

The impact of Value-Added Tax on unemployment in Nigeria

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Abstract Since the Finance Act 2020 became effective, there have been scholarly debates regarding the impact of the hike in the value-added tax (VAT) rate from 5% to 7.5% on the general economy of Nigeria. One of the macroeconomic variables that often features in academic discussions is unemployment. Therefore, this study was aimed at examining the impact of the new VAT regime on the situation of unemployment in Nigeria. Autoregressive distributed lag (ARDL) framework was employed in the analysis. Thus, unemployment rate is the dynamic dependent variable while VAT revenue is the dynamic regressor. For robustness purposes, inflation rate and manufacturing output, which are commonly-discussed drivers of unemployment, are included as the control variables. Data on the macro variables were sourced from the World Bank's World Development Indicators, Central Bank of Nigeria's Statistical Bulletins and the Federal Inland Revenue Service's Financial Reports. The data covered the period 1994–2021. Empirical findings revealed that the VAT revenues have a positive relationship with the unemployment rate, suggesting that the hike in VAT rate might have a contractionary impact on employment. Furthermore, the unemployment and inflation appear to have positive relationship over the long run. The proposition of Phillips curve is therefore rejected using data sourced from the Nigerian economy.

Introduction

When the federal government of Nigeria increased the value-added tax (VAT) rate from 5% to 7.5% in 2020, there were nation-wide commentaries and debates about the consequences of the new tax regime. The Nigerian economy was predicted to contract when the proposal of the VAT hike was announced (Awoyinfa et al., 2019). Thus, the new tax structure has renewed the interest of researchers (such as Odu, 2022; Omodero & Eriabie, 2022) to investigate the impact of the VAT systems on macroeconomic variables in Nigeria. This study joins the stream of literature uncovering whether the predicted consequences of VAT actually happen on the levels and changes in unemployment numbers in the country.

It is noteworthy that, before the VAT increase, the annual VAT revenue targets in Nigeria were hardly met (Omodero & Eriabie, 2022). However, since 2020, the Federal Inland Revenue Service (FIRS) has repeatedly stated that it exceeds its annual target of VAT revenues. For example, in 2021, the FIRS reported N2.07 trillion as total VAT receipts against the target of N1.84 trillion included in the 2021 budget (Oyekanmi, 2022). This has generated comments applauding the government's decision on the VAT increase (Oyekanmi, 2022; Omodero & Eriabie, 2022).

Nevertheless, following the official introduction of the new VAT rate in 2020, the Nigerian economy experienced a recession which lasted for two quarters – the unemployment situation was also bleak during the period. This consequence follows the prediction in the economic literature that tax hikes are contractionary. Although the 2020 recession coincided with the Covid-19 pandemic which induced recessions in many advanced economies, it is somewhat difficult to determine whether the 2020 economic contraction in Nigeria was caused entirely by the pandemic or in part by the new VAT structure.

The mechanism of VAT was explained by Omodero & Eriabie (2022) who investigated the relationship between VAT proceeds and the unemployment rate. The paper argued that increasing VAT correlates with decreased industrial performance. This is so because, following the acceleration principle, industrial growth is hinged on consumer demand. So if the consumption expenditure had been dragged by elevated VAT rate, production experiences an equivalent slowdown. In consequence, fall in industrial output implies lower demand for labour and hence more unemployment is triggered. By a similar argument, Egunjobi (2021) stated that higher unemployment always coincides with high poverty.

Tax hikes have also been linked with inflation. Afolayan et al. (2021) noted that Nigerian companies treat their VAT expenses as input costs and pass them to the consumers in the form of higher prices. Even before the VAT rate was increased in 2020, Ikpe & Nteegah (2013) had argued that increased VAT revenues in Nigeria had inflationary effects. Furthermore, Nigeria's infrastructure is of poor quality by any standard and this constrains the smooth running of businesses. In the outcome of a survey, manufacturing companies in Nigeria ranked infrastructure as their most severe business constraint (Igbaekemen, 2014). In a country where basic physical infrastructure to strengthen competitiveness and expand productive capacity is lacking, an increase in VAT creates a pass-through effect on consumer prices (Igbaekemen, 2014). It is on this

basis that inflation rate and manufacturing performance are included as control variables in the analysis of the unemployment-VAT nexus in this study.

