



Government Expenditure and Gender Distribution of Unemployment: Evidence from Nigeria

Adebayo Mohammed Ojuolape^a , Saidatulakmal Mohd^{a,*} , Sodiq Abiodun Oladipupo^b 

a. School of Social Sciences, Universiti Sains Malaysia, Pulau Pinang, Malaysia; Department of Economics, University of Ilorin, Ilorin, Nigeria

b. Department of Economics, University of Ilorin, Ilorin, Nigeria

* Corresponding author, E-mail: eieydda@usm.my

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Abstract

This paper investigates the impact of government expenditure on gender unemployment in Nigeria, capturing the impact of Labour market institutions in explaining unemployment behavior from 1991 to 2018. This study employed augmented Dickey-Fuller and Philip Perron unit root tests and Engle-Granger cointegration tests. The study used the fully modified ordinary least squares (FMOLS) estimation technique to examine the effects of government expenditure on gender unemployment. The study revealed that macroeconomic variables of capital accumulation, capital, and recurrent expenditure sufficiently explained the behavior of gender unemployment in Nigeria. On the other hand, Labour market institutions indicators (Tax wedge & minimum wages) are not significant in explaining gender unemployment in Nigeria. The study further showed that, of the two genders, females benefited more from Government expenditure. Therefore, this study recommends that the government should invest heavily in social overhead capital (infrastructure) as this will attract more foreign and domestic investments and, in turn, reduce unemployment among both genders.

Keywords: Gender, Government Expenditure, Unemployment.

JEL Classification: F16, H53, J21.

1. Introduction

Unemployment is a socio-economic problem that is pressing in the developing and advanced nations of the world. Nigeria, as a country, is not an exception. It is, therefore, key to look at this socio-economic issue, which also falls under the United Nations Sustainable Development Goal 8 (UNSDG8). Employment is a major concern of the United Nations, and a vital part of the sustainable development goal is to attain full employment by the year 2030 (Nigeria Government, 2020).

In Nigeria, many policies and programs have been put in place to lower the rate of unemployment. For example, we have the National Directorate of Employment (NDE), which was created in 1986 to design and implement suitable programs to solve the problem of mass unemployment. Others are The National Economic Emancipation and Development Strategy (NEEDS), The National Poverty Eradication Program (NAPEP), Small and Medium Scale Enterprises Development Agency of Nigeria (SMEDAN). However, despite all these programs, unemployment rates in the states and the country have continued to rise (Nyong, 2013).

The United Nations world economic situation prospects classified Nigeria as one of Africa's emerging economies (UN/DESA, 2019; UNDESA, 2020; United Nations, 2018). However, a very pertinent issue that goes a long way in affecting the development of Nigeria's economy is the un-utilization of its human capital or, in other words, unemployment (Ede et al., 2013; Egbulonu and Amadi, 2016; George and Oseni, 2012; Hammer, 2006).

Notably, unemployment in Nigeria is marked by gender differences as women are more likely than men to be unemployed. (Enfield, 2019; ILO, 2018; Olowa, Adeoti et al., 2014). For instance, the National Bureau of Statistics (2018) during quarter three (Q3) of 2018 revealed that 26.6 percent of women employed by the workforce (16-64 years old, fit and willing to work) were out of work. This figure is 6.3 percent points more than the unemployment rate for males (20.3 percent). Moreover, it exceeds the total unemployment rate for the labor force (23.1 percent) by 3.5 percent point. This indicates a 5.4 percent point rise in the unemployment rate for women from the same period in 2017. Also, the underemployment rate for women in the labor force stood at 25.9 percent, which indicates a 4.1 percent point increase in the underemployment rate for women from the previous year. In the same period, the unemployment rate for men in the labor force stood at 20.3 percent, implying a 3.8 percent point higher than the same period in 2017 and a 2.8 percentage point lower than the total labor force unemployment rate. In the same vein, 15.4 percent of men in the labor force were not adequately employed, revealing a 5.1 percent point decline in the underemployment rate in the same period in 2017 (National Bureau of Statistics, 2018). From the above, it is evident that even though women represent just 49.4 percent of Nigeria's population, the 6.3 percent gap between the rate of unemployment for men and women is an indication that more females are trapped in high unemployment in Nigeria.

In line with the National Bureau of Statistics (2018), Nigeria's unemployment rate has been on the pendulum since the 2014 economic crisis. However, this high unemployment rate has consequences for various aspects of a nation's social and

economic life. Figure 1 depicts the trend in female and male unemployment rates in Nigeria.

