

# An Empirical Examination of the Influence of Private Sector Credit on Unemployment in Nigeria

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**Abstract:** *This study was an attempt to examine the short run and long run influence of private sector credit on the rate of unemployment in Nigeria from 1990 through 2020. Data which were obtained from the Central Bank of Nigeria and the World Bank were analysed using the Augmented Dickey-Fuller (ADF) unit root test, autoregressive distributed lag (ARDL) bounds test for cointegration, and error correction model. The unit root test revealed that our time series variables were integrated of orders 0 and 1. Using the ARDL bounds testing approach to detect the possibility of any cointegration among the variables, our findings revealed that a long run relationship exists between unemployment rate and private sector credit, clearly showing that private sector credit affects unemployment in the long run. From the ARDL estimates, credit to the private sector put forth a positive but insignificant influence on unemployment; while its one-period lag wielded a positive and significant effect. This shows that the past value of credit to the private sector could not support the reduction in unemployment. In the long run, credit to private sector is noted to wield a negative effect on the unemployment rate, though such an effect is insignificant. Such could be linked to the effect of interest rate as the study revealed a positive and significant influence of interest rate on the rate of unemployment in Nigeria. The paper therefore concludes that increasing the volume of private sector credit will help stimulate productivity which will aid in a long-term unemployment reduction in Nigeria if the rate of interest is put in check.*

**Keywords:** Unemployment Rate, Credit to Private Sector, Monetary Policy, Interest Rate, SMEs.

## 1. Introduction

Private sector credit refers to “financial resources provided to the private sector, such as through loans, purchases of non-equity securities, trade credits and other accounts receivables, which establish a claim for repayment” (The World Bank, 2022). Availability of financial resources is critical for the growth of any businesses, as it forms the basis for the accumulation of both physical and human capitals. Such financial resources flowing to the private sector forms the basis for private sector investment which is crucial for employment generation. The importance of the private sector has earlier been stressed by Ede, Ndubisi, & Anayochukwu (2013) in terms of its capacity to generate more jobs at a rate greater than 90%. Apart from this, it is also an avenue where opportunities exist for poor individuals to thrive, through private investments. Private sector investments are those that are made by either private or corporate investors (local or foreign). Activities in this area are overseen and directed by a non-governmental organization (private or corporate individuals). In other words, all for-profit companies that are not owned or run by the government are included in the private sector.

Through the production of jobs and income, private sector investment supports effective growth and development. Thus, Tony (2016), referenced in Ndugbu, Osuka, & Duruechi (2019), argued that efforts should be focused on addressing unemployment and job creation on a vast scale, as well as on significantly boosting access to energy, while designing the set of goals. These objectives, which are essential to people's lives and quality of life, cannot be achieved without cooperation from the business sector. By including people more actively in the production and decision-making processes, in addition to the merits of private sector investments, it also has positive social and political effects. The tax bases established by private sector development may be used to address social and environmental problems (Bahar, 2003; Ndugbu, Osuka, & Duruechi, 2019). Most productive economies rely heavily on private sector credit or commercial financing. Finance is the natural lifeblood of an economy, allowing the private sector to develop their firms and execute new ideas. The private sector frequently attributes its success to financial accessibility thus, access to bank credit by the private sector influences the survival of firms and entrepreneurship in a country (Omodero, 2019).

One of the key drawbacks of entrepreneurial spirit is the lack of start-up capital, or additional capital for expansion. A nation with a critical mass of entrepreneurs, as represented by micro, small, and medium-sized firms (MSMEs), has a fair probability of seeing a lot more company growth and therefore greater job creation. MSMEs, also known as SMEs, have enormous potential to create jobs in both developed and developing nations (George-Anokwuru & Okowa, 2021). They raise living standards, create jobs, and add value to a wide range of products and services. It will be anticipated that the development of such viable businesses in Nigeria will serve a similar employment-creating function. Additionally, the establishment of effective microcredit programs can help SMEs create jobs by meeting their credit needs as they are typically turned down by regular banks due to their high credit risk reputations. SMEs require capital in order to generate jobs. Deposit money banks, microfinance institutions, governments, and organizations in Nigeria all provide capital for SMEs through programs and soft loans. Such provision of credit is premised on the capacity of the

private sector to boost economic growth, employment generation, and poverty reduction in a nation (George-Anokwuru & Okowa, 2021). This therefore forms the basis for the provision of credit to the private sector by commercial banks in Nigeria over the years.

The role of financial sector in providing investment finance is crucial for development as earlier argued by the Schumpeter (1911) who supported the concept of finance-led growth (Olowofeso, Adeleke, & Udoji, 2015). The financial sector is critical to a country's economic prosperity. Those with deregulated banking sectors have had faster economic development than countries with regulated financial systems. Furthermore, banking deregulation benefits other areas of the economy such as income inequality, unemployment, entrepreneurship, and investment. A regulated banking system is seen to have a key role in boosting equilibrium unemployment by imposing credit limits and limiting company entrance (Acemoglu, 2001; Wasmer & Weil, 2004). A highly competitive and efficient banking system makes low-cost loans to entrepreneurs and businesses, increasing investment through improving capital availability (Zakaria, Risalat, & Fida, 2015). "This rise in investment raises the demand for labour, lowering the unemployment rate" (Strahan, 2003; Dromel, Kolakez, & Lehmann, 2010).

The credit to private sector in Nigeria has been witnessing substantial increase in Nigeria over the years, and this is also being accompanied by its increasing proportion to the gross domestic product (GDP). Table 1 reflects on these aspects.

