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CAPITAL INFLOWS AND LIFE EXPECTANCY IN NIGERIA: DOES QUALITY OF INSTITUTIONS MATTER?

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Abstract

This study examines the relationship between capital inflows, institutional quality and life expectancy at birth in Nigeria for the period 1990 to 2023 under the two-gap theory and human capital theory. Central to most development goals is the need to better human life and well-being. Capital inflows on their part are necessary for providing additional funds needed to carry out economic activities. Human development was captured by one of its indicators which is life expectancy at birth. Capital inflows were measured by remittances, external debts and foreign aids. The Autoregressive Distributed Lag (ARDL) technique was employed in analysing the data. The empirical result showed that the selected capital flows jointly have significant impact on life expectancy at birth (human development) in Nigeria during the period under study. The study also indicates a discernible interaction between institutional quality and selected capital flows on human development in Nigeria. The study therefore concludes institutional frameworks complements the effect of capital inflows on human development in Nigeria, but has not been effective in averting the negative influence of capital inflows on human development in Nigeria looking at life expectancy at birth. The study recommends that Ministry of Budget and Planning should allocate adequate proportion of foreign aid and external debts to health-related projects which would ultimately enhance human development in Nigeria. Also, institutions should be made more effective to ensure accountability and efficient use of funds.

Key words: capital inflows, life expectancy, institutions

JEL Classification Codes: F21, L131, E02

1. Introduction

According to UNDP 2020, Nigeria has not been able to move to high human development category. For example, Nigeria's human development index (HDI) value for 2020 stood at 0.539, is ranked 158 out of 189 countries. Life expectancy at birth (LEB) is one of the three indicators that have been selected by United Nations Development Program as a component of human development index which helps to measure long and healthy life. Life expectancy at birth represents the number of years a newborn infant could expect to live if prevailing patterns of age-specific mortality rates at the time of birth stay the same throughout the infant's life, it reflects the

ability to lead a long and healthy life. This implies that data on LEB can help to measure human development of any country under study. It is vital to measuring the level of welfare of human beings in any economy, (UNDP 2020). According to human development report of 1990, human development is defined as the process or means by which people's choices are widened and at the same time ensuring that their well - being is improved, (Human Development Report – HDR, 2016). Improvement in human resource is critical to attaining the first, third, fourth, eighth, and sixteenth sustainable development goals (SDGs) since they are parts of the programs aimed at achieving human development. Human Development Index (HDI) measures the average achievement on these three basic dimensions of human development – a long and healthy life, knowledge and a decent standard of living (UNDP, 2020). A higher HDI shows that the human development is growing which suggests that there is positive increase in those educated, those that have access to medical care, access to drinking water, access to better living standard among other things, (UNDP 2020).

Capital inflow is defined as funds or money that come into an economy from external sources with a major desire to add it to the existing domestic funds to help the said economy in many ways. Capital inflow is a strong factor which affects human development in developing countries, (HDR, 2016; Chorn & Siek, 2017; Mezni & Djebali, 2022). Remittances, foreign aid, foreign direct investment, foreign portfolio investment and external debt are all components of capital inflows. Capital inflows are considered as one of the major determinants of the movement towards globalization and higher economic development. This strategic role of capital in accelerating the development process has traditionally been acknowledged in economics via the two-gap model as proposed by Chenery and Strout (1966) which explained that to have a reasonable level of development, capital inflow is needed to bridge the gap between savings and investment which is needed for higher economic development. The need for more foreign capital inflow to support domestic resources has been deemed vital as an engine of development, since it is considered as the central element of the process of economic growth and human development in most developing nations (Okafor, Ugwuegbe & Ezeaku 2016; Musibau, Yusuf & Gold, 2019). Many works have focused on foreign direct investment and foreign portfolio together or individually. This study however focused on external debt, remittances and foreign aid.

External debt as a component of capital inflow plays an important role in the

utilization of local resources to achieve the overall national economic goals. Macroeconomic stability in developing countries is at risk of being disturbed by an increase in external debt, (Sikandar, Erokhin, Wang, Rehman & Ivolga 2021). Official development assistance (ODA) is defined as government aid designed to promote the economic development and welfare of developing countries (Asongu, Uduji & Okolo-Obasi, 2019). It is aimed at alleviating poverty and improving living standards and quality of life for people in the recipient countries. World Bank (2016) opined that, remittances resulting from migration constitute reliable sources of foreign earnings and cushion households' income during bad times. In as much as capital inflow is beneficial especially to developing economies, some economies do not fully experience these advantages due to certain basic factors like poor utilization of capital inflow, bad governance, weak institutions etc.

Better health, better nutrition, and better education represent more opportunities for the poorest to escape poverty and get better living conditions, (Staicu & Barbulescu 2017). The percentage of government allocation aggregate expenditure on health for Nigeria was less than 5% (BudgiT, 2020). This is a far cry from the World Health Organization (WHO) recommendation of at least 15% allocation being made to health. So, we begin to ask, could the allocation pattern have impacted on the human development level experienced in Nigeria via the amount of money that has been allocated to health matters in the past? It is against this background that we examined the effect of capital inflows on human development in Nigeria. This study also investigated how institutional quality interacts with foreign capital inflows to impact on human development in Nigeria.

Since human development focuses more on welfare of humans in the society, it becomes important to know if truly these funds have impacted on human beings as regards to health of humans proxied by life expectancy at birth. This study therefore expanded on the existing literature by selecting one of the human development dimensions, such that it can aid in specific policy recommendation. The study also examined three components of the capital inflow to analyse if they have peculiar effects on human development and not just selecting one component alone as done by other studies. Making the study a country specific one also promotes country specific policies that will be particular to the country Nigeria.

