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## **Leveraging Foreign Direct Investment for Sustainability: An Approach to Sustainable Human Development in Nigeria**

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**Fisayo Fagbemi & Tolulope T. Osinubi**

Department of Economics, Obafemi Awolowo University, Nigeria

Corresponding author's e-mail address: [fisay4real@yahoo.com](mailto:fisay4real@yahoo.com) (F. Fagbemi)



## **Abstract**

The paper assesses the interconnections between FDI and human capital development in Nigeria over the period 1981-2018. The analysis is carried out with the use of both non-linear autoregressive distributed lag (NARDL) and linear ARDL bounds test approach to cointegration, and VECM Granger causality technique. Findings reveal that the effect of FDI on human capital is found to be insignificant in the long run, while it is significant in the short run. However, following the asymmetric link, the empirical evidence reveals that a rise in FDI inflows to a certain rate, in the long-run, could result in a significant increase in the level of human capital development, suggesting that the magnitude of inward FDI matters in the economy. This further implies that as FDI inflows require sound technical know-how, and more skilled labour to work with or adapt to more advanced technologies, such could draw attention to improved human capital. Results also indicate that there is unidirectional causality between FDI and human capital in the long run, which runs from human capital to FDI, suggesting that the quality of human capital matters for sustainable leverage and attractiveness of FDI inflows. By implication, it is critical to adopt policy measures that could engender the sustainable development of human capital by the government, while the underlying structural bottlenecks and protracted state of insecurity that could deter foreign investors are accorded significant attention.

**Keywords:** Economic Development, Foreign direct investment, Human capital development, Nigeria

## 1. Introduction

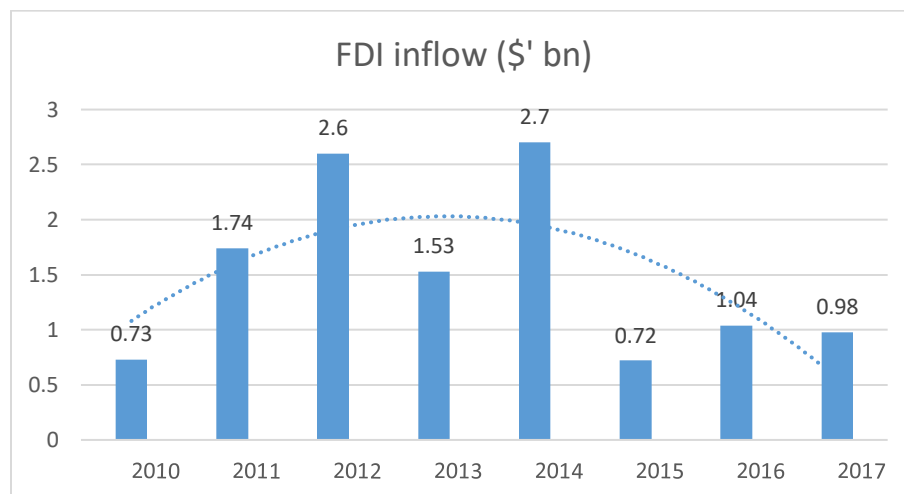
In view of the theoretical underpinning established by neoclassical and endogenous growth theories on foreign capital – growth nexus (Solow, 1957, Romer, 1990), inward foreign direct investment (FDI) could be a strategic conduit through which human resources are enriched in developing countries by providing host countries with needed funds and new technology (Balasubramanyam et al., 1996; Todaro & Smith, 2009; Agbola, 2013). These growth theorists stress the relevance of capital inflows in developing economies as they bridge the saving-investment gap. Hence, due to limited domestic capital to spur growth, foreign capital inflows are critical to enhancing capital formation and sustainable human development. A rise in FDI could engender efficiency in developing countries, since the need to stimulate inward FDI flows by these countries might necessitate increased investment in human capital. In view of the attention given to the role of FDI, Fowowe and Shuaibu (2014) emphasize that FDI can likewise result in poverty alleviation in African countries.

As inward FDI forms the largest component of capital inflows, and as a major propelling force of investment growth in most countries in the world (Asiedu, 2002), FDI could be viewed as the harbinger of economic development. Hence, the worsening case of health conditions and high illiteracy rates might be exacerbated by the insufficiency and ineffectiveness of foreign direct investment (FDI) in most developing countries including Nigeria (Fagbemi & Oladejo, 2019). While there is a growing need to enhance the operational rate (inward FDI performance) of inward FDI in Africa for the attainment of sustainable social inclusion and development, the effectiveness of FDI in the host country could be conditional on investment climatic factors (Li & Liu, 2005) — absorptive capacity and host country characteristics. Thus, in addition to the exploration of the impact of FDI on human development, ascertaining the two-way causal direction between FDI and human capital (skills, knowledge, and technical know-how are collectively seen as human capital —World Bank, 2018) is vital.

Central to the role of capital inflows, FDI is typically viewed as the flows of investment activities among countries (normally from one country to another) through the establishing operations of multinational companies (MNCs) which entail the acquisition of tangible assets and stakes in other businesses. In most developing countries, FDI is often seen as the remedy to a country's

development challenge, as it offers a substitute to domestic investment and with the potential to influence the host country's macroeconomic variables such as GNI per capita, investment and employment (Fry, 1993; Borensztien et al., 1998). Through FDI, production is invariably ameliorated by better technologies and enhanced financial capabilities (Luiz, 1999)<sup>1</sup>. Hence, FDI could play a prime role in the economic development process, thereby engendering improved social welfare. Since such effects would be beneficial to the labour force of the recipient economies, human capital enhancement could be stimulated by a significant improvement in FDI inflows.

In recognition of the prominent role of FDI, and in order to attract FDI into the national economy, over the years, Nigerian government adopted several policies. For instance, in the mid-80s, structural adjustment program (SAP) was introduced with the aim of liberalizing the economy and to accelerate foreign investors' attraction to the manufacturing industry. Although the policy received wide criticism, it aided increased FDI inflows into the country, as inward FDI rose from an estimated \$200mn in 1970 to \$2bn in 1994. However, due to ensuing political crisis and uncertainty, FDI inflows shrank between 1996 and 1999, but attained its significant state again between 2000 and 2014 with the return to democracy in 1999 and the upsurge in oil prices (Proshare, 2018). Nonetheless, in recent years, Nigeria's FDI has been on the decline, as it ebbed in 2015 and 2017 while with a slight increase in 2016 (see Figure 1).



**Figure 1:** FDI inflows to Nigeria between 2010 and 2017.  
**Source:** World Bank (2018).

<sup>1</sup> On the other hand, according to Kokko (1994), the indirect effect of FDI includes spillover effects.

