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Evaluating the Hypothesis of Aid Fungibility: A Focus on Human Development in Nigeria

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ABSTRACT

The thrust of this paper is the empirical investigation of the aid fungibility hypothesis with a focus on the effectiveness of net ODA received, grants and technical cooperation grants in driving the pace of human development. The research method relied on quasi-experimental approach with fully modified Least Squares (FMOLS) and error correction mechanism as techniques for the data analysis. The unit root tests results from the Augmented Dickey-Fuller method showed that all the series are difference stationary I(1). In addition to the unit root test, the Hansen cointegration tests results shows evidence of cointegration among the series. This is suggestive of parameter stability in each of the model. The cointegrating regression results indicate that technical cooperation grant exerts significant positive impact on human development in Nigeria in both long run and short run. This suggests that free-standing funds from international sources committed to the development of technical and managerial skills or technology fostered human development by making resources available for longevity and improved standard of living. Similarly, the dynamic regression result shows that Nigeria tends to leverage on grants in addition to technical cooperation grants in boosting the level of human development in the short run. On the contrary, the results show that net ODA received has adverse effect on the underlying human development indicators in the short run. This suggests that net ODA received is a fungible source of aid considering its ineffectiveness in fostering human development. Accordingly, it is recommended for aid policy to focus on Aid-on-Delivery (AoD) and General Budget Support (GBS) in order to improve the effectiveness of aid in scaling up the pace of human development in Nigeria.

Keywords: Human development, Fungibility, ODA, Grants and Technical cooperation grants

1 INTRODUCTION

The Mosley (1986) micro-macro paradox has drawn policy and research attentions to the effectiveness of aid in addressing development challenges in the aid recipient poor countries. Thus, the issue of aid fungibility - inappropriate allocation of aid or ineffectiveness of aid has become widespread in development economics literature considering the fact that international aid has remained an outstanding source of capital for low income countries, especially in Africa where the level of human development is low. Vathis (2013) opined that the aid effectiveness evaluation has been surrounded by controversies as various scholars hold distinct views. Sachs (2005) advocated for increase in aid flows from rich countries to poor countries so as to eradicate poverty by 2025. On the contrary, Easterly (2006) opposed the aid process, claiming that the aid organizations have achieved very little result in terms of poverty reduction compared to the volume of aid received.

Notwithstanding the growing criticisms of aid effectiveness in recipient countries from various scholars (Easterly; 2006, Collier, 2007 and Easterly, 2003), substantial development assistance continues to flow from rich countries to sub-Sahara Africa (SSA) compared to other regions of the world with little or no improvement on the pace of human development. The HDI for SSA in 2015 as contained in the United Nations Development Programme (UNDP, 2016) is 0.523 while that of other regions (Arab States, East Asia and the Pacific, Europe and Central Asia, Latin America and the Caribbean and South Asia) ranged from 0.621 to 0.756. This is an indication that SSA has low human development despite the huge resources it received overtime. Like other countries in the SSA, Nigeria has been receiving development assistance since its independence in 1960. The

World Bank, IMF, OECD DAC countries, United States Agency for International Development (USAID), European Commission (EC), African Development Bank (AFDB) and the British Department of International Development have remained traditional donor agencies. Okon (2012) observed that between 1999 and 2007, Nigeria received a total of US$6 billion as development aid.

The composition of this development aid as outlined in Abdulhamed (2008) show that grant constituted US$3.2 billion, credit constituted US$2.8 billion while the remaining where supports from International non-governmental Organizations (NGOs). More so, the OECD (2016) report indicates that net ODA and official aid received in Nigeria increased from US$1,293,720,000 in 2008 to US$2,431,600,000 in 2015.In spite of being a long term beneficiary of ODA and other forms of development assistance, evidences abound that Nigeria has not made substantial achievement in human development. For instance, the UNDP (2016) survey on HDI in 2015 revealed that Nigeria failed to substantially improve on her HDI score compared to other countries as reported in Figure 1.2.