2. Literature Review

This study is based on the two-gap theory and human capital theory. The two-gap theory was proposed by Chenery and Strout (1966). It opines that there is a gap in most economies

which is the savings investment gap and to have a reasonable level of development; capital inflow is needed to bridge this gap. It is the bridging of this gap that brings about human development. The human capital theory which was proposed by Becker (1964) says that investment must be made in humans through education and health to bring out capabilities as supported by the capability theory. The two-gap theory and human capital theory together in this study brings the link to how funds can come in to generate investment that will ensure that human life is enhanced and that standard of living is improved upon.

The discussion on capital inflows and human development is not new. Extant literature has tried to discuss the various components of capital inflow and how it relates to human development. Analyzing the impact of financial and capital flow dimension of globalisation on human welfare in the sub-Saharan Africa for the period 1980 to 2012, Maku and Ajike (2015) used human welfare which was proxied by human development index, access to basic necessities such as water, sanitation and health services as alternative measure of human welfare while governance index (GI) was considered as a control variable which stimulates globalization and human welfare. Employing the generalized least square (GLS) estimator to estimate the fixed and random effect panel regression models, the results revealed that foreign direct investment (FDI) significantly increased HDI, infant mortality rate, life expectancy, mean year of schooling, access to water, access to sanitation, and access to health services. The portfolio investment was found to influence HDI access to health services and life expectancy at birth negatively but improved access to water and sanitation significantly.

Ochalibe, Awoderu and Onyia (2017) investigated the impact of external debt on economic development and the policy implications for poverty reduction. Applying Ordinary Least Square regression, the study utilized secondary data for the period1982-2015. It showed a relationship between external debt and economic development on the one hand and the existence of long run relationship between external debt and economic development on the other. The study concluded that the resultant effects of external debt on economic development in Nigeria are negative and significant, which implies that debt as a burden should be traded with caution also that external borrowings should be directed towards productive investments that will bring about returns that are sufficient enough to offset the debt when due.

Staicu and Barbulescu (2017) analysed the effectiveness of foreign aid in eradicating poverty and improving life conditions in African countries for the period 1980 to 2014.

The study tested the effectiveness of aid on improving life conditions of the African people, measured by the Human Development Index. It decomposed Human Development Index and tested the impact of ODA, ILE (Economic Freedom Index), and Polity on some HDI sub indicators (life school expectancy). Using ADF-Fischer value and regression model the study found that ODA had a positive impact on life expectancy at birth, thereby giving room for better health, better nutrition, and better education which translates into more opportunities for the poorest to escape poverty and get better living conditions.

In analysing the effects of countries external indebtedness and foreign aid utilization on poverty in Heavily Indebted Poor Countries (HIPC), Yildiz (2017) estimated using a panel data analysis. The study used human development index, life expectancy at birth and infant mortality to model poverty. Pedroni and Johansen Fisher cointegration tests and panel causality test by Dumitrescu-Hurlin (2012) was applied to determine the causality relationship between the variables. Dynamic Ordinary Least Square (DOLS) and Fully Modified Ordinary Least Squares (FMOLS) tests are applied to make long term parameter estimations for the period of 2000-2014. The findings show that between external indebtedness in long term, foreign aid and poverty variables cointegration and bi-directional causality relationships are found.

Gokmenoglu, Apinran and Taspinar (2018) analysed the impact of foreign direct investment (FDI) on the human development index (HDI) in Nigeria for the period of 1972–2013. Long-run coefficients of models were estimated using the DOLS (dynamic ordinary least squares) approach. Using Johansen cointegration test their findings reveal a long-term relationship between FDI and human development indicators (i.e. life expectancy at birth, school enrolment, and gross national income per capita). Specifically, the results of DOLS estimates indicate FDI has a positive, inelastic, and statistically significant impact on school enrolment and GNI, while it has an inelastic, negative, and statistically significant impact on life expectancy at birth in the long run. This implies that FDI has a significant impact on the HDI in Nigeria during the sample period. The study therefore concludes that the effect of FDI on the HDI is a complicated issue but in order to make the best out of FDI, policy-makers should take cognizance the pros and cons of FDI inflows on several aspects of human development.

Ozigbo and Ewubare (2019) focused on examining how inflows of foreign aid (ODA) have helped in shaping the level of human capital formation with emphasis on investments in education and healthcare. The

study used country-specific time series data over the period 1990-2017 and autoregressive distributive lag (ARDL) model. The study showed that the estimated ARDL models reveal that lagged values ODA exert significant positive impact on public investment in education in the short run. The long run result revealed that ODA and technical cooperation grants have significant positive relationship with public investment in education. They also discovered that the contemporaneous value of ODA has positive relationship with public healthcare investment in the short run.

Igudia (2021) investigated the impact of external debt stock and debt servicing on human capital development (HCD) in Nigeria from 1960-2019. Human capital development was measured in terms of primary, secondary and tertiary education expenditures and government investments in health services. Data was collected from the archives of the Central Bank of Nigeria (CBN), the National Bureau of Statistics (NBS) and the debt management office (DMO). The ordinary least squares (OLS) regression technique was used to test eight hypotheses. Results revealed that external debt servicing has an inverse relationship with HCD whereas external debt stock has a significantly positive impact on HCD. All other variables in the model contributed to the increase in public spending on education and health.

Ali, Jehan and Sherbaz (2022) in investigating the impact of foreign capital flows on human development in 65 developing countries over the time period 1984-2014 used three indicators of human development namely: per capita income (PCI), Secondary School Enrolment (SSE) and Life Expectancy (LE) instead of Human Development Index (HDI). Two step system GMM estimation technique was employed. Result indicates that capital flows affect each indicator of human development in different manner. The study found that both FDI and FPI negatively affect per capita income and secondary school enrolment, while, remittances affect all the indicators of human development positively, except for life expectancy. The interaction between institutions and each type of foreign capital flow exerts a positive influence on all indicators of human development.