With the increasingly changing business world, drive towards human capital formation is being induced by a variety of factors which include; on the job training, schooling, and sharing and application of knowledge by labour force (Becker, 1964). Although many scholars raise the issue of how FDI is leveraged in both developed and developing countries, and its contributions to skill acquisition and performance, few investigate how FDI can influence human capital development in any economy, in particular Nigeria. For this reason, it is central to verify the nexus between FDI and human capital development in Nigeria's context. In the country, in spite of significant improvements recorded in terms of FDI inflows in certain periods, the country is fraught with an incidence of protracted human capital deficiencies. There seems to be no period when Nigeria is found in the high human development category. Cases of high rates of inequalities, poverty, human insecurity, illiteracy and poor health conditions are outrageously noticeable. For example, Nigeria's human development index<sup>2</sup> (HDI) value for 2017 stood at 0.532. This has put the country in the low human development category which positioned it at 157 out of 189 countries ranked. Indeed, given the increasing concern as to why FDI is not effectively leveraged for the attainment of critical development, Nigeria's human development state calls for special attention as revealed in Table 1.

Table 1: Nigeria's HDI trends based on consistent time series data and new goalposts

Year	HDI value	Life expectancy at birth	Expected years of schooling	Mean years of schooling	GNI per capita (2011 ppp\$)
2005	0.465	48.2	9	5.2	3,669
2010	0.484	50.8	8.4	5.2	4,862
2015	0.527	53	10	6	5,527
2016	0.53	53.4	10	6.2	5,326
2017	0.532	53.9	10	6.2	5,231

Source: The United Nations Development Programme (UNDP) — Human Development Indices and Indicators: 2018 Statistical Update.

In the literature, the role of human capital is theoretically and empirically apparent. With reference to factors of production, human capital appears to be more important (Rashid, 2000), since resources are mostly explained by human knowledge in view of the fact that the central and primary source of wealth is human labour. In addition, Berkeley (1953) asserts that the level of human capability is a key source and measure of economic growth process. Thus, improved human capital is critical to attaining sustainable development goals (SDGs). In studies, while the impact of both FDI and human capital development on growth have been evaluated in details (Li & Liu,

<sup>2</sup>“The Human Development Index (HDI) is a summary measure of average achievement in major dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living” (World Bank, 2019).

2005; Carkovic & Levine, 2005; Attanasio et al., 2017), empirical evidence on how human capital development could be influenced by FDI inflows is scarcely reported especially in Nigeria's case. Most empirical studies seem to have concentrated on the nexus between FDI and economic growth, although with distinct conclusive outcomes. For instance, while Keho (2015); Iamsiraroj (2016); Sunde (2017) posit that FDI is a fundamental engine of growth since it offers the needed capital, and technology for many developing countries required to stimulate economic growth, Akinlo (2004); Adams (2009); Temiz & Gokmen (2014) conclude that FDI has an insignificant positive impact. On the other hand, some authors also contend that the effect of FDI on economic growth could be adverse (Adams & Klobodu, 2017; Adelegan, 2000; Musibah, Shahzad, & Fadzil, 2015).

In view of the heterogeneous conclusions among researchers on the role of FDI in most economies, understanding the impact of FDI on other development indicators, such as human capital, needs to be given more attention in Africa. Hence, considering limited attention given to the nexus between FDI and human capital development especially in Nigerian context, a study of this nature could offer a novel contribution to the extant literature. In addition, given the possible asymmetric relationship that could exist between these variables, and as no known study seems to have considered the potential non-linearity effect of FDI on human capital, employing non-linear autoregressive distributed lag (NARDL) in explaining FDI-human capital nexus is yet another novel development this study sets to bring into the literature. As autoregressive distributed lag (ARDL) is also applied to account for possible symmetric association (linear) between these indicators, and with the examination of the causation between them, the study's findings can be adequate for identifying factors crucial for designing an effective operational rate of FDI through the exploration of FDI-human capital linkage. This could stimulate the potential effect of inward FDI on the development of human capital, and in turn, on economic performance in the country. Hence, the study sets out to explore the ways through which FDI can affect human capital development, verify the difficulties of having effective FDI, and devise a strategy for enhancing inward FDI performance in Nigeria. This would be explored with the incorporation of the following human capital indicators exclusively into the model; Model 1 — human capital index developed by Feenstra, Inklaar & Timmer (2015) — Penn World Table (PWT9) which is based on years of schooling and returns to education; and Model 2 — life expectancy at birth.

The rest of the paper is structured as follows: Section 2 presents the review of the literature. Section 3 contains the detailed accounts of the methodology and data description. Section 4 centers on results and discussion, while the final section gives the concluding remarks.

## **2. Literature review**

### **2.1. Theoretical linkage between FDI and human capital development**

Over the years, the primary anticipation of most host countries, in particular developing countries, regarding effects of inward FDI flows, are the spillovers of knowledge and increased opportunities for enhancing economic development (Slaughter, 2002). However, according to literature, the functionality of inward FDI in recipient economies depends on the prevailing circumstances (Borensztien et al., 1998; Xu, 2000). These effects could be exogenous or endogenous (Hoffmann, 2001); Kheng, Sun & Anwar, 2016). In terms of exogenous effects, FDI could serve as a key determinant of human capital development. On the other hand, FDI effect could be endogenous in that FDI inflows are determined by the level of human capital in the recipient economy. This suggests the possibility of feedback effects between FDI and human capital in most developing countries. In the work of Marc Dougall (1960), following interest on the external effects of FDI, the impact of such effects on the general welfare is examined, while Hoffmann (2001), with the construction of a general equilibrium model, affirms two-way causal direction between human capital (skilled labour) and inward FDI. The work of Hoffmann (2001) only illustrates the possible association between investment liberalization and human capital development, further empirical studies are critical to ascertaining such effects. Also, in support of the earlier assertion, Toufik & Bouoiyour (2002) stress that the external effects of FDI depended on terms of exchange, public takings, fiscal policy and the structure of the trade balance of the host countries. While assessing the causes and consequences of the spillovers for the recipient country as well as the country of origin, Findlay (1978) elaborates and builds a dynamic model with FDI and transfer of technology between the developed countries and the underdeveloped countries in terms of technological development. The author proves that greater the gap between the index of technological efficiency in the developed countries  $[A(t)]$  and the technological level of the underdeveloped region  $[B(t)]$ , more significant are the technological effects in the less developed region<sup>3</sup>. Findlay's view is based on the notion that investors are motivated to be established in technologically backward countries given their attraction to the high profitability of capital in such economies. However, Wang (1990) challenges Findlay's proposition by stating that a factor of attraction of foreign

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<sup>3</sup> According to Findlay (1978), it is assumed that the world is composed of two regions: developed region (the advanced region) and underdeveloped region (the delayed region).



capital is the level of human capital accumulation on the one hand, and to the influence of FDI with high technology on the rise of the macroeconomic aggregates<sup>4</sup>.

Furthermore, in view of the possible effect of FDI on the accumulation of human capital, various avenues have been given in the literature through which FDI could have a positive effect on the human capital accumulation in developing countries. Based on Slaughter (2002); Willem(2003), using a demand and supply framework, on the demand side, three plausible channels by which FDI may positively influence the accumulation of human capital are suggested. According to Slaughter (2002), these channels include; technology transfer, spillovers and physical capital investment. While on the supply side, the process is not well known and documented, FDI can affect human capital development through its impact on the general education level, and official and informal on-the-job training. It has been posited that through changes in employment and wage structure, FDI influences the labour market, which result in human capital formation through skill upgrading of human capital of recipient countries. These can be termed as supply side effects of FDI on human capital formation process (Michie, 2001; Miyamoto, 2003).