Unemployment – VAT Nexus: A literature review

Conceptual review: Meaning of VAT

According to Bickely (1996), VAT is a tax levied at each stage of production on the first value added. Oldman & Woods (1996) considered VAT as a multi-stage consumption tax levied on the difference between a firm's sales and the value of its purchased inputs used in producing goods. Earlier, in the Statement of Standard Accounting Practice (1993), VAT was defined as a tax on the supply of goods and services, which is eventually borne by the final consumer but collected at each stage of the production and distribution chain (SSAP, 1993). From these definitions, it is evident that the classical VAT is a multi-stage consumption tax whose incidence is majorly on the final consumers. Nigeria also adopted VAT in 1993 (Ogundeke, 1996). Many other countries have come to replace sales tax with VAT for certain reasons. VAT is more comprehensive and well equipped to ensure voluntary compliance for its multi-stage collection and credit mechanism through the use of invoices (Ogundeke, 1996).

Meaning of unemployment

Unemployment is the situation whereby people looking for a job could not get a job (Keynes, 1936; Hicks, 1937). It is a condition that describes people who are active in the labour market but are jobless. It is noteworthy that the unemployment rate is not a fraction of the overall population or a fraction of the working-age population. Rather it is a fraction of the labour force. It applies only to people who are actively searching for jobs but do not have jobs. Of the types of unemployment, cyclical unemployment is what generates a lot of concerns for economists and policy-makers (Keynes, 1936). Demand-deficient unemployment has effects that can negatively affect composition and prosperity of the economy. When cyclical unemployment occurs, the economy stalls as the GDP falls and there are pressures of recessionary trends (Keynes, 1936). As a result, cyclical unemployment causes serious debates and analysis among economists. And the government is very concerned when cyclical unemployment occurs.

Theoretical statement

Ricardian Equivalence Theorem

One of the prominent theories on taxation is the Ricardian Equivalence Theorem. The theorem holds the tenet that if taxes are non-distortionary, the mix of tax and debt financing of government purchases is irrelevant in the sense that there is no impact on the equilibrium sequence of key real variables (Evans et al., 2010). The theorem is easily understood in the context of the "Ramsey model" in which infinitely-lived representative agents solve dynamic optimization problems and have

rational expectations about the future course of the economy. The extension by Barro (1974) to an overlapping-generations model with finitely-lived agents, who make bequests to their children, showed that Ricardian equivalence holds more generally than one might think. At the same time, it is widely understood that Ricardian equivalence does not generally hold if agents are not dynamic optimizers, households are liquidity constrained, taxes are distortionary, or government spending is not exogenous to financing (Evans & Honkapohja, 2003). According to recent revisions by Hayo & Neumeier (2016), the Ricardian equivalence theorem suggests that fiscal stimulus, which may be public spending hikes or tax cuts, will lead to a crowding out of private consumption, thus decreasing the effectiveness of fiscal policy in boosting employment and economic activity. Similarly, tax hikes might increase private consumption, culminating in economic growth and positive trends in other macro variables including employment. On this basis, governments justify their stances to pursue contractionary fiscal policy, hoping that the effect would ultimately be expansionary (Ikiz, 2020; Parker et al., 2013). Although studies showing the effectiveness of fiscal policy may cast doubt on Ricardian equivalence theorem's validity, they provide only indirect evidence of the theorem's usefulness for linking tax hikes with lower unemployment (Hayo & Uhl, 2014).

Laffer Curve Theorem

On the other hand, the Laffer Curve Theorem is adopted in this study to contextualize the doctrine that tax hikes may have expansionary effects on government revenues and overall economic performance. Arthur Laffer's seminal discussion of the relation between tax revenues and the tax rate was an analytical cornerstone of the supply-side economics revolution during the early 1980s (Canto et al., 1982). The conjecture that if tax rates were reduced, tax revenues would increase has become a powerful, suggestive policy stand.

The surprising policy implication was that public funds could be increased without burdening the private sector by adverse incentive effects or redistributive measures (Buchanan & Lee, 1982). The Laffer relation provided an important theoretical ingredient for the formulation of a convincing hypothesis about the behavior of the government in the guise of a revenue-maximizing bureaucracy. It was as early as 1982 when Buchanan and Lee used the Laffer relation to analyze the behavior of political agents and derived the conditions for political equilibrium (Buchanan & Lee, 1982).