Table 1: Volume of private sector credit in Nigeria, 1990 – 2021

Year	Credit to Private Sector (CPS) (₦ Billion)	% of GDP	Year	Credit to Private Sector (CPS) (₦ Billion)	% of GDP
1990	30.40	6.78	2006	1,838.39	7.54
1991	33.55	7.01	2007	2,290.62	10.58
1992	41.35	6.42	2008	3,668.66	19.77
1993	58.12	10.11	2009	7,899.14	22.75
1994	127.12	8.11	2010	9,889.58	18.96
1995	143.42	5.81	2011	10,518.17	15.07
1996	180.00	5.84	2012	9,600.02	18.31
1997	238.60	7.16	2013	13,293.64	17.85
1998	316.21	7.32	2014	14,461.41	18.59
1999	351.96	7.86	2015	16,753.00	19.64
2000	431.17	7.51	2016	18,688.42	20.50
2001	530.37	9.29	2017	21,025.24	19.55
2002	764.96	8.09	2018	22,459.18	17.54
2003	930.49	8.09	2019	22,646.33	17.63
2004	1,096.54	7.84	2020	25,676.87	18.82
2005	1,421.66	7.95	2021	29,030.01	18.67

Source: Central Bank of Nigeria (2021)

It is clear in Table 1 that with a record of ₦30.40 billion credit was accorded to the private sector in 1990, and this represented 6.78% of GDP. This increased substantially to ₦431.17 billion in 2000 or 7.51% of GDP. The rising trend continued and reaching ₦9,889.58 billion in 2010 or 18.96% of GDP as against 10.58% in 2007. The value reached ₦16,753.00 billion in 2015 (19.64% of GDP) before rising substantially to ₦25,676.87 billion (18.82% of GDP) and ₦29,030.01 billion (18.67% of GDP) in 2020 and 2021 respectively.

Though this may reveal a rising trend over the years, an inspection of the percentage change reveals the true behaviour of the variables over time. Figure 1 therefore captures the trend in the growth rate of private sector credit in Nigeria.

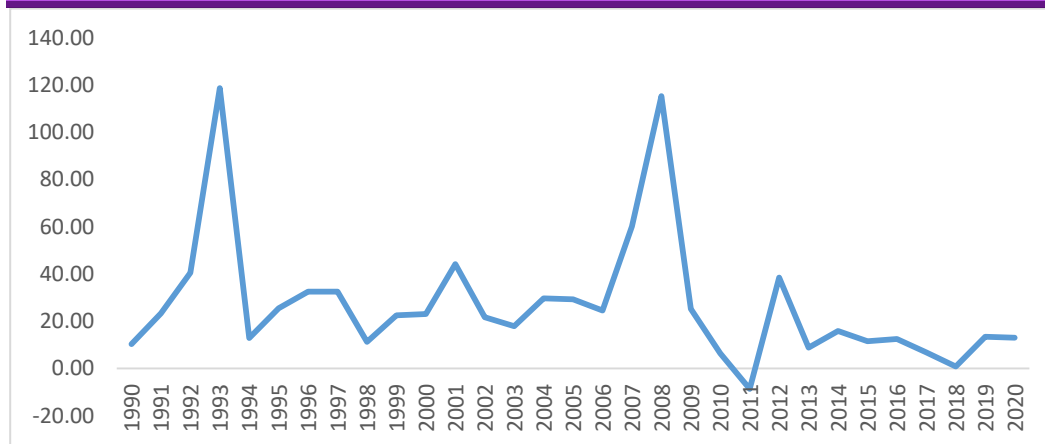


Figure 1: Trend of the growth rate of credit to the private sector (%)

An inspection of Figure 1 reveals that private sector credit grew sharply in 1990 through 1992 by increasing from 10.34% to 118.70% before dropping sharply 12.83% in 1994. From 1995 through 2006, the growth has been oscillating before a record high of 115.31% was recorded in 2008. Thereafter, the growth plummeted substantially and even reaching a negative as at 2011. Though some recovery were recorded, the growth in the private sector credit has been minimal for the subsequent years as it reaches 0.83% in 2018 before surging to 13.06% in 2020.

Given this recent behaviour in the private sector credit, an inspection of Nigeria’s unemployment rate exhibited a sharp increase recently. In the fourth quarter of 2020, the rate of unemployment and underemployment stood at 33.3% and 22.8% respective; while youth unemployment and youth underemployment was 42.5% and 21.0% respectively. Between 2007 and 2018, total number of unemployed people increased from 17.6 million in the fourth quarter of 2017 to 20.9 million in the third quarter of 2018; causing the rate of unemployment to increase from 18.8% in the third quarter of 2017 to 23.1% in the third quarter of 2018 (National Bureau of Statistics, 2018). This recent rise in the rate of unemployment is captured in Figure 2 where the chart reflects on the level of unemployment in the country from the first quarter of 2015 to the fourth quarter of 2020.

