



How Investment Does Affect Unemployment in a Developing Economy

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Abstract

Thoroughly going through studies on unemployment tends to submit that investment, despite its strong empirical connection with unemployment, seemed to be relegated and ignored as a key variable behind solving unemployment threats. This study estimating a dynamic model with error correction was able to expound with empirical evidence using data from Nigeria between 1980 and 2017 that investment is capable of creating opportunities for employment of idle resources thus reducing the level of unemployment in a developing economy. Hence a justification for the assumption of the “Two-Gap model” that filling Saving-Investment gap will boost employment conditions. Recommendation therefore demands that attentions should be channeled towards investment (especially private investments) to ensure that available resources are attractive enough to attract both local and foreign investors at any given opportunity.

Keywords: Unemployment; NAIRU; Public sector investment; Private domestic investment; Foreign direct investment.

1. Introduction

Nigeria is a Sub-Saharan African country located on the Gulf of Guinea. This location gives her unique and important economic and geographical comparative advantages that offer her opportunities of an investment destination and access to compete in global market. Investment has been identified in theoretical and empirical studies as central determinant of economic growth; more so literatures suggest that investment could be a succor to expedite solutions to key macroeconomic challenge like unemployment. However, it appears to us and as also observed by [Smith and Zoega \(2009\)](#), that investment, notwithstanding robust empirical association it has with unemployment, is rarely seen as major variable or rather variable of interest in building unemployment model. This gives reasons to the need, as opined by [Onodugo et al. \(2014\)](#), to refocus attention on all kinds of investment like public and private (especially domestic private and foreign private) investments. The justification for the above assertion as posited by [Onodugo et al. \(2014\)](#), is primarily because of flexibility, adaptability and regenerative tendencies of the private sector activities in propelling economic growth and development. Nevertheless, structural challenges contending with investment like market inefficiencies as identified by [Onodugo et al. \(2013\)](#), are fundamental causes of economic backwardness in the developing economies. Common knowledge of Macroeconomics obviously suggests that unemployment rate is a conflicting force against achieving desired set macroeconomic goals of any society and therefore represents an index of backwardness.

Economic theory teaches that unemployment is a demonstration of economic imbalance in the economy. The cause can be traced to both macroeconomic and microeconomic sources ([Iacovoïu, 2012](#)). The macroeconomic sources are: ineffective demand, changes in economic structure, unevenness of the educational system to the labour market needs, policies that are inimical to the flows between savings and investment, and any other factor. The microeconomic sources follow-on fundamentally in the decisions of individual entrepreneurs on controlling or streamlining of activities, wage policy, sources of finance, assimilation of technological progress, and some other factors. Also another important microeconomic factor as pointed by [Iacovoïu \(2012\)](#), is the supply of labour which has a lot to do with skill level, adaptability and flexibility of individual workers and individual's aspirations and motivation. Unemployment is defined by [International Labour Organization \(2017\)](#), as the economically active population within specified age without work but are actively seeking for job at prevailing wage rate but are yet to found and those who have voluntarily left work. Though there seems to be convergence on the above definition, however its applications as noted in [Okorie and Anowor \(2017\)](#), have been constrained with series of challenges across countries and regions. While the developed countries seem to be highly committed in combating and resolving challenges of unemployment, the commitment is likely to be lower in countries with opposite attitudes ([Okorie and Anowor, 2017](#)).

Nigerian economy experienced shock as the nation slipped into recession in 2016 which affected the country in specific social and economic terms. Growth figures showed that the economy contracted by 2.06% in just two months. Prior to the recession saga, Nigeria has been battling rising unemployment rate. Available data suggests that unemployment has been on a rising trend over the years: 4.1% in 1981 to 7.0% in 1987, it rose to 13.1% in year

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2000, it rose further to 14.9% in 2008; the official unemployment rate as at 2018 was 22.6%, growing at a worrisome average annual rate of 16.02%. The postulation is that this trend in unemployment has given rise to intensified level of social ills such as kidnapping, banditry, militancy, robbery, rape, productive man-hour waste, and other activities which have led to immense socio-economic losses.