3. Research Methods and Procedures

This study is anchored on the two -gap theory and human capital theory. The two -gap theory follows Chenery and Strout (1966) view which explained that to have a reasonable level of development, capital inflow is needed to bridge the gap between savings and investment, it is the bridging of this gap that brings about human development. The human capital theory says that investment must be made in humans through education and health. The two- gap theory then brings the link to how funds can

come in to bring about investment that will ensure that human life is bettered and standard of living is improved upon.

The study adopts Monogbe and Achugbu (2016) model, which has been modified to have two equations:

$$HDI_t = f(BLT_t, MTL_t, FDI_t, HRT_t) \quad (3.1)$$

Where BLT= Bilateral creditors, MTL= Multilateral creditors, FDI= Foreign direct investment and HRT= Home remittances. Adjusting we have:

$$LEB = f(EXTD, FA, REM, GEH, CO_2, GDPPC, GFCF)$$

$$LnLEB_t = \beta_0 + \beta_1 LnEXTD_t + \beta_2 LnFA_t + \beta_3 LnREM_t + \beta_4 LnGEH_t + \beta_5 LnCO_{2t} + \beta_6 LnGDPPC_t + \beta_7 LnGFCF_t + U_t \quad (3.2)$$

Where LEB = life expectancy at birth, EXTD = external debt, FA = foreign aid, REM = remittance, GEH = government expenditure on health, CO_2 = Carbon dioxide emission, GDPPC = per capita income, GFCF = gross fixed capital formation. β_0 represent the constant, while β_1 - β_7 represents the slope or parameters of coefficient of the equation and U_t represents the error term.

Taking into consideration the interaction effect, the study adopts the model from Mohammed (2021) given as

$$HDI = f(HDI_{it-1}, REM_{it}, INS_{it}, (Rem_{it} * INS_{it}))$$

$$\ln HDI_{it-1} = \alpha_0 \ln HDI_{it-1} + \beta_1 REM_t + \beta_2 INS_t + \beta_3 (Rem_t * INS_t) + \theta X_t + \delta_i + \mu_t + \varepsilon_t \quad (3.3)$$

Adjusting Equation 3.3, we have as follows:

$$LnLEB_t = \alpha_0 LnLEB_{it-1} + \beta_1 LnEXTD_t + \beta_2 LnFA_t + \beta_3 LnREM_t + \beta_4 LnGFCF_t + \beta_5 LnINSTQ_t + \beta_6 LnGEH_t + \beta_7 (EXTD_t * INSTQ_t) + \beta_8 (FA_t * INSTQ_t) + \beta_9 (REM_t * INSTQ_t) + U_t$$

Interaction of capital inflow with institutional variables would mean that If $\beta_i > 0$, it denotes that capital inflow and institutions are complementary (they interact), this would mean that institutions improve the positive effect of capital inflow on life expectancy at birth; if $\beta_i < 0$, it implies that capital inflow and institutions are substitutes (they don't interact), implying that the relationship between capital inflow and life expectancy at birth is not based on the institutional quality of the host country, it means capital inflows serve as a substitute in impacting life expectancy at birth when there are weak or imperfect institutions.

3.1 Estimation Techniques and Procedures

To enable us estimate the specified equation for this quantitative research, the study carried out some pre-estimation analysis such as descriptive statistics and unit root tests which would expose the attributes and distributional pattern of the variables for this study. The estimation technique used for analysis was the

auto regressive distributed lag (ARDL). This informs the use of error correction model in order to check adjustments from the short run to the long run.

The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests were conducted to test the order of integration of the variables. The ADF test is applied in order to eliminate the possibility of rejecting a correct null hypothesis incorrectly (Dickey &Fuller, 1981). The PP procedures compute a residual variance that is robust to autocorrelation; it is commonly used to test for non-stationarity of variables as an alternative to the ADF unit root test (Phillips &Perron, 1988).

Co-integration test was conducted to check for long run relationship among the variables of the equation, while the error correction mechanism was employed to ascertain the speed of adjustment from the short-term equilibrium to the long run equilibrium.

4. Results and Discussion of Findings

4.1.1 Unit Root (Stationarity Test)

This study evaluates stationarity using both the Augmented Dickey-Fuller (ADF) and the Phillip Perron unit tests on the data under the following hypothesis.

H_o: Variable contains unit root hence non-stationary.

H_1: Variable does not contain unit root hence stationary.

The decision criterion involves rejecting the null hypothesis if the ADF and PP statistic value exceeds the critical value at a chosen significance level (in absolute terms). The summary of the ADF and PP unit root results is presented in Table 4.1.

Table 4.1: Summary of ADF and PP Unit Root Test Results

Variable	ADF Critical value @ 5%	ADF Statistic	PP Critical value @ 5%	PP Statistic	Order of Integration
LEB	-2.957110	-4.956856	-2.957110	-3.543325	I (1)
EXTB	-2.957110	-5.757818	-2.957110	-5.939982	I (1)
REM	-2.957110	-5.845096	-2.957110	-7.236380	I (1)
FA	-2.954021	-3.255980	-2.954021	-3.136563	I (0)
GFCF	-2.957110	-3.887082	-2.957110	-3.892566	I (1)
GDPPC	-2.957110	-4.101070	-2.957110	-4.012895	I (1)
CO2	-2.957110	-5.785856	-2.957110	-10.13181	I (1)
GEH	-2.957110	-7.300218	-2.957110	-7.224586	I (1)
INSTQEXTD	-3.557759	-5.464986	-2.957110	-5.587042	I (1)
INSTQFA	-2.954021	-3.242904	-2.954021	-3.127260	I (0)
INSTQREM	-2.957110	-5.910569	-2.957110	-6.371375	I (1)

Source: Researchers' computation from EViews 10

Following the decision rule which is to reject null hypothesis if the ADF and PP statistic value exceeds the critical value at a chosen level of significance (in absolute terms), and accept stationarity when ADF and PP statistics is greater than criteria value, it can be observed from Table 4.1 that all the variables are stationary at first difference except foreign aid (FA), institutional quality (INSTQ) and the interaction of institutional quality and foreign aid (INSTQFA) which were stationary at level for both the ADF and PP unit root test. Having obtained a mixed order of both level and first difference, the ARDL F-Bound test was conducted as this meets the conditions under which the test could be applied.