Thus, Slaughter (2002) emphasizes that the transfer of technology via multinational corporations (MNCs) to the host country connects both the demand for more skilled labour within the host firms. Also, Blomstrom & Kokko (2003) argue that MNCs can influence human capital development in host countries given their requirement for formal education. As MNCs often offer attractive employment opportunities to highly skilled graduates, on the one hand, this may induce gifted students to complete tertiary training, and on the other hand, since MNCs demand skilled labor, such may be an incentive for governments to invest in higher education. Many authors have proposed that the transfer of technology would lead to skill upgrading in the recipient economies (Galor & Tsiddon, 1997; Slaughter; 2002; Blomstrom & Kokko, 2003; Willem, 2003). Therefore, FDI inflows, in this context, can be a key determinant of human capital development in developing countries. However, based on Mortimore (2004) argument, spillover studies(micro, and macro by implication) are criticized for assuming that the impact of FDI is automatic, and that it is not dependent on factors such as government policies or prevailing environmental conditions. Overall, given the divergent arguments in the literature, complementing the previous studies with new findings remains central to researchers.

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<sup>4</sup> For detailed accounts on the opposition to Findlay's model, see the work of Wang & Blomstr n (1992).

## **2.2. Empirical evidence**

The joint association between FDI and human capital in relation to their interaction effect on economic growth has prominently featured in the literature (Lipsey (2000); Zhang (2001); Durham (2004); Li & Liu (2005), while the individual effect on economic performance is also accorded considerable attention (Carkovic & Levine, 2005; Blonigen & Wang, 2005; Attanasio et al., 2017). More specifically, Odusola (1998) assesses the linkage between human capital investment and economic growth in Nigeria. The author's findings indicate that the association between human capital and economic growth seems to be weak, but positive. Another key observation in the literature is that the impact of human capital development on inward FDI received better attention compared with the examination on the influence of the latter on human capital development in developing countries. Although little research efforts have been undertaken in this respect, empirical evidence on how FDI could be regarded as an important ingredient of human capital enhancement has been scarcely presented, especially in Nigeria's context.

In the literature, following micro-level studies, there are heterogeneous pictures of the effect of FDI on the economy. Micro-level studies (such as Haddad & Harrison, 1993; Djankov & Hoekman, 2000) reveal that the productivity level of foreign firms is greater than in domestic firms. On the other hand, it is also suggested that productivity growth in domestic firms is found lower than it would have been when foreign firms are absent (in Morocco and the Czech Republic), or in other conditions where positive spillovers exist (for instance, Mexico). In another way, it is argued that the externalities may have an effect when the multinational companies fail to internalize the beneficial effects of their operational presence in the recipient countries (Blomström & Koko, 1998). Thus, the productivity of the host countries could improve when foreign firms introduce new technologies, bring in trained workers and managers who would in turn exercise these in the local firms. The pressure often exerts by the multinational companies seems to have forced the local firms to be efficient in their operation, and thereby benefit more from such positive externalities. Furthermore, according to Borenzstein et al. (1998), the training required to prepare the recipient affiliates labor force to work with new technology implies that there can be an effect of FDI on the human capital accumulation.

The importance of FDI in human capital development process is captured in the work of Ndeffo (2010). The author argues that in 32 sub-Saharan African countries between 1980 and 2005, a

correlation exists between FDI and human capital (the percentage of children in full-time education in primary and secondary schools). Similarly, a study carried out on 138 developing countries by Arturo (2001) shows a positive effect of FDI on the human capital development measured by the percentage of children in full-time education. Sharma & Gani (2004), using fixed-effects model, examine the impact of FDI on human development for low and middle-income countries over the period of 1975-1999. Findings reveal a significant and positive impact of FDI on human development (measured by the human development index<sup>5</sup>) for Bangladesh, Burundi, Burkina Faso, Cameroon, Cote d'Ivoire, Ghana, Kenya, Lesotho, Nepal, Niger, Pakistan, Malawi, Rwanda, Senegal, and Zimbabwe. In addition, using inward FDI as foreign capital inflows' indicator for 87 countries between 1960 and 2000, Egger et al. (2005) show that inward FDI positively correlates with higher school participation. Based on a panel study, Adenutsi (2010) posits that international remittance flows, in the long run, positively enhance human development in 18 low-income countries of sub-Saharan African countries during 1987-2007. Other studies that also argue in support of the positive effect of international remittances include; Matano & Ramos (2013); Azam (2015). Focusing on Ghana, Asiedu (2015) stresses that migrant remittances considerably increase the prospect of children enrolment in primary and secondary schools, suggesting that migrant remittances engender education human capital accumulation in the country.

In contrast, Checchi et al. (2007) indicate that FDI inflows impede secondary enrollment while stimulating tertiary enrollment, but the overall impact of FDI is adverse over the period 1985-2000, although the data on FDI employed in the study seem to be attracted by existing capacity of human capital, just at the secondary level. By and large, however, foreign firms' presence in the recipient economy has a notable impact on tertiary school enrollment, as inward FDI creates job opportunities for skilled labor. While examining the impact of FDI in various industries on tertiary schooling in the US, Wang (2011), with the use of US state-level data over the period 1997-2004, posits that manufacturing FDI is connected with a reduction in tertiary schooling, but FDI in information industries seem to give rise to postsecondary schooling. Focusing on 16 East Asian countries between 1985 and 2010, Zhuang (2017) investigates the effect of inward FDI on human capital accumulation. Author's findings stress that a rise in foreign presence could engender a rise

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<sup>5</sup> Human development index in these authors' study comprises a long and healthy life as measured by life expectancy at birth; knowledge measured by adult literacy rate, and the combined primary, secondary and tertiary gross enrolment ratio, and a decent standard of living measured by the GDP per capita (PPP US\$). However, the current study differs by incorporating the following indicators exclusively into the model; Model 1 — human capital index developed by Feenstra, Inklaar & Timmer (2015) — Penn World Table (PWT9) which is based on years of schooling and returns to education; and Model 2 — life expectancy at birth.

in secondary schooling, yet with an adverse effect on tertiary schooling. Further evidence indicates that, on both secondary and tertiary schooling in East Asian countries, FDI from OECD countries have positive effects. In a more recent study, covering 55 developing countries over the period 1980–2011, based on simultaneous equations fixed effect estimation, the interrelationship between FDI and human capital is examined by Kheng, Sun & Anwar (2016). Findings support a significant bi-directional causation between human capital and FDI. These studies have shown that inward FDI could be essential for the development of human capital in host countries. However, FDI is found to diminish economic growth as it can increase income inequality in the economy (Adams and Klobodu, 2017). Hence, these arguments show that the impact of FDI on human capital development seems to be mixed in the literature. As a consequence, a further investigation could provide a better understanding.