A number of economies depend on investment to resolve several economic problems, crisis and challenges (Atuma *et al.*, 2017). The reason is that investment is assumed to be attached to benefits such as increase in income per capita, employment generation, poverty reduction and consequently increase in the size of the economy. Investment according to Iya and Aminu (2015), is an important part of an effective economic system as it serves as major factor that facilitates growth of economies. Foreign direct investment has been seen to be useful to expanding economies as it provides cross-border employment opportunities (Agosin and Mayer, 2010). Likewise, domestic investment expected to create and provide employment opportunities to the local population.

In the light of the above, the specific questions are: to what extent has public sector investments affect unemployment in Nigeria? To what extent has private domestic investments affect unemployment in Nigeria? To what extent has foreign direct investments affect unemployment in Nigeria? Therefore the primary aim of this study is to provide answers to the questions raised above.

2. Literature

Tobin's Q theory of investment links a firm's investment decisions to stock market's fluctuations. Firm's investment decisions depend on the following ratio called Tobin's q:

$$q = \text{Market Value of Capital Stock} / \text{Replacement Cost of Capital}$$

Net investment would depend on whether q is greater than (q>1) or less than 1 (q<1). If q> 1, the market value of the firm's share in the stock market is more than the replacement of the cost of real capital, machinery etc. The implication of this model is it provides incentives to invest for firms on the basis of stock market. This is so because investment is expected to be higher in the future when the value of q is greater than 1.

Jorgenson's theory of investment is based on the determination of the optimal capital stock on the assumption that firm maximizes its present value. The production process consists a single output, a single variable input which is labour and as single fixed input which is capital. The flow of net receipts (R) at time t is given by

$$R(t) = p(t)Q(t) - w(t)L(t) - q(t)I(t) \dots\dots\dots(1)$$

Where Q is output and p is its price; L is the flow of labour services and w the wage rate; I is investment and q is the price of capital goods.

The present value is defined as the integral of discounted net receipts which is represented as

$$W = \int_0^{\infty} e^{-rt} R(t) dt \dots\dots\dots(2)$$

Where W is the present value (net worth); e is the exponential used for continuous discounting; and r is the constant rate of interest.

Investment is equal to total investment less replacement investment where replacement investment is proportional to capital stock.

Duesenberry's financial/cost of capital theory of investment assumes that the market rate of interest represents the cost of capital to firm which does not change with the amount of investment it makes. In other words, the supply of funds to the firm is very elastic. In reality, an unlimited supply of funds is not available to the firm in any time period at the market rate of interest. As more and more funds are required by it for investment spending, the cost of funds (rate of interest) rises. To finance investment spending, the firm may borrow in the market at whatever interest rate funds are available.

The profit theory regards profit as a source of internal funds for financing investment. Investment depends on profit, and profit in turn depends on income. Profits in this theory relate to the level of current profit and of the recent past. If total income and total profits are high, the retained earnings of the firms are also high, and vice versa. Thus if profits are high, the retained earnings are also high. This is the reason firms prefer to reinvest their spare profit instead of keeping them in the banks in order to buy securities or to give dividends to shareholders. On the contrary, when their profits fall, they cut down their investment projects.

The optimal capital stock is another version of a function of expected profits. If the aggregate profits in the economy and business profits are rising, they may lead to the expectation of their continued increase in the future

Thus expected profits are some function of actual profits in the past,

$$K_t = f(\pi_{t-1}) \dots\dots\dots(3)$$

Where K is the optimal capital stock and f (π_{t-1}) is some function of past actual profits.

Total profits vary directly with the income level in the profits theory of investment developed by Shapiro (1974). That is to say that there is an optimal capital stock that varies directly with the level of profits. Hence for any particular level of profits, the lower the interest rate, the larger will be the optimal capital stock, and vice versa. In summary, the level of aggregate profits varies with the level of national income, and the optimal capital stock varies with the level of aggregate profits. However, the relationships between investment and profit and between aggregate profits and income are not proportional.