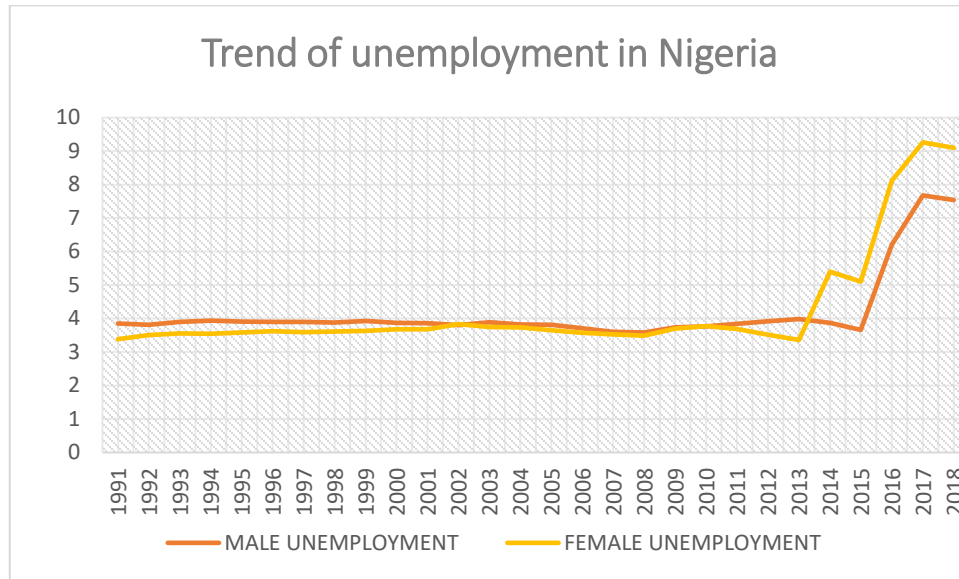


Figure 1. The trend of Male and Female Unemployment in Nigeria (1991–2018)

Source: National Bureau of Statistics (2018).

Figure 1 indicates that the rate of unemployment for males and females in the country remained almost stable between 1991 and 2013 as it drifts between 3 and 4 percent. Over time, it is observable that both male and female unemployment has varied the same way. However, drastic changes occurred in 2013. Female unemployment has risen sporadically above that of its male counterpart. Several factors could account for this huge disparity. Some of these include; an unequal gender pay gap, a deficit in women's training, and low participation in the formal sector. Also, Discrimination against women is still prevalent today, and it is a hindrance to economic growth and causes higher unemployment among women. According to a 2015 report by the National Bureau of Statistics, women account for almost half of Nigeria's population, with 49.4 percent (female) to 50.6 percent (male). However, women's work and their working conditions and access to advancement chances differ from men's. Women are frequently disadvantaged in employment possibilities, financial access, and working conditions due to their family responsibilities. Also, women are at a disadvantage in education; for example, men have a literacy rate of 69.17 percent, while women have a literacy rate of 49.68 percent. In addition, the male

illiteracy rate is 30.83 percent compared to a high female illiteracy rate of 50.32 percent (Ewubare and Ogbuagu, 2017).

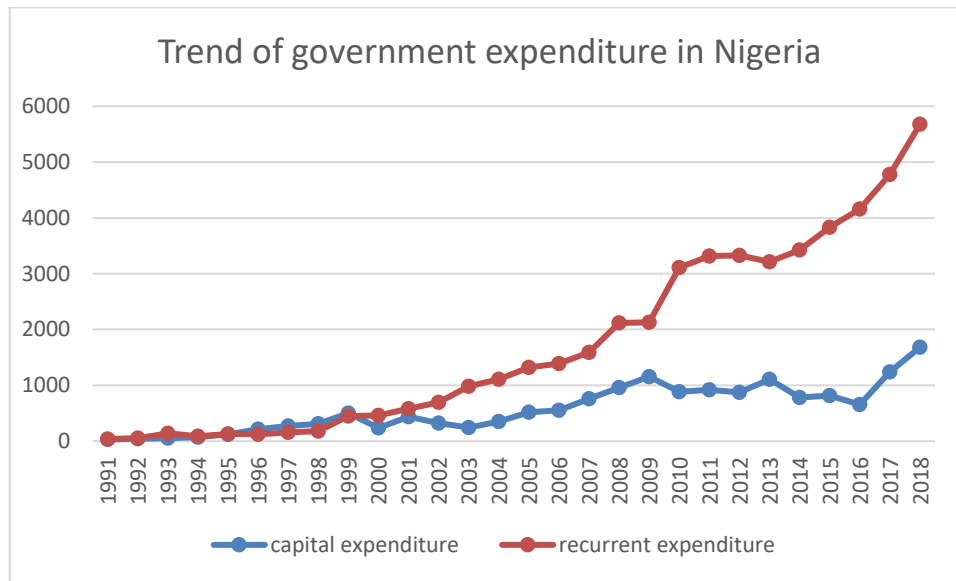


Figure 2. Government Expenditure in Nigeria for the Period 1991-2018 (Billion Naira)

Source: National Bureau of Statistics (2018).

The trend of government expenditure (capital and recurrent) from 1991 to 2018 is shown in Figure 2 above. Figure 2 revealed that capital expenditure was higher than recurrent expenditure between 1996 and 1999. However, capital expenditure fell below recurrent expenditure in 2000, and the explanation for this may not be far from the cost of preserving democracy. Nigeria's recurrent expenditure has outweighed capital expenditure (CAPEX) since the early 2000s. Evidence of the government fiscal and budgetary shift towards recurrent projects and fewer capital infrastructures required to provide critical social infrastructures for economic growth. Several reasons could account for this drastic drift: the bloated civil service structure and the bi-camera legislative system the nation embarked on at the onset of the 2000s. Other factors could include the rising poverty rate and the need for transfer payments to households, rising debt profile, and debt servicing (Onifade et al., 2020).

There is a wealth of literature on the link between government spending and unemployment in Nigeria. However, our understanding of the behavior of unemployment still has some shortcomings. First, previous research papers on the link between government spending and unemployment in Nigeria excluded labor market institutions (LMIs) as vital variables in explaining unemployment behavior.