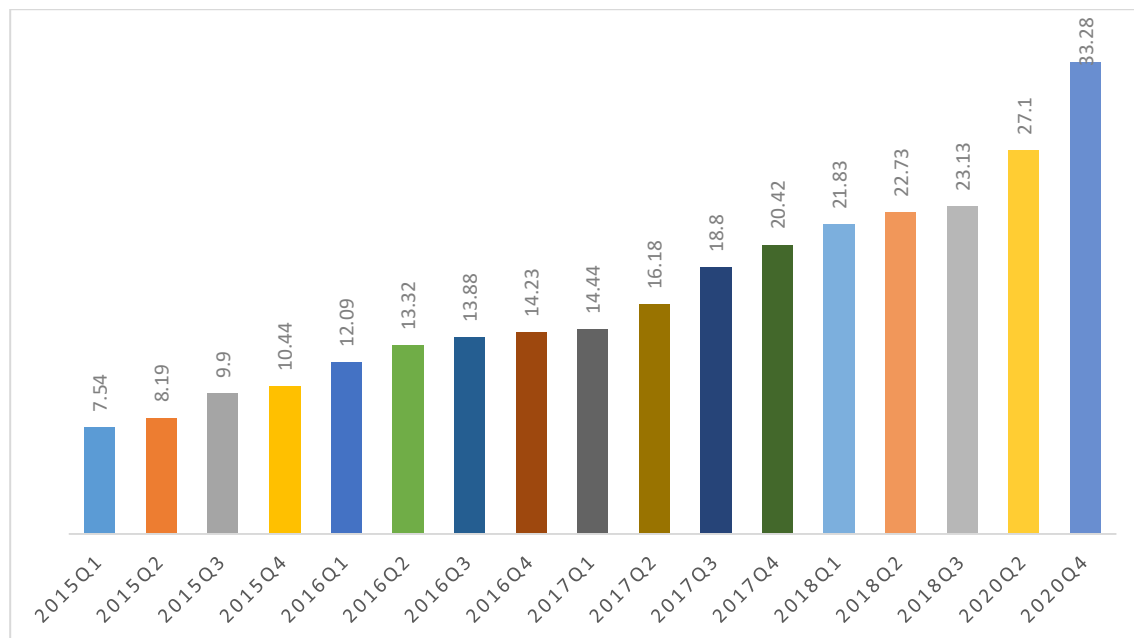


Figure 2: Pictorial representation of unemployment rate in Nigeria (National Estimates)

A reflection on Figure 2 gives a clear indication that the rate of unemployment has maintained a rising trend recently, starting from 7.54% in the first quarter of 2015 to 10.44% in the fourth quarter which represents a 38.46% change within the period. This rising trend continued as unemployment rose to 13.32% in the second quarter of 2016 before reaching 14.23% in the fourth quarter, and averaging 13.38% within the four quarters in 2016. In 2017, a further significant increase was recorded to the tune of 20.42% in the fourth quarter as against 14.44% in the first quarter which signifies a 41.41% increase. The trend continued through 2018 and 2020

as the rate averaged 22.56% within the first and third quarter of 2018 and 30.19% for the second and fourth quarter of 2020, with an unemployment rate of 33.28% being recorded in the fourth quarter of 2020 (note that all the values are national estimates).

By considering the declining growth in broad money supply and the rising trend in the rate of unemployment, one could begin to ponder whether the private sector credit could influence the rate of unemployment in Nigeria since it is a crucial factor that determines the availability of borrowed capital for productive investments in the private sector. Consequently, the attention of this study is channelled towards ascertaining the effect of private sector credit on the rate of unemployment in Nigeria from 1990 through 2020.

## **2. Literature Review**

The Keynesian Theory of Unemployment holds that an economy's effective demand drives job creation. The aggregate demand and aggregate supply determine effective demand. Keynes thinks that aggregate supply is constant and that aggregate demand is determined by consumption and investment, which defines a country's level of employment. According to Hussain & Nadol (1997), employment, capital stock, and technological advancement are all endogenously determined. However, a rise in government spending will result in a drop in borrowing rates, which will in turn result in an increase in investment. This will increase aggregate demand, which will have a multiplier effect on income, production, and job growth. This will increase aggregate demand, which will have a multiplier effect on income, production, and job growth. According to Keynesians' theory, increasing expansionary monetary or fiscal policy reduces interest rates, which boosts investment demand. Increased investment boosts employment and lowers unemployment in the country (Nnabu, Udude, & Egbeoma, 2017). It follows from this argument that increasing private sector credit will boost private sector investment which will stimulate production, income, and employment.

Some studies have been conducted to check on the effect of credit and the financial sector on unemployment. Using panel data of 19 OECD countries from 1982 to 2003, Dromel, Kolakez, & Lehmann (2010) examined the effects of credit market growth on the level and persistence of unemployment. The Generalized Least Square (GLS) estimation method was used in the investigation. The study's conclusions showed a conflict between the growth of the financial industry and the continuance of unemployment.

Raskin (2011) notes that altering the near-term path of interest rates, including a decrease in current short-term rates and a corresponding downward shift in private-sector expectations about the future path of such rates, is the traditional tool of monetary policy to influence unemployment. This lowers borrowing costs for households and businesses.

Shabbir, Anwar, Hussain, & Iman (2012) looked at how the growth of the financial industry affected Pakistan's unemployment rate between 1973 and 2007. The study, which made use of the ARDL statistical approach, discovered that growing financial sector activity had a positive, substantial influence on the decline in unemployment in Pakistan over the long and short terms. Furthermore, it was found that extending loans to the private sector creates job chances and raises the employment rate in Pakistan.

For the years 1980 to 2010, Loganathan, Ishak, & Mori (2012) examined the dynamic integration of monetary shock and overall unemployment in Malaysia. Numerous unit root tests, the Gregory-Hansen cointegration test, the VECM, and the Granger causality test were used in the study while taking the likelihood of a structural break into account. The findings indicate a structural rupture around the middle of the 1990s, with monetary shock and unemployment co-integrating over the long term.