Co-integration Test

This study used the ARDL F-Bound test since the unit root test shows that the variables are stationary at both level and first order. The results of the bound testing approach for the two equations are presented in Table 4.2.

Given the null hypothesis:

$H_0 = \beta_0 = \beta_1 =$ ----------$\beta_n = 0$ (no cointegration among the variables)

Decision rule:

Case 1: Reject H_0 if the F-value is greater than the upper bound

Case 2: Accept H_0 if the F-value is less than lower bound

Case 3: Inconclusive if the F-value falls between the lower and upper bounds

Table 4.2: ARDL Bound Test Results

Equation 1				
F-Bounds Test			**Null Hypothesis: No levels relationship**	
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	4.104410	10%	2.03	3.13
K	7	5%	2.32	3.5
		2.5%	2.6	3.84
		1%	2.96	4.26
Equation 2				
F-statistic	9.628820	10%	1.88	2.99
K	9	5%	2.14	3.3
		2.5%	2.37	3.6
		1%	2.65	3.97

Source: Researchers' Computation from EViews 10

From Table 4.2, life expectancy shows F-statistic value of 4.10. This indicates the significance of the lagged level variables are greater than the upper bound I (1) at a 5% level of significance. Therefore, we reject the null hypothesis and conclude that a long-run relationship exists between the dependent variable (life expectancy at birth) and its

independent variables. Also, there is a long-run relationship between life expectancy at birth and the interaction of institutional quality and capital inflows. This is evident in the F-statistics of 9.63 which is greater than the significance of the lagged level variables at the lower (0) and upper bound I (1) at a 5% level of significance.

Evaluation of Long Run and Short Run Estimates

To discuss the long-run and short-run estimation results, the study employs economic criterion, statistical criterion and econometric criterion.

Panel A: Long Run Estimates

Since we have established that a long-run relationship exists in the two equations, the ARDL model long-run form will be used to determine the coefficients of the regression models. The estimated long-run coefficients are summarized in Table 4.3 and Table 4.4.

Table 4.3: Summary of ARDL Long run result

OBJECTIVE 1				
Equation 1				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
LNEXTD	-0.01107	0.018676	-0.59273	0.5622
LNREM	-0.021075	0.008917	-2.363563	0.032
LNFA	0.017802	0.006233	2.856136	0.012
LNGEH	0.028866	0.007212	4.00249	0.0012
LNCO2	-0.061567	0.038646	-1.593128	0.132
LNGDPPC	-0.00792	0.03509	-0.225694	0.8245
GFCF	0.001495	0.000543	2.751611	0.0148

Source: Researchers' Computation from EViews 10

Results in Table 4.3 indicate a negative impact of capital inflows such as external debt (EXTD) and remittance (REM) on life expectancy in Nigeria. This implies that an increase in external debt and remittances by 1%, on average, decreases life expectancy by 0.011% and 0.021% respectively in the long run, and they do not conform to economic expectations. Contrary, foreign aid (FA) which is also a capital inflow has a positive impact on life expectancy such that a 1% increase in foreign aid, increases life expectancy by 0.0178% on average in the long run. This result conforms to theoretical expectations.

More so, government expenditure on health (GEH) and gross fixed capital formation (GFCF) have a positive impact on life expectancy. This is deduced from the estimate that a 1% increase in government expenditure on health and gross fixed capital formation, on average, increases life expectancy by 0.029%, and 0.001% respectively in the long

run in Nigeria. The estimate of carbon emission (CO2) and gross domestic product per capita (GDPPC) shows a negative impact on life expectancy in the long run. Thus, a 1% increase in carbon emission and gross domestic product per capita (GDPPC), on average, reduces life expectancy by 0.062% and 0.008% in the long run.

From this result, variables such as foreign aid (FA), government expenditure on health (GEH), gross fixed capital formation (GFCF) and carbon emission (CO2) align with economic expectation while other variables such as external debts (EXTD), remittances (REM) and gross domestic product per capita (GDPPC) does not conform to theoretical expectations. Possible explanations to these counterintuitive relationships are explained below.

The negative impact of external debts and remittances as capital inflows on life expectancy can be attributed to the underutilization of capital flows for the projects that aid in improving life expectancy. Other possible explanation could be that mismanagement of these capital flows through corruption and frivolous expenditures amount to directing funds towards debt servicing rather than improving health outcomes through health expenditures. The negative impact of gross domestic product per capita on life expectancy can be attributed to the presences of high inequality in Nigeria. Hence, the health and wellbeing of lower-income individuals might not improve at the same rate as those of wealthier individuals, potentially resulting in a lower overall life expectancy.