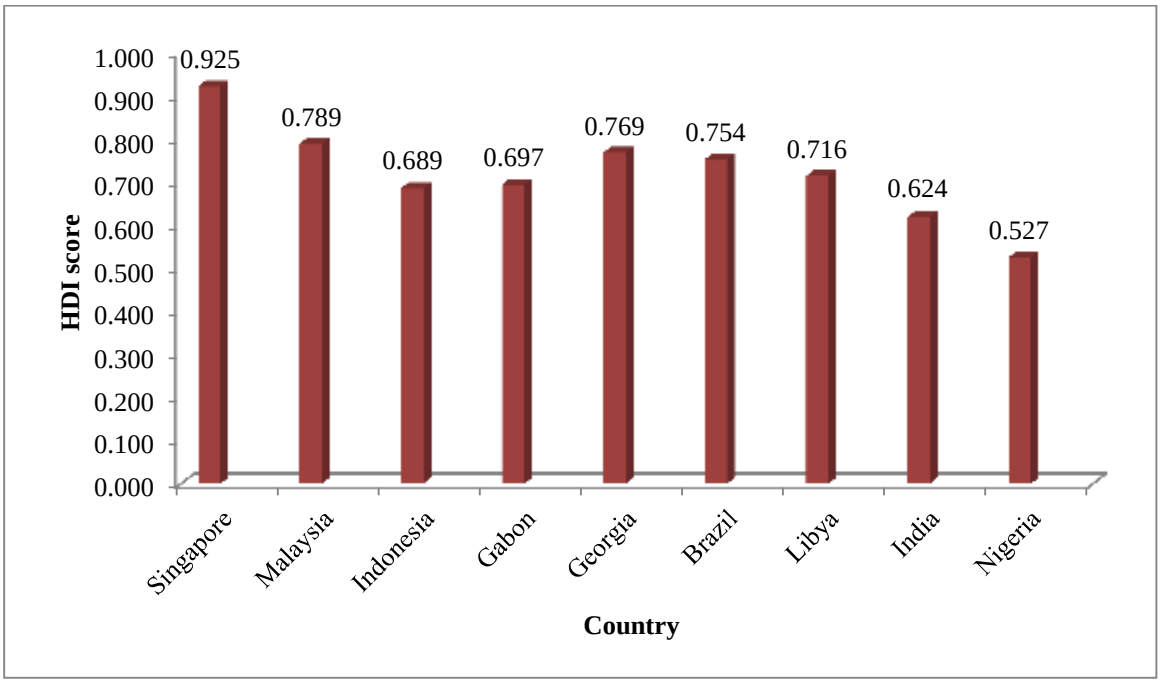


Figure1.1: 2015 HDI score for Nigeria and selected countries

Source: Author's illustration

With a HDI value of 0.527 in 2015, Nigeria is classified a low human development economy. Its HDI rank stood at 152 among the 188 countries surveyed. However Singapore with a HDI score of 0.925 is classified as very high human development country while Malaysia, Georgia, Brazil and Libya under the category of high human development countries. The 2015 HDI scores for Indonesia, Gabon and India also surpassed that of Nigeria, thus earning them the status of medium human development economies.

The dismal performance of Nigeria in HDI as mirrored by her poor achievements in the three dimensions of human development such as life expectancy, education and standard of living generated conflicting arguments on the effectiveness of foreign aid in Nigeria. Donor agencies and other development partners have continue to express dissatisfaction on the pace of human development considering the volume of development assistance available to Nigeria overtime. This has provoked renewed interest on the fungibility of foreign aid as experiences in Nigeria suggests that development aid meant for critical social and economic sectors seem to be diverted to unproductive expenditures. Based on the foregoing, this study evaluated the hypothesis of aid fungibility with particular focus on the effects of net ODA received, grants and technical cooperation grants on longevity and standard of living as core components of human development in Nigeria.

2. LITERATURE REVIEW

2.1 Theoretical Underpinnings

2.1.1 Dual Gap Theory of Development

Chenery and Bruno (1962) and Chenery and Strout (1966) provided the theoretical foundation for the dual gap model. The model assumes that developing economies are faced with the challenge of foreign exchange gap in addition to their savings-investment gap as outlined in the Harrod-Domar model. Therefore, it is expected that inflow of foreign aid will provide opportunities for bridging these gaps through the importation of capital goods. It is argued that foreign exchange gap is peculiar to developing countries and foreign aid helps to narrowing this gap. The tendency of the aid received to fill the perceived savings and foreign exchange gaps depends on the availability of incentives which are regarded as pull factors in the aid recipient country. Conchesta (2008) argued that in addition to the foreign exchange gap, technological backwardness, poor educational quality, social overhead capital and high debt service payments that are prevalent in developing economies pose to serious constraints to aid inflows.

The two-gap model also assumes that a linear relationship exists between investment and growth in the very short run. Easterly (2003) traced the root of this assumption to the Leontief production function which assumes that the substitution of labor for capital is possible. Although the dual gap model is believed to have made substantial improvement to the Harrod-Domar model, it has been criticized by various scholars. For instance, Conlisk and Huddle (1969) and Findlay (1971) are of the view that the theoretical background and statistical application of the model lack merit. The model is also criticized for prioritizing capital formation as the engine of economic growth in developing economies.