With the help of monthly variables for the money supply, total loans, employment rates, and the industrial production index, Cambazolu & Karaalp (2012) assess the impact of a restricted credit perspective on output and employment in Turkey. It was discovered that changes in the money stock had an influence on production and employment.

Using a panel data analysis method that takes into account structural breaks and cross-section dependence, Göçer (2013) investigates the relationship between changes in money supply in terms of total lending of the banking sector and unemployment in fourteen chosen European Union countries for the 1980–2012 period. According to the data, these countries' lower unemployment rates can be attributable to an increase in lending.

Haruna, Saifullahi, & Mukhtar (2013) used the Auto Regressive Distributed Lag (ARDL) Bound Test approach for the estimate of the long-run (co-integration) connection to analyze the association between the growth of the financial industry and unemployment in Nigeria from 1980 to 2011. Proxy measures of financial sector development included credit to the private sector, broad money supply, money supply to GDP ratio, deposits mobilized by rural bank branches, and formal loans granted to rural residents by rural bank branches. The study's findings demonstrated that there is a short- and long-term link between Nigeria's banking sector growth and its unemployment rate.

In an auto-regressive distributed lag framework, Aliero, Ibrahim, & Shuaibu (2013) looked at the link between the growth of the financial industry and unemployment using time series data from 1980 to 2011. The study found that there was persistent unemployment in Nigeria and came to the conclusion that formal credit distribution in rural regions reduced unemployment in the

short and long terms. The report suggests that in order to give the country's throngs of jobless young the required credit facilities, monetary authority should be reinforced and financial services should be increased, especially deposit money institutions.

Using panel data for the years 1991 to 2005, Zakaria, Risalat, & Fida (2015) investigated the impact of banking deregulations on overall and young unemployment rates in South Asian nations. The findings indicate that the region's young unemployment rate has declined as a result of banking deregulation. The findings also show that while bank crises and high pay rates have raised unemployment in the area, high consumption levels, per capita income, and bank credit have decreased it. The findings imply that banking liberalization may aid in lowering unemployment, particularly among young people in South Asian nations.

A vector autoregressive (VAR) approach was used by Essien *et al.* (2016) to investigate the relationship between unemployment and monetary policy in Nigeria for the years 1983 first quarter to 2014 first quarter. By selecting three structural breakpoints and including them as dummy variables in the VAR model, the article examines the impact of structural change. The findings demonstrate that over a period of 10 quarters, a positive shock to the policy rate increases unemployment. A dynamic link between monetary policy and unemployment in Nigeria is further implied by the fact that all the variables utilized as proxies in the model jointly cause unemployment.

Nnabu, Udude, & Egbeoma (2017) used the Vector Error Correction Model (VECM) Approach on yearly data from 1992 to 2014 to empirically investigate the influence of commercial bank loans to SMEs on unemployment reduction in Nigeria. The Augmented Dickey-Fuller (ADF) unit root test reveals that all variables have a unit root at the level but become stationary after the first difference. The Johansen cointegration test reveals evidence of cointegration between bank credit to SMEs and Nigeria's unemployment rate, whereas the VECM demonstrates that bank credit to SMEs and personal savings have no impact on unemployment reduction in Nigeria and that the current interest rate is to blame for the country's high unemployment.

Raifu (2019) utilized the ARDL estimating approach to determine how different financial development variables affected unemployment in Nigeria. It was discovered that the single factor that has the capacity to lower the unemployment rate over the long and short terms is the financial system's contribution to GDP. The unemployment rate is only temporarily lowered by other financial variables including loans to the private sector, financial liquidity, financial efficiency, and financial stability.

Okorie & Allison (2021) investigated the relationship between Nigeria's unemployment rate and private sector investment. Regarding the Nigerian labour force, the study used time series data from the National Bureau of Statistics, ILO Data Base, and Central Bank of Nigeria Statistical Bulletin. Unit roots and co-integration tests were performed on each variable. The Auto-Regressive Distributed Lag (ARDL) Model was used in the data analysis to take into account the various orders of integration of the variables. Results indicated that both in the short and long terms, private sector investment had a negative and significant influence on unemployment in Nigeria.

Daniel, Israel, Chidubem, & Quansah (2021) estimated three different models to ascertain the effect of some variables on unemployment and inflation from 1981 through 2020. By using the vector autoregressive and error correction model, their findings revealed that the two-period lags of private sector credit and government spending has a negative and significant influence on the rate of unemployment.

The concern of this study is channelled towards detecting the influence of private sector credit on unemployment in Nigeria from 1990 through 2020 with the use of the autoregressive distributed lag (ARDL) approach.

### 3. Methodology

#### 3.1 Model Specification

Modelling the relationship between unemployment and private sector credit in Nigeria is done by modifying the model employed by Daniel *et al.* (2021); where they defined unemployment rate (UMPr) as a function of investment (INV), government expenditures (GOV), and private sector credit (CPS). By modifying and incorporating other key variables, the model for this study is specified thus;

$$UNMP = f(CPS, ECG, ELEC, GES, INT) \quad (1)$$

Where:

UNMP = Unemployment rate (ILO modelled estimates, %)

CPS = Domestic credit to private sector (% annual growth)

ECG = GDP growth (annual %)

ELEC = Access to electricity (% of population)

GES = Government expenditure on Social Community Services (% of total)

INT = Prime lending rate (%)

Equation (1) is transformed into an estimable form as follows:

$$UNMP = \gamma_0 + \gamma_1CPS + \gamma_2ECG + \gamma_3ELEC + \gamma_4GES + \gamma_5INT + \mu \quad (2)$$

Of which the variables are as earlier defined, the  $\gamma$ 's are the parameters to be estimated, and  $\mu$  is the random term. It is expected that  $\gamma_0 \neq 0$ ;  $\gamma_1 < 0$ ;  $\gamma_2 < 0$ ;  $\gamma_3 < 0$ ;  $\gamma_4 < 0$ ; and  $\gamma_5 > 0$ .

