WEST AFRICAN JOURNAL ON SUSTAINABLE DEVELOPMENT

IMPACT OF FOREIGN DIRECT INVESTMENT (FDI) ON UNEMPLOYMENT RATE IN SUB-SAHARAN AFRICAN COUNTRIES: PANEL ARDL ANALYSIS

[1]Ositaufere, Wilfred, [2]Prof S. O. Okafor
[1]Postgraduate Research Student, [2]Lecturer
[1&2]Economics Department, Unizik

[1]wilfredositaufere1@gmail.com, [2]so.okafor@unizik.edu.ng

ABSTRACT

In spite of the importance of foreign direct investment in employment creation, unemployment rate in Sub Saharan African is still on alarming rate. It is on this that this study seek to examined the impact of FDI on unemployment rates in sub-Saharan Africa using new econometric techniques for PMG/ARDL for the period 2000–2021. Taking into account the influence of education, population and the inflation rate, the long-run effect of foreign direct investment (FDI) on the unemployment rate is statistically significant, suggesting that foreign direct investment has a significant relationship with unemployment in the selected sub-region. The error correction model coefficient is negative and significant in the specification, indicating that the short-run imbalance is corrected in the long-run. Given the significant role of foreign direct investment inflows in influencing the unemployment rate, we recommend that governments in this region should provide adequate policy and good environment that will attract FDI. Also, education authorities should be able to provide the type of education (Skill acquisition) that will fit in the industries.

Keywords/Phrases: Unemployment, Foreign Direct Investment (FDI), sub-Saharan Africa, PMG/ARDL and Cointegration.

1. Introduction

African region is home to underdeveloped countries affected by terrorism, political unrest and extreme poverty (Rathnayake, Jayakody, Wannisinghe, Wijayasinghe, Jayathilaka & Madhavika, 2023). Despite rich natural resources and strategic geographic location, the economies of the African region have been fragile, indicating poor macroeconomic conditions that have impacted the quality of life of its citizens. The countries of Sub-Saharan Africa (SSA) have the potential to become a major player in the global economy due to their human and natural resources.

However, the countries in Africa's Sub-Saharan region are facing major challenges which, according to the World Bank (2022), lead to rising unemployment or underemployment, inadequate infrastructure and poor access to markets; impact of security challenges in the country on investments; low skill level affecting productivity; Low capacity utilization in the manufacturing sector due to the fall in consumer demand, which among other things has led to the closure of some companies.

The interdependence of foreign direct investment and labor market aspects is an important topic in the economic literature on foreign direct investment and its impact on unemployment. There are numerous assumptions that foreign direct investment works to save workers money by increasing their real wages and productive capabilities by training workers in advanced techniques and technological means to increase production efficiency (Balcerzak & Miroslawa, 2011).

Furthermore, foreign investments will increase the state's tax revenues, leading to increased government spending and local investments, the creation of new job opportunities, the stability of seasonal employment, and the development of labor-intensive projects characterized by the use of modern technology, resulting in the creation and diversification of new job opportunities (Yabuuchi, 1999). Foreign direct investment may not always be advantageous in the same vein. According to Djafar, (2012), one of the indirect effects of foreign direct investment is to limit brain drain, competencies, and capital by retaining these productive factors from workers and capital in the home country to work with the investor rather than leaving the national economy.

In sub-Saharan Africa, foreign investment is seen as a key source of capital inflows and a stimulus of economic growth, and not just because policymakers believe that foreign direct investment will, for example, help close the large resource gap (i.e. the gap between savings and investment). But also because it contributes to the achievement of the Sustainable Development Goals.

The annual unemployment rate and FDI inflow to SSA from 1991 to 2021. The

trends show that between 1991 and 2021, Unemployment rate in Sub Saharan Africa was as low as 5.45% in 2008 after which it continued with its fluctuation in the regions but rose to 6.798% in 2021. For the past few years unemployment rate in Sub-Saharan Africa got to its peak in 2021. This trend shows that unemployment rate has been on the increase ever since the year 2008 which speaks no good on the economy in SSA (World Bank, 2022).

Sub-Saharan Africa faces volatile FDI inflows. The global financial crises which began in United States of America and United Kingdom in the early 2004 until mid-2007 affected most economies of the world especially developing countries like African countries. This brought about falling rates of investment (such low foreign direct investment among others) (Ojuola, 2011). Foreign Direct Investment total inflow to Sub Saharan Africa was as low as 0.54% in 1991 but rose to 3.866% in 2001. For the past few years FDI got to its peak in 2001 after which it continued with its fluctuation in the regions of Sub-Saharan Africa (UNCTAD, 2022).