2.1.2 Three-Gap Model of Development

Bacha (1990) and Taylor (1990) developed the three-gap theory of development as an improvement to the two-gap model. The major contribution of the model is the assumption of fiscal-gap. As contained in this assumption, public investments in developing economies are perceived to be constrained by fiscal gap due to insufficient domestic tax revenues. Consequently, the theory assumes that these countries tend to leverage on foreign aid to overcome this fiscal challenge. Aid is important in narrowing fiscal gap and changing the equilibrium level of investment by raising private investment (Hanson and Tarp 2000). The growing expenditure-revenue gap in developing economies makes them to resort to foreign aid as a reliable source of financing developmental projects. In its broadest structure, Conchesta (2008) described the three gap model as the saving- investment gap, trade gap and the fiscal gap. Evidences abound in developing economies including Nigeria that the increasing obligation of foreign debt servicing tends to reduce the spending capacity of the public sector. Therefore, external source of funding, especially international aid play important role in narrowing this fiscal gap with a positive spill-over effects on public budget intentions.

Conchesta (2008) described the provision of aid in the form of loan as detrimental to development in the aid recipient country. This is based on the perceived negative implication of debt on savings, foreign exchange, fiscal stimulus and overall macroeconomic performance in the long run. It has been established theoretically and empirically that debt servicing adversely affects public investment, thus reducing government investment in the key indicators of human development such as infrastructure, education and healthcare. Several criticisms have been levelled against three gap model. For instance, Snowdon (2009) was of the view that the effectiveness of external aid does not always hold sway as it seems to constrain domestic savings. Radelet et al. (2004) also outlined misappropriation, corruption and poor economic policies as threats to aid effectiveness.

2.2 Conceptualization of Aid Fungibility and Human Development

Aid fungibility has remained a fundamental phenomenon for the aid recipient countries and donors alike. McGillivray and Morrissey (2000) argued that aid is said to be fungible when it is channeled to different uses than those originally planned by donors. Consequently, the resources received are shifted from their initial projects to other nonproductive ventures. Cashel-Cordo and Craig (1990) are of the view that fungibility occurs when aid recipient governments divert their own spending for a particular sector due to inflow of external resources. Newby (2010) opined that the fungibility of aid is associated with the replacement of government spending by foreign aid tied to social and economic sectors for improving general welfare. Hence, the aid received is perceived as making resources available for other purposes not planned for by the donors - and which may not translate to improvement in the overall welfare of the majority of the population. A central argument in the fungibility literature is that aid is perceived as source of increased consumption rather than being channeled

into productive investment to ensure inclusive and sustained growth. The long standing and sustained debate on aid-development nexus offered more insights into the effectiveness of aid, thus, drawing more research and policy attentions to the issue of aid fungibility. In the fungibility literature, international development assistance is adjudged to be shifted way from its original targeted projects and programmes in the recipient countries. In other words, foreign aid received tends to fund programmes completely different from it is intended (Pettersson, 2007).

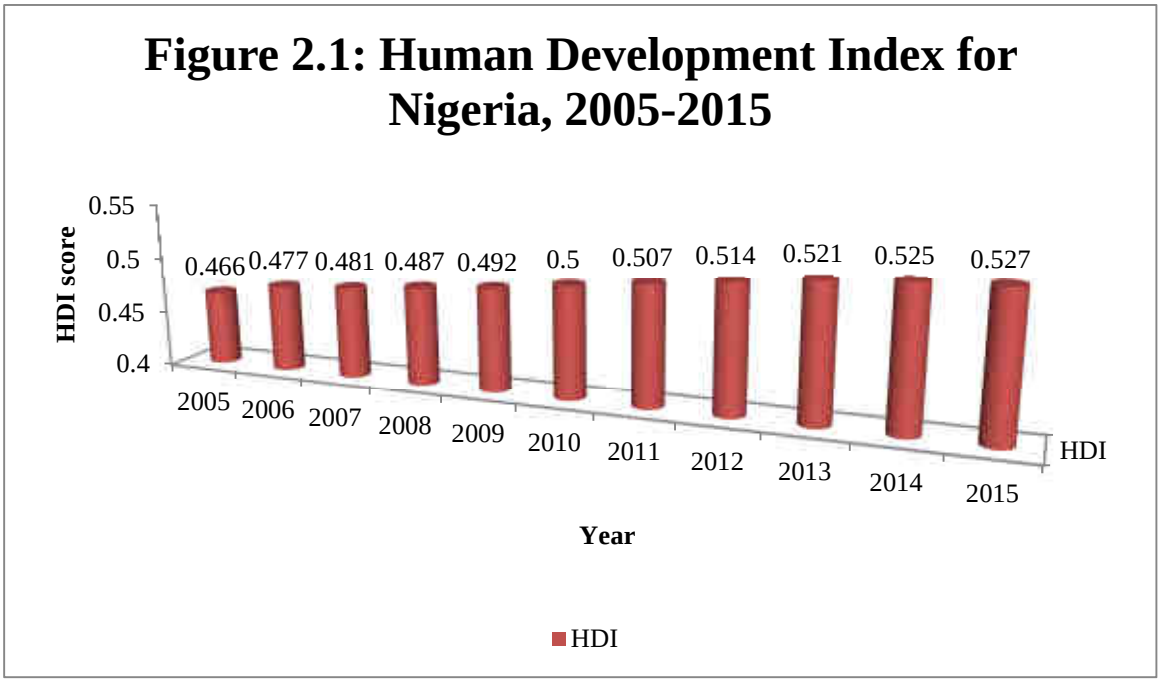
The United Nations Development Progromme (UNDP, 1990) Human Development Report offered a fundamental introduction to the concept of human development. It views human development from the achievements of a country on the three basic components of human development such as longevity, knowledge and standard of living. Based on this context, the core objective of development is the creation of an enabling environment for people to live long, healthy and productive lives. Specifically, longevity is measured by life expectancy while educational attainment is measured by the expected and mean years of schooling. Standard of living on the other hand, is measured by purchasing power, based on real GDP per capita often adjusted for the local cost of living. Alkire (2010) argued that human development encompasses not only basic needs satisfaction but also the expansion human capacities as an inclusive and dynamic process. In this case, people–centered development is prioritized with emphasis on human empowerment, participation, equity and sustainability amongst others.