The effective demand theory of unemployment assumes employment as a function of income. Effective demand is however determined by two factors which are aggregate supply and aggregate demand functions of which aggregate supply function do not change in the short-run. Consequently, employment therefore depends largely on aggregate demand which in turn is determined by consumption demand and investment demand. Hence employment can be increased by adjusting upward the level of consumption and/or investment.

The Keynesian theory of unemployment averred that low wage rate should have brought about rise in employment but does not because the economy is recession. Keynes (1936) as noted in Mouhammed (2010), thinks that employment is cyclical, generated by the deficiency of aggregate demand, in addition capitalists hire workers and invest to produce output when the expectations about the economy and profits are favourable. If expectations about the future are supported by reality, investments and employment continue rising until equilibrium is reached.

The Nairu investment model supports the idea of capital accumulation as a major determinant of unemployment. The result of inadequate capital stock in developing economies to sustain the growing population is rise in the rate of unemployment (Dikko, 2016).

The Classical school maintained that the economy will attain full employment if wages and price are flexible. This school affirmed that unemployment occurs when wages rise higher than the equilibrium. Firms tend to lay off as many workers as possible to maintain efficient wage bill when wages go up beyond equilibrium. The consequent of this is that fewer persons will be employed while so many will be looking for where to be hired. However, the Classical school claims that unemployment rate will always go through cycles, but at the end will always correct itself to the natural unemployment rate.

A dig into related empirical works especially in Nigeria shows that considerations are yet to be accorded to investments (public sector investment, private domestic investment and foreign direct investment) simultaneously as the variables of interest in the any of the unemployment models. The much they did was on Foreign Direct Investment (FDI) as a separate variable.

Hauwa (2016), adopting Ordinary Least Square regression technique carried out a study on the impact of unemployment on economic growth in Nigeria with data covering 1980 and 2010. The result shows that unemployment does not significantly affect economic growth, but a good performance of an economy in terms of per capita growth may therefore be attributed to the other factors affecting economic growth in the country. It recommended that concerted effort should be made by policy makers to increase the level of output in Nigeria by reducing unemployment. Abaukaka (2014), examined the relationship between foreign direct investment and employment generation in Nigeria. The result showed that, FDI exhibit negative relationship with the level of employment in Nigeria while GDP, interest rate are positively related with the level of employment but none of the explanatory variables significantly impact on the level of employment in Nigeria within the period (2002 - 2012) of the study. Abor and Harvey (2008), used a simultaneous panel regression model to estimate the effect of FDI on employment and wages in Ghana. The result indicated that FDI have a statistically significant and positive effect on the levels of employment in Ghana. Rizvi and Nishat (2009), studied the creation of employment opportunities by FDI during 1985 and 2008 in Pakistan, India and China. They employed the Im- Pesaran- Shin (IPN) test of unit root to find out the order of integration and the Pedroni (2004), test of panel co-integration to investigate the long-run relationship. The result suggests that there is a long-run relationship amongst the variables and also that FDI does not have any impact upon the creation of employment in Pakistan, India and China. Shaari et al. (2012), examined the impact of foreign direct investment on the unemployment rate and economic growth in Malaysia with data ranging from 1970 and 2005. They adopted standard Granger causality tests was employed. The findings indicated that FDI helped to reduce the unemployment rate and increased gross domestic products. The findings indicated that FDI helped to reduce the unemployment rate and increased gross domestic products. Hamidah et al. (2016), worked on the impact of FDI on unemployment rate in Malaysia. Autoregressive distributed lag (ARDL) model was used to determine the long run relationship between the variables. The study finds that FDI, number of foreign workers, and GDP significantly influence the unemployment rate in Malaysia. Bakare (2011), investigated the relationship between urban unemployment crisis and economic growth in Nigeria employing standard econometric method. The result showed that unemployment had significant impact on economic growth in Nigeria over the period under study.

3. Method, Model and Data

Theoretical Framework of this study was drawn from the Post-Keynesian view of unemployment within the non-accelerating inflation rate of unemployment (NAIRU) framework. Keynes (1936), originally argued that insufficient capital accumulation has been the cause of unemployment in an economy. The Post-Keynesian version further argued that NAIRU is endogenous and that capital accumulation is a major determinant of unemployment in the short and medium term Stockhammer et al. (2014). The mainstream NAIRU however, regarded the labour market institutions to be the major determinant of unemployment.