Figure 1 describes a typical Laffer curve where the variable on the horizontal axis denotes the tax rate and the variable on the vertical axis is the tax revenues. The tax revenue is clearly zero if the tax rate as a multiplying factor is zero. If the tax rate is equal to one, one might expect that the return from supplying labor services is zero. The consequence will be that economic agents withdraw from market activities and possibly concentrate on rest and leisure. Thus, the two crossings along the horizontal are intuitively established. Tax revenues are the product of the tax rate, t , and the tax base, x , written as a function of the tax rate (see Figure 1). If we assume that the tax base is a decreasing function of the tax rate, the simple Laffer curve seems to predict that tax rate cannot increase indefinitely, otherwise the tax revenues would fall. Thus, ultra-high taxes discourage workers' efforts and contribute to higher unemployment.

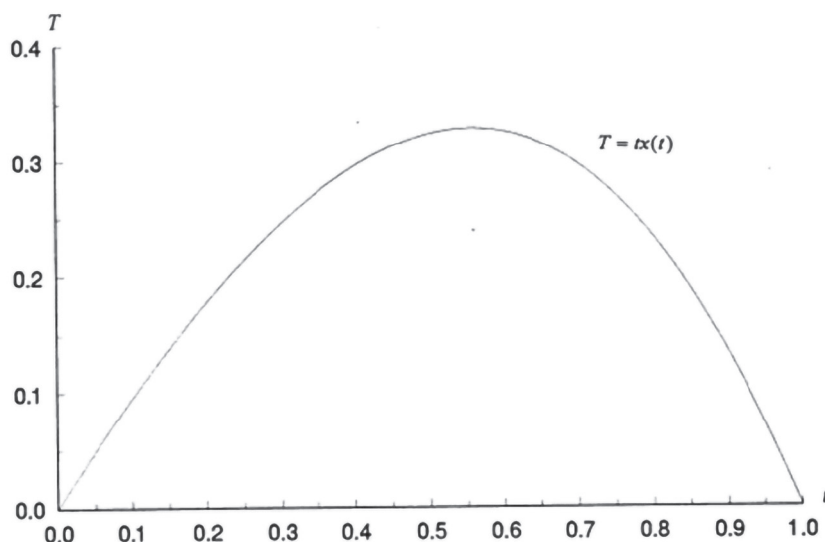


Figure 1. Laffer Curve

Source: owns study.

Empirical review

Eiye and Osazuwa (2017) used a quantitative approach to investigate the impact of VAT systems on unemployment in Nigeria. The paper adopted the augmented Dickey-Fuller test to measure the stationarity properties of the data. Also, the Johansen co-integration methodology was used in testing the co-integration properties of the data and the fully modified OLS was used to estimate the regression specification. The data on VAT revenues and unemployment spanned 1984–2014. The study found VAT and customs and excise duties as positively related to unemployment in Nigeria. The study recommended that taxes collected be judiciously used to provide infrastructure that will attract employment.

While Eiye & Osazuwa (2017)'s research was expository of the negative effect of VAT on employment, the transmission mechanism by which the impact manifests was ignored in the paper. To fill this void, Afolayan et al. (2021) analyzed that an increase in VAT adds to production costs of manufacturing firms. These firms are propelled to increase their output prices, which in turn depress the consumer demand. In effect, there is less demand for labour and hence unemployment becomes rife in the country.

Also, Anichebe (2019) found a positive relationship between VAT and unemployment. Using OLS to estimate data on variants of indirect tax and unemployment in Nigeria, Anichebe (2019) pushed the narrative that an increase in VAT discourages production. And this leads to distortions in the labour market. The study therefore recommended that the unemployment impact of VAT increase should be mitigated by building sustainable infrastructure for the taxpayers.

In another vein, Alabi et al. (2019) traced the effects of government policy on taxation on the performance of Small and Medium Enterprises (SMEs) in South-west Nigeria. The study adopted a descriptive ex-post facto design and involved both primary and secondary data. Stratified sampling technique was used to select the sample. Alabi et al. (2019) found a significant relationship between government policy and business growth of SMEs in South-west Nigeria. Specifically, hikes in taxes and other levies paid by the SMEs are counterproductive. The thematic analysis of the primary data showed that demanding more taxes from SMEs sends many of their owners/managers out of business. This adds to the unemployment count in Nigeria.