Nayak (2008) outlined four key elements in the concept of human development to include productivity, equity, sustainability and empowerment. He further explained that productivity involves offering opportunities for people to participate fully in the process of income generation and remunerative employment with a view to achieving higher economic growth - a core segment of human development models. As an alternative to the popular money metrics of economic well-being such as GDP, debt statistics and stock market outcomes, human development connotes the process of enlarging people's freedom and opportunities and improving their well-being. This freedom is important for people to make decision regarding who they want to be, what to do, and how to spend their lives. From every perspective of human development, longevity, education and living standard are fundamental components. The ability to live a long and healthy life defines the life expectancy at birth. This determines the health of the population and offers more insights on the pace of human development.

2.3 Stylized Facts on Trajectories of Human Development Index in Nigeria

The human development index in Nigeria has continued to vary in response to the inflows of international aid and other forms of development assistance as well as the policy initiatives of successive governments in meeting the core developmental goals. The transition to democracy in 1999 was associated with increasing flows of international aid in support of the governments' commitment to human development. The Nigerian's achievement in human development index between 2005 and 2015 is showed in Figure 2.1.

Figure 2.1 shows that the HDI trended upward from 0.466 in 2005 to 0.527 in 2017. It averaged 0.4806 between 2005 and 2009, indication that Nigeria falls within the category of low human development. However, Nigeria's score for HDI improved between 2010 and 2015 as it averaged 0.516. This consequently improved Nigeria's position to medium human development group. The level of progress in the indicators of HDI for Nigeria during 2010-2015 is summarized in Table 2.1



Source: UNDP (2016) Human Development Report

Table 2.1: Components of HDI for Nigeria, 2010-2015

Year	Life expectancy at birth (years)	Expected years of schooling (years)	Mean years of schooling (years)	GNI per capita (2011 PPP$)
2010	51.3	9.6	5.2	4,834
2011	51.7	9.7	5.5	4,940
2012	52.1	9.8	5.7	5,035
2013	52.4	10.0	5.9	5,173
2014	52.8	10.0	5.9	5,443
2015	53.1	10.0	6.0	5,443

Source: UNDP (2016) Human Development Report

As showed in Table 2.1 between 2010 and 2015, life expectancy and expected years of schooling averaged 52.23 years and 9.85 years respectively while mean years of schooling and GNI per capita respectively averaged 5.7 years and $5,145. The life expectancy increased from 51.3 years in 2010 to 53.1 years in 2015. This is indicative that only marginal progress was achieved by Nigeria in terms promoting a healthy and long life for the population. Similarly, the education indexes - expected years of schooling and mean years of schooling increased during the period covered. The expected years of schooling increased from 9.6 years in 2010 to 10.0 years whereas the mean years of schooling rose from 5.2 years to 6.0 years. The values of the expected years of schooling in each of the six years period (2010-2015) are far from the global standard of 18 years, thus, suggesting that Nigeria still fall within the category of low human development countries in terms educational attainment. The GNI per capita reported in the last column of Table 2.1 increased marginally from US$4,834 in 2010 to a maximum value of US$5,443 in 2015. The values of GNI per capita during the period covered are very far from the benchmark of US$75,000 which countries worldwide strive to attain. This is a pointer that the living standard in Nigeria is very sub-optimal.

2.3 Empirical Literature

The effectiveness of international aid in enhancing development in the recipient economies has attracted the attention of numerous researchers across the globe with the study scope ranging from country-specific to multi-country case. The findings from these studies have resulted to mixed evidence, thus, generating further controversies on aid effectiveness in aid-recipient economies.