### 3.2 Nature and Sources of Data

Our data are time series in nature, covering the period of 1990 through 2020. All the variables are represented in percentages. Data on prime lending rate (INT), private sector credit (CPS), and government expenditure on social and community services (GES) were all gotten from the Central Bank of Nigeria (2021) statistical bulletin; while the World Bank (2021) data base provided data on unemployment rate (UNMP), GDP growth capturing economic growth (ECG), and access to electricity (ELEC).

### 3.3 Estimation Technique

The technique of estimation in this study follows the autoregressive distributed lag (ARDL) approach developed by Pesaran, Shin, & Smith (2001). With this technique, we are able to estimate both the short-run and the long-run effect of the explanatory variables (CPS, ECG, ELEC, GES, INT) on the dependent variable (UNMP). The estimation is done by following a step by step procedure of ascertaining the unit root properties of the variables with the aid of the Augmented Dickey-Fuller unit root test developed by Dickey & Fuller (1979), checking on the existence of a levels relationship (cointegration) using ARDL bounds testing approach developed by Pesaran, Shin & Smith (2001), and then estimating the short-run and long-run model using the ARDL error correction model. The error correction model aids in the detection of how the short-run discrepancies in the model is adjusted in order to achieve a long-run equilibrium.

The ADF unit root test is conducted using the constant and trend assumption, where the model is specified as a random walk model with drift and deterministic time trend as follows:

$$\Delta y_t = \varphi + \delta t + \beta_1 y_{t-1} + \sum_{i=1}^p \rho_i \Delta y_{t-i} + \varepsilon_t \quad (3)$$

Where  $y_t$  is the time series variables to be tested for unit root (in this case we have UNMP, CPS, ECG, ELEC, GES, and INT);  $p$  captures the lag length;  $t$  measures the time trend,  $\varphi$  is the constant (drift);  $\beta_1$  is the parameter to be subjected to the test where the null hypothesis is stated as  $\beta_1 = 1$ ;  $\Delta$  is the difference operator; and the summation component of the model captures the augmented aspect of the model where its importance is to correct for any form of serial correlation.

The error correction model which will aid in our estimation of the short-run and long-run estimates of our model is specified thus;

$$\Delta UNMP_t = \tau_0 + \sigma_i X_i + \sum_{i=1}^n \varphi_i \Delta UNMP_{t-i} + \sum_{i=0}^m \rho_i \Delta X_{t-i} + \delta ECM_{t-1} + \varepsilon_t \quad (4)$$

Here,  $X_i$  represents all the explanatory variables in in the model (CPS, ECG, ELEC, GES, and INT),  $n$  is the optimal lag length of the dependent variables while  $m$  captures that of the explanatory variables. The parameter  $\sigma_i$  denotes the long-run estimates of the model's parameters,  $\varphi_i$  and  $\rho_i$  represents the short-run parameters,  $\delta$  measures the speed of adjustment of the short-run disequilibrium to attain long-run equilibrium, and  $ECM$  is the error correction mechanism expressed as the one-period lag of the residual.

## 4. Empirical Findings

### 4.1 Descriptive Analysis

Capturing the descriptive nature of the variables over time helps us to know how the values of the variables concentrated around the mean, how they dispersed, and the nature of their distribution. Table 2 presents these features for each of the variables over the thirty-one (31) years.

Table 2: Descriptive features of the time series variables

	UNMP	CPS	ECG	ELEC	GES	INT
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Mean	4.8714	27.0946	4.3418	46.8785	14.0444	18.6161
Median	3.9990	22.50626	4.6312	47.6100	15.2133	17.9800
Maximum	9.7880	118.7049	15.3292	59.3000	21.1306	29.8000
Minimum	3.7000	-8.7292	-2.0351	27.3000	3.7380	12.3193
Standard Deviation	1.9367	27.6722	4.0817	7.8175	4.9662	3.4373
Skewness	1.6821	2.2179	0.4131	-0.4696	-0.2781	1.2567
Kurtosis	4.1022	7.9484	3.1807	2.4957	1.9058	5.4557
Jarque-Bera	16.1888	57.0445	0.9239	1.4678	1.9462	15.949
Probability	0.0003	0.0000	0.6301	0.4800	0.3779	0.0003
Observations	31	31	31	31	31	31

Source: Researchers Computation

As it could be seen from Table 2, the mean unemployment rate (ILO modelled estimate) stood at 4.8714%, and having a standard deviation of 1.9367. The maximum value of the variable within the period was 9.788% while the minimum value was 3.70%, thus giving a range of 6.088%. The distribution has an elongated tail to the right, as indicated by the positive skewness coefficient of 1.6821; and the coefficient of kurtosis which is greater than 3 is a clear indication that the unemployment rate follows a distribution that is platykurtic. Likewise, the growth rate of private sector credit averaged 27.0946% with a standard deviation of 27.6722%; and having a maximum and minimum values of 118.7049% and -8.7292% respectively. The distribution is also platykurtic and positively skewed. Other variables in Table 2 like ECG, ELEC, GES, and INT can be discussed in a similar manner.