More recently, Ezejiyor & Ezekwesili (2022) analyzed the consequences of increased tax revenues in Nigeria on the jobless rate. The study concluded that tax revenue has a significant effect on the unemployment rate of Nigeria at the 5% level of significance. This implies that the increase in tax revenue automatically leads to an increase in the unemployment rate. As a result, Ezejiyor & Ezekwesili (2022) recommended that the government should identify and close any administrative loopholes in order to optimize the contribution of customs and excise duties to economic development. It follows that if tax receipts are ploughed back into the economy, the negative impact of increased VAT revenues on unemployment can be avoided. Osa (2014) noted that if the VAT revenues are plagued with corrupt practices from the government, the taxpayers would have no choice but to resort to tax avoidance and evasion.

Gap in knowledge

The available evidence from the developed countries indicated that the pass-through effects of VAT on consumer prices is not significant, especially in the United States. The effects are rather marginal in Europe. The reason for such development is that the tax structures in the developed countries are more related to incomes and assets, rather than goods and services. However, in Nigeria and other developing countries, the VAT systems are more skewed towards goods and services than items of incomes. This has made VAT reforms to generate notable impact in the developing countries. Nevertheless, the empirical literature on the impact of VAT on macroeconomic variables has hardly included unemployment in a given model. This study has therefore closed this knowledge gap as it analyzed the particular impact of the Nigeria's VAT structure on the situation of unemployment in the country.

Methodology

Model specification

This study employed the ARDL methodology in the estimation procedure. This analytical approach enabled the researcher to measure the variations around the unemployment rate as might be impacted by the value-added tax. While the value-added tax is the core regressor in the ARDL framework, the inflation rate and manufacturing output are included as control variables because they have both theoretical and empirical links with the unemployment rate. The model is therefore developed as follows.

$$UNE = f(VAT, INF, MNO) \dots\dots (1)$$

Where UNE is the unemployment rate, VAT is the value-added tax, INF is the inflation rate and MNO is the manufacturing output. Equation (1) closely follows Acosta-Ormaechea & Morozumi (2019) who argued that the design of the VAT system has an economy-wide impact on output and employment. Also, on the theoretical front, VAT rates are distortionary on manufacturing performance and consumption patterns (Otemu, 2020). Furthermore, the inflation-unemployment nexus is popularly explained by the propositions of the Phillips curve which is well grounded in the macroeconomic literature.

In econometric terms and within the auspices of the ARDL technique, we specify the short- and long-run relationships among the variables in Equation 2. The insights for the inclusion of the macroeconomic variables are derived from the empirical works of Ajide (2013).

$$UNE_t = \alpha_1 VAT_{t-1} + \alpha_2 INF_{t-1} + \alpha_3 MNO_{t-1} + \sum_{i=1}^p \beta_i \Delta UNE_{t-i} + \sum_{i=1}^q \phi_i \Delta VAT_{t-i} + \sum_{i=1}^r \theta_i \Delta INF_{t-i} + \sum_{i=1}^s \pi_i \Delta MNO_{t-i} + e_t \dots\dots (2)$$

Where α_1 , α_2 and α_3 are long-run coefficients, β s, ϕ s, θ s and π s are short-run coefficients, p , q , r and s are all optimal lags on the first-differenced variables. The lags are selected by Schwarz Information Criterion (SIC). Δ is a notation for change. e is a stochastic error term distributed with a constant mean and zero variance. All the variables are in log form.

Data issues and sources

The time series data of the four variables (unemployment, VAT, inflation, and manufacturing output) are used for data analysis in this study. The current VAT rate in Nigeria is fixed at 7.5%, so it is not a variable. There have only been two VAT rates (5% before and 7.5% after February 2020) since its general introduction in 1994. Therefore, the VAT revenues, which are collected and reported by the Federal Inland Revenue Service (FIRS) are used in the present study. As the revenues change, it is expected that there are changes in the unemployment rate. The inflation rate in Nigeria, which is measured by the consumer price index, is computed and published by the National Bureau of Statistics. The unemployment rate is published by the NBS, but this is done every two or three years – the latest unemployment figures were released in 2020. Due to irregular NBS reports, data on unemployment rates were collected as published by the World Bank's World Development Indicators (WDI). Data on manufacturing output is also sourced from the WDI where it is reported in billions of dollars. To achieve time consistencies in the data, they are all annualized. The data cover the period 1994–2021.