Meanwhile, a substantial strand of literature such as Bertola (2017), Blanchard and Wolfers (2000), Heimberger et al. (2017), and Constancio (2018) emphasized that LMIs are key drivers of unemployment. Secondly, existing studies that captured the effect of LMIs on unemployment focused on developed and, Organization for Economic Cooperation and Development (OECD) countries, leaving no evidence for Africa and Nigeria in particular. However, there could be a variation in the impact of LMIs across countries. Thus, it could be misleading to generalize the results from developed and OECD countries for Nigeria. Therefore, this paper intends to investigate the impact of government spending on unemployment in Nigeria, focusing on LMIs.

Hence, the objectives of this research are; (i) To examine the impact of government expenditure on female and male unemployment in Nigeria. (ii) To assess which gender benefits most in terms of unemployment through government expenditure.

The rest of the paper presents the literature review, methodology in section three, empirical results in section four, and conclusion in section five.

2. Literature Review

2.1 Theoretical Framework

This study's theoretical framework is the non-accelerating inflation rate of unemployment (NAIRU) model, which according to Stockhammer (2008), has close relations to the mainstream view. Though there is contention on why NAIRU is a foremost framework for macroeconomic analysis of unemployment, Stockhammer (2008) established that NAIRU could be consistent with the new Keynesian, post-Keynesian monetarist, and Marxist views. The NAIRU model is usually interpreted based on two propositions. First, the model presumes that NAIRU is exogenously determined by labor market institutions (LMIs). Secondly, the model suggests that changes in NAIRU induce changes in the actual rate of unemployment. This is because NAIRU is considered a powerful influencer of actual unemployment. The NAIRU further posited that there is some unemployment rate at which the inflation rate does not intensify (Stockhammer, 2008; Blanchard, 2018; Constancio, 2018). It is also attributed to the unemployment rate (natural rate) that exists. There are no seasonal or cyclical fluctuations such that structural unemployment is equal to the natural level of unemployment. The wage and price-setting functions (linearized using the logarithm function) remain the NAIRU model's building block. Wages are dependent on expected prices, unemployment, and other factors that influence labor's bargaining power, such as labor market institutions (Tax wedge, trade union density, minimum

wages, etc.). Therefore, this study relies on the NAIRU model, determined by capital accumulation, labor market institutions, and macroeconomic shocks such as government expenditure (recurrent & capital).

2.2 Empirical Review of Literature

Numerous studies have been conducted on the relationship between government spending and unemployment in established and emerging economies. However, only those that are directly related to this study are examined further below.

Stockhammer and Klar (2010) examined the role of capital accumulation, LMIs, and other macroeconomic shocks on unemployment with panel data from 20 OECD economies. The study results revealed that capital accumulation and real interest rates have a more significant effect on employment than LMIs. In a similar vein, Moutos (2011) provides empirical support that capital accumulation is vital in explaining unemployment behavior.

Findings from gender-specific studies that concentrated on the female gender found that schooling positively affects employment. Spierings et al. (2010), in a study of six Arab nations of Algeria, Egypt, Jordan, Morocco, Syria, and Tunisia, found that uneducated women or those with fewer years of schooling have a lower chance of gaining employment, unlike those with secondary level and above. Additionally, Assaad and El-Hamidi (2001) deduced that the chances of women between the age of 15-64 years old being employed in Egypt and education level are positively related. Davia and Legazpe (2014) study on Spanish women also demonstrates a positive relationship between education and employment.

Wosowei (2013) analyzed the association between fiscal deficit and macroeconomic aggregates in Nigeria from 1980 to 2010. The study used the Ordinary Least Square (OLS) and angle granger cointegration test. The empirical result revealed that fiscal deficits did not have a significant effect on output. However, it is also evident from the results of the study that a bilateral causality relationship exists between the government deficit and unemployment.

Arewa and Nwakahma (2013) examined the nexus between government spending and macroeconomic variables such as the Consumer price index, GDP, and unemployment from 1981 to 2011. Johanson multivariate co-integration was used, and the study discovered that there is the existence of a long-run association between government spending and macroeconomic variables. Furthermore, the result showed that capital expenditure positively affects economic growth, whereas recurrent expenditure negatively influences economic growth.

For the period 1981-2011, Nwosa (2014) investigates the nexus between government spending, unemployment, and poverty rates in Nigeria. The Ordinary Least Square (OLS) outcome indicates that government spending has a negative and vital effect on employment levels, which means that employment rates decrease with government spending. In contrast, government spending has a negative and negligible relationship with poverty rates.

Besamusca et al. (2015) examined the rate of female participation in the labor force of 117 countries with more attention on developing economies. The study shows a rise in females' participation in the labor force as they grow and then a downward movement toward retirement age. In addition, the study finds that paid maternity leave encourages more females to participate in the labor force.

Obayori (2016) examined Nigeria's fiscal policy-unemployment nexus for the period 1980-2013. The study adopted the Johansen-Julius cointegration test and found that long-run relationships exist among the variables. The error correction model (ECM) result shows that the unemployment rate in Nigeria is significantly and negatively influenced by capital and recurrent expenditure.

Abubakar (2016) analyzed the dynamic impact of fiscal policy on Nigeria's output and unemployment from 1981 to 2015. The study used Structural Vector Auto Regression (SVAR). The outcome of the regression indicates that public expenditure has a positive lasting effect on output, while revenue shock has a positive but lower effect on output when compared with public expenditure. In addition, the output effect and revenue shock have a short-term negative impact on unemployment.