#### 4.2 Correlation Analysis

Revealing how two variables moves will require the use of the correlation analysis where the correlation coefficient will help us to know whether two variables are correlated directly (positively) or indirectly (negatively). Table 3 presents the correlation matrix of the variables, where a positive coefficient indicates that the two variables move in the same direction while a negative coefficient exhibits that the variables move in an opposing direction.

Table 3: Correlation matrix

	UNMP	CPS	ECG	ELEC	GES	INT
UNMP	1					
CPS	-0.3117	1				
ECG	-0.4630	-0.0415	1			
ELEC	0.5318	-0.2487	-0.0718	1		
GES	0.3606	-0.2358	0.1869	0.8355	1	
INT	-0.3325	-0.0493	0.3201	-0.5946	-0.5059	1

Source: Researchers Computation

As it can be adduced from Table 3, CPS, ECG, and INT are inversely correlated with the rate of unemployment implying that as these variables increases, unemployment decreases and vice versa. Meanwhile, ELEC and GES portrays a positive correlation with UNMP portraying that as they increase, the rate of unemployment is also increasing. Though the correlation coefficient gives us the picture on how the variables are moving, it does not in any way imply a cause-effect relationship. Consequently, we will conduct the needed regression analysis to address this.

#### 4.3 Unit Root Test

The use of time series variables requires that we subject these variables to unit root analysis. This is to help us detect if the variables are driven by the effect of time. The Augmented Dickey-Fuller (ADF) unit root analysis is therefore executed and Table 4 presents the result.

Table 4: Augmented Dickey-Fuller (ADF) unit root test result

Variables	Level	First Difference	Decision
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	ADF Statistic	5% Critical Value	ADF Statistic	5% Critical Value	
UNMP	3.8354	-3.6032	-5.0809	-3.5875	I(1)
CPS	-4.7477	-3.5684	-----	-----	I(0)
ECG	-3.2063	-3.5684	-4.744	-3.5875	I(1)
ELEC	-6.0592	-3.5684	-----	-----	I(0)
GES	-3.0834	-3.5684	-6.9269	-3.5742	I(1)
INT	-5.6487	-3.5684	-----	-----	I(0)

Source: Researchers Computation

It is required that the ADF statistic be more negative than the 5% critical value for the null hypothesis of existence of unit root to be rejected. As it can be observed from Table 4, only CPS, ELEC, and INT had their ADF statistic to be more negative than the 5% critical value at level; hence, they are all stationary at level or they are being integrated of order 0 (that is, they are I(0) variables). The case of UNMP, ECG, and GES is that these variables only became stationary after differencing them once. That is, they are integrated or order 1, I(1), or that they are being stationary at first difference.

#### 4.4 Cointegration Analysis

The fact that our variables are not all stationary at level requires the test to detect if the variables are cointegrated in the long-run. With the stationarity of the variables at levels and first difference, it becomes appropriate to utilize the autoregressive distributed lag (ARDL) bounds testing approach to cointegration (levels relationship). Table 5 presents the result where by the F-statistic is used as a point of inference in the acceptance or rejection of the null hypothesis of “no levels relationship”.

Table 5: F-Bound test for cointegration result

Null Hypothesis: No levels relationship				
Test Statistic	Value	Significance	I(0)	I(1)
F-statistic	3.8895**	10%	2.08	3.00
k	5	5%	2.39	3.38
		2.5%	2.70	3.73
		1%	3.06	4.15

Note: \*\* captures significance at the 5% level

Source: Researchers Computation

It is clear from Table 5 that the F-statistic of 3.8895 lies outside the 5% critical lower bound (2.39) and upper bound (3.38). This calls for the rejection of the null hypothesis hence, there is a long-run (levels) relationship between unemployment rate and private sector credit in Nigeria. This existence of long-run relationship (or cointegration) therefore necessitates the estimation of the short-run and long-run estimates of the model under the ARDL error correction model.

#### 4.5 ARDL Short-Run Error Correction Model

The ARDL short-run error correction model gives us a picture of how the proportion of the short-run distortions in the model is corrected to arrive at the long-run equilibrium model. Table 6 reflects on the result of the estimation.

Table 6: Short-Run Error Correction Model Estimates

Variable	Coefficient	Standard Error	t-Statistic	Probability
Δ(CPS)	0.0030	0.0029	1.0436	0.3239
Δ(CPS(-1))	0.0086	0.0027	3.1844	0.0111**
Δ(ECG)	-0.1397	0.0355	-3.9391	0.0034**
Δ(ECG(-1))	-0.0436	0.0344	-1.2665	0.2371



$\Delta(\text{ECG}(-2))$	0.0900	0.0299	3.0088	0.0147**
$\Delta(\text{ELEC})$	-0.1379	0.0396	-3.4864	0.0069**
$\Delta(\text{ELEC}(-1))$	-0.1801	0.0400	-4.5006	0.0015**
$\Delta(\text{ELEC}(-2))$	-0.0572	0.0320	-1.7863	0.1077
$\Delta(\text{GES})$	0.0018	0.0350	0.0505	0.9608
$\Delta(\text{GES}(-1))$	-0.0908	0.0389	-2.3362	0.0443**
$\Delta(\text{INT})$	0.0335	0.0339	0.9868	0.3495
$\Delta(\text{INT}(-1))$	0.1098	0.0336	3.2662	0.0097**
$\text{ECM}(-1)$	-0.1353	0.0201	-6.7363	0.0001***
R-squared	0.7838	Adjusted R-squared	0.6109	

Note: \*\* and \*\*\* captures significance at the 5% and 1% level respectively

Source: Researchers Computation

The short-run estimates in Table 6 reveals that changes in the growth in the private sector credit,  $\Delta(\text{CPS})$ , had a positive but insignificant influence on changes in the rate of unemployment in the short-run. Meanwhile, its one-period lag put forth a positive and significant influence by increasing the rate of unemployment by 0.0086% on the average. This points to the idea that an increase in private sector credit in the short-run could spur inflation which could be detrimental to production, thus causing unemployment through the effect of higher input prices on labour demand. This positive effect emanates from the idea of lags in monetary policy, whereby it will take time for a monetary policy stance to have the desired influence on the economy. Thus, the short-run effect may not actually be in line with the present policy objective due to the effect of lags.