Based on the post-Keynesian NAIRU model as contained in Stockhammer et al. (2014) and Stockhammer and Klär (2008), the NAIRU is determined by macroeconomic shocks, labour market institutions and capital accumulation, thus integrating both main stream and post-Keynesian NAIRU model as shown below:

$$U_N = f(MS, LMI, K) \dots\dots\dots(4)$$

Where U_N = unemployment rate, MS = a vector of Macroeconomic shocks, LMI= Labour market institutions and K = capital accumulation.

However, given that unemployment can be affected by other factors other than as contained in the standard Post-Keynesian NAIRU model and the fact that the model may not suit developing countries like Nigeria, the study adopted a multiple regression model below used in (Dikko, 2016).

$$U_N = f(MS, LMI, K, IM) \dots\dots\dots(5)$$

Where INF =inflation rate, INT=interest rate and IM= Imports of goods and services.

Note that K can be broken into different investment components such as PSI= Public sector investment; PDI= private domestic investment; and FDI= foreign direct investment. Incorporating this into equation (5), we now have equation (6);

$$U_N = f(INF, INT, PSI, PDI, FDI, IM) \dots \dots \dots (6)$$

Equation (6) is later transformed into equation (7) to make it estimable

$$U_N = \lambda_0 + \lambda_1 INF_t + \lambda_2 INT_t + \lambda_3 PSI_t + \lambda_4 PDI_t + \lambda_5 FDI_t + \lambda_6 IM_t + \varepsilon_t \dots \dots \dots (7)$$

Time series data of the specified variables from 1980 to 2017 were collected. The dependent variable (U_N) was sourced from World Bank Development Indicator (WDI); inflation rate, interest rate, public sector investment (proxy for government aggregate expenditure) private domestic investment, foreign direct investment and import were sourced from Central Bank of Nigeria (CBN) Statistical Bulletin.

3.1. Unit Root and Cointegration Test

The study undertakes to check for the time series properties of the data by applying stationarity test as shown below in table 1.

Table-1. Unit Root Test of the Variables

Variable	Variable at level form			Variable at difference form			Order of integration
Variable	ADF Stat.	Lag	5%	ADF Stat.	Lag	5%	
LNIM	-1.647854	0	-2.945842	-7.366679	0	-2.948404	I[1]
LNPDI	-0.586061	3	-2.954021	-3.062621	2	-2.954021	I[1]
INF	-2.457845	2	-2.951125	-6.022557	0	-2.948404	I[1]
LNFDI	-0.456342	0	-2.94584	-4.989540	0	-2.948404	I[1]
LNPSI	-2.529940	0	-2.951125	-22.64730	0	-2.948404	I[1]
RNTR	-2.462045	2	-2.945842	-6.276276	1	-2.951125	I[1]
U_N	-0.634529	0	-2.945842	-6.920127	0	-2.948404	I[1]
ECM_1	-3.373021	0	-1.950394	NA		NA	0

Source: Authors' Computation using E-views 9.0

The unit root test on the variables (ADF result) show that all the variables are integrated at their first difference. The evidence is that all the variables used for study have unit root as revealed when ADF statistics for each variable was compared with their critical ADF. On the other hand, each of the variables when differenced turned stationary at 5 per cent and some at even less than 5%. This implies that the null hypothesis of unit root is rejected for all the variables at their first difference as each of the ADF statistics is greater than the critical ADF value.

Furthermore, the equation was subjected to co-integration using Engel and Granger approach. Evidence in the table 1 proved that the equation was cointegrated. Thus, the null hypothesis for no co-integration was being rejected for the equations.

Since it has been established that all the variables used in the equations are integrated of order one I[1], the OLS t-values are no longer reliable and cannot be used (Brooks, 2008). Thus the study estimated the short-run dynamic model with error correction as shown and presented in the table 2 below.