Egbulonu and Amadi (2016) studied Nigeria's fiscal-unemployment relationship from 1970-2013. The result of the Augmented Dickey-Fuller showed that all variables are stationary at first difference. The error correction model (ECM) result shows a negative relationship between government spending and government debt stock and Nigeria's rate of unemployment. In contrast, government tax revenues have a positive association with the rate of unemployment.

The study of Heimberger et al. (2017) found that while capital accumulation is an essential variable in explaining NAIRU, labor market institutions such as tax wedge, trade union density, and minimum wages perform below expectations in providing an adequate explanation for NAIRU.

Bertola (2017) found that to describe the movement of the unemployment rate in Europe, capital flow and economic integration become indispensable. From the 1960s to the 1990s, Nickell et al. (2005) analyzed unemployment patterns using the OECD sample. The study found that labor market institutions are an essential determinant of unemployment across the OECD. Using samples from nine EMU

Countries, Arestis et al. (2007) analyzed the association between unemployment, capital stock, and wages. The study concluded that capital stock is an important determinant of earnings and unemployment in the countries under consideration.

Onodugo et al. (2017) analyzed public sector spending on unemployment in Nigeria from 1980 to 2013 and also private investment. The regression outcome showed that private investment and expenditure on capital goods decreased unemployment in the medium- and long term. On the other hand, recurrent expenditure was not statistically significant enough to do the same. The study also shows that the explanatory variable accounts for a more significant proportion of the variation in unemployment.

Using the cointegration and error correction model (ECM), Ewubare and Maeba (2018) investigated the nexus between Nigeria's public spending and employment from 1980 to 2017. The cointegration test, however, revealed that long-run equilibrium exists among the variables. Simultaneously, the outcome of the error correction model showed that government expenditure would solve the problem of unemployment in the country in the long run.

Onuoha and Agbede (2019) investigated the impact of public expenditure in its disaggregated form on selected African nations' unemployment rates using dynamic panel econometric analysis for 2000- 2017. The system generalized method of moments (GMM) was used for analysis. The result of the two-step GMM revealed that spending on infrastructure and education negatively influenced unemployment. In contrast, spending on health and defense has a positive association with the rate of unemployment. Furthermore, the estimates for short-run elasticity show that expenditure on education and infrastructure reduces unemployment by 1.83 percent and 9 percent, respectively, while expenditure on health and defense raises the unemployment rate by 84.5 percent and 5.2 percent. Additionally, the long-run elasticity result depicts that while education and infrastructure expenditure reduce unemployment by 7.89 percent and 3.8 percent, expenditure on defense and health increases the rate of unemployment by 22.22 percent and 364.58 percent.

The study by Heimberger (2019) discovered that the impact of macroeconomic variables, especially capital accumulation on structural unemployment, are significant compared to the impact Labor Market Institutions (LMIs) such as trade union density and tax wedge have on structural unemployment.

Dibeh et al. (2019) findings emphasized the importance of gender in employment issues. The study found that the labor market condition differs for both genders in the labor force and suggests that employment policies should align with these differences.

Fakih et al. (2020) assessed issues of gender, youth unemployment, and institutions when there is a transition with a focus on Arab spring. The study found an increase in the probability of being employed if an individual is a male and a graduate of a government-owned institution. On the other hand, promoting gender equality in the labor market leads to a rise in unemployment.

Obayelu et al. (2020) researched the gender gaps in agriculture in Nigeria, and the study shows that males dominate the sector. However, according to the study, females are more engaged with domestic activities, which creates a gender gap in their agricultural employment participation.

According to the literature review, there are studies on the effect of government spending on unemployment in Nigeria. However, none of these studies included labor market institutions as key drivers of unemployment to the best of our knowledge.

3. Methodology

The study uses augmented Dickey Fuller and Philip Perron tests to examine the stationarity features of time series to accept or refute the use of ordinary least square (OLS). The reason for this is that most macroeconomic variables are non-stationary. As such, a very high R^2 is obtained from the estimation of parameters using OLS, and a non-stationary procedure can generate a spurious regression problem (Bashier and Siam, 2014). The results obtained from ADF and PP unit root test showed that all variables are integration of order one $I(1)$, and as such, it becomes important to establish the existence of long-run and non-spurious relationship among the variables (Bashier and Siam, 2014). For this reason, the Engle granger (EG) cointegration test was adopted. Finally, a fully modified ordinary least square (FMOLS) was used to investigate the nexus between government expenditure and gender unemployment. The FMOLS method generates reliable estimates for small sample sizes and provides a test for the robustness of the results. Philips and Hansen (1990) originally introduced and improved the FMOLS method to estimate a single co-integrating relationship with a combination of $I(1)$. In implementing adequate correction to solve the EG approach's inference problem, The FMOLS method outperforms the EG techniques. As a result, the t-test for long-run estimates is correct (Amarawickrama and Hunt, 2008). The FMOLS process uses kernel estimators of the Nuisance parameters, which affect the OLS estimator's asymptotic distribution. In order to achieve asymptotic reliability, this technique modifies least squares to take account of serial correlation effects and the endogeneity test in the regressors resulting from the presence of Co-integrating Relationships (Kalim and Shahbaz, 2009).