The effect of changes in economic growth,  $\Delta(\text{ECG})$ , is seen to be negative and significant while its one period lag is negative but insignificant and its two-period lags put forth a positive but insignificant influence on the rate of unemployment. Thus, a unit percent increase in economic growth reduces unemployment by 0.1397% on the average. This negative influence can be linked to the Okun's law where a positive relationship exists between employment and output growth, implying that a negative relationship will exist between unemployment and output growth. The two-period lag increased unemployment by 0.09% on the average, pointing out that the last two year's level of economic growth could not in any way aid in reducing the rate of unemployment in Nigeria.

The access to electricity is observed to be a crucial variable that aids in the reduction of unemployment in the short-run. This is derived from the fact that the variable, along with its one-period and two-period lags, put forth a negative and significant influence on the rate of unemployment, although the effect of the two-period lag is not significant. Hence, a 1% increase in the access to electricity reduces unemployment by 0.1379% on the average, while the one-period lag of access to electricity reduces unemployment by an average of 0.1801%. This finding aligns itself to the importance of power supply in boosting economic activities, and as a key variable for the emergence and survival businesses.

The effect of the changes on government expenditure on social and community services (expenditure on education and health) is noticed to put forth a positive but insignificant influence on the rate of unemployment, while the effect of its one-period lag is negative and significant. Therefore, a past value of GES reduced unemployment by 0.0908% on the average. This points to the fact that increasing government expenditure on social and community services (expenditure on education and health) will aid in the training of quality human resources that can spur entrepreneurial ideas for self-employment, along with the creation of the needed skills which firms will be willing to employ.

The short-run effect of interest rate on unemployment is seen to be positive and significant only on the first period lag. This means that high interest rate, which is the cost of credit, will deter investors from borrowing for expansion or even the start-ups. This will limit the demand for labour thereby causing a rising trend in the rate of unemployment in the economy. What this finding reveal is that for unemployment to be reduced, both the availability and cost of credit matters in a very significant way.

To account for the possibility of the short-run distortions to be corrected in the long-run, the error correction term,  $\text{ECM}(-1)$ , reflects on how fast or slow the adjustment pace could be. As the coefficient indicate, only 13.53% of such distortions is corrected on a yearly basis before equilibrium could be restored in the long-run. This speed of adjustment is quite slow, and indicates that it will take about seven years and four months before equilibrium could be fully restored. Our regression result portrays some goodness of fit as the R-squared indicates that 78.38% of the overall changes in the rate of unemployment is explained by the changes in the credit to the private sector, economic growth, access to electricity, government spending on social and community services, and interest rate.

#### 4.6 Long-Run Estimates

The long-run result of our model is presented in Table 7 where there are some discrepancies with the short-run estimates. For instance, the effect of CPS is now negative while the effect of ELEC becomes positive in the long-run.

Table 7: long-run (levels) result

Variable	Coefficient	Standard Error	t-Statistic	Probability
CPS	-0.0164	0.0124	-1.3155	0.2008
ECG	-0.4530	0.0660	-6.8645	0.0002***
ELEC	0.5687	0.1058	5.3771	0.0010**
GES	-0.3307	0.1382	-2.3933	0.0479**
INT	0.4805	0.1331	3.6114	0.0086**

Note: \*\* and \*\*\* captures significance at the 5% and 1% level respectively

Source: Researchers Computation

In the long-run, the effect of credit to the private sector (CPS) on the rate of unemployment is negative but still insignificant. This indicates that the level of credit made available to the private sector is not sufficient to boost productivity which could act as a panacea for more employment and hence, a reduction in the rate of unemployment. This insignificant effect of CPS is due to the fact that interest rate yields a positive and significant influence on the rate of unemployment. The link can be established in the sense that even if credit is made available to the private sector, the high rate of interest could deter access to such credits.

Economic growth and government spending on social and community services still exhibit a negative and significant influence on the rate of unemployment in the long-run. This implies that high economic growth and high public spending on education and health will be advantageous in reducing unemployment in Nigeria. This is obtained from the fact that a 1% increase in ECG will reduce the rate of unemployment by an average of 0.4530%, while a 1% increase in GES will reduce unemployment by 0.3307% on the average.

Access to electricity (ELEC) put forth a negative and significant influence on unemployment in the long-run, and it changes the rate of unemployment by 0.5687% on the average. This can be attributed to the declining power supply which made industrial enterprises and other businesses to resort to generating their own energy, and this adds to the production cost which could call for a substitution of more labour employment by energy cost. On a similar case, interest rate put forth a positive and significant long-run effect on the rate of unemployment, indicating that a rise in interest rate could stall the demand for credit for business expansion which is crucial for the employment of more labour units.

#### 4.7 Stability Test

The test for the stability of the parameter estimates is done using the cumulative sum (CUSUM) of squares approach. Figure 3 clearly captures the outcome.