Few studies that consider Nigeria examine the relationship between capital inflows and economic growth (Ehigiamusoe & Lean, 2019) for only Nigeria, and the relationship between inward FDI and growth (Akinlo, 2004; Adeniyi, Omisakin, Egwaikhide, and Oyinlola, 2012; Alvarado, Iniguez, and Ponce, 2017) for developing countries. Although most of these studies are not specifically on Nigeria as they are cross-country studies, some authors also consider the impact of foreign aid and foreign portfolio investment on economic growth (Adams and Atsu, 2014; Albulescu, 2015; Moolio & Kong, 2016). Based on the perceived gap in the literature, as most studies tend to focus on other economies other than Nigeria, it becomes necessary to look into the specific case of Nigeria. In addition, since the bulk of studies is cross-country studies, a time series study would offer substantial and more reliable evidence which could guide policy actors in ascertaining the extent of the influence of FDI on human capital development in a seemingly weak economy (such as Nigeria).

### 3. Methodology and data description

Following Michie (2001); Miyamoto (2003), the supply side effects of FDI on human capital that explain how MNCs contribute to increasing demand and wages for skilled workers motivate the theoretical framework for the study. Accordingly, in the long-run, they influence the general-equilibrium incentives of the people in recipient countries to acquire necessary skills through education and/or training, and also the increase in economic activity from MNCs affiliates implies a rise in host-country tax revenue. The expansion in host-country tax bases may induce greater government investment in education and training. Although FDI output and taxes do not automatically mean greater investment in human capital, both FDI output and taxes normally free up budget constraints, thereby engendering the possibility of greater investments. Theories suggest the incorporation of time dimension in the analysis, as FDI is expected to have an impact on the level of human capital formation in future (next generation), although this assertion needs further verification through empirical analysis. Hence, FDI-human capital relationship is based on the following functional equation:

$$HUMC_t = f(FDI_t, GDP_t, TRP_t, INF_t) \quad (1)$$

*HUMC* represents human capital indicators (Human capital index, and life expectancy at birth), *FDI* is a measure of *FDI* inflows (foreign direct investment, net inflows [% of GDP]) into the country, *GDP* (GDP per capita), *TRP* (trade openness) and *INF* (inflation) are other variables that could theoretically have an effect on human capital development. *t* represents time dimension. These variables are transformed into logarithm prior to the analysis.

#### 3.1 Non-linear ARDL model

Non-linear ARDL model is a good approach for detecting any possible asymmetry in relation to the long and short non-linearity among economic or/ financial indicators, which makes it different from linear ARDL, although both techniques perform better compared to other cointegration methods (such as Johansen, & Juselius, 1990; Johansen, 1991). They are applicable even if the series are not only I(1) but I(0) unlike others cointegration techniques. This makes ARDL superior among other cointegration techniques, and they are proposed by Shin et al. (2011), who equally represented the non-linear form of the symmetric ARDL model. Given the possible asymmetric

relationship between FDI and human capital development in Nigeria, the study employs asymmetric cointegrating regression. Thus, following Pesaran et al. (2001), and Shin et al. (2011), and the recent work of Ghardallou & Boudriga (2014), the model is specified as;

$$HUMC_t = \delta_0 + \delta_1 FDI_t^+ + \delta_2 FDI_t^- + \delta_3 GDP_t + \delta_4 TRP_t + \delta_5 INF_t + \varepsilon_t \quad (2)$$

Where the vector of long run parameter estimates is represented by  $\delta_i$ .  $FDI_t^+$  accounts for the asymmetric effect of FDI based on the inclusion of positive changes, while  $FDI_t^-$  covers negative changes. Furthermore,  $FDI_t^+$  and  $FDI_t^-$  are the partial sum of positive and negative in  $FDI_t$  respectively. Non-linearity is only allowed for FDI as is the main variable of interest, while others are taken as control variables.

$$FDI_t^+ = \sum_{i=1}^t \Delta FDI_t^+ = \sum_{i=1}^t \max(FDI_t, 0) \quad (3)$$

$$FDI_t^- = \sum_{i=1}^t \Delta FDI_t^- = \sum_{i=1}^t \min(FDI_t, 0) \quad (4)$$

Based on Eq. (2, 3, & 4),  $\delta_1$  accounts for the long run relation between FDI increase and human capital, and it is expected to be positive. On the other hand,  $\delta_2$  represents the long run effect of FDI reduction on human capital development. Given that they are expected to move in the similar direction, it is expected that  $\delta_2$  to be negative. Thus, the long run association as represented by (Eq. [2]) reflects asymmetric effect of FDI on human capital development in the long run. By relating (Eq. [2]) to the case of linear ARDL, the study derives the asymmetric error correction model (AECM) as;

$$\begin{aligned}
\Delta HUMC_t = & \alpha_0 \\
& + \sum_{i=1}^k \omega_i \Delta HUMC_{t-1} + \sum_{i=1}^k \gamma_i \Delta FDI_{t-1}^+ + \sum_{i=1}^k \sigma_i \Delta FDI_{t-1}^- + \sum_{i=1}^k \pi_i \Delta GDP_{t-1} \\
& + \sum_{i=1}^k \vartheta_i \Delta TRP_{t-1} + \sum_{i=1}^k \theta_i \Delta INF_{t-1} + \alpha_1 HUMC_{t-1} + \alpha_2 FDI_{t-1}^+ + \alpha_3 FDI_{t-1}^- \\
& + \alpha_4 GDP_{t-1} + \alpha_5 TRP_{t-1} + \alpha_6 INF_{t-1} \\
& + \varepsilon_t
\end{aligned} \tag{5}$$

Where  $k$  indicates the lag order.

$$\sum_{i=1}^k \gamma_i \Delta FDI_{t-1}^+$$

measures the short run effect of FDI increase on human capital development indicators.

$$\sum_{i=1}^k \sigma_i \Delta FDI_{t-1}^-$$

captures the short run effect of FDI decrease on human capital development. The asymmetric dynamic multiplier effect of percentage changes in  $FDI_{t-1}^+$  and  $FDI_{t-1}^-$  on human capital development as  $P$  tends towards infinity is specified as;

$$m_p^+ = \sum_{j=0}^p \frac{\partial HUMC_{t+j}}{\partial FDI_{t-1}^+}, m_h^- = \sum_{j=0}^p \frac{\partial HUMC_{t+j}}{\partial FDI_{t-1}^-} \quad p = 0, 1, 2, \dots \tag{6}$$

Note that as  $p \rightarrow \infty, m_p^+ \rightarrow \delta_1$  and  $m_h^- \rightarrow \delta_2$

### Linear ARDL model

In addition to NARDL, the symmetric association between FDI and human capital development level is given attention by the study. This will help ascertain possible ways through which FDI can impact human capital in the context of Nigeria. With anticipated comprehensive outcomes, the adoption of different techniques in the study could close the existing gap in the literature. Thus, the linear ARDL bound test model is specified as;

$$\begin{aligned}
\Delta HUMC_t = & \alpha_0 + \sum_{i=1}^m \alpha_1 \Delta HUMC_{t-i} + \sum_{j=0}^n \alpha_2 \Delta FDI_{t-j} + \sum_{k=0}^o \alpha_3 \Delta GDP_{t-k} + \sum_{l=0}^p \alpha_4 \Delta TRP_{t-l} \\
& + \sum_{m=0}^q \alpha_5 \Delta INF_{t-m} + \alpha_6 HUMC_{t-1} + \alpha_7 FDI_{t-1} + \alpha_8 GDP_{t-1} + \alpha_9 TRP_{t-1} \\
& + \alpha_{10} INF_{t-1} + \varepsilon_t \quad (7)
\end{aligned}$$