3.1 Model Specification

The primary goal of this study is to investigate the impact of government spending on unemployment gender distribution in Nigeria. However, to make the study novel, special attention is given to Labor market institutions (LMIs) and macroeconomic variables in explaining the behavior of both male and female unemployment in Nigeria.

Therefore, in line with the theoretical framework, the baseline models for this study are specified below;

$$MUEM = \gamma_0 + \gamma_1 CAPEX + \gamma_2 REXP + \gamma_3 GFCF + \gamma_4 TW + \gamma_5 MW + \mu_t \quad (1)$$

$$FUEM = \gamma_0 + \gamma_1 CAPEX + \gamma_2 REXP + \gamma_3 GFCF + \gamma_4 TW + \gamma_5 MW + \mu_t \quad (2)$$

The natural logarithm of REXP, CAPEX, GFCF, TW, and MW will be taken in order to linearize the model; hence, Equations (1) and (2) will be;

$$MUEM = \gamma_0 + \gamma_1 LCAPEX + \gamma_2 LREXP + \gamma_3 LGFCF + \gamma_4 LTW + \gamma_5 LMW + \mu_t \quad (3)$$

$$FUEM = \gamma_0 + \gamma_1 LCAPEX + \gamma_2 LREXP + \gamma_3 LGFCF + \gamma_4 LTW + \gamma_5 LMW + \mu_t \quad (4)$$

where, MUEM is the male unemployment rate, FUEM is the female unemployment. Two variables, Tax wedge (TW) and minimum wages (MW), are used to capture labor market institutions' effect on gender unemployment. The expectation is that minimum wages and tax wedge will be positively related to unemployment (Burkhauser et al., 2000; Nickell, 1998; International Monetary Fund, 2003; Bassanini and Duval, 2006). Gross fixed capital formation was used as a proxy for capital accumulation and is expected to negatively affect unemployment (Heimberger, 2019). Furthermore, both capital expenditure (CAPEX) and recurrent expenditure (REXP) are expected to have a negative impact on unemployment. This is justified because an increase in government spending leads to more job creation and, as a result, lower unemployment.

3.2 Nature and Sources of Data

Male Unemployment (MUEM) and Female Unemployment (FUEM) are two types of unemployment derived from World Bank development indices (FUEM). The rate of male unemployment is the number of unemployed men as a percentage of the total number of men in the labor force, whereas the rate of female unemployment is defined as the number of unemployed women as a percentage of the total number of women

in the labor force. In addition, the Central Bank of Nigeria bulletin provides data on capital expenditure (CAPEX), recurrent expenditure (REXP), tax wedge (TW), and minimum wages (MW). Finally, Gross fixed capital formation was sourced from the World Bank development indicator.

4. Empirical Result

This section starts with summary statistics before moving to the stationarity test, cointegration test and the regression results for male and female unemployment. Finally, the section concludes with Diagnostic tests.

4.1 Summary Statistics

Table 1 shows the descriptive statistical summary of the variables under study. Based on the Table 1, the total number of observations is twenty-eight (28) from 1991 to 2018.

Table 1. The Descriptive Statistical Summary of the Variables

	MUEM	FUEM	CAPEX	GFCF	MW	REXP	TW
Mean	4.1843	4.2840	575.2342	8541.177	9107.143	1734.759	224.6689
Median	3.8690	3.6415	508.7488	8316.088	7500.000	1215.937	128.2750
Std. Dev.	1.0699	1.6710	424.3389	1142.179	6505.492	1670.535	204.7884
Skewness	2.6822	2.3066	0.6419	0.4809	0.5193	0.7271	0.7679
Kurtosis	8.5712	6.7699	2.8031	2.0853	1.5363	2.3409	2.1750
Jarque-Bera	69.7834	41.4095	1.9679	2.0554	3.7579	2.9739	3.5459
Probability	0.1939	0.5679	0.3738	0.3578	0.1528	0.2261	0.1698

Source: Research finding.

Table 2. Unit Root Test Results

Variables		Augmented Dickey-Fuller (ADF)			Phillips-Perron (PP)		
		t-statistic	p-value	Order of Integration	t-statistic	p-value	Order of Integration
MUEM	Level	2.0226	1.0000	I(1)	0.4399	0.9810	I(1)
	1 st Diff	-3.5683	0.0139		-3.4451	0.0184	
FUEM	Level	0.7808	0.7808	I(1)	-0.0929	0.9923	I(1)
	1 st Diff	2.2096	0.0135		-5.5695	0.0006	
LCAPEX	Level	-2.6273	0.2720	I(1)	-2.6273	0.2720	I(1)
	1 st Diff	-6.0591	0.0002		-7.5887	0.0000	
LREXP	Level	-2.2389	0.4507	I(1)	-2.1410	0.5013	I(1)
	1 st Diff	-4.8717	0.0041		-8.0303	0.0000	
LGFCF	Level	-0.4194	0.8912	I(1)	-2.8997	0.0585	I(1)
	1 st Diff	-9.5956	0.0000		-13.6772	0.0000	
LMW	Level	-2.6725	0.2545	I(1)	-2.6725	0.2545	I(1)
	1 st Diff	-5.2121	0.0014		-5.223	0.0014	
LTW	Level	-3.4633	0.0687	I(1)	0.3730	0.9778	I(1)
	1 st Diff	-6.2476	0.0000		-8.1743	0.0000	

Source: Research finding.