Estimation technique

The implementation of the ARDL approach involves two stages. First, the existence of the long-run nexus (cointegration) between the variables under investigation is tested by computing the F-statistics of bounds tests for analyzing the significance of the lagged levels of the variables. Pesaran et al. (2001) have provided two sets of appropriate critical values for different numbers of regressors (variables). One set assumes that all the variables in the ARDL model are

I (0), and another assumes that all the variables are I(1). If the F-statistic lies above the upper-bound critical value for a given significance level, the conclusion is that there is a non-spurious long-run level relationship with the dependent variable. If the F-statistic lies below the lower bound critical value, the conclusion is that there is no long-run level relationship with the dependent variable. And if it lies between the lower and the upper limits, the result is inconclusive (Pesaran et al., 2001). Second, if the cointegration between variables is identified, then one can undertake further analysis of the long-run and short-run (error correction) relationship between the variables. This is done under the nomenclature of the error correction modelling. The ECM representation of the series is given as:

$$\Delta \text{UNE}_t = \alpha_0 + \sum_{i=1}^p \beta_i \Delta \text{UNE}_{t-1} + \sum_{i=1}^q \phi_i \Delta \text{VAT}_{t-1} + \sum_{i=1}^r \theta_i \Delta \text{INF}_{t-1} + \sum_{i=1}^s \pi_i \Delta \text{MNO}_{t-1} + \xi \text{ECM}_{t-1} + e_t \dots (3)$$

Where ξ is the speed of adjustment coefficient, measuring how much deviation from the long-run will be restored within the time period (in this case one year). ξ is expected to be negative and statistically significant to support the cointegrating relationship. While Equation 2 includes both long- and short-run dynamics of the variables in a single model, Equation 3 contains only the short-run representation and a component to measure the deviation of the short run from the long run form. This study estimates Equation 3 to follow contemporary studies of Adeyemi & Olufemi (2016) and Ayanwale (2013). All other variables are as defined previously.

Empirical analysis

Descriptive analysis of variables

Table 1 presents the first moments and second moments of descriptive statistics of the variables. It is revealing that the average unemployment rate is 4.14%. This may be immediately shocking to the reader, so it may be sufficient to state that the unemployment data used in this study were modelled after the International Labour Organisation (ILO)'s estimates, not the locally-estimated figures by the National Bureau of Statistics (NBS). This may further be justified, given the recent proposal of the NBS to align the data measurements of the unemployment computations with the ILO methodology. Moreover, the NBS-based data are very scanty: there are only four data points in the data period (1994–2021). It follows that only the ILO-modelled data can currently provide the comprehensive, reliable unemployment data in Nigeria. Hence, they were used for the data analysis in this study.

The minimum and maximum unemployment figures (3.7% and 6%, respectively) are close to the mean value, indicating a low spread in the series of unemployment. This is better explained by the standard deviation (0.64) which is significantly lower than the mean value. The skewness (1.92) shows that the series has a number of increasing positive values and kurtosis (2.52) suggests very few outliers in the series. The Jarque-Bera statistic (24.5) represents a normal distribution of the unemployment series.

Table 1. Descriptive statistics of variables

	Unemployment Rate (%)	VAT Revenues (₦' billion)	Inflation Rate (%)	Manufacturing Output (\$' billion)
Mean	4.14	395.22	16.28	2.29E+10
Maximum	6.00	1605.17	72.84	6.44E+10
Minimum	3.70	8.34	5.39	5.10E+09
Standard deviation	0.64	404.24	14.71	1.58E+10
Skewness	1.92	1.23	2.90	0.96
Kurtosis	5.51	4.11	10.73	3.88
Jarque-Bera statistic	24.50	8.56	108.89	89.04
Jarque-Bera prob	0.00	0.01	0.00	0.01

Source: Authors' computation.

The average value of VAT revenues over the sample period (1994-2021) is ₦395.22bn. This mean value is much distant from the maximum and minimum values of VAT, which are about ₦1.61tr and ₦8.34bn, respectively. It follows that the series of VAT revenues are characterized by many outliers. This is not particularly shocking because the experience of publishing the VAT revenues that were above the projected figures is a recent phenomenon in Nigeria. In fact, prior to the enactment of the Finance Act 2020 which increased the VAT rate from 5% to 7.5%, the FIRS hardly reported annual VAT revenues that shot above the budgeted figures at the beginning of each year.