Okon (2012) examined the long-term link between development aid and human development in Nigeria over the period 1960-2010. The data collected from various secondary sources was analyzed using employs two-stage least squares estimation technique. It was evident from the result that development aid impacted negatively on human development during the period covered. The implication of this finding is that aid seems to contract development in Nigeria. The study therefore, recommended that the Nigerian government should ensure that appropriate policy measures are put in place in order to monitor the maximum and effective utilization of foreign aid received. The study equally advocated for the donor countries to provide modalities for the disbursement of future aid in order to reduce the uncertainty associated with aid flows and improve fiscal planning.

Adedokun and Folawewo (2017) applied the generalized methods of moments (GMM) technique in investigating the impact of aid selectivity practice on aid-growth relationship in Sub-Saharan Africa (SSA) and several groups of countries within the SSA between 1980 and 2012. The outcome of the empirical data analysis shows strong evidence that aid selectivity significantly improved aid effectiveness during the study period. The study further explained that the policy implication of this finding is that donors should embrace aid selectivity in aid administration to improve effectiveness as it will not only make aid available to countries with good governance, but also serve as a tool to improve governance. Owing to the finding, the study recommended that efforts should be made to increase the volume of aid flowing to with a view to promoting the aid effectiveness in SSA countries.

Satish (2004) investigated the direction and extent of relation between foreign aid and development. The study particularly measured development from the perspective of human development index that incorporates a knowledge index, health index, and standard of living index. On the other hand, social aid provided the basis for measuring foreign aid towards achieving development goals. The empirical basis for testing the null hypothesis that foreign aid has a positive effect on HDI is the Ordinary Least Squares technique. Evidence from the regression results indicates that foreign aid has a negative relationship with development. Thus, the study concluded that foreign direct investment and domestic investment are important in determining the level of a country's development.

Asiama and Quartey (2009) offered some new and exclusive empirical evidence on the implication of aid on some selected welfare indicators of welfare in sub-Saharan Africa. The study applied multivariate regression analysis and found that aggregate bilateral aid does not show a significant effect on the human development indicators and other welfare variables. However, disaggregated aid in the form of sector specific and programme aid tend to exert significant effect on the selected welfare indicators. On the basis of the findings, the study recommended that aid flows to the SSA should be scaled up but targeted at areas where its effectiveness mostly manifests.

Hammarstrand and Sundsmy (2013) explored the link between aid and Human Development Index (HDI) in the Sub-Saharan Africa. The study particularly measured the effectiveness of aid using the standards of living. The study applied the econometrics techniques in analyzing the data sourced from various secondary sources including the OECD database. Specifically, two econometrics analyses were undertaken metric analyses with the first sample ranging from 1993- 2007 while the second sample ranged between 2005 and 2011. The results revealed that ODA excluding debt, exerted significant positive impact on the HDI of the aid recipient within the first year of receiving it. The results also show evidence of different effects of aids such as technical cooperation assistance and humanitarian aid lagged between 1 and 3 over the sample. The study therefore concluded that the overall effect of aid is positive and recommended for further studies to be country based as include corruption as part of the explanatory variables.

Mohamed and Mzee (2017) examined the impact of foreign aid on human development. The proxy for human development in the study is human development index (HDI). The empirical analysis which covered 124 developing countries from 1980 to 2013 relied on quantile multivariate regression. Generally, the result revealed

that aid is positively linked to the human development index. It was obvious from the result that the effect is much greater in countries with low level of human development. Similarly, positive impact of aid on income, health, and education indices was also observed during the sample. In view of the findings, the study therefore concluded that development aid from donor countries is important in promoting human welfare.

Ishnazarov and Cevik (2017) focused their study on the effectiveness of official development assistance (ODA) in promoting human development and economic progress of the recipient Organization of Islamic Cooperation (OIC) member countries between 2002 and 2015. The study particularly measures the impact of ODA classified by sectors on the components of Human Development Index (HDI) such as standards of living, life expectancy and education indices while controlling for the magnitude of civil violence, population growth, foreign direct investment, income, urbanization and regime type. It was found from the results that ODA is effective in influencing human development, having a greater and a more efficient impact on human development than other development instruments included in the analysis. The study equally reveals that civil violence is very harmful to HDI. In view of the findings, the study recommended for increase in ODA, especially, aid flows to health and education sectors, and intensify efforts to prevent and reduce civil violence to substantially attract foreign aid.

