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Healthcare Resources and Employment Structure on Female Labor Force Participation in Nigeria

V. O. Aninwagu[1] and A. A. Momodu[2]

[1 & 2] are in the Department of Economics, Rivers State University, Port Harcourt, Rivers State, Nigeria.
victoraninwagu@gmail.com
https://orcid.org/0009-0002-0725-1219

ABSTRACT

This study examines the impact of healthcare resources and employment structure on female labor force participation in Nigeria from 1995 to 2023. The data for the study were sourced from the Central Bank of Nigeria Statistical Bulletin and the World Development Indicators from 1995 and 2023. Using the ARDL method analysis, the study found that Health expenditure (HEXP) has a positive and statistically significant impact on female labor force participation (LFRW) in the short run, but its long-run effect, while positive, is not statistically significant. Nurses and midwives (NURM) exhibit a mixed short-run effect, with initial negative impacts turning positive at lag 3, while the long-run effect remains positive but not significant. Wage and salaried workers (SALT) negatively affect LFRW in both the short and long run. The model's strong explanatory power (R-squared = 0.993) and rapid error correction (82.2% annually) confirm the robustness of these findings. Based on these findings, this study recommends among others thing that policymakers should prioritize appropriate allocation and continuing professional development of healthcare staff to guarantee that their deployment has long-term positive impacts on female labor force participation; and that policies should aim to improve job security, wages, and career advancement opportunities for women in the wage and salaried sector. This can include implementing gender-sensitive labor laws, promoting equal pay, and providing training and development programs to enhance women's skills and career prospects.

Keywords: Wage and salaried workers, Nurses and midwives, health expenditure, and female labor force participation.

1. Introduction

Female labor force participation is a crucial driver of economic growth, yet in Nigeria, women's workforce involvement remains lower than that of men. According to data from the World Bank, Nigeria's female labor force participation rate stood at 80.75%, compared to 84.45% for males in 2023 (World Bank, 2023). The disparity is influenced by multiple socioeconomic factors, including healthcare availability and employment structures. Access to healthcare services, such as maternal healthcare and child support facilities, reduces the burden of unpaid domestic responsibilities, allowing more women to engage in formal employment (Elborgh-Woytek et al. (2013). According to Bloom et al. (2017) increased healthcare spending positively correlates with female workforce participation, as better health services improve women's physical well-being and reduce absenteeism from work. Similarly, female labor force participation is also impacted by employment patterns, namely the availability of wage and salaried positions. The ILO estimates that 93% of all jobs in Nigeria are in the informal sector, with 90% of men and 95% of women employed in this sector (ILO, 2018).

According to Datta and Kotikula (2017), women's access to steady, salaried employment increases their participation rates and closes gender differences in job quality. Thus, understanding how healthcare resources and employment structures interact to shape female workforce participation is critical to achieving gender-inclusive economic growth in Nigeria.

Despite various policy interventions, Nigeria continues to face gender gaps in labor force participation. Women continue to be underrepresented in the formal workforce due to restricted access to healthcare services, inadequate maternity support policies, and the prevalence of informal employment (Diaz et al., 2017). According to a 2023 study by the Nigerian Bureau of Statistics (NBS), women's labor participation rates consistently lag behind men's, with 78.2% for female compared to 80.9% for male, this could be attributed to health-related family responsibilities as a barrier to full-time employment. Additionally, Nigeria has one of the lowest nurse-to-population ratios in Africa, with only 1.68 nurses and midwives per 1,000 people, far below the WHO-recommended threshold of 2.5 per 1,000 (World Bank, 2022). This shortage restricts women's healthcare access, further limiting their workforce participation.

Furthermore, according to World Bank data in 2023, wage and salaried employment as a percentage of total employment in Nigeria is estimated at 15.27%, with 10.80% female compared to 19.38% of male, revealing that women disproportionately engaged in informal, low-paying jobs (World Bank, 2023). Without structural improvements in employment policies and healthcare systems, gender disparities in labor force participation will persist, limiting Nigeria's economic growth and social development.

By analyzing the impact of healthcare resources, such as health spending and the number of nurses and midwives per 1,000 people, as well as the employment structure, particularly the proportion of wage and salaried workers, on female labor force participation in Nigeria, this study aims to address an important research gap. Specifically, the objectives are to examine: (1) the effect of health spending on women's labor force participation in Nigeria; (2) the impact of the availability of nurses and midwives per 1,000 people on female labor force participation; and (3) the influence of wage and salaried employment on Nigerian women's participation in the labor force.

2. Literature Review

Human Capital Theory

the Human Capital Theory was introduced by Becker (1964), the theory posits that individuals make rational decisions to invest in education, healthcare, and skills to increase their productivity and earning potential. This theory assumes that higher investments in healthcare and education improve worker efficiency, leading to increased labor force participation and higher wages. According to Becker's model, when governments and families invest in women's healthcare and education, female labor force participation increases, as healthier and more educated women are more likely to seek employment.