Eq. (7) comprises two divisions of results. The short-run cointegration association is considered in first division  $(\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5)$ , while the second division centers on the long-run association between FDI and human capital development  $(\alpha_6, \alpha_7, \alpha_8, \alpha_9, \alpha_{10})$ . Based on Schwarz Information Criteria (SIC), the number of lags selection is represented by  $m, n, o, p, q$ . The null hypothesis of no cointegration between FDI and human capital is tested against the alternative hypothesis as;

$$\begin{aligned}
H_0 &= \alpha_6 = \alpha_7 = \alpha_8 = \alpha_9 = \alpha_{10} = 0 \\
H_1 &= \alpha_6 = \alpha_7 = \alpha_8 = \alpha_9 = \alpha_{10} \neq 0
\end{aligned}$$

If the calculated F-statistic is greater than the upper bound value at 1%, 5% or 10% significance level, the null hypothesis of no cointegration is rejected. Also, the existence of a long-run relationship suggests that it is necessary to establish a causal direction between FDI and human capital. If the variables are cointegrated, according to Engle and Granger (1987), there should be existence of causal link between the variables in at least one direction. Thus, VECM Granger causality is employed in order to identify any causal relationship between the variables in both the long-run and short-run. This empirical technique could guide policy design process. The VECM Granger causality model is specified as:

$$\begin{aligned}
\Delta HUMC_t = & \alpha_0 + \sum_{i=1}^m \alpha_1 \Delta HUMC_{t-i} + \sum_{j=0}^n \alpha_2 \Delta FDI_{t-j} + \sum_{k=0}^o \alpha_3 \Delta GDP_{t-k} + \sum_{l=0}^p \alpha_4 \Delta TRP_{t-l} \\
& + \sum_{m=0}^q \alpha_5 \Delta INF_{t-m} + \partial_i ECT_{t-1} \\
& + \varepsilon_t \quad (8)
\end{aligned}$$



$$\begin{aligned}
\Delta FDI_t = & \alpha_0 + \sum_{i=1}^m \alpha_1 \Delta FDI_{t-i} + \sum_{j=0}^n \alpha_2 \Delta HUMC_{t-j} + \sum_{k=0}^o \alpha_3 \Delta GDP_{t-k} + \sum_{l=0}^p \alpha_4 \Delta TRP_{t-l} \\
& + \sum_{m=0}^q \alpha_5 \Delta INF_{t-m} + \phi_i ECT_{t-1} \\
& + \varepsilon_t
\end{aligned} \tag{9}$$

Lagged error correction term is  $ECT_{t-1}$ . The significance of the estimates ( $\partial_i$  &  $\phi_i$ ) of  $ECT_{t-1}$  (which is expected to have negative signs) implies the existence of long-run causal links, while the significant association in the first differences of the variables explains the direction of short run causality. Under the framework of the Wald test in VECM approach, the joint  $\chi^2$  statistic for the first differenced lagged independent variables is adopted to examine the direction of short-run causality among the variables.

Furthermore, given the importance of the test of stability, CUSUM and CUSUMSQ would be conducted to ascertain the stability of the long run and short run relationship confirmed for the study period. The Cumulative Sum (CUSUM) and Cumulative Sum of Squares (CUSUMSQ) tests proposed by Brown et al. (1975) are employed. These techniques can be applied even if the structural break point is unknown, which makes it different from Chow test that needs break points to be specified.

Annual time series data for the period 1981 – 2018 are used in the study. The scope covers both the period when the country experienced a significant increase and decrease in FDI inflows, and it is also determined by the availability of data. Two human capital development indicators are incorporated in the model. They include population health (life expectancy at birth), and human capital index. Human capital index developed by Feenstra, Inklaar & Timmer (2015) —Penn World Table (PWT9) is employed as the human development indicator. The index is based on years of schooling and returns to education. This measure captures the critical aspect of human capital development and it covers a very long period compared to others human development index. These make the index well suitable for the time series study. On the other hand, the inclusion of population health (life expectancy at birth) is necessitated by the assertion that, in low- and middle-income countries, this variable has a significant influence on FDI inflows (Alsan et al.,

2006). FDI is measured by foreign direct investment, net inflows (% of GDP) which is defined as the direct investment equity flows in the reporting economy. It represents the sum of equity capital, reinvestment of earnings, and other capital as indicated in the balance of payments. This study chooses this type of FDI based on the extant literature which suggests that is the best measurement of capital inflows (Anwar & Nguyen, 2010; Iamsiraroj, 2016; Moolio & Kong, 2016; Ehigiamusoe & Lean, 2019), although no general consensus seems to be established in the literature. Real GDP per capita (constant 2010 US\$) is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products, while trade openness is the sum of exports and imports of goods and services as a share of gross domestic product. The inclusion of trade openness as one of the control variables is selected based on the work Noorbakhsh et al. (2001); Kheng, Sun & Anwar (2016) that assess the relationship between human capital and inward FDI in developing countries. Inflation rate, consumer prices (annual %), is the annual % change in the cost to the average consumer of getting a basket of goods and services that can be fixed or changed at defined intervals, such as annually. The inclusion of inflation (as a control variable) is critical to explaining the level of human capital development in Nigeria, as this indicator has been found to have a significant impact on human capital (Heylen et al., 2003), whereas the inclusion of real GDP per capita (constant 2010 US\$) follows the recent work of Ehigiamusoe & Lean (2019) that centered mainly on Nigeria's context. The data on FDI, life expectancy at birth, GDP per capita, trade openness and inflation are obtained from World Development Indicators (2020 Edition).

#### 4. Estimation results and discussion

The main empirical investigation of the study is on how FDI inflows shape human capital development in Nigeria, and that there could be feedback effects between FDI inflows and human capital in the country. Given the nature of the time series studies, the estimations start with the test for unit root of the variables employed. In order to account for the level of stationarity of the series, both Augmented Dickey Fuller (ADF) Phillips Perron (PP) are used. As shown in Table 2, there is a mixture of I (0) and I (1) variables in the model, indicating that some variables are stationary at level and at first difference but none is I (2) or above. The test satisfied the condition for the use of ARDL (both non-linear and linear) approach, as it mostly applicable where there is existence of both I (0) and I (1) variables in the model. In this case, this cointegration approach performs better compared to other cointegration techniques. Furthermore, Bounds F-tests for cointegration association is reported in Table 3. The computed F-statistic is found to be greater than lower and upper critical bounds, implying that the null hypothesis of no cointegration is rejected at 1% and 5% significant level. The stability of the specification regarding the variables is confirmed by the stability test conducted —ARDL Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ) presented in Figure 2. Various diagnostic tests conducted also substantiate the validity and robustness of the estimates. In all, two different models are examined; Model 1 represents the use of human capital index (HUM), and Model 2 covers the use of life expectancy (LEXP) as dependent variables respectively.