3.2. Interpretation of Error Correction Estimates Result

Table-2. Parsimonious Error Correction Estimates of the impact of investment on unemployment

Variable	Coef.	t-stat	Prob.value
Cons	2.414528**	3.600670	0.0016
DUN(-2)	0.034673	0.250217	0.8047
DINF	0.011022.	0.108875	0.9143
DlnFDI	-3.81159*	-1.895136	0.0713
DlnIm	2.058189**	3.557819	0.0018
DlnPDI(-1)	-6.22218**	3.718560	0.0012
DlnPSI	-3.20192*	-9.18351	0.0681
DRNTR	0.146748	-5.296822	0.1395
ECM_1	-0.77870**		0.0000
	R ² = 0.760906		
	F-statistic =6.364915; Prob(F-statistic)= 0.000120		
	** and * means significance at 5% and 10% respectively		

Source: Authors' Computation using E-views 9.0

The results in table 2 show the impact of investment on unemployment. The study disaggregated investment into three components, Public sector investment (lnPSI), private domestic investment (lnPDI and foreign direct investment (lnFDI) and each of the component appeared to be negatively related to unemployment. This means that each of these components is capable of creating opportunities for employment of idle resources thus reducing the level of unemployment in Nigeria. Other covariates as shown in the table include import (lnIM), inflation rate

(INF), real interest rate (RNTR) and the lag of unemployment UN(-2). All these control variables are positively related to unemployment and this implies that unemployment increases as they increase. Conventionally, importation should reduce unemployment when capital good make up a larger share of a country’s import. However, when a country imports mostly consumer goods more especially those consumer goods that can be produced locally, unemployment certainly accompany such, because of de-industrialization tendency of such policy. Real interest rate naturally discourages investment because, a rise in the cost of borrowing reduces the profitability of an investment and this leads to a fall in investment. Inflation as well leads to an increase in unemployment as it discourages investment it possibly increase unemployment.

In terms of the significance of the parameter estimates, the study revealed that foreign direct investment is significant at 10% level(p-value of 0.0713< 10 % level of significance), import is significant at even 1%(p-value of 0.0018< 1% level of significance), private domestic investment is also significant at even 7 %(p-value of 0.0681< 7% level of significance). This implies that one percent increase in foreign direct investment makes unemployment go down by about 3.81 percentage points. Unemployment will also go down by 2.058, 6.22 and 3.20 percentage point for one percent rise in import, private domestic investment and public sector investment respectively. Evidence from the results is that private domestic investment has the highest explanatory power reflecting its potency in combating unemployment relative to other component of investment. On the other hand public sector investment has the least potency in reducing unemployment. Moreover, import as shown by the result can raise unemployment by about 2.05 percentage point as it rises by one percentage. However, inflation, and real interest rate are not significantly different from zero since (their p-values of 0.9143 and 0.1395 are both > 10% level of significance).

The coefficient of the first lag of the error term ECM_1 is -0.77870 and is appropriately signed. This speed of adjustment suggests that about 77.9% of the previous period’s disequilibrium in unemployment function is corrected each period (each year).

3.2. The Coefficient of Multiple Determinations R²

The coefficient of determination (R²) as shown in table 2 above is 0.760906 and this shows that all the regressor in the model were able to explain about 76 percent variations in the dependent variable. This shows quite a good fit.

3.2.1. F – Test

It was found that the probability for F-statistics value of 6.36 is less than one percent (p-value of 0.000120< 1%), suggesting that all the parameters are jointly significant. Thus, we conclude that all the regressors jointly have impact on the unemployment in Nigeria.

3.2.2. Test for Auto- Correlation

The underlying assumption of autocorrelation is that the successive values of the random μ_i are temporally independent. The Breusch-Godfrey statistics is used to test for the presence of autocorrelation of order q in the models.

Table-3. Breusch-Godfrey tests

	χ^2 Statistics	Probability
Breusch-Godfrey LM test for autocorrelation	1.782148	0.4102

Source: Authors’ Computation using E-views 9.0

From table 3 above, the probability value of B-Q statistics is greater than 0.05. Since the B-Q statistics is greater than 0.05, we therefore conclude that there exists no q order serial correlation of stochastic errors terms in the model.