Despite the increasing influx of foreign investment across African countries over the decades, sub-Saharan African countries have failed to attract the necessary levels of investment to boost their economies. Given this scenario, the study aimed at the impact of foreign direct investment inflow on unemployment rate in Sub Saharan African countries.

2. Theoretical framework

2.1 Review of Basic Theories:

The Neoliberal school of thought (Pro-Foreign Investment School)

The Neoliberal school of thought Also known as the Pro-Foreign Investment School, the neoliberal school claims that foreign direct investment can have a significant impact on the economic development of host countries. They believe that foreign direct investment brings crucial Western knowledge and value in the form of managerial skills, business ethics and entrepreneurial attitudes, better labor-to-capital ratios and manufacturing techniques. As a result, foreign direct investment fuels business growth by providing access to western

markets. As a result, this expansion creates new jobs and stimulates demand for inputs from domestic suppliers. As a result, FDI introduces new entrants outside of the domestic economies where TNC subsidiaries are based. According to the pro-foreign investment school, foreign direct investment can create new jobs and reduce unemployment in developing countries (Ugochukwu et. al, 2013).

Linder's theory of over-lapping demand

Linder (1961) proposed an alternative theory of trade consistent with Leontief's paradox. The Linder hypothesis represents a demand-based theory of trade as opposed to supply-based theories, which involve international differences in technology or factor endowments. According to the theory developed by Linder, trade in manufactured goods occurs between countries with similar domestic demand conditions - an alternative explanation to trade. Linder hypothesized that countries with similar needs would develop similar industries. These nations would then trade with each other for similar but different goods.

Assuming that similar tastes or preferences stem primarily from similar levels of income, Linder predicted that trade in manufactured goods would occur between countries whose demand overlapped, reflected in overlapping ranges of per capita income. It is evident that much trade in manufactured goods occurs between developed countries and not between developed and developing countries as traditional factor endowment theories would predict. However, global trade trends cannot be fully explained with this theory, as there are also strong trade links between industrialized and developing countries.

2.2 Empirical Review

Alam, Alam, and Hoque, (2020) examines the impact of some crucial macroeconomic factors on the increasing growth rate of unemployment in Bangladesh employing variables such as GDPs, inflation, population growth, FDI during the period 1995-2019, employing OLS technique. The study indicates that there exists a long

run relationship among the factors and unemployment in Bangladesh.

Alalawneh, and Nessa, (2020) investigates the impact of foreign direct investment on unemployment in six countries in the Middle East and North Africa employing panel data for the period 1990 - 2018. In the study, three economic models were used to examine the impact of FDI on unemployment, male unemployment, and female unemployment, in the long run, using the Fixed Effect Model (FEM) and Random Effect Model (REM), in addition to finding the causal relationship in the short term using Panel VAR (Granger causality tests). The results showed that FDI reduces the unemployment rate, the male unemployment rate, and the female unemployment rate in the long run. The results of the study also revealed that there is no causal relationship in the short term between FDI and unemployment in its various forms.

Mustafa and Azizun (2020) carried out a study to determine the impact of foreign direct investment on unemployment in six Middle Eastern and North African countries including Egypt, Jordan, Lebanon, Morocco, Tunisia, and Turkey. The study covered the period, 1990 – 2018. Study employed the Fixed Effect Model (FEM) and Random Effect Model (REM) for the analysis of data. Results indicate that: (1) FDI reduces unemployment, male unemployment, and female unemployment in the long run. (2) There is no short-term causal relationship between FDI and unemployment in its various forms. (3) There is a bidirectional causal relationship between FDI and exports. The study derived its strength from the large sample used for the study.

Johnny, Timipere, Krokeme, and Markjackson, (2018) examined the impact of foreign direct investment on unemployment rate in Nigeria from 1980 to 2015 employing OLS technique. The study used two explanatory variables (foreign direct investment and capital formation) and one explained variable (unemployment rate). The result of the study revealed that: There is negative and insignificant relationship between foreign direct investment and unemployment rate in Nigeria and there is positive and

significant relationship between capital formation and unemployment rate in Nigeria. Policy implication of the findings is the need for Nigerian country to implement policies that will attract foreign investors to Nigeria in order invest more and should also ensure that all resources for productive activities are fully employed before going into any form of savings

Grahovac and Softić (2017) examined the impact of FDI on unemployment rate in Western Balkan countries using period, as shown in numerous empirical studies.