**Table 2.**  
Unit root test

Variable	Augmented Dickey Fuller (ADF)			Phillips Perron (PP)		
	Level	First difference	Status	Level	First difference	Status
<i>HUM</i>	-0.41 (0.90)	-3.19** (0.02)	I (1)	2.16 (0.10)	-3.11** (0.02)	I (1)
<i>LEXP</i>	-0.33 (0.86)	-2.67** (0.03)	I(1)	-0.25 (0.31)	-2.98** (0.03)	I(1)
<i>FDI</i>	-3.77** (0.01)	-5.51*** (0.00)	I (0)	-3.64** (0.01)	-13.86*** (0.00)	I (0)
<i>GDP</i>	-0.25 (0.92)	-4.92*** (0.00)	I (1)	-0.59 (0.86)	-4.92*** (0.00)	I (1)
<i>TRP</i>	-2.12 (0.24)	-7.36*** (0.00)	I (1)	-2.40 (0.15)	-7.36** (0.00)	I (1)
<i>INF</i>	-2.41 (0.16)	-6.07** (0.00)	I (1)	-2.82* (0.07)	-11.46*** (0.00)	I (1)

Note: \*\*\*represent 1%, \*\*represent 5%, \*represent 10%. Values in bracket are probability values, while the ones with no bracket are t-statistical values. The critical values of both Augmented Dickey Fuller (ADF) and Phillips Perron (PP) technique are (-3.679322), (-2.967767), and (-2.622989) at 1%, 5% & 10% respectively. *HUM* represents human capital index; *LEXP* represents life expectancy; *FDI* represents foreign direct investment; *TRP* represents trade openness; and *INF* represents inflation rate.

**Table 3.**

F-bounds test for cointegration

	<i>Test statistic</i>	<i>Value</i>	<i>K</i>
<i>Linear ARDL</i>	<i>F-statistic (Model 1)</i>	18.34***	4
	(2, 2, 0, 2, 2)		
	<i>F-statistic (Model 2)</i>	13.71***	4
	(1, 0, 2, 2, 1)		
<i>Non-linear ARDL</i>	<i>F-statistic (Model 1)</i>	4.94**	4
	(2, 3, 0, 0, 2)		
	<i>F-statistic Model (2)</i>	14.62***	4
	(1, 0, 0, 2, 0)		
	<i>Significance</i>	<i>I(0) lower bound</i>	<i>I(1) upper bound</i>
<i>Linear ARDL</i>	1%	3.74	5.06
	5%	2.86	4.01
	10%	2.45	3.52
<i>Non-linear ARDL</i>	1%	4.4	5.72
	5%	3.47	4.57
	10%	3.03	4.06

\*\*\* &amp; \*\* indicate level of significance at 1% and 5% respectively, while K is the number of independent variables.

#### 4.1 Linear ARDL long and short run estimates

In Table 4, the long run and short run estimates are presented. Following Model 1, results show a positive relationship between FDI and human capital index in the long run as well as in the short run, but FDI is only significant in the short run at 5 % level of significance. The insignificance of the estimated parameter of FDI indicates that although FDI inflows are essential ingredients for technology transfer and local skill improvement, the significant role of FDI holds when there is optimal utilization capacity in the host country. In this case, leveraging FDI for sustainability could only be enhanced if the investment climate is characterized by a well-developed financial system, strong legal framework and effective government policy. This buttresses the argument of some authors (Choe, 2003; Borensztein et al., 1998; Zhang, 2001) who contend that the effectiveness of inward FDI depends on certain country-specific features. In Model 2, when life expectancy is used as the human capital indicator, estimated results are similar to the effect of FDI on human capital index in Model 1.

In addition to the seeming insufficient rates of the foreign capital in the country (Nigeria), these findings corroborate the view that Nigerian economy is characterized by festering socioeconomic and governance challenges (Fagbemi & Adeoye, 2020) — a precarious and unstable business environment— that could often hamper the performance of FDI inflows. The country seems to be unattractive to long-term foreign investors, since the investment climate is characterized by overly

bureaucratic bottlenecks, weak legal framework and stringent government policies. Hence, the fundamental weakness of the economy has been its failure to attract substantial FDI inflows, which could also account for the negligible effect of inward FDI on human capital development. This further consolidates the report that the proportion of FDI going to Nigeria, and which is channeled towards the enhancement of economic development is somewhat low and ineffective (Proshare, 2018). Furthermore, the lack of economic diversification<sup>6</sup> and protracted state of insecurity in Nigeria have been a major deterrent for investors, and hence the low impact of foreign capital inflows on human capital (Stein & Daude, 2002; UNCTAD, 2018). Given that in most developing countries, foreign investors are often advised to carry out collective social investments in the area where their firms are located (Ndeffo, 2010), while building of schools is one of the key priorities, some investors are not fully committed to the implementation of these socially impactful projects in these countries. This can also be attributed to these results in the long run. In terms of health, investors' contribution to health service seems to be minimal in Africa (Ndeffo, 2010).

Moreover, GDP and trade openness also have a positive relationship with human capital indicators in both short run and long run across model. The estimated parameters of trade openness are not significant in the long run as well as in the short run, while GDP is only significant in the long run. The main reason for the insignificant effect of trade on human capital could be ascribed to the country's reliance on import at the expense of export, which has contributed to poor economic performance, and thus low human capital development level in Nigeria. On the other hand, the insignificant of the coefficients of GDP in the short run could be linked to gross mismanagement of public funds budgeted for the immediate improvement of the education and health sector. However, inflation has an adverse association with human capital indicators, but it is significant, suggesting that a high level of inflation may result to low human capital development. In view of the high inflation rate in the country, it has been suggested by Heylen et al. (2003) that an adverse effect is possible when inflation rates exceeds a level (such as double digit rates as in the country's case). Overall, the estimated parameter of the Error Correction Term (ECT) which shows the speed of adjustment of human capital indicators (human capital index and life expectancy) to shocks in exogenous variables is negative and statistically significant. This implies a stable process of

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<sup>6</sup>The overdependence on hydrocarbons for government revenue and foreign-exchange has been a fundamental problem of the economy, which makes it vulnerable to boom and bust cycles. For instance, when the price of oil is on the increase, money inflows rise and vice-versa.

adjustment to the long run equilibrium, and the validity of the Error Correction Term (ECT) is confirmed by the estimate.