3. RESEARCH METHOD

3.1 Model Specification

This paper employs two multivariate cointegrating regression models anchored on the Three-Gap theory of development credited to Bacha (1990) and Taylor (1990) which assumes that developing countries tend to leverage on foreign aid in narrowing expenditure-revenue gap and financing development projects. The life expectancy at birth and standard of living served as the dependent variables while the foreign aid sources comprising net ODA received, technical cooperation grants and grants excluding technical cooperation grants are the explanatory variables. The models are of the form:

$$InLIFX_t = \text{Ш}_0 + ß_1 InNODA_t + ß_2 InTCOG_t + ß_2 InGRAN_t + U_{1t} \quad (3.1)$$

$$InSTAD_t = \text{Ш}_0 + ß_1 InNODA_t + ß_2 InTCOG_t + ß_2 InGRAN_t + U_{2t} \quad (3.2)$$

Where: LIFX = life expectancy at birth, STAD = standard of living proxied by GNI per capita, NODA = net ODA received, TCOG = technical cooperation grants, GRAN = grants excluding technical cooperation grants, Ш_0 = constant term, $ß_1$- $ß_2$ = slope coefficients, U_{1t}- U_{2t} = white noise error process, In = natural log notation and t = time frame.

The dynamic expression of the relationship between the underlying sources of foreign aid and human development indicators based on the notations in (3.1) and (3.2) are as follows:

$$\Delta InLIFX = \alpha_0 + \sum_{i=1}^{q} \theta_1 \Delta InLIFX_{t-i} + \sum_{i=1}^{q} \theta_2 \Delta InNODA_{t-i} + \sum_{i=1}^{q} \theta_3 \Delta InTCOG_{t-i} + \sum_{i=1}^{q} \theta_4 \Delta InGRAN_{t-i} + \delta ECM_{t-1} + e1_t \quad (3.3)$$

$$\Delta InSTAD = \alpha_0 + \sum_{i=1}^{q} \theta_1 \Delta InSTAD_{t-i} + \sum_{i=1}^{q} \theta_2 \Delta InNODA_{t-i} + \sum_{i=1}^{q} \theta_3 \Delta InTCOG_{t-i} + \sum_{i=1}^{q} \theta_4 \Delta InGRAN_{t-i} + \delta ECM_{t-1} + e2_t \quad (3.4)$$

Where: α_0 =constant parameter, θ_1 - θ_4 = short run dynamic estimates of the regressors, q and Δ respectively denote optimal lag order and first difference notation, ECM = error correction mechanism, δ = error correction parameter (measure of speed of convergence) and e_1 – e_2 = white noise error process.

In each of the models, the hypothesized sign of each of the coefficients of the explanatory variables is positive. This is in accord with the literature on aid-development relationship as inflows of aid are expected to foster human development.

3.2 Variables Description and Data Source

The descriptions of the series as well as their measures and data sources are provided in Table 3.1.

Table 3.1 Description of variables and sources of data

Variable	Description	Source
Life expectancy (LIFX)	Number of years a newborn child could expect to live assuming patterns of age-specific mortality rates at the time of birth remain unchanged over the infant's life.	WDI
Standard of living (STD)	This is measured by the GNI per capita which denotes total income of an economy generated by its productive activities and ownership of factors of production, less the incomes paid for the use of factors of production owned by the rest of the world	WDI
Net ODA received (NODA)	This connotes disbursements of loans made on concessional basis and grants by official agencies of the members of the Development Assistance Committee (DAC), by multilateral institutions to engender economic development and improve human welfare.	WDI
Technical cooperation grant (TCOG)	This encompasses free-standing technical cooperation grants, which are channeled into technical and managerial skills or technology intended to build-up general national capacity.	WDI
Grants (FOP)	This defines legally binding commitment excluding technical cooperation grants that makes funds available for disbursement for which there is no repayment requirement.	WDI

Source: Author's compilation, 2018

3.4 Estimation Technique

This paper applied Phillips and Hansen (1990) Fully Modified Least Squares (FMOLS) method in estimating the cointegrating regression parameters. This method is preferred to the static OLS as it corrects for the simultanity process in the explanatory variables and increases the likelihood of estimating robust results. More so the FMOLS is associated asymptotically normal estimates, which ensures that the conventional techniques for inference are valid. In addition to the FMOLS, the error correction mechanism is adopted in estimating the short run dynamic coefficients of the regressors. The coefficient of the ECM is very informing as it indicates the convergence speed and verifies the outcome of the cointegration test. The augmented Dickey-Fuller (ADF) unit root and Hansen (1992) cointegration tests were applied as pre-estimation in addition to the some post-estimation tests.

4. Findings and Discussion

4.1 Unit Root Test

The test for unit root was carried out at 5 percent level using the ADF method and the results are reported in Table 4.2

Table 4.2: ADF Unit root tests results

Variable	Results of Levels test	Results of 1st difference test	Order of integration
	t-statistic	t-statistic	
LOG(STAD)	-2.31 (0.415)	-5.23 (0.002)	I (1)
LOG(LIFX)	-3.23 (0.105)	-6.63 (0.000)	I (1)
LOG(NODA)	-2.98 (0.157)	-4.64 (0.006)	I (1)
LOG(TCOG)	-2.19 (0.476)	-5.26 (0.002)	I (1)
LOG(GRAN)	-2.89 (0.183)	-4.45 (0.009)	I(1)

Source: Computed by the Author from E-views Software

The results in Table 4.1 show that the variables contain unit root (nonstationary). On the basis of this finding, the null hypothesis of unit root cannot be rejected. The variables were transformed by differencing them once and it was found from the unit root test results that the variables are first difference stationary. In other words, the variables are integrated of order 1. The evidence of unit root in the series necessitates the test for cointegration using Hansen (1992) approach.