The Table 1 shows the mean and median values of the variables, and it can be inferred from the values that in MUEM and FUEM, there exists a minimal spread. This implies that there are no extreme values as the mean values are not too far from the median. The standard deviation that measures the level of dispersion in the variables also conforms to the observation in the mean and median variables. Therefore, the standard deviation values of the variables (MUEM and FUEM) are low and not too far from zero. On the other hand, the table shows that the variables (LCAPEX, LREXP, LMW and LTW) have a high standard deviation, indicating extreme values in the data.

Skewness and kurtosis, which measures the degree of peakedness, are combined to give us the Jarque-Bera statistics, which is the accurate measure of normality of our variables. The Jarque-Bera statistics are based on a null hypothesis of normality. The result shows that all the variables under study are normally distributed since the probability value of the Jarque-Bera statistics is greater than 0.05.

4.2 Pre-estimation Tests

The pre-estimation tests performed (unit-root test and co-integration test) are presented in this section.

4.2.1 Unit Root Test

The test for unit root is conducted to determine if the variables are stationary or non-stationary and how many times the variables must be differenced before they become stationary. The augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests were used to carry out the unit root test. The table below depicts the order of integration for each variable in the ADF test and the order of integrations in the PP test (see Table 2).

The Augmented Dickey-Fuller unit root test above shows that none of the variables is significant at level, given their respective level probabilities, which are greater than 1%, 5%, and 10% significance level. However, all the variables (MUEM, FUEM, LCAPEX, LREXP, LGFCF, LMW and LTW) became stationary after first differencing, given their first difference p-values of 0.0139, 0.0135, 0.0002, 0.0041, 0.0000, 0.0014 and 0.0000 respectively, which are all less than 5% significance level. This result implies that the variables in the model are I(1) series.

Since the variables are I(1) series, to avoid spurious regression, it is necessary to run a cointegration test to determine if a long-run relationship exists among the variables to determine the appropriate estimation technique to adopt. Therefore, the

Engle-Granger Cointegration test will be used in this study to see if there is a long-run relationship between the variables.

4.2.2 Cointegration Test

The Engle granger cointegration test is conducted to determine if the variables that have been observed to be stationary at first difference have a long-run relationship or not. The results of the cointegration test for the two models are summarized below:

Table 3. Male Unemployment Cointegration Test Results

	Value	Prob.
Engle-Granger tau-statistic	-2.5422	0.0097
Engle-Granger z-statistic	-137.2774	0.0000

Source: Research finding.

From the table above, the probability value of the t-statistic and z-statistic is given as 0.0097 and 0.0000, and these values are less than a 5% level of significance. Therefore, the null hypothesis is rejected. Therefore, this indicates a long-run relationship among the variables (MUEM, LCAPEX, LREXP, LGFCF, LMW and LTW) examined in Equation 1.

Table 4. Female Unemployment Cointegration Test Results

	Value	Prob.
Engle-Granger tau-statistic	-1.8285	0.0065
Engle-Granger z-statistic	-10.3367	0.0021

Source: Research finding.

The probability values of the t-statistic and z-statistic are given in the table above as 0.0065 and 0.0021, respectively, and these values are less than the 5% level of significance. As a result, the null hypothesis is rejected. As a result, this suggests a long-run relationship between the variables examined in Equation 2 (FUEM, LCAPEX, LREXP, LGFCF, LMW, and LTW).

4.3. Presentation and Discussion of Regression Results

4.3.1 Male Unemployment Results

Since the variables (MUEM, LCAPEX, LREXP, LGFCF, LMW and LTW) under study in Model1 are stationary after the first difference. The Engle-granger test reveals that the variables have a long-run relationship. Therefore, the model parameters will

be estimated using the Fully Modified Ordinary Least Squares (FMOLS) method's long-run co-integrating regression.

Table 5. Summary of Fully Modified Ordinary Least Squares (FMOLS) Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LCAPEX	-0.0025	0.0006	-3.9684	0.0007
LREXP	-0.0018	0.0005	3.5159	0.0021
LGFCF	-0.0012	0.0001	-1.4103	0.0017
LMW	-0.0003	5.57E-05	-6.2305	0.1674
LTW	0.0049	0.0038	1.2968	0.2088
C	6.3202	1.1572	5.4615	0.0000

$R^2 = 0.7386$; $\text{Adj } R^2 = 0.6764$

Source: Research finding

Note: * means significant at 5%; Dependent Variable: MUEM.

The table above presents the estimation output. The model's R squared is 0.7386, indicating that LCAPEX, LREXP, LGFCF, LMW, and LTW explain approximately 74% of the variations in MUEM. Three of the dependent variables (LCAPEX, LREXP and LGFCF) are statistically significant at 5% level from the result above.

LCAPEX has a coefficient of -0.0025 during the period. This implies a negative relationship between Capital Expenditure and Male Unemployment in Nigeria. A percentage increase in Capital Expenditure results in a -0.00002 percent reduction in Male Unemployment in Nigeria. At a 5% level of significance, this estimate is statistically significant. This result is expected since capital expenditures refer to expenditures on fixed assets, infrastructures, and other capital projects that provide employment opportunities. Therefore, the tendency of the capital expenditure in creating job opportunities to reduce unemployment depends on if the expenditure is appropriately managed. However, the Nigerian government has been keen on developing the economy by investing in capital projects over the years (Abdulsalam and Abdullahi, 2016; Fosu, 2019).