Table 4.4: Summary of ARDL Long run result

OBJECTIVE 2				
Equation 2				
LNEXTD	-0.022893	0.016344	-1.400695	0.2202
LNREM	-0.029875	0.017284	-1.728501	0.1445
LNFA	-0.092522	0.056429	-1.639614	0.162
LNINSTQ	-0.110858	0.068806	-1.611169	0.1681
INSTQEXTD	8.73E-05	5.74E-05	1.520958	0.1888
INSTQREM	0.000734	0.00047	1.563541	0.1787
INSTQFA	0.000436	0.000242	1.80129	0.1315
LNGEH	0.042135	0.009861	4.272939	0.0079
LNCO2	-0.215329	0.097025	-2.21931	0.0772

Source: Researchers' Computation from EViews 10

The result of equation 2 indicates that capital inflow variables (external debts, remittances and foreign aid) have negative impact on life expectancy at birth which negates the economic expectation of this study in the long run. Thus, a 1% increase in external debt (EXTD) decreases life expectancy by 0.023% on average; a 1% increase in foreign aid (FA)

decreases life expectancy by 0.093% on average while a 1% increase in remittances (REM) decreases life expectancy by 0.03% on average. Also, institutional quality (INSTQ) and carbon emission (CO2) as well exhibit negative impact on life expectancy at birth, of which only carbon emission align with a prior expectation. As such that 1% increase in institutional quality and carbon emission decreases life expectancy by 0.11% and 0.215% on average in the long run.

In general, the interaction of institutional quality and capital inflow (external debts, remittances and foreign aid) all have positive impact on life expectancy at birth in Nigeria in the long run. Specifically, a 1% increase in the interaction of institutional quality and capital flows (INSTQEXTD, INSTQREM and INSTQFA) implies a positive interaction which means that institutions improve the effect of capital inflow on life expectancy by 0.0001%, 0.007% and 0.004% respectively. Thus, a well-established institution complements capital flows in enhancing life expectancy. Also, government expenditure on health (GEH) also has a positive impact on life expectancy such that a 1% increase in government expenditure on health increases life expectancy by 0.042% on average.

From the regression analysis, it is observed that all variables conform to the a priori expectation of the study with the exception of external debt, remittances and institutional quality.

Panel B: Short Run Estimates (Error Correction Model)

Error correction modelling aims to align the extended behaviour of cointegrated variables with their immediate responses, enabling dynamic analysis of errors. The differenced variables are estimated at a one/two-period lag of residuals from the cointegrating equation, which is to aid in evaluating and rectifying a short-term imbalance in the long run. The error correction term, indicating the speed of adjustment, is expected to be negatively valued, falling between 0 and 1, and should be statistically significant at the 5% level, signifying robust convergence to long-term equilibrium. Error correction model specifications for the two equations are presented in Table 4.5

Table 4.5: Summary of Short Run Coefficients (Error Correction Regression)
Dependent variable: Life Expectancy at Birth

Equation 1				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.860725	0.555736	6.947051	0.0000
D(LNEXTD)	0.007986	0.006964	1.146764	0.2694
D(LNREM)	-0.012048	0.003473	-3.468835	0.0034
D(LNFA)	0.014584	0.003066	4.755952	0.0003
D(LNGEH)	0.018941	0.003448	5.493436	0.0001

D(LNCO2)	0.020337	0.014762	1.377618	0.1885
D(LNCO2(-1))	0.044646	0.017909	2.492956	0.0248
D(LNGDPPC)	8.89E-05	0.013990	0.006356	0.9950
D(LNGDPPC (-1))	-0.037503	0.009377	-3.999283	0.0012
CointEq(-1)*	-1.014195	0.146145	-6.939626	0.0000
R-squared	0.714026	**Mean dependent var**		0.005090
Adjusted R-squared	0.597036	**S.D. dependent var**		0.009907
S.E. of regression	0.006289	**Akaike info criterion**		-7.049831
Sum squared resid	0.000870	**Schwarz criterion**		-6.591789
Log likelihood	122.7973	**Hannan-Quinn criter.**		-6.898003
F-statistic	6.103328	**Durbin-Watson stat**		2.045505
Prob(F-statistic)	0.000261			

Source: Researchers' Computation from EViews 10.

From Table 4.5, it is observed that the regression line has a positive intercept as presented by the constant (c) = 3.861. This means that if all the variables are held constant or fixed (zero), life expectancy in Nigeria will increase by about 3.861% per annum. Thus, the a-priori expectation is that the intercept could be positive or negative, so it conforms to the theoretical expectation.

The estimate of external debts and foreign aid indicates a positive impact on life expectancy while that of remittances indicate a negative impact on life expectancy. Such that 1% increase in external debts and foreign aid will on average increase life expectancy by 0.008% and 0.0145% respectively while a 1% increase in remittances from diaspora will on average decrease life expectancy by 0.012% in the short run. More so, government expenditure, carbon emission and its first lag value and gross domestic product per capita have a positive impact on life expectancy in Nigeria. Hence, 1% increase in government expenditure on health, carbon emission and its first lag value and gross domestic product per capita, on average, enhances life expectancy by 0.0189%, 0.0203%, 0.0446% and 0.00001% respectively in the short run. However, the impact of gross domestic product per capita in the previous year reduces life expectancy by 0.0375% respectively in the short run.

In conclusion, it is observed that remittances, carbon emission and its first lagged value and the first lagged value of gross domestic product per capita did not conform to the theoretical expectations of this study. The result also shows that the error correction term satisfies a priori expectation as it assumed a value between 0 and 1, which is correctly signed. Its coefficient is 1.014, suggesting that the speed of adjustment from the short run back to the long run if there is disequilibrium in the equation when rounded down is

approximately 100%. This is accepted as it is rightly signed and the probability shows it is significant.