The standard deviation of the VAT revenues (₦404.24bn) is above the mean value, indicating that the VAT receipts are very volatile: they change markedly each year. Turning to the second moment statistics, the skewness of the VAT distribution is positive at 1.23. This means the distribution has a long right tail, suggesting the VAT revenues have been experiencing upward trend since 1994. Given the threshold of 3, the kurtosis of 4.11 implies that the VAT series are leptokurtic, meaning they are fat-tailed with many outliers. The Jarque-Bera statistic (8.56) shows that the VAT series are normally distributed with a 5% level ($p < 0.05$). The behaviour of VAT revenues on the second moment statistics has a similar rhetoric as that of manufacturing output. However, they are different in that the standard deviation (\$15.8b) is relatively not much distant from the mean manufacturing output (\$22.9b).

The average inflation rate is 16.28%. This shows the CBN is far from achieving its long-term objective of single-digit inflation. It also shows Nigeria deviates from the group of countries experiencing a high inflation spiral. Nevertheless, unlike other major central banks in Europe and America which have an inflation target of 2%, the Central Bank of Nigeria has consistently excused itself from pursuing a low inflation regime. The mean inflation rate is much further from the maximum value (72.84%) than the minimum value (5.39%), suggesting that price growth has been steady in Nigeria. It also implies that Nigeria did not experience any episode of hyperinflation over the sample period.

The steady increases in price levels are projected further by the standard deviation of the inflation series (14.71%) which is less than the mean figure. While this may sound counterintuitive, inflation rates in Nigeria are less volatile compared to other high-frequency macroeconomic variables. The skewness figure (2.89) reinforces the assertion that the inflation series have a long right tail, with many positive values indicating an increasing trend. Although most of the inflation figures are close to each other, the kurtosis is very large (10.73), demonstrating that the series of inflation has many outliers: there are notable years of price shocks over the sample period. The inflation series are normally distributed, as indicated by the Jarque-Bera statistic (108.89).

Correlation analysis

According to Table 2, the association between VAT revenues and unemployment is high and positive at 0.85. This demonstrates a contractionary structure of Nigeria's tax system. Traditionally, higher taxes are distortionary on the production of goods and services. Taxes are also considered as a leakage in the standard macroeconomic analysis. Hence, higher tax rates or revenues discourage consumption and production and lead to higher unemployment. Before the Finance Act 2020 was signed by former President Buhari into law, the employment effect of the increased VAT rate was commonplace in the socio-economic discussions in Nigeria. Yet, since 2020, the Federal Inland Revenue Service has been proud to announce over-the-target VAT revenues at the expense of growing unemployment in the country.

Table 2. Correlation coefficients of the variables

	UNE	VAT	INF	MNO
UNE	1.00			
VAT	0.85	1.00		
INF	-0.02	-0.23	1.00	
MNO	0.68	0.93	-0.32	1.00

Source: Author's computations.

The correlation coefficient between VAT revenues and inflation is negatively low at -0.23. This is counterintuitive. Higher prices of consumer goods reduce the household consumption expenditure on such goods. This reduces the VAT paid by the consumers, hence lower VAT receipts. In another argument, inflation erodes the value of money, creating a disincentive for the households to purchase more goods and pay more taxes. VAT is a consumption tax, implying that lower consumption generates lower VAT proceeds. The relationship between inflation and unemployment is negatively weak at -0.02. While this follows the Phillips curve hypothesis, the responsiveness of unemployment to the inflation rate is fairly inelastic. This suggests that labour employment does not adjust immediately to changes in the inflation rates in Nigeria. In other words, unemployment rates might be unchanged in periods of fluctuating inflation rates. Finally, manufacturing output is positively related with unemployment (0.68) and VAT (0.93), but negatively related with inflation (-0.32).

Unit root analysis

To avoid the possibility of spurious regression, the unit root test is required (Choi, 2015). This is important because a spurious regression implies that the estimates cannot be conclusively determined to be unbiased, consistent efficient (Choi, 2015). To this end, a unit root test was conducted in this study. To provide a robust discussion, two popular measures were used: the augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. In principle, the stationarity test determines whether the series have a constant mean, constant variance and constant co-variance. Nevertheless, series with a constant mean almost always have a constant variance and constant co-variance, making the constancy of the mean to be a sufficient requirement (Kim & Choi, 2017). To provide consistency in the measurements, the variables were logged before the unit root tests were conducted on them. Following the computations of the ADF and PP statistics (see Table 3), they were compared with the given critical values in order to make a decision. Where the statistics are greater than the critical value, it was concluded that the series were stationary. If the converse was the case, it was concluded that the series were non-stationary. Hence, three of the series for the variables (UNE, VAT and INF) over the sample period were non-stationary at levels, but stationary at first differences. On the other hand, the series for MNO were stationary at levels. This satisfies the necessary condition for the use of ARDL as the analytical technique in this study – as the technique requires a mixture of orders of integration among the variables.