Empirical research supports this notion, demonstrating that countries with higher healthcare investments tend to exhibit greater female labor force participation. For example, the strong female labor force participation in the Nordic countries can be attributed to their welfare-state principles, which emphasize women's right to work (Hall and Zoega, 2014). Similarly, Psacharopoulos and Patrinos (2018) found that an additional year of education often facilitated by improved access to healthcare increases women's earnings, highlighting the role of human capital investment in shaping labor market outcomes.

Labor Market Segmentation Theory

Doeringer and Piore (1971) proposed the Labor Market Segmentation Theory, which argues that labor markets are divided into primary and secondary sectors. The primary sector consists of stable, high-wage jobs with benefits and career growth opportunities, while the secondary sector is characterized by low wages, job insecurity, and minimal career advancement. The theory assumes that women, particularly in developing economies, are disproportionately placed in the secondary labor market due to systemic discrimination, weaker institutional protections, and sociocultural norms.

This assumption is evident in global labor market trends, where the developed nations has more salaried women than the developing nation. The theory suggests that reducing labor market segmentation through stronger labor protections and gender-equal hiring practices can facilitate greater female workforce inclusion.

New Institutional Economics (North, 1990)

North (1990) developed the New Institutional Economics theory, which emphasizes that economic performance is shaped by formal institutions (laws, regulations) and informal norms (cultural practices). The theory assumes that weak legal frameworks and discriminatory policies prevent women from fully participating in the labor market. It suggests that improving institutions such as labor laws, healthcare policies, and anti-discrimination measures can enhance female workforce engagement.

For instance, if the healthcare system is underfunded, women may need to spend more time caring for sick family members, reducing their availability for paid work. Similarly, if labor market regulations are not supportive of women's employment, such as the lack of maternity leave or flexible working hours, women may be less likely to enter or remain in the labor market

Empirical Review

Using a cross-sectional correlational study design, Rodríguez-García et al. (2022) examined the relationship between midwives' work environment, women's safety culture, and intent to stay, using a sample of 218 midwives employed in Spain. The authors employed descriptive and bivariate statistical techniques for data analysis. Their findings indicated that the work environment for midwives was mixed, comprising both positive and negative elements. A more favorable work environment was associated with an improved patient safety culture and outcomes. Additionally, their results revealed that midwives' intention to remain in their current roles and profession was linked to the prevailing safety culture and practices within healthcare organizations.

Gulesci et al. (2023) investigated the direct and indirect effects of a training program for women aspiring to become primary care nurses in Southern Egypt on the trainees' labor market outcomes and the attitudes toward female employment within their social networks. Utilizing a randomized controlled trial design, the study traced the influence of pioneer trainees on their social contacts. Their findings demonstrated that the training program directly increased the employment of female trainees. Moreover, the program exerted indirect effects by positively shaping the attitudes toward female employment and improving labor market outcomes within the trainees' social circles.

Opeloyeru et al. (2021) explored how institutional quality influenced the relationship between labor force participation and health spending in Africa. Their methodology followed a four-step estimation process: first assessing the association between health spending and labor force participation; second, incorporating an interaction term; third, introducing institutional quality; and finally, controlling for other relevant variables. The authors employed two main econometric techniques: two-step system GMM to address endogeneity and panel fixed effects with Driscoll and Kraay standard errors to address heteroskedasticity and autocorrelation. Their findings indicated that government health expenditure positively affected labor force participation, while out-of-pocket health spending exerted a negative effect

Tian et al. (2018) analyzed the determinants of per capita health care spending using data from 28 OECD countries between 1990 and 2012. Employing an instrumental variable quantile regression method within a dynamic panel model with fixed effects, their analysis revealed that the determinants of health expenditure growth such as lagged health spending, per capita GDP, physician density, elderly population, life expectancy, urbanization, and female labor force participation varied across the conditional distribution of expenditure growth. The results supported Baumol's unbalanced growth hypothesis, showing its consistently positive impact on the rise in per capita health spending. However, the relationship between health expenditure growth and the components of the "Baumol variable" (wage growth and labor productivity growth) was more heterogeneous. In contrast, conditional mean regressions identified more limited associations, primarily with the Baumol variable, per capita GDP, and lagged health spending.

Rad et al. (2014) assessed the effects of health indicators on labor supply in Eastern Mediterranean countries between 1995 and 2011. Using panel cointegration techniques, including Pesaran's cross-sectional dependency and unit root tests, Westerlund's panel cointegration test, and random effects models, their findings revealed that higher fertility rates reduced female labor supply while increasing male labor supply. Conversely, increased public health expenditures enhanced female labor supply and decreased male labor supply, likely due to substitution effects. Similar substitution dynamics were observed with urbanization. Additionally, gross domestic product exhibited a positive relationship with female labor supply, though no significant association was found for male labor supply.