Table 4.6: Summary of Short Run Coefficients (Error Correction Regression)
Dependent Variable: Life Expectancy at Birth

Equation2				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	3.113286	0.189414	16.43637	0.0000
D(LNLEB(-1))	0.544987	0.086866	6.273870	0.0015
D(LNEXTD)	-0.013171	0.006164	-2.136873	0.0857
D(LNEXTD(-1))	0.088692	0.006128	14.47305	0.0000
D(LNREM)	-0.010738	0.002890	-3.715411	0.0138
D(LNREM(-1))	0.006725	0.001668	4.031371	0.0100
D(LNFA)	-0.005671	0.004183	-1.355833	0.2332
D(LNINSTQ)	0.108032	0.015869	6.807879	0.0010
D(LNINSTQ(-1))	0.187514	0.014473	12.95629	0.0000
D(INSTQEXTD)	0.000102	1.38E-05	7.380779	0.0007
D(INSTQREM)	0.000150	8.82E-05	1.698908	0.1501
D(INSTQREM(-1))	-0.000718	7.52E-05	-9.545149	0.0002
D(INSTQFA)	8.40E-05	1.28E-05	6.555670	0.0012
D(LNGEH)	0.007513	0.001712	4.388358	0.0071
D(LNGEH(-1))	-0.013157	0.001709	-7.698383	0.0006
D(LNCO2)	0.021845	0.009366	2.332421	0.0670
D(LNCO2(-1))	0.202207	0.016169	12.50618	0.0001
CointEq(-1)*	-0.764952	0.046587	-16.41971	0.0000
R-squared	0.958882	**Mean dependent var**		0.005090
Adjusted R-squared	0.908952	**S.D. dependent var**		0.009907
S.E. of regression	0.002989	**Akaike info criterion**		-8.489278
Sum squared resid	0.000125	**Schwarz criterion**		-7.664802
Log likelihood	153.8285	**Hannan-Quinn criter.**		-8.215988
F-statistic	19.20472	**Durbin-Watson stat**		2.556845
Prob(F-statistic)	0.000001			

Source: Researchers' Computation from EViews 10.

From Table 4.6, the intercept is positively signed as presented by the constant (c) = 3.11. This means that if all the variables are held constant or fixed (zero), life expectancy in Nigeria will increase by about 3.11% averagely which conforms to theoretical expectation as the intercept can either assume a positive or negative. The first lag value of life expectancy has a positive impact on life expectancy such that it increases life expectancy by 0.544%.

For the impact of capital inflow, it can be observed that external debts, remittances and foreign aid have negative impact on life expectancy. This is deduced from Table 4.6, that a 1% increase in external debts (EXTD), remittances (REM) and foreign aid (FA) reduces life expectancy by 0.013%, 0.0057% and 0.0107%. However, a 1% increase in the first lagged value of external debts and remittances increases life expectancy by 0.088% and 0.0067% respectively. Contrary,

institutional quality and its first lagged value has a positive impact on life expectancy, such that a 1% increase in institutional quality and its first lagged value increases life expectancy by 0.108% and 0.187% respectively.

Generally, the interaction of institutional quality and capital inflow (external debts, remittances and foreign aid) all have positive impact on life expectancy at birth in Nigeria in the short run. Specifically, a 1% increase in the interaction of institutional quality and capital flows (INSTQEXTD, INSTQREM and INSTQFA) implies a positive interaction which means that institutions improve the positive effect of capital inflow on life expectancy by 0.0001%, 0.0002% and 0.00008% respectively. Thus, a well-established institution complements capital flows in enhancing life expectancy in the short run. However, the first lagged value of there is a negative interaction of institutional quality and remittances on life expectancy, meaning that, remittances did not promote life expectancy due to the presence of weak institutions in Nigeria.

Furthermore, government expenditure on health (GEH) and carbon emission (CO_2) as well as its first lag value show a positive impact on life expectancy such that a 1% increase in government expenditure on health and carbon emission as well as its first lag increases life expectancy by 0.0075%, 0.021% and 0.202% on average. However, there is an observed negative impact of the first lag value of government expenditure on health (GEH) on life expectancy. In conclusion, the result of Equation 3.2 indicates that the error correction term satisfies a priori expectation as it assumes a value between 0 and 1, and it is correctly signed. With its coefficient of 0.764, the speed of adjustment from the short run back to the long run if there is disequilibrium in the equation is approximately 76.4%.

From the regression analysis, it is observed that all variables conform to the a priori expectation of the study with the exception of external debt, remittances, foreign aid, and carbon emission. However, that of foreign aid share similar attributes as misallocation, diversion of foreign aid by corrupt officials rather than being used for intended health programs or infrastructure development can lead to inefficiencies in healthcare systems and hinder improvements in life expectancy. The finding for carbon emission, however, shows no practical evidence or validation.

Statistical Criterion (First Order Test)

In order to check if the statistical criterion was met for the equations in this study, the R^2, adjusted R^2 and the F-test were applied. The coefficient of determination (R^2) from the study regression result in Table 4.6 is 0.71, implying that the model has high explanatory power. Thus, only about 0.29% variation in life expectancy is not accounted for and can

be attributed to variables not in the equation. The second coefficient of determination is 0.96. This implies that approximately 96% of the variation in life expectancy is explained by the independent variables of external debts, remittance, foreign aid, institutional quality, gross fixed capital formation, carbon emission, interaction of institutional quality and external debt, the interaction of institutional quality and remittances and the interaction of institutional quality and foreign aid.

The adjusted Coefficient of Determination (R^2) which is more suitable for multiple regression analysis supports the claim of the R^2 with values of 0.60% and 0.91% for Equations 3.2 and 3.3 respectively. This indicates that 60% and 91% variation in dependent variables of the two equations are explained by their respective independent variables. Thus, this supports the statement that the explanatory power of the variables is averagely high.