**Table 4.**

Linear ARDL long run and short run estimates

	<i>Model 1 (HUM as the dependent variable)</i>	<i>Model 2 (LEXP as the dependent variable)</i>
<b>Long run estimate</b>		
<i>FDI</i>	0.21 [0.43]	0.41 [0.16]
<i>GDP</i>	0.34** [2.81]	0.25*** [5.11]
<i>TRP</i>	0.70 [0.61]	0.28 [0.61]
<i>INF</i>	-0.01** [-2.61]	-0.31** [-2.91]
<i>C</i>	0.01 [0.19]	0.21** [3.01]
<b>Short run estimate</b>		
$\Delta FDI$	0.012** [2.74]	0.51** [2.99]
$\Delta GDP$	0.03 [1.52]	0.01 [1.11]
$\Delta TRP$	0.03 [0.21]	0.14 [1.01]
$\Delta INF$	-0.42** [-2.91]	-0.23** [-2.62]
<i>ECT</i>	-0.01*** [-3.32]	-0.12*** [-4.11]
<b>Diagnostic test</b>		
<i>Durbin-Watson</i>	2.05	1.85
<i>Breusch-Godfrey</i>	0.52	0.42
<i>serial correlation test</i>		
<i>Ramsey reset test</i>	0.11	0.14
<i>Normality test</i>	0.81	0.51

\*\*\*& \*\* indicate 1% and 5% level of significance respectively, while figures in parentheses are t-values. *HUM* represents human capital index; *LEXP* represents life expectancy; *FDI* represents foreign direct investment; *TRP* represents trade openness; and *INF* represents inflation rate.

## 4.2 Granger causality test based on VECM

In this section, Lag Order Selection Criteria for the estimations, in Table 5 & 6, are based on Schwarz information criterion (SC). SC seems to be more reliable. Following Table 7, the Granger causality results reveal that all human capital indicators employed Granger cause FDI inflows in the long run as well as in the short run, indicating that high human capital development could attract more inward FDI into the country. These results imply that the level of human capital development is a significant determinant of inward FDI flows. Hence, to stimulate FDI inflows, attention should be given to the development of human capital such as increased spending on health, education sector and training. These findings are consistent with the institutional FDI fitness-based conceptual framework followed by Wilhelms & Witter (1998); Bhaumik & Dimova

(2013); Miningou & Tapsoba (2017), as they argued that investment in human capital is central to FDI promotion in developing countries. On the other hand, FDI does not Granger cause human capital index and life expectancy at birth in the long run, but there is causality in the short run. This indicates that there is a unidirectional causal relation in the long run between FDI and human capital. However, this outcome negates the findings of Kheng, Sun & Anwar (2016) who argue that there is bi-directional causal link between the two indicators, although their work is cross-country study (panel) of developing countries. Thus, the difference might be as a result of techniques used, scope, and the nature of the studies. In relation to long term causal direction, unidirectional causality exists between FDI and human capital, which runs from human capital to FDI. This suggests that human capital is a key determinant of inward FDI, and may account for the insignificance of FDI in the previous section, indicating that the quality of human capital matters for the attractiveness and effectiveness of FDI inflows (Assuncao et al., 2011; Noorbakhsh et al., 2001). By implication, in order to stimulate the rate of foreign capital (FDI) and presence of investors in the country, there should be improved human capital. Hence, it is critical to adopt policy options that would engender the sustainable development of human capital by the government, while the underlying structural bottlenecks and protracted state of insecurity are accorded significant attention.

**Table 5.** Lag Order Selection Criteria (Model 1)

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-576.8473	NA	1.89e+08	33.24842	33.47061	33.32512
1	-386.1458	316.0197	14875.46	23.77976	25.11291*	24.23996
2	-345.2726	56.05469*	6590.685	22.87272	25.31684	23.71643
3	-313.1415	34.88517	5660.946*	22.46523*	26.02031	23.69244*

\* indicates lag order selected by the criterion at 5% level. LR: sequential modified LR test statistic; FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion; HQ: Hannan-Quinn information criterion

**Table 6.** Lag Order Selection Criteria (Model 2)

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-644.8882	NA	9.24e+09	37.13647	37.35866	37.21317
1	-499.2349	241.3683*	9527603.	30.24199	31.57515*	30.70220*
2	-472.0913	37.22546	9250604.*	30.11950	32.56362	30.96321
3	-446.6935	27.57476	11674196	30.09677*	33.65185	31.32399

\* indicates lag order selected by the criterion at 5% level. LR: sequential modified LR test statistic; FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion; HQ: Hannan-Quinn information criterion

**Table 7.**

Granger causality results based on VECM

Lag	Model	Human capital– led FDI			FDI – led human capital		
		Variable	Short run <sup>a</sup>	ECT <sup>b</sup>	Variable	Short run <sup>a</sup>	ECT <sup>b</sup>
1	1	<i>HUM</i>	19.30***	-1.71*** [-5.79]	<i>FDI</i>	12.22***	-0.02 [-0.99]
		<i>GDP</i>	2.83		<i>GDP</i>	2.05	
		<i>TRP</i>	17.59***		<i>TRP</i>	6.51**	
		<i>INF</i>	0.12		<i>INF</i>	9.67***	
1	2	<i>LEXP</i>	12.26***	-1.31*** [-7.42]	<i>FDI</i>	12.03**	-0.52 [-0.45]
		<i>GDP</i>	1.13		<i>GDP</i>	6.01**	
		<i>TRP</i>	2.04		<i>TRP</i>	1.10	
		<i>INF</i>	1.43		<i>INF</i>	5.51**	

(<sup>a</sup>) The Wald statistic is reported. It tests the joint significance of the lagged values of the variables, which follow  $\chi^2$  distribution. (\*\*\*) & (\*\*) indicate the level of significance at 1% and 5% respectively. *HUM* represents human capital index; *LEXP* represents life expectancy; *FDI* represents foreign direct investment; *TRP* represents trade openness; and *INF* represents inflation rate.

### 4.3 Non-linear ARDL long and short run estimates

In this section, the main point of emphasis centers on the effect of the direction of FDI inflows on human capital indicators. The significance of the test of asymmetry in both short-run and long-run implies that a non-linear relationship could exist between inward FDI and human capital in Nigeria's context. In Table 8, estimated results indicate that an increase in FDI inflows has a significant positive effect on human capital index, and life expectancy in the long run. However, in the short run, the effect is insignificant, which could be ascribed to prevailing factors enumerated earlier. This suggests that a rise in FDI inflows to a certain rate, in the long-term, could result in a significant increase in the level of human capital, suggesting that the magnitude of inward FDI matters in any economy (Zhuang, 2017). This also buttresses the argument of Barba & Venables (2004) that the larger present of foreign affiliates in the USA, compared to domestic firms, tends to result in higher productivity. Another plausible elucidation is that since FDI inflows require sound technical know-how, and more skilled labour to work with or adapt to more advanced technologies, thus such rising demand for skilled labor could offer a significant incentive for improved human capital (Todo, 2006), which might be inform of improved health services and education system. In essence, the urge to increase the rate and operational efficiency of FDI could have a long-term substantial influence on human capital. However, the effective institutional structures needed for strengthening the link between FDI and human capital is central, as poor policy measures might impede the contribution of increased FDI inflows to human capital development in the long run (Miningou & Tapsoba, 2017). Regarding the short run case, this