3.2.3. Test for Heteroscedasticity

The primary reason to test for heteroscedasticity is to detect violation of assumption OLS:5, which is one of the assumptions needed for the usual statistics accompanying OLS regression to be valid. The F – statistics can be used to verify this assumption, and the hypothesis is formulated as follow:

Hypothesis

H₀: (There is no heteroscedasticity, i.e. homoscedasticity)

H₁: (There is heteroscedasticity)

Decision Rule; Reject H₀ if the calculated F value is greater than the tabulated F value, otherwise accept Ho. The heteroscedasticity result is presented as;

Table-4. White Heteroskedasticity Test

F-statistic	1.785993	Probability	0.1190
Obs*R-squared	16.03906	Probability	0.1397

Source: Authors’ Computation using E-views 9.0

Following the above result, calculated F value = 1.785993 and the F probability value = 0.1190 Therefore, since the F-probability is greater than 0.05 it is considered not significant, and then we accept H₀ of homoscedasticity and conclude that the conditional variances of the error terms are equal.

3.2.4. Normality Test

This test is to enable us determine whether the residual follow the normal distribution as postulated by classical OLS assumption. This is tested using the Jarque-Bera test. The hypothesis is formulated as follows:

$H_0: \mu = 0$ (Residual follow normal distribution)

$H_1: \mu \neq 0$ (Residual does not follow normal distribution)

Evidently as indicated by the result, the null hypothesis cannot be rejected since the Jarque- Bera probability is 0.6958 (> 0.05). Thus we accept H_0 and conclude that the residual follows normal distribution and that the assumption of normal distribution is hereby satisfied

Table-5. Multicollinearity

	INF	lnFDI	lnIM	lnPDI	lnPSI	RNTR
INF	1.000000	0.792814	0.793099	-0.346516	0.028850	0.697650
lnFDI	0.792814	1.000000	0.699999	-0.306020	0.037798	0.743914
lnMI	0.793099	0.699999	1.000000	-0.306137	0.038314	0.743958
lnPDI	-0.346516	-0.306020	-0.306137	1.000000	0.241267	-0.271979
LnPSI	0.028850	0.037798	0.038314	0.241267	1.000000	0.056690
#RNTR	0.697650	0.743914	0.743958	-0.271979	0.056690	1.000000

Note: the variables were taken according to their order of integration.

Source: Authors' Computation using E-views 9.0

From the above table, it can be deduced that all the variables showed no multicollinearity since their pair-wise or zero order matrix is not up to or greater than 0.8 except real interest rate and inflation. Consequently, we conclude that there is no serious multicollinearity among the variables, and the randomness of the explanatory variables is hereby met.

4. Conclusion and Recommendations

This study disaggregate investment into three components, Public sector investment (lnPSI), private domestic investment (lnPDI) and foreign direct investment (lnFDI) and each of the component appeared to be negatively related to unemployment. This means that each of these components is capable of creating opportunities for employment of idle resources thus reducing the level of unemployment in Nigeria.

This study therefore found theoretical and empirical justifications for the assumption of the "Two-Gap model" that filling Saving-Investment gap will boost employment conditions. If specified investments are properly carried out, they can inspire an improvement in the economy thereby reducing unemployment rate. The major assumption of the "Two-Gap model" is that most developing economies are facing domestic and external gaps to augment for needed resources. This suggests that opening investment opportunities for public sector investment, private domestic investment and foreign direct investment will close this gap.

The study therefore recommends that attentions should be channeled towards investment to ensure that available resources are attractive enough to attract both local and foreign investors at any given opportunity. Importation of capital goods should be encouraged as shows to enhance growth; but importation of consumer goods as suggested by the results of our analysis should be discouraged retards the growth of local production and thus unhealthy to the growth of domestic economy. Private investment has shown from the result to be more viable and major source of growth than others in contributing to economic growth and employment creation in the economy, therefore enabling environment should be provided for the private sector to enhance a sustainable economy. Access to finance at a subsidized interest rate to investors should one of the top policy priorities because high cost of borrowing reduces the opportunities for investment. Likewise investors in real the sector should be considered for tax concessions because of the sector's direct effect on employment.

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