3. Econometric Criterion (Second Order Test)

These tests were used to determine the reliability of statistic criteria and also establish whether the estimates have desirable properties of unbiasedness and consistency.

a) **Test for Heteroscedasticity (Breusch-Pagan Godfrey):** It is conducted to ascertain if the variance of the error term is constant for all observations. Therefore, to confirm that the variance of the error term is constant, the Breusch- Pagan Godfrey heteroscedasticity test was adopted. This result is presented in Table 4.7

Table 4.7: Summary of Heteroskedasticity Test: Breusch-Pagan-Godfrey.

Equation 1			
F-statistic	2.137015	**Prob. F(16,15)**	0.0746
Obs*R-squared	22.24236	**Prob. Chi-Square(16)**	0.1355
Scaled explained SS	6.596655	**Prob. Chi-Square(16)**	0.9803
Equation2			
F-statistic	1.095130	**Prob. F(26,5)**	0.5121
Obs*R-squared	27.22008	**Prob. Chi-Square(26)**	0.3979
Scaled explained SS	0.757408	**Prob. Chi-Square(26)**	1.0000

Source: Researchers' Computation from EViews 10

Hypothesis

$H_0 = \beta_1 = \beta_2 = \beta_3 = 0$ (absence of heteroskedasticity),

$H_1 = \beta_1 \neq \beta_2 \neq \beta_3 \neq 0$ (presence of heteroskedasticity)

Decision Rule: Accept the null hypothesis (H_0) that there is no heteroscedasticity in the residuals if the P-value is greater than 0.05. Therefore, this study accepts the null hypothesis of the absence of heteroscedasticity given that the P-values of the two equations are all greater than 0.05.

b. Autocorrelation Test: The autocorrelation test is used to check if the error terms of different observations are correlated with each other which is against the assumptions of OLS. Autocorrelation is manifested by OLS estimators which are not BLUE (Best linear unbiased estimates). In this study, the Breusch-Godfrey Serial Correlation LM Test is used to detect the presence of autocorrelation in the short run of the two equations ahead of the Durbin-Watson test since it is more general and has no restrictions. These results are presented in Table 4.8.

Table 4.8: Summary of Breusch-Godfrey Serial Correlation LM Test for Autocorrelation

Equation 1	F-statistic	1.359743	Prob. F(2,13)	0.2909
Equation2	F-statistic	1.246278	Prob. F(2,3)	0.4037

Source: Researchers' Computation from EViews 10

Hypothesis

H_0 = There is no serial correlation,

H_1 = There is serial correlation

Decision Rule: Since it is observed that the p values obtained are greater than 0.05, the study accepts the null hypothesis that there is no serial correlation and reject the alternate hypothesis. Therefore, the variables in the equations are reliable for predictions.

c. Normality Test: The Normality tests for the equations are as explained below.

Hypothesis:

H_0 = residuals are normally distributed.

H_1 = residuals are not normally distributed

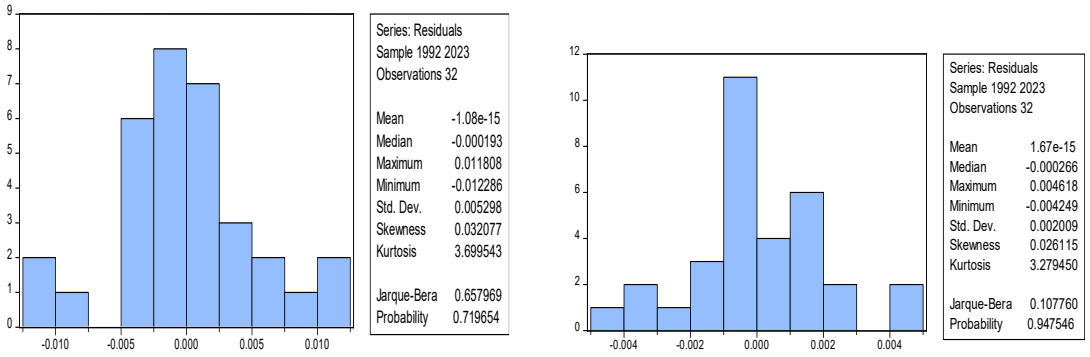

Figure 4.1: Diagram of Normality test for the two equations Equation 3.1 and Equation 3.
Source: Researchers' Computation from EViews 10

Decision Rule: Since the probability value of the jarque-bera for the two equations are greater than 0.05, the study accepts the null hypothesis that the residuals are normally distributed and reject the alternate hypothesis that the residuals are not normally distributed.

4.2 Evaluation of Research Hypothesis.

This sub-section seeks to answer research hypothesis posed in this paper. In testing the working hypotheses, which partly satisfies the objectives of this study, the study employs a 5% level of significance.

Hypothesis one:

The research hypothesis is evaluated using the t-statistics results for the selected capital inflows and the results are presented in the Table 4.9. Therefore, the t-calculated value is compared to the t-critical value at a 5% significance level. If the t-calculated is greater than the t-tabulated, we accept that there is a significant impact of the capital flow on life expectancy at birth otherwise, there is no significant impact of the capital inflow on life expectancy at birth.

Table 4.9: Summary of t-test for Equation 3.2

Equation	Dependent Variable	Independent Variable	T-calculated	T-tabulated	Remark
1	**Life Expectancy**	**External debts**	**-0.593**	**2.056**	**Statistically Insignificant**
		Remittance	2.364	2.056	Statistically Significant
		Foreign aid	2.856	2.056	Statistically Significant

Source: Researches' computation from EViews 10 and Snapshot from Table 4.4

So, the t-tabulated value for both equations are: degree of freedom (df) = n - k = 33 – 7 =26, given that they both have same number of independent variables. Therefore, the study's $t_{(0.025, 26)} = 2.056$. It is used in other to either reject or accept the null hypothesis, given the hypothesis statement below:

H_0: The selected capital inflow variables do not impact significantly on life expectancy at birth in Nigeria.