The LREXP has a coefficient of -0.0018. This implies that a percent increase in recurrent expenditure will result in approximately 0.00002 percent decrease in Male Unemployment in Nigeria. This estimate conforms to the Apriori expectation, and it is statistically significant at a 5% level of significance. As a result of this finding, it is clear that to reduce unemployment significantly, the government of Nigeria, like many developing nations, must endeavor to become the largest employer of labor. This results in consistent increases in its expenditure in the form of wage/salary payments.

The GFCF has a coefficient of -0.001202, which implies a negative relationship between Gross fixed capital formation and Male Unemployment in Nigeria. Therefore, this estimate conforms to the apriori expectation, and it is statistically significant at a 5% level of significance. Gross Fixed Capital Formation has to do with investment in the country's fixed asset and capital structure, which helps produce more consumer goods efficiently and generate employment. Therefore, the more the gross fixed capital formation, the lower the unemployment in the country.

Also, from the results, the coefficient of LMW and LTW is -0.0003 and 0.0049, respectively. However, these estimates are not statistically significant.

4.3.2 Female Unemployment Results

Table 6. Summary of Fully Modified Ordinary Least Squares (FMOLS) Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LCAPEX	-0.0043	0.0006	-6.6944	0.0000
LREXP	-0.0029	0.0005	5.5427	0.0000
LGFCF	-0.0003	0.0001	-0.1983	0.0084
LMW	-0.0005	5.68E-05	-8.5793	0.9673
LTW	0.0056	0.0038	1.4485	0.1622
C	5.2351	1.1801	4.4361	0.0002

$R^2 = 0.8684$; $Adj R^2 = 0.83705$

Source: Research finding.

Note: * means significant at 5%; Dependent Variable: FUEM.

Table 6 presents the estimation output. The model's R squared is 0.8684, indicating that LCAPEX, LREXP, LGFCF, LMW, and LTW explain approximately 87 percent of the variations in FUEM. From the result above, three of the dependent variables (LCAPEX, LREXP and LGFCF) are statistically significant at a 5% level.

During the period, LCAPEX has a coefficient of -0.0043, indicating that there is a negative relationship between Capital Expenditure and Female Unemployment in Nigeria, with a percent increase in Capital Expenditure resulting in a -0.0043 percent reduction in Female Unemployment in Nigeria. This estimate is statistically significant at a 5% level of significance. This result is expected since capital expenditures refer to expenditures on fixed assets, infrastructures, and other capital projects that provide employment opportunities. Therefore, the tendency of the capital expenditure in creating job opportunities to reduce unemployment depends on if the expenditure is appropriately managed. However, the Nigerian government has been keen on developing the economy by investing in capital projects over the years (Abdulsalam and Abdullahi, 2016; Fosu, 2019).

The LREXP has a coefficient of -0.0029, which means that a percentage increase in recurrent expenditure results in a 0.0029 percent decrease in female unemployment in Nigeria. This estimate matches the apriori expectation and is statistically significant at a 5% level of significance. As a result of this finding, it is clear that to reduce unemployment significantly, the government of Nigeria, like many developing nations, must endeavor to become the largest employer of labor. This results in consistent increases in its expenditure in the form of wage/salary payments.

The GFCF has a coefficient of -0.0003, which implies a negative relationship between Gross fixed capital formation and female Unemployment in Nigeria. Therefore, this estimate conforms to the apriori expectation, and it is statistically significant at a 5% level of significance. This is because Gross Fixed Capital Formation has to do with investment in the country's fixed asset and capital structure, which helps produce more consumer goods efficiently and generate employment. Therefore, the more the gross fixed capital formation, the lower the unemployment in the country.

Also, from the results, the coefficient of LMW and LNTW is -0.0005 and 0.0056, respectively. However, these estimates are not statistically significant.

4.4 Post-estimation Tests/Diagnostic Tests

Diagnostic tests were performed to determine the validity of three model variants. These tests include looking for heteroscedasticity, serial correlation, and whether the residuals are normally distributed. The outcomes of these tests are shown below.

Table 7. Diagnostic Test Result for Male Unemployment

Test type	Test stat.	p-value
Jarque-Bera Normality Test	2.0539	0.3580
Heteroscedasticity Test: Breush Pagan Godfrey	1.4402	0.2493
Breush-Godfrey Serial Correlation LM Test	1.1974	0.1807

Source: Research finding (2021).

The normality test determines whether the residuals of the models are normally distributed. The chi-square distribution with two degrees of freedom is used for the normality test using the Jarque-Bera criterion. The test results show that the Jarque-Bera statistic for the model is 2.0539, with a p-value of 0.3580. This JB statistic is significant, with a p-value greater than 0.05. This implies that the model's residuals are normally distributed.

In order to detect the presence of heteroscedasticity in the regression output, the Breusch-Pagan-Godfrey Heteroscedasticity test is used. Given its associated p-value of 0.2493, which is greater than 5%, the test reveals a lack of heteroscedasticity in the model.

Finally, using the Breusch-Godfrey LM test, the serial correlation test yields a probability value of 0.1807, which is greater than 0.05. As a result, we accept the null hypothesis at a 5% level of significance. This null hypothesis states that there is no serial correlation in the random variables, which leads to the conclusion that there is no serial correlation in the model.