3. Model Specification

Given that the goal is to investigate the long-run association among unemployment and FDI, while exchange rate, gross fixed capital formation and population growth are used as control variables. The empirical analysis makes use of PMG ARDL methodologies. To this end, the empirical analysis employs a panel cointegration approach, as well as Panel non-linear ARDL to identify the relationship among these variables. Based on the study objective, the benchmark model equation yields:

comparative analysis for the period 2000-2014. The result of the analysis showed that since 2009, there is a significant reduction of net investments, which is more obvious in the case of FDI due to a lower domestic and external demand as a result of the global economic crisis what led to a decreasing number of employees and rising unemployment. Results, also, shows the absence of a positive impact of FDI on employment, which was present in most CEE countries during the transition

$$(UNR)_{it} = f(FDI_{it}, EDU_{it}, POP_{it}, INFR_{it}, v_{it})$$

UNR represents unemployment. We have also foreign direct investment net inflows as our main variable of interest, while our control variables are education (School enrollment, primary and secondary (gross)), population growth (Age 15-64 years) and inflation rate represents individual fixed country effects. Similarly, countries are indicated by the subscript i (i=1, ... ,N),while t represents the time period (t=1, ...,T).

$$Unr_{it} = \alpha_i + \delta_{it} + \beta_{1i}FDI_{it} + \beta_{1i}EDU_{it} + \beta_{1i}POP_{it} + \beta_{1i}INFR_{it} + V_{it}$$

Where α_i and δ_i are the intercept and the parameter associated with the trends respectively. The use of the logarithm permits to remove heteroscedasticity from the regression model and also to interpret the coefficients as long-term elasticities.

4. Data Presentation/ Analysis

Descriptive Statistics

The descriptive statistics of the data collected for the study are presented and discussed in this section, the summary of the descriptive statistics is in Table 4.1 as follows;

Table 4.1: Summary of Descriptive Statistics

Variables	UNR	FDI	EDU	POP	INFR
Mean	8.820765	4.899550	0.899863	10560570	7.118492
Median	5.219000	2.526879	0.938735	6401079.	3.836000
Maximum	28.77000	84.93685	1.387486	99550750	418.0000
Minimum	0.320000	-11.199	0.013918	102.3958	-16.8
Std. Dev.	7.566046	8.320928	0.147520	15175682	21.28618
Skewness	0.958824	4.915937	-1.65102	3.486378	14.80316
Kurtosis	2.478623	34.84398	9.076367	16.99958	266.4809
Jarque-Bera	90.50274	25453.65	1096.004	5605.587	1611012.
Probability	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	4851.421	2694.752	494.9249	5.81E+09	3915.171
Sum Sq. Dev.	31427.53	38011.58	11.94749	1.26E+17	248752.6
Observations	550	550	550	550	550

Table 4.1 shows that UNR has mean value of 8.820765 and minimum and maximum values of 0.320000 and 28.77000 respectively; also FDI has mean value of 4.899550 and minimum and maximum values of -11.199 and 84.93685 respectively. Also, EDU has mean value of 0.899863 and minimum and maximum values of 0.013918 and 1.387486 respectively while POP has mean value of 10560570 and minimum and maximum values of 102.3958 and 99550750 respectively. Moreover, INFR has mean value of 7.118492 with minimum and maximum value of -16.8 and 418.0000 respectively.

The high range (maximum – minimum) values and high std. dev. Values of the dependent and independent variables are a clear indication that there is wide disparity across Sub-Saharan African countries based on these variables. Thus, it has become necessary to carry out

logarithm transformation of the variables in order to reduce the likelihood of heteroskedasticity in econometric analysis. Tables 4.2 shows the intercorrelations among the variables

Correlation Results

Table 4.2 present the Pearson correlation coefficient of the variables

Table 4.2: Correlation Matrix

Correlation

Model 2	LUNR	LFDI	EDU	LPOP	INFR
LUNR	1				

LFDI	0.056496	1			
	0.1858	-----			
EDU	0.344455	0.123572	1		
	0.0000	0.0037	-----		
LPOP	-0.3421	-0.03375	-0.15501	1	
	0.0000	0.4296	0.0003	-----	
INFR	0.069511	0.062854	0.021656	0.036521	1
	0.1034	0.141	0.6123	0.3926	-----

As can be seen in the table 4.2, regressors do not have perfect or exact linear representations of one another. From the result, it can be seen that there is no linear dependency between dependent and independent variables. This is because none of the explanatory variables has correlation coefficient up to 0.8.

It is therefore, safe to conclude that there is no problem of multicollinearity that could undermine the efficacy of this model.

Empirical result: Cross-sectional dependence and unit root test

As seen in Table 4.3, all the LM tests including Pesaran CD reveal the existence of cross-sectional dependence at a 1per cent significance level for all the variables. Hence we conduct a unit root test which allows for cross-sectional dependence. Table 4.4 is the Pesaran panel unit root test in the presence of cross-sectional dependence (CIPS and CADF).