H_1: The selected capital inflow variables impact significantly on life expectancy at birth in Nigeria.

From Table 4.9, it can be seen that there are three values of t-calculated which are greater than the t-tabulated value of 2.056. Specifically, remittances and foreign aid with their calculated values of 2.3635 and 2.8561 in Equation 3.1 is greater than 2.056. Hence, remittances and foreign aid have a significant impact on life expectancy

Decision Rule: Therefore, since Equation 3.1 shows that there are two significant impacts of capital inflows on life expectancy at birth; the study accepts the alternative hypothesis

that capital inflows have a significant impact on life expectancy at birth.

Hypothesis Two:

To evaluate hypotheses 2 which is based on the interaction of capital inflow with institutional variables, the study makes use of β_i which denotes the slope of the interaction of capital inflow with institutional variables.

If $\beta_i > 0$, it denotes that capital inflow and institutions are complementary (they interact).

if $\beta_i < 0$, it implies that capital inflow and institutions are substitutes (they don't interact).

Table 4.10: Summary of co-efficient for the interaction of capital flows and institutional quality in Equation 2

Equation	Variable	Co-efficient	β_i	Prob	Remark
Equation 2	**INSTQEXTD**	0.0001	0	0.1888	Complementary (Interaction)
	INSTQREM	0.000734	0	0.1787	Complementary (Interaction)
	INSTQFA	0.000436	0	0.1315	Complementary (Interaction)

Source: Researches' computation from EViews 10 and Snapshot from Table 4.6

Restating the second research hypothesis

H_0: there is no interaction effect of institutional quality and the capital inflows on life expectancy at birth in Nigeria

H_1: there is interaction effect of institutional quality and the capital inflows on life expectancy at birth in Nigeria

From the provided ARDL long results for equation 2, the β_i which represent the interaction of institutional quality and any of the capital inflow variables (external debts, foreign aid and remittances) have their respective co-efficient as 0.0001, 0.000734 and 0.000436; which are all greater than 0 (See Table 4.10). This implies that the relationship between capital inflow and life expectancy at birth is complemented by institutional quality of the recipient country (Nigeria). Thus, the presence of strong institutional quality enhances the impact of capital inflow on life expectancy at birth (human development) in Nigeria.

Decision Rule: This study finds that interaction of capital inflows and institutional quality are greater than 0 for life expectancy. Since the interaction of capital inflows and institutional quality are greater than 0 for life expectancy at birth, the study rejects the null hypothesis and accepts the alternative hypothesis that the interaction of capital inflows and institutional quality has an impact on life expectancy at birth (human development) in Nigeria during the period under study. This implies that institutions have the possibilities of enhancing the impact of capital inflow on life expectancy at birth

Discussion of Findings

This discussion is done based on the foregoing analysis and the results generated. The study analysed the impact of capital inflow on life expectancy at birth while looking at the interaction effect of the quality of institutions on capital inflow in achieving improved life expectancy at birth (human development) in Nigeria from 1990 to 2023. It was found that the selected capital flows jointly have significant impact on life expectancy at birth (human development) in Nigeria during the period under study. Specifically with life expectancy as an indicator for human development, remittances and foreign aid had a significant impact while external debt was found to be statistically insignificant. In addition, the direction of relationship with life expectancy at birth was found to be consistent as external debt and remittances have negative impact while foreign aid has a positive impact on life expectancy in the long run. These results indicate that remittances have a negative influence on life expectancy at birth (human development) and does not conform to economic expectation. However, empirical findings of Ali et al. (2022) align with this result as they also found a negative and significant impact of remittances on life expectancy in developing countries.

The results of interaction between institutional quality and selected capital flows on human development in Nigeria shows a positive relationship between institutions and capital inflows in shaping human development in Nigeria except for the interaction of institutional quality and foreign aid which was negative. These findings prove the existence of an interaction between capital inflows and institutional quality in influencing life expectancy at birth (human development) in Nigeria. This is because there exist several institutional frameworks manned with the responsibility to ensure that these capital inflows are used for the appropriate purpose of human development. These empirical findings align with theoretical expectations and some empirical studies, such as Adegboye et al. (2020); Thi Cam Ha, Doan, Holmes, and Tran (2023). They found a complementary interaction between foreign direct investment and institutional quality in enhancing human development in SSA countries. Ali et al. (2022) suggests a similar perspective but note that this interaction does not completely eliminate the adverse influence of capital flows, emphasizing the need for institutional reforms due to the inadequacy of existing institutional quality in developing countries.

5. Conclusion and Recommendations

The ultimate desire to achieve higher levels of human development in Nigeria through foreign capital needs a supportive institutional framework. The study concludes that though

institutional frameworks are present and complements the effect of capital inflows in human development in Nigeria, institutional frameworks has not been effective enough in averting the possible negative influence of capital inflows on human development in Nigeria looking at both life expectancy at birth and adult literacy. In light of the key findings and in line with the policy implications, the following policy recommendations are proposed: that the federal government should focus on these selected capital inflows (external debts, remittances and foreign aid) as a means of influencing human development in Nigeria. Specifically, government at all levels through the Ministry of Budget and Planning should allocate an adequate proportion of capital inflows especially from foreign aid and external debts to the investment in health and education projects which would ultimately enhance human development in Nigeria.

Considering the presence of an interaction effect between institutional quality and capital inflow on life expectancy or adult literacy, the federal government should grant institutions complete autonomy in their operations and implement effective checks and balances for any lapses in any arm of government. This approach would not only promote transparency in utilizing capital inflows for human development but also mitigate potential adverse effects of foreign capital in the economy. It will also provide the opportunity for institutions to influence the judicial use of capital inflows to improve human development in Nigeria.

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