*Significant at 1% level.

The Error Correction Model (ECM) with the coefficient (-0.795) corroborates the long-run relationship among the variables and donates the speed of adjustment of the variables convergence from short-run to long-run equilibrium is 79.5%. This shows that in the event of any shock the speed of adjustment is high. The reported F-statistics values, adjusted R-squared, and the Durbin-Watson statistic suggest that the model is a good fit.

Table 3 presents the log-run and short-run results for Model 2. In the long-run, the interaction of FDI with human capital is positive and statistically significant at the 5 % level. In fact, a 1% increase in the interaction of FDI with human capital (HC) would lead to 0.311% increase in economic growth. This is also true for the short-run .This would imply that the interaction of FDI and human capital have had a positive effect on the economy's growth. This shows that in Nigeria, human capital encourages FDI inflow with a resultant increase in long-run economic growth. The interaction became necessary because according to the new growth theory, spillovers of technology can be fully utilized by a country that has a developed human capital. That is, human capital is necessary to absorb technology that comes through FDI (Grossman and Helpman, 1990, 1991). Including the interaction between FDI and human capital improves the overall performance of the regression. In this model specification, we relied on the interaction to establish the contingency. If the interaction term is positive and significant, this would imply that the indirect effect of FDI on economic growth increases with human capital development. Whereas, if the interaction term between FDI and human capital is negative and significant, this would imply that the indirect effect of FDI on economic growth decreases with human capital development.

Table 3. The estimated Long-Run and short-run Coefficients Based on Schwarz Bayesian Criterion for Model 2 (With Interaction)

Regressors	Coefficients	T-Ratio[Prob]
The long-run results		
LFDI	0.052	1.317[0.201]
LLF	5.129	4.399[0.000]***
LK	0.225	7.387[0.000]***
LHC	-0.326	-2.160[0.041]**
LGE	0.135	5.308[0.000]***
LINTR	0.311	2.455[0.022]**
CONST	-7.654	-1.321[0.199]
The short-run results		
dLFDI	0.047	1.427[0.165]
dLLF	14.732	3.284[0.003]***
dLK	0.215	4.857[0.000]***
dLHC	-0.289	-2.266[0.032]**
dLGE	0.192	7.275[0.000]***
dLINTR	0.188	1.769[0.088]*
dCONST	-6.788	-1.260[0.219]
ECM (-1)	-0.887	-4.572[0.000]***
Adjusted R <sup>2</sup>	0.988	
Durbin-Watson statistics	2.052	

Note: LRGDP = Dependent Variable; Lag lengths are 2, 0, 2, 2, 1, 1 selected based on SBC

Note: \*Significant at 10% level. \*\* Significant at 5% level. \*\*\*Significant at 1% level.

The result is consistent with the findings advanced by Balasubramanyam et al. (1999); Karbasi et al. (2005); Li and Liu (2005) and Borensztein et al. (1998); who reported similar results that human capital is an important precondition for positive effects of FDI. The Error Correction Model (ECM) coefficient (-0.887) substantiates the long-run relationship among the variables and donates the speed of adjustment of the variables' convergence from short-run to long-run equilibrium is 88.7%. The adjusted R<sup>2</sup>, Durbin-Watson statistic, and F statistic indicate that the model is a good fit.

Like any other time series analysis, diagnostic tests are imperative in assessing the validity, efficiency and consistency of the estimated model. Table 4 shows that Model 1 and Model 2 have passed all the diagnostic tests. The result is free from autocorrelation. The Jacque Bera statistics confirmed that the model is stable because the normality test favours the alternative hypothesis. The functional form results reveals that the model is correctly specified. The results of the heteroscedasticity show that the residual is constant over time since the null of the presence of heteroscedasticity is rejected.

Table 4. Diagnostic Tests

Test-Statistics	LM Version	F Version
Model 1		
Serial Correlation	CHSQ(1)= 0.015[0.901]	F(1, 23) 0.009[0.924]
Functional Form	CHSQ(1)= 0.470[0.493]	F(1, 23) 0.288[0.597]
Normality	CHSQ(2)= 1.653[0.438]	Not applicable
Heteroskedasticity	CHSQ(1)= 0.382[0.537]	F(1, 36) 0.366[0.549]
Model 2		
Serial Correlation	CHSQ(1)= 0.057[0.810]	F(1, 22) 0.033[0.856]
Functional Form	CHSQ(1)= 2.649[0.104]	F(1, 22) 1.649[0.212]
Normality	CHSQ(2)= 1.148[0.563]	Not applicable
Heteroskedasticity	CHSQ(1)= 1.695[0.193]	F(1, 36) 1.681[0.203]

## 5. CONCLUSION AND POLICY RECOMMENDATIONS

The findings of the long-run relationship have revealed that FDI and human capital individually have no direct effect on the growth of the Nigerian economy over the sampled period. In effect, FDI by itself has weak economic potential to motivate growth especially in the short run. Also, both human capital considered separately has no significant effect on growth in the long-run, even though it was found to have significant negative impact in the short-run. The impact of foreign direct investment on economic growth is contingent on the capacity of human capital. The long-run results of the interaction of FDI with human capital were confirmed to have positive and significant effect on economic growth in Nigeria. In other words, human capital encourages and stimulates FDI inflows such that the effect of FDI on economic growth increases with human capital not only in the long-run but also in the short-run. The ECMs for the two models have confirmed the long-run relationship and indicated a moderate speed of adjustment of the variables' convergence to equilibrium in the long run. The two models used in the study have passed diagnostic tests, including the stability tests of CUSUM and CUSUMSQ. This has confirmed the inferential power of the two models, as well as their reliability.

From the conclusion above, the following recommendations are proffered to guide policy and decision making: The authorities in Nigeria would need to work on policy frameworks that will provide suitable environment for foreign direct investment. This will motivate the flow of profitable foreign businesses that would support the economy and reduce some of the nation's economic predicaments that are partly exacerbated by unemployment. The government needs to improve the educational situation in the country by increasing the level of funding especially in the areas of research, development and innovations as well as by providing the needed training equipment and infrastructure in schools in particular and across the nation in general. Thus a lot of investment must be put in place by the government to invigorate the primary and secondary levels of education to make them qualitative enough such that secondary school leavers who are unable to secure admission into higher institutions of learning would have acquired adequate intellectual and practical know-how to profitably be engaged in one form of economic venture or another. This is where FDI will be of great help. In specific terms, the areas that would be of interest for FDI, within the context of symbiotic relationship with both the government and private sector entrepreneurs in Nigeria should cover not only the oil and gas sector, but the agricultural, construction, and manufacturing sectors. These are sectors that can accommodate both skilled and semi-skilled employees where the bulk of them can be secondary school leavers.

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