Table 4.3: Cross-sectional dependence Test Result

Cross-Sectional Dependence Test

Variables	Breusch-Pagan LM	Pesaran scaled LM	Bias-corrected scaled LM	Pesaran CD
LUNR	**1708.1***(0.0000)**	**56.46484***(0.0000)**	**55.8696***(0.0000)**	**4.514454***(0.0000)**
LFDI	**780.0379***(0.0000)**	**18.57684***(0.0000)**	**17.9816***(0.0000)**	**2.680772***(0.0073)**
EDU	**2638.416***(0.0000)**	**94.44481***(0.0000)**	**93.84957***(0.0000)**	**20.05892***(0.0000)**
LPOP	**6490.312***(0.0000)**	**251.6978***(0.0000)**	**251.1026***(0.0000)**	**80.54883***(0.0000)**
INFR	**610.1212***(0.0000)**	**11.64002***(0.0000)**	**11.04479***(0.0000)**	**12.35436***(0.0000)**

Values in brackets indicate probability values; *, **, and *** indicate significance at 10% level, 5% level, and 1% level, respectively. Null hypothesis: no cross-sectional dependence; Ha: there is cross-sectional dependence among groups or firms

Source: Researchers' computation using Eviews 9.0

Table 4.4: Pesaran Panel Unit Root Test Results

Pesaran Panel Unit root test with cross-sectional (CIPS & CADF)

	CIPS			CADF		
	Level	**1st Diff.**	**Decision**	**Level**	**1st Diff.**	**Decision**
LUNR	-0.575	-3.032	I(1)	-1.227	-2.642	I(1)
LFDI	-2.361	-4.749	I(1)	0.175	-7.324	I(1)
EDU	-5.965	-5.965	I(0)	-3.523	-3.523	I(0)
LPOP	-3.205	-2.252	I(1)	-3.195	-2.548	I(1)
INFR	-3.376	-5.111	I(0)	-3.006	-4.212	I(0)

Source: Researcher computation using stata 15.0

From table 4.4, Pesaran panel unit root test was estimated. Our panel unit root test results using CIPS & CADF indicate that all the CIPS & CADF statistics are greater than their critical values of 10 per cent, 5 per cent, and 1 per cent only at their first differences. This implies that the variables are integrated of order one [I(1)] except EDU and INFR which was integrated of order zero [I(0)]. This test is motivated by the outcome of the cross sectional dependence test. This is a criteria for conducting cointegration (Hossain, 2014). This also indicates that we will analyse the hypothesis using dynamic panel analysis rather than static panel analysis.

Table 4.5: Pedroni Cointegration Test Result

Pedroni Residual Cointegration Test

Series: LUNR LFDI EDU LPOP INFR
Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-1.45567	0.9273	-1.82958	0.9663
Panel rho-Statistic	2.804405	0.9975	2.910449	0.9982
Panel PP-Statistic	-0.44782	0.3271	0.371308	0.6448
Panel ADF-Statistic	-1.25098	0.1055	0.763386	0.7774

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	4.585583	1.0000
Group PP-Statistic	1.293495	0.9021
Group ADF-Statistic	1.618919	0.9473

All test statistics are distributed N(0,1), under a null of no cointegration, and diverge to negative infinity (save for panel v).

Source: Researcher computation using Eview 9.0

From Table 4.5, it can be seen that the cointegration results indicate that there are seven outcomes such as panel v-statistics, panel rho-statistics, panel PP-statistics, panel ADF-statistics, Group rho-statistics, group t-statistics and group ADF-statistics. These have their corresponding probability values. The null hypothesis states that there is no cointegration among the variables. However, the p-values of all the outcomes are non-significant. This implies that all the values are not significant, thereby warranting the acceptance of null hypothesis which states that there is no long-run relationship among the variables. Hence, we estimate PMG.