4.2 Cointegration Test Results

The Hansen (1992) approach was applied in conducting the cointegration test. The results are reported in Table 4.3 and 4.4.

Table 4.3: Hansen cointegration test result for model 1

Series: LOG(LIFX) LOG(NODA) LOG(TCOG) LOG(GRAN)				
Null hypothesis: Series are cointegrated				
	Stochastic	Deterministic	Excluded	
Lc statistic	Trends (m)	Trends (k)	Trends (p2)	Prob.*
0.681490	3	0	0	0.1001

Source: Computed by the Author from E-views Software

Table 4.4: Hansen cointegration test result for model 2

Series: LOG(STAD) LOG(NODA) LOG(TCOG) LOG(GRAN)				
Null hypothesis: Series are cointegrated				
	Stochastic	Deterministic	Excluded	
Lc statistic	Trends (m)	Trends (k)	Trends (p2)	Prob.*
0.279933	3	0	0	0.2

Source: Computed by the Author from E-views Software

The cointegration test results for model 1 and 2 are reported in Table 4.3 and 4.4 respectively. The results showed that the test statistics (0.681 and 0.2799) for models 1 and 2 showed in the first columns of each of the

tables are associated with high probability values (0.1001 and 0.2). This implies that the variables in each of the models have long run relationship. Consequently, the null hypothesis that the series are cointegrated cannot be rejected. This confirmation of cointegration among the series in each of the models can move together in the long run. Hence, the cointegrating parameters is estimated using FMOLS.

4.3 Cointegration Regression Models

The long run regression parameters was estimated using. The results are reported in Table 4.5.

Table 4.5: Cointegrating regression model

Variable	**Model 1** **Dependent variable: LOG(LIFX)**	**Model 2** **Dependent variable: LOG(STAD)**
	Coefficient	**Coefficient**
LOG(NODA)	0.017 (0.547)	0.214 (0.147)
LOG(TCOG)	0.091*** (0.000)	0.273** (0.024)
LOG(GRAN)	-0.016 (0.422)	-0.062 (0.534)
CONST.	2.11*** (0.000)	-0.121 (0.935)
R-squared	0.724	0.793
Prob(F-stat.)	0.000	0.000

Source: Computed by the Author from E-views Software

NB: * and ** denote significant at 1percent and 5 percent level respectively. In parenthesis are the probability values of the t-statistics**

The results in Table 4.5 show that technical cooperation grants exert significant positive influence on life expectancy and standard of living. Specifically, a percentage increase in technical cooperation grant leads to 0.091 percent increase in life expectancy and 0.273 percent increase in standard of living. This finding suggests that the financing of transfer of technical and managerial skills or technology are beneficial to human development in terms of longevity of human life and better living condition for the population. Conversely, net ODA received and grants excluding technical cooperation grants do not significantly influence the underlying indicators of human development, thus, suggesting that the available aid from this source tends to be fungible in the long run. The probability values of the F-statistics in both models indicate that the underlying external aid sources in the both models are collectively significant in influencing the two measures of human development. With 0.724 and 0.793 coefficients of determination for models 1 and 2 respectively, the underlying regressors account for 72.4 percent and 79.3 percent variations in the former and latter models respectively. This is indicative that both models are well fitted as the explanatory powers of the regressors in both models exceed the reference value of 50 percent.

4.4 Short run Dynamic Regression Model

The estimation of short run dynamic regression models followed a general-to-specific approach. The results are reported in Table 4.6.

Table 4.6: Parsimonious error correction model

Model 1 **Dependent variable: DLOG(LIFX)**		**Model 2** **Dependent variable: DLOG(STAD)**	
Variable	**Coefficient**	**Variable**	**Coefficient**
DLOG(LIFX(-1))	1.859*** (0.000)	DLOG(STAD(-1))	0.461** (0.029)
DLOG(LIFX(-2))	-0.9096*** (0.000)	DLOG(STAD(-2))	0.492** (0.033)
DLOG(NODA)	-0.00029*** (0.001)	DLOG(STAD(-3))	0.723*** (0.002)
DLOG(NODA(-1))	-0.00013 (0.104)	DLOG(NODA(-1))	-0.053 (0.361)
DLOG(TCOG)	0.00013 (0.137)	DLOG(NODA(-3))	0.089*** (0.007)
DLOG(TCOG(-1))	0.00054*** (0.000)	DLOG(TCOG)	0.117*** (0.013)
DLOG(TCOG(-2))	0.00022*** (0.005)	DLOG(TCOG(-2))	0.081** (0.058)
DLOG(GRAN)	0.00021*** (0.001)	DLOG(TCOG(-3))	0.0703 (0.151)
DLOG(GRAN(-1))	0.00011** (0.041)	DLOG(GRAN)	0.029** (0.044)
ECT(-1)	-0.0083*** (0.000)	DLOG(GRAN(-1))	-0.033 (0.284)
C	0.00029*** (0.000)	ECT(-1)	-0.443*** (0.003)
		C	0.013 (0.249)
R-squared	0.914	R-squared	0.852
Prob(F-stat.)	0.000	Prob(F-stat.)	0.000