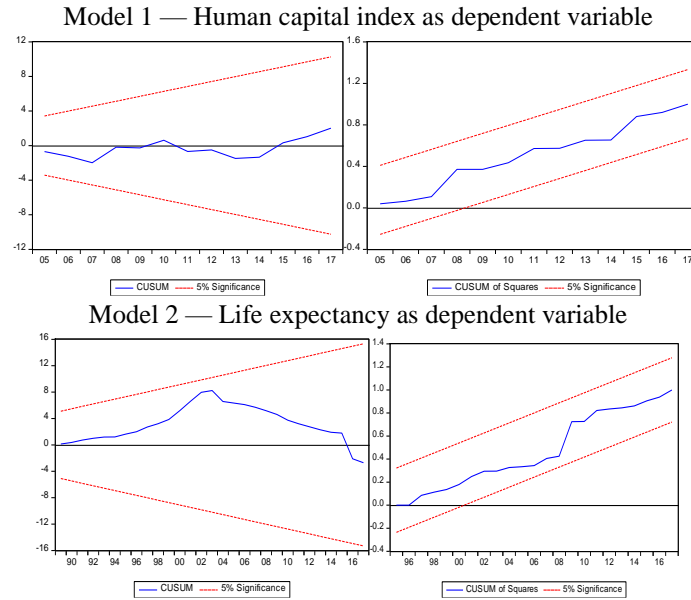
empirical evidence alludes to the current passiveness of FDI inflows in development process in most developing countries (Akinlo, 2004; Temiz & Gokmen (2014). Hence, it could be suggested that enhancing the immediate effect of FDI inflows on Nigerian economy would aid human capital development. This is crucial to ensuring the sustainable leverage of FDI inflows which seems to have eluded the country over the years.

**Table 8.**

Non- linear ARDL long run and short run estimates

	<i>Model 1 (HUM as the dependent variable)</i>	<i>Model 2 (LEXP as the dependent variable)</i>
<b>Long run estimate</b>		
<i>FDI</i> <sup>+</sup>	0.01** [2.95]	0.001** [2.84]
<i>FDI</i> <sup>-</sup>	0.01 [1.88]	0.11 [0.97]
<i>GDP</i>	0.18*** [7.91]	0.13*** [8.28]
<i>TRP</i>	0.01 [0.83]	0.01 [0.76]
<i>INF</i>	-0.001*** [-4.12]	-0.41 [-0.36]
<i>C</i>	0.03*** [5.45]	0.001 [1.07]
<i>Test of asymmetry</i>	6.98**	8.26**
<b>Short run estimate</b>		
$\Delta FDI^+$	0.02 [1.10]	0.31 [0.11]
$\Delta FDI^-$	0.01 [1.96]	0.45 [0.16]
$\Delta GDP$	0.01 [1.83]	0.001 [0.07]
$\Delta TRP$	0.001 [0.10]	0.82 [0.06]
$\Delta INF$	-0.01** [-2.67]	-1.52** [-2.92]
<i>ECT</i>	-0.09*** [-5.14]	-0.25*** [-9.96]
<i>Test of asymmetry</i>	7.51**	6.72**
<b>Diagnostic test</b>		
<i>Durbin-Watson</i>	2.02	2.41
<i>Breusch-Godfrey</i>	0.36	0.11
<i>serial correlation test</i>		
<i>Ramsey reset test</i>	0.62	0.53
<i>Normality test</i>	0.49	0.12

\*\*\*& \*\* indicate 1% and 5% level of significance respectively, while figures in parentheses are t-values. *HUM* represents human capital index; *LEXP* represents life expectancy; *FDI* represents foreign direct investment; *TRP* represents trade openness; and *INF* represents inflation rate.



**Figure 2: Stability test**

In sum, this study reveals that the effect of FDI on human capital seem to be negligible. The most probable explanation for this empirical assertion could be the pervasiveness of poor policy framework which hinders the ability of investors to substantially contribute to human capital development. Given that ineffectiveness of FDI can be exacerbated by weak institutional environment and lack of commitment on the part of investors (Ndeffo, 2010; Miningou &Tapsoba, 2017), it is crucial to initiate measures that could enhance the impact of FDI inflows on human capital. A focus on the development of education and health sector through FDI channel might engender human capital development. Essentially, in relation to human capital, findings offer a substantial need for the improvement of FDI inflows and their effects in Nigeria.

## 5. Concluding remarks

The basic objective of the study is to assess the long run and short run effect of FDI on human capital development in Nigeria over the period of 1981-2018. This study highlights the asymmetric significant effect of FDI on human capital in the long run, as FDI inflows could create a tendency for spillovers of knowledge to the domestic labor force from foreign-induced investment to Nigerian economic performance. Two human development indicators (human capital index; and life expectancy at birth) are employed to ascertain the impact. The analysis is carried out with the use of both linear and non-linear autoregressive distributed lag (ARDL) bounds testing approach and VECM Granger causality test.

With a keen interest on the effect of FDI, findings reveal that, in the long run, the effect of FDI on human capital is insignificant, but with a significant effect in the short run. Considering the asymmetric linkage, an increase in FDI inflows is found to have a significant effect on human capital, while a decrease in FDI has no significant effect on human capital in the long run. It is posited that the larger the present of foreign affiliates or investors in the country, compared to domestic firms, could result in higher productivity. Also, given that FDI inflows require sound technical know-how, and more skilled labour to work with or adapt to more advanced technologies, these could draw attention to improved human capital. Thus, increased FDI inflows into the country could substantially enhance the years of schooling and better health services which induce the human capital development. Foreign investors' contribution to education sector would enhance more school enrollment, and in turn improved human capital. The study support the notion that FDI could promote the standard of education in Nigeria if investors are truly committed to the implementation of socially beneficial projects in developing countries (Ndeffo, 2010). With reference to the present passive role of FDI, stimulating the immediate effect of FDI inflows on Nigerian economy could engender human capital development. In addition, the study justifies the persistent insufficient rates of capital inflows into the country, and its meager role in human capital enhancement. The study indicates that lack of economic diversification and protracted state of insecurity in Nigeria has been a major impediment to investors, and thus the low impact of foreign capital on human capital.

Furthermore, it is demonstrated that the overdependence on import contributes to poor economic performance, and thus low human capital development level in Nigeria. Empirical evidence further

shows that there is unidirectional causality between FDI and human capital in the long run, which runs from human capital to FDI. Hence, the level of human capital development is a significant determinant of inward FDI flows, which also suggests that the quality of human capital matters for sustainable leverage and attractiveness of FDI inflows. By implication, in order to stimulate FDI inflows, attention should be accorded the development of human capital such as increased spending on health, education sector and training. Also, it is critical to adopt policy measures that could engender the sustainable development of human capital by the government, while the underlying structural bottlenecks and protracted state of insecurity are given significant attention.

Given that the current study indicates that limited attention has been given to the effect of capital inflows on human capital development in the literature in Nigeria's context, further studies are required to strengthen the existing understanding. Although this study has shown how foreign capital, in form of inward FDI flows, could affect human capital, there are other indicators that need to be considered, which include foreign aid, foreign loan, remittances, and portfolio investment. Future research can broaden the existing knowledge by incorporating these indicators into the analysis to ascertain their respective effects on human capital development in the country.

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