Table 3. ADF and PP unit root test results

Variables	Form of test	Constant		Constant and Linear Trend		Order of Integration
		Levels	First Differences	Levels	First Differences	
UNE	ADF	-0.0567	-6.5550	-2.5982	-6.4567	I(1)
	PP	-0.4401	-7.4511	-2.4567	-7.6590	I(1)
VAT	ADF	-0.8233	-7.2471	-1.3054	-7.7890	I(1)
	PP	-0.7723	-7.9451	-1.5982	-7.9835	I(1)
INF	ADF	-1.1037	-6.2578	-1.3881	-6.3456	I(1)
	PP	-1.3011	-6.4561	-1.8821	-6.3450	I(1)
MNO	ADF	-4.2315	-8.5489	-5.4321	-8.7654	I(0)
	PP	-4.8994	-9.0981	-5.6556	-8.0871	I(0)
Asymptotic Critical Values:						
1%	ADF	-3.6463	-3.6463	-4.2528	-4.2627	
	PP	-3.6394	-3.6463	-4.2529	-4.2627	
5%	ADF	-2.9540	-2.9540	-3.5485	-3.5530	
	PP	-2.9511	-2.9540	-3.5485	-3.5530	
10%	ADF	-2.6158	-2.6158	-3.2071	-3.2096	
	PP	-2.6143	-2.6158	-3.2071	-3.2096	

Source: Authors' computations.

Bounds test

Before exploring the long run dynamics of the model, it is important to determine whether these variables co-move over the long run. This is achieved by conducting a bounds test. The cointegration properties revealed by the bounds testing also show the empirical relevance of the short-run dynamics of the series. As Table 4 indicates, the computed bounds F -statistic (7.76) is above both the lower and upper limits of the critical values at 10%, 5% and 1%. It follows that both short- and long-run relationships among the unemployment rate, VAT revenues, inflation rate and manufacturing output can be determined empirically, and inferences can be made from them.

Table 4. Bounds test for cointegration

Computed F -statistic: 7.76 (lag structure, $k = 3$)
Critical bound's value at 10% - Lower: 3.17 ; Upper: 4.14 Critical bound's value at 5% - Lower: 3.79 ; Upper: 4.85 Critical bound's value at 1% - Lower: 4.41 ; Upper: 5.82
(Three regressors and no trends in the model) Critical values for the bound tests are due to Narayan (2005)

Source: Authors' computations.

ARDL estimates

The short-run estimates (Table 5) show that the unemployment rate in Nigeria is indeed introgressive because its value in the previous years positively influence its values in the current year. In specific terms, a rise in the unemployment rate in the past year has a 43% chance of increasing the unemployment in the current year. A similar rise in the past two years has a higher change of 58%. The VAT revenues have a positive impact on the unemployment rate. When the government increases VAT revenues in the current year, there is a negligible impact on unemployment. Nevertheless, similar increase in the past year might increase the unemployment rate by 20% in the current year. The same increase in the past two years would increase the current-year unemployment rate by 10%. It follows that there exists a time lag of the impact of VAT receipts on the unemployment rate. This finding is well grounded in the economic literature of the tax-employment nexus. Indirect taxes discourage consumption spending which may crowd out domestic investment in goods and services. As a result, higher VAT revenues imply less employment and thus more unemployment.

Table 5. Short-run estimates

	Coefficient	T-statistic
Δ UNE (-1)	0.43*	7.43
Δ UNE (-2)	0.58**	3.88
Δ VAT	5.71E-05**	2.05

Δ VAT (-1)	0.2***	-1.33
Δ VAT (-2)	0.1***	1.67
Δ INF	0.03**	-1.98
Δ INF (-1)	0.01*	-8.25
Δ MNO	-3.48E-13**	3.57
ECM (-1)	-0.56*	-5.29
R ² = 0.769;	F-stat = 3.94*	F-stat prob (0.01)

Source: Authors' computations.

Notes: The table reports ARDL (2, 2, 1, 0). Dependent variable is UNE. All variables are in log form. The lags were selected based on Schwarz Bayesian Criterion.

* indicates significance at 5%; ** indicates significance at 10%; *** indicates no significance.