Tables 4.6: Panel Non-Linear ARDL Test Results

model (LUNR)			
Variables	**Coefficient**	**t-Statistics**	**Prob**
Longrun			
LFDI	-0.097488	-2.5100	0.0120
EDU	2.104426	5.3200	0.0000
LPOP	**-0.346**	**-9.510**	0.0000
INFR	-0.020894	-0.5000	0.6180
Short run			
ECT(-1)	-0.814127	-13.800	0.0000
LFDI	-0.011452	-0.5400	0.5880
EDU	2.006913	5.4700	0.0000
LPOP	**0.036**	**1.7300**	0.0830
INFR	0.0256115	1.1400	0.2540

Source: Researcher computation using Stata 15.0

In table 4.6, the panel non-linear ARDL results for sub-Saharan African countries using PMG output shows that the coefficients of LFDI, LPOP and INFR are -0.097488, -0.346 and -0.020894 respectively with a P-values of 0.0120, 0.0000 and 0.0000 respectively. This indicates that LFDI, LPOP and INFR have negative impact on UNR. That is to say

one per cent increases in LFDI, LPOP and INFR will leads to reductions in the rate of unemployment about -0.097, -0.35 and -0.021 per cent respectively. While the coefficient of EDU is 2.1 with a P-value of 0.0000. This indicate that EDU has positive impact on UNR and coefficient of EDU which is (2.1) with a P-value of 0.0000 indicating that one per cent increase in EDU leads to increase in the rate of unemployment by about 2.11 per cent.

The value of ECT (-1) is -0.81. The result is significant because it is negative and fractional and the P-value of 0.000 which is less than 0.05. Thus, the three conditions for satisfying the validity of ECT have been met. Therefore, the speed of adjustment to equilibrium is 81 per cent.

5 Conclusion/ Policy Recommendations

The objective of this study was to determine the impact of FDI on unemployment rate in selected sub-Saharan African countries. The cointegration test result revealed no long run relationship existing among the variables. The panel non-linear ARDL estimates revealed that FDI and POP have negative and significant impact on UNR. Meanwhile, INFR has negative but nonsignificant impact on UNR. While EDU has positive effect on UNR. The target explanatory variables met apriori sign. Hence, we reject the null hypothesis and accept the alternate hypothesis and conclude that there is significant relationship between UNR and FDI. This outcome is in line with the findings of Alam *et al* (2020), Alalawneh and Nessa (2020) and Mustafa and Azizun (2020) but different from the findings of Johnny *et al* (2018) and Grahovac and Softic (2017).

Based on the findings, FDI is helpful in reducing unemployment in SSA and therefore should be encouraged by providing adequate policy and good environment that will attract foreign investors. Also, it is on record that in terms of education, education authorities should be able to provide the type of education (Skill acquisition) that will fit in the industries.

References

Alalawneh, M., & Nessa, A. (2020). The impact of foreign direct investment on unemployment: Panel data approach.

Alam, J., Nur Alam, Q., & Hoque, M. T. (2020). Impact of GDP, inflation, population growth and FDI on unemployment: A study on Bangladesh economy. *African Journal of Economics and Sustainable Development, 3(3), 67-79.*

Balcerzak, A., & Miroslawa, Z. (2011). Foreign Direct Investment and Unemployment: VAR Analysis for Poland in the Years 1995-2009. *European Research Studies Journal XIV(1): 3–14.*

Djafar, F. (2012). Dynamics of Push and Pull Factors of Migrant Workers in Developing Countries: The Case of Indonesian Workers in Malaysia. *Journal of Economics and Behavioral Studies 4(12):703–711.*

Grahovac, D., & Softić, S. (2017). Impact of the FDI on Unemployment rate in countries of West Balkan. *Review of Innovation and Competitiveness: A Journal of Economic and Social Research*, *3*(2), 65-82.

Hossain, D. (2014). Differential impacts of foreign capital and remittance inflows on domestic savings in developing countries: a dynamic heterogeneous panel analysis. *Economic record*, 90(l):102-126.

Johnny, N., Timipere, E., & Krokeme, O., (2018). Impact of foreign direct investment on unemployment rate in Nigeria (1980-2015). *International Journal of Academic Research in Business and Social Sciences*. 8. 10.6007/ijarbss/v8-i3/3905.

Mustafa, A., & Azizun, N. (2020). Impact of foreign direct investment on unemployment: panel data approach. *Emerging Science Journal*. 4:228-242.

Rathnayake, S., Jayakody, S., Wannisinghe, P., Wijayasinghe, D., Jayathilaka, R., & Madhavika, N. (2023). Macroeconomic factors affecting FDI in the African region. *Plos one*, *18*(1), e0280843.

Ugochukwu, U., Amah, O., & Onoh, J. O. (2013). The impact of foreign direct investment on the Nigerian economy. *European Journal of Business and Management*, *5*(2), 2222-1905.

United Nations conference on trade and development (UNCTAD). (2022). World investment report 2022: trends and determinants, United Nations publication, New York and Geneva: United Nations.

World Bank. (2022). World development report 2023: Jobs. The World Bank.

Yabuuchi, S. (1999). Foreign Direct Investment, Urban Unemployment and Welfare. *Journal of International Trade & Economic Development 8(4): 359–371.*