In summary, the residual diagnostic tests result reveals that the residuals are not serially correlated, absence of heteroscedasticity and that the residuals of the model are normally distributed. Furthermore, since the error term is well-behaved, inferences made from the estimated model are valid.

Table 8. Diagnostic Test Result for Female Unemployment

Test type	Test stat.	p-value
Jarque-Bera Normality Test	0.2197	0.8959
Heteroscedasticity Test: Breush Pagan Godfrey	0.5986	0.7014
Breush-Godfrey Serial Correlation LM Test	2.3995	0.1164

Source: Research finding (2021).

The normality test is carried out to ascertain if the residuals of the models are normally distributed. The normality test using the Jarque-Bera criterion follows the chi-square distribution with 2 degrees of freedom. The output of the test shows that the value of the Jarque-Bera statistic for the model is 0.2197, with its p-value of 0.8959. Thus, this JB statistic is high, and its p-value is greater than 0.05. This infers that the model is normally distributed.

The Breusch-Pagan-Godfrey Heteroscedasticity test is carried out to detect the presence of heteroscedasticity in the regression output. The test reveals an absence of heteroscedasticity in the model given its associated p-value of 0.7014, which is greater than 5%.

Finally, the serial correlation test using the Breusch-Godfrey LM test shows a probability value of 0.1164, which is greater than 0.05. Therefore, we do not reject the null hypothesis at a 5% significance level, which states that there is no serial correlation in the random variables and concludes that there is no serial correlation in the model.

In summary, the residual diagnostic tests result reveals that the residuals are not serially correlated, the absence of heteroscedasticity and that the model's residuals are

normally distributed. Furthermore, since the error term is well behaved, inferences made from the estimated model are valid.

4.5 Limitation of Study

First, several attempts were made to gather data at the state or geopolitical zone level to capture the effect of Nigeria being a heterogeneous entity in the analysis. However, to the best of our knowledge, no such data exist for the Nigerian economy. Similarly, beyond tax wedge and minimum wages, there are other variables such as union density, unemployment benefit, collective bargaining coverage etc. which could have been used to capture the effect of labor market institutions, but Nigeria does not have such data. Lastly, the period of the analysis would have extended beyond 1991. However, gender unemployment was only available for Nigeria's economy on the World Bank development indicator starting from 1991 until date.

5. Conclusion

According to the estimation results, both capital and recurrent expenditure have a negative impact on both male and female unemployment in Nigeria, and these impacts are statistically significant. Furthermore, gross fixed capital formation has a negative impact on both male and female unemployment in Nigeria. However, the study revealed that minimum wage and tax wedge have no significant effect on male and female unemployment in Nigeria.

One of the paper's key findings is that increasing capital and recurrent expenditure could reduce male and female unemployment. It was also discovered that recurrent and capital expenditure have a greater impact on reducing female unemployment than male unemployment. The coefficients of the variables revealed this. This is primarily due to the fact that more than half of the population of the workforce in Nigeria consists of female workers. Also, over the past few years, government policies are aimed at promoting gender equality in Nigeria. Most government policies aimed at reducing unemployment target females mostly in terms of schooling, training, entry barriers, and empowerment. It should be noted that recurrent expenditure like capital expenditure is also found to reduce unemployment in Nigeria, which is justifiable. In 2016, the current administration of the Federal Republic of Nigeria led by President Muhammadu Buhari established a scheme called N-Power to reduce the inherent issues of Youth unemployment in the country. The schemes' establishment automatically leads to an increase in the Nigerian government's recurrent expenditure. This scheme has, over the years, empowered several youths, for instance, in 2016, about 500,000 youth were empowered (Obadan,

2017; Owenvbiugie and Egbri, 2020). However, several empirical studies have pointed to the positive impact of the N-power scheme on youth empowerment, reducing the unemployment rate. For instance, the study of Akujuru and Enyioko (2019) concluded that N-power significantly impacts youth empowerment in river state, Nigeria. Also, N-power has a significant impact on employment creation, as revealed by the study of Frank, Thomas, Mary and Hussein (2021). Similarly, the empirical study of Ebi and Ibe (2019) also found recurrent expenditure to reduce unemployment in Nigeria significantly.

Finally, it is worth noting that labor market institutions of tax wedge and minimum wages underperformed in explaining Nigeria's unemployment behavior as TW and MW's coefficients are not statistically significant. This result is consistent for both male and female unemployment. While, Macroeconomic variables of capital accumulation (proxied by GFCF), recurrent and capital expenditure sufficiently explained the behavior of both male and female unemployment in Nigeria. These results are, however, similar to the findings of Heimberger et al. (2017), Heimberger (2019), and Stockhammer and Klar (2010).

Therefore, this study recommends that much emphasis be placed on government capital and recurrent expenditure, establishing more incentive schemes, and ensuring an efficient fiscal system to significantly reduce male and female unemployment in Nigeria. Also, the Government should invest heavily in social overhead capital (infrastructure) as this will attract more foreign and domestic investments which will, in turn, generate more employment opportunities. Furthermore, policymakers in Nigeria must establish investor-friendly policies that will encourage, promote, and attract greater capital inflows (whether official or private) and provide a conducive and enabling climate for gross fixed capital formation to thrive.

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