Source: Computed by the Author from E-views Software

NB: * and ** denote significant at 1percent and 5 percent level respectively**

The results in Table 4.6 show that both the contemporaneous and lagged values of net ODA received have significant negative impacts on life expectancy and standard of living in the short run. This finding coincides with finding of Okon (2012) that development aid adversely influenced human development in Nigeria, thus, suggesting that net ODA as a source of international aid seems not to foster the process of human development in Nigeria. On the contrary, technical cooperation grant is positively linked to human development during the study period. This is because it induces significant positive impact on life expectancy and standard of living. This finding is in accord with the theoretical expectations and authenticates its long run behavior as reported in Table 4.5. Similarly, grants other than technical cooperation grants also exert significant positive impact on the underlying indicators of human development in the long run. This finding is desirable as it reveals that grants offer opportunities for human development in Nigeria. The outcome of the F-test indicates that the underlying explanatory variables are jointly important in explaining changes in life expectancy and standard of living in Nigeria. More importantly, the error correction coefficients (-0.0083 and -0.443) reveal that each of the models adjust to equilibrium following a shock in any of the exogenous variables. The speed of adjustment is faster in the standard of living than the life expectancy model. These findings authenticate the long run equilibrium relationship observed from the cointegration tests. The post-estimation tests for the models are reported in Table 4.7.

Table 4.7 Post-estimation tests results

Tests results for model 1		
Test type	**Test statistic**	**Probability value**
Breusch-Godfrey Serial Correlation LM Test	Chi-square statistic	0.204
Breusch-Pagan-Godfrey Heteroscedasticity test	Chi-square statistic	0.387
Normality test	Jarque-Bera statistic	0.516
Tests results for model 2		
Test type	**Test statistic**	**Probability value**
Breusch-Godfrey Serial Correlation LM Test	Chi-square statistic	0.091
Breusch-Pagan-Godfrey Heteroscedasticity test	Chi-square statistic	0.514
Normality test	Jarque-Bera statistic	0.786

Source: Computed by the Author from E-views Software

The results in Table 4.7 show that each of the estimated models is free from serial correlation and heteroscedasticity as the probability values of the Breusch-Godfrey serial correlation LM test and Breusch-Pagan-Godfrey heteroscedasticity test exceed 0.05. Additionally, the outcome of the normality test reveals that the residuals are normally distributed. This is because the probability values of the Jarque-Bera statistic are higher than 0.05. Hence, the null hypothesis of normal distribution in the residuals cannot be rejected. On the basis of these results, the models are considered valid for long term predictions.

5. Concluding Remarks and Recommendations

The generic nature of international aid in the recipient poor countries has received widespread attention considering the likelihood of its fungibility in terms of keeping up the pace of human development and ensuring inclusive, sustainable growth amid structural changes to the global economy. Thus, this study seeks to provide credible empirical evidence on the fungibility of international aid in Nigeria with particular focus on the extent of achievements in two key segments of human development - life expectancy and standard of living following the increasing inflows of development aid. The cointegrating regression results indicate that technical cooperation grant is outstanding in driving the process of human development in Nigeria in both long run and short run. This suggests that free-standing funds from international sources committed to the development of technical and managerial skills or technology offered opportunities for human development by making resources available for longevity and improved standard of living. In a like manner, the dynamic regression result shows

that Nigeria tends to leverage on grants in addition to technical cooperation grants in boosting the level of human development in the short run. Unlike grants and technical cooperation grants, net ODA received has adverse effects on human development indicators in the short run and its long run behavior is not statistically significant. This finding suggests that net ODA received is a fungible source of aid considering its ineffectiveness in fostering human development. This however, negates the conventional aid-development hypothesis. To tackle this challenge of fungibility and improve the effectiveness of net ODA received, Aid-on-Delivery (AoD) approach as proposed by Leiderer (2012) should be followed in the disbursements of the net ODA received. More so, the donor countries should scale up their aid to General Budget Support (GBS) in order to build-up general national capacity through improved technical and managerial skills to foster the pace of human development.

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