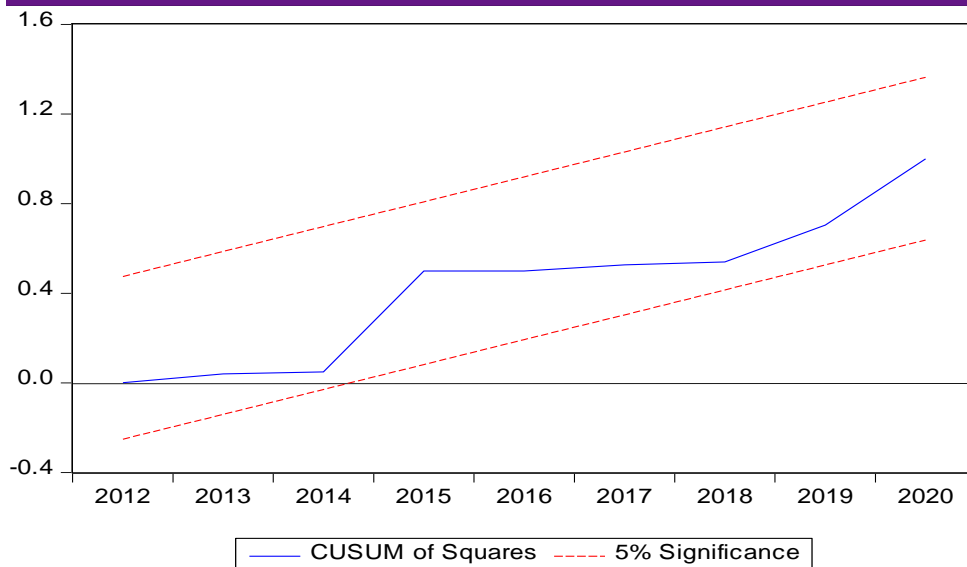


Figure 3: Cumulative Sum (CUSUM) of squares test for stability

As it can be seen in Table 3, the CUSUM of squares line lies within the 5% critical lower and upper bounds, and this is a clear evidence that the parameter estimates are stable and are reliable for making inference.

## 5. Conclusion and Recommendations

The supply, availability, and cost of credit are the core monetary policy components that the monetary authority strives to control. This is due to the impact that these variables could exert on the real sector of the economy. Private sector credit falls under the 'availability of credit' component, and changes in its volume could have an implication on the overall economy. As argued by Ede, Ndubisi, & Anayochukwu (2013) "private sector accounts for more than 90% of jobs for the people, as well as provides both the opportunities and platform on which the poor people can take their fate in their hands". Upon this background, this paper therefore was an attempt to ascertain the influence of private sector credit on the rate of unemployment in Nigeria from 1990 through 2020. Data were obtained from the World Bank database and from the Central Bank of Nigeria statistical bulletin. The technique of analysis employed in the study include the unit root test, autoregressive distributed lag (ARDL) bounds test for cointegration, and the error correction model. The data were subjected to unit root test based on the Augmented Dickey-Fuller (ADF) unit root test on the constant and trend assumption. The result of the test showcases that the variables were integrated in mixed order, with some being stationary at levels,  $I(0)$ , while others became stationary at first difference,  $I(1)$ . Further analysis using the ARDL bounds test indicated that there exists a long-run relationship between private sector credit and unemployment in Nigeria.

In addition, the short-run result revealed that the effect of private sector credit on unemployment is positive but insignificant, while its one-period lag put forth a positive and significant effect on the rate of unemployment in the short-run. The short-run effect of economic growth on the rate of unemployment in the Nigerian economy is noted to be negative and significant. This indicates that higher economic growth do reduce unemployment in Nigeria, pointing out that there is no presence of "jobless growth" in Nigeria; which is in variant with the findings of Seth, John, & Dalhatu (2018) but aligns with the findings of Elorhor (2019) and Effiong, Udofia, and Ekpe (2022). Also, access to electricity and one-period lag of government spending on social and community services also wielded a negative and significant short-run effect on the rate of unemployment in Nigeria; implying that the variables also aid in reducing unemployment substantially if they are being increased. On the contrary, the short-run effect of interest rate on the rate of unemployment is positive; meaning that a rise in the rate of interest will cause unemployment to rise due to its dampening effect on the real sector of the economy.

In the long-run, the effect of private sector credit on unemployment is negative but insignificant. This points to the fact that though the private sector credit has been reducing unemployment, such is not momentous in the long-run. The implication here is that a rising private sector credit will reduce unemployment in the long-run. Economic growth and government spending on social and community services still maintains a negative and significant influence on unemployment in the long-run; pointing that an increase in these variables will aid in reducing the problem of unemployment in a substantial manner. Likewise, as in the short-run situation, the long-run effect of interest rate on unemployment is positive and significant which is a clear indication that higher interest rate will lead to higher rate of unemployment. In the long-run as well, the effect of access to electricity now becomes positive and significant, pointing that the variable has the likelihood of increasing the rate of unemployment in a substantial manner.

Laying concerns from the findings illuminated above, increasing the volume of private sector credit will help stimulate productivity which will aid in a long-term unemployment reduction in Nigeria if the rate of interest is put on check. Hence, the monetary authority needs to channel more credit to the private sector and at the same time maintain a favourable rate of interest in order to encourage borrowing. This is because the private sector credit will have an influence on the level of unemployment through the private sector investment. Also, the productive segment of the economy should be stimulated to bring up the desired growth which is a catalyst for employment generation. There is also the need for the government to spend more on social and community services (education and health) as this is noted to be a core variable that aids in the reduction of unemployment in Nigeria.

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