However, this study was unable to uphold the Phillips curve proposition. Contrary to the negative correlation reported between inflation and unemployment, the short-run estimates symbolise that the two variables are positively related – increases in the inflation rate are associated with increases in unemployment. Particularly, a 1% rise in the inflation rate in the current year leads to a 3% increase in the unemployment rate in the same year while a 1% increase in the inflation rate in the past year is connected with a 1% increase in the unemployment rate in the current year. This result is empirically underpinned in Nigeria. For example, when the NBS published the labour market and price statistics in 2021Q4, the unemployment rate increased from 27.1% to 33.3% and the inflation rate increased from 21.79% to 22.95% (NBS, 2021). This was evidence of the rejection of the Phillips curve by Nigeria's macro data. Hence, it is probable that the Nigerian economy has been experiencing a scenario of hyperinflation: a simultaneous increase in inflation and unemployment. The regression estimates further indicate that higher manufacturing output leads to lower unemployment, though the responsiveness of unemployment to manufacturing output is fairly inelastic. This follows the logical relationship between output growth and employment. The manufacturing sector is a major custodian of economic activity, suggesting that higher output production necessarily imply higher employment of workers and thus lower unemployment in the economy. The speed of adjustment (0.56) interprets that about 56% deviation from the previous-year's long-run equilibrium will be corrected within one year. This error correction term is both negative and statistically significant at 5%. Turning to the diagnostic checks, the F-statistic (3.94) indicate that all the explanatory variables are jointly significant. The R-squared figures show that the regressors account for about 76.9% variation in unemployment. Over the long run, the VAT revenues remain to have contractionary impact on employment. And the sensitivity remains fairly inelastic (Table 6). Nevertheless, the elasticity of unemployment with rest to VAT revenues is insignificant, suggesting that the fluctuations around VAT revenues cannot reliably indicate changes in the labour market. In standard labour market analysis, indirect taxes are distortionary on output and employment, making them unsuitable mechanism of heralding booms on employment. Furthermore, the unemployment and inflation appear to have positive relationship over the long run. The proposition of Phillips curve

is therefore rejected using data sourced from the Nigerian economy. Finally, the manufacturing sector has the potentials to reduce the unemployment rates in Nigeria. However, the growth in the sector itself has been consistently sluggish. The R-squared value implies that the three variables jointly account for about 72.3% in the variation of unemployment over the long run. The F-statistic (5.28) shows that the variables are all jointly significant to register long-term changes in the unemployment figures.

Table 6. Long-run estimates

	Coefficient	Tstatistic
VAT	-0.0023***	-2.54
INF	0.067**	4.61
MNO	-1.34E-10*	4.66
R ² = 0.723	F-stat = 5.28*	F-stat prob (0.02)

Source: Authors' computations.

Conclusion and recommendations

The exploration of the macroeconomic repercussions of Nigeria's current VAT regime remains insufficient in existing literature. This study, employing ARDL as the analytical method, contributes novel insights into the influence of Nigeria's VAT structure on the country's unemployment rate. In ensuring the robustness of our approach, control variables encompass inflation and manufacturing output.

Key revelations unfold as the study progresses. Unemployment rates in Nigeria exhibit an autoregressive nature, indicating that past levels significantly foreshadow future rates. Notably, VAT and unemployment showcase a positive relationship in both short and long-term scenarios, signifying that VAT revenues exert a contractionary impact on employment. Despite the federal government allocating a portion of VAT receipts to empower unemployed youths, these programs have proven inconsequential in the battle against unemployment. The inadequacy of these initiatives, coupled with intermittent and whimsical funding, undermines their effectiveness. However, a beacon of hope emerges in the form of a potential reduction in unemployment through a fortified manufacturing sector.

Recommendations arise from these findings. Firstly, we propose redirecting VAT receipts toward sustainable unemployment-reducing programs. The government should cease allocating VAT revenues to programs lacking economic value and prioritize initiatives that enhance production, channeling VAT injections into poverty-alleviating schemes.

Furthermore, we call upon Nigerian policymakers, encompassing the federal government and the CBN, to synchronize fiscal and monetary policies. For instance, in response to a government-driven VAT increase, the CBN should have lowered, not heightened, the monetary policy rate. This strategic realignment would counterbalance the potential negative impact of VAT hikes on employment by reducing borrowing costs. The opportunity to rectify this apparent policy misstep remains, and corrective action is encouraged.

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