Asai (2023) examined the role of structural fiscal policies in promoting female labor force participation and reducing gender gaps in labor markets across 26 OECD countries from 2000 to 2019. Utilizing a panel vector error-correction model to address non-stationarity in the variables, the analysis confirmed statistically significant positive impacts of government spending on (1) early childcare and education, (2) active labor market programs, and (3) unemployment benefits each of which encouraged women to enter the labor force. Conversely, an increase in the relative tax rate on second earners appeared to exert a negative impact on female labor force participation. The empirical findings demonstrated that increased government expenditure in these policy areas positively influenced female labor force participation, while higher relative tax rates on secondary earners (typically women) negatively affected such participation.

Detraz and Peksen (2017) investigated the extent to which welfare spending influenced women's economic and political status. Drawing on a panel of 97 countries from 1990 to 2010, their results indicated that governmental fiscal commitment to social welfare policies, including social security, health, and education was positively associated with higher levels of women's labor force and political participation. Their findings suggested that increased government spending on social welfare contributed to women's economic and political empowerment, thereby addressing gender imbalances in both the economy and the political domain.

Taşseven et al. (2016) analyzed the determinants of female labor force participation in OECD countries, focusing on variables such as per capita GDP, unemployment rate, the ratio of female to male tertiary enrollment, fertility rate, and the number of waged and salaried workers, using a panel logit model. Their data, sourced from the World Bank, covered the period between 1990 and 2013. Their findings revealed that unemployment rate, GDP per capita, and fertility rate significantly and positively affected female labor force participation. Among these, fertility rate exhibited the strongest influence.

Majbouri (2015) investigated the causes behind the low female labor force participation rate in Iran. Employing a structural estimation framework and controlling for selection bias, the study found that the low participation rate was not attributable to low wages, but rather to labor market institutions and individual preferences.

Winkler (2016) examined the determinants of women's labor force participation and found that it was primarily influenced by the comparative value of women's market wages versus their non-market time, in addition to institutional, cultural, and policy factors.

Using multiple rounds of National Sample Survey Organization (NSSO) data from 1993–94 to 2011–12, along with census data, Andrés et al. (2017) reassessed the patterns of female labor force participation in India. Their findings showed that the rising share of regular wage earners and the declining share of casual labor within household composition contributed to the observed decline in female labor force participation over the study period.

3. Methodology

Research design refers to the courses of action followed by a researcher in the carrying out any empirical investigation. In other words, the given that this study relied on secondary time series data, a retrospective research design was adopted. While the data for the study were sourced from the World Bank Development Indicators and the CBN Statistical Bulletin from 1995 to 2023.

For model specification, this study adopted the human capital theory developed by Backer (1964). To achieve the objective of this study, the following model were developed thus:

$$LFRW = f\ (HEXP, NURM, SALT) \qquad (1)$$

The econometric form of the model in equation 1 can be expressed as:

$$LFRW_t = \beta_0 + \beta_1 HEXP_t + \beta_2 NURM_t + \beta_3 SALT_t + \mu_t \qquad (2)$$

Where;

LFRW = Labor force participation rate, female (% of female population ages 15 and above)

HEXP = Health Expenditure (logged)

NURM = Nurses and Midwives per 1,000 People

SALT = Wage and salaried workers, total (% of total employment)

β_o = Constant parameter, while the β1 – β3 are the coefficients

μ_t = error term

Justifications of the Variables Used

In analyzing the impact of healthcare resources and employment structure on female labor force participation in Nigeria, the appropriate dependent variable is the female labor force participation rate, defined as the percentage of the female population aged 15 and above who are either employed or actively seeking employment. This metric provides a comprehensive measure of women's engagement in the labor market. Given Nigeria's demographic profile and economic challenges, understanding the extent to which healthcare and employment institutions influence female labor force participation is critical for informing the design of inclusive labor policies.

The choice of health expenditure and nurses and midwives per 1,000 people as independent variables is justified by the fundamental role healthcare access plays in shaping women's labor market decisions. Higher health expenditure indicates greater investment in medical services, which can improve maternal and reproductive health, reduce disease burdens, and decrease time spent on unpaid caregiving, thereby enabling more women to participate in the workforce. Likewise, higher availability of nurses and midwives enhances access to essential healthcare services, particularly for women, improving overall well-being and work readiness.

Similarly, wage and salaried workers as a percentage of total employment serves as an independent variable because it reflects the structure of employment opportunities available to women. A labor market dominated by formal, salaried jobs tends to offer greater job security, benefits, and work-life balance, which can encourage female participation. In contrast, an economy reliant on informal or subsistence employment may deter women's entry into the workforce due to lower earnings, instability, and lack of social protections.

4. Data Analysis

Table 4.1 Descriptive Statistics

	LFRW	HEXP	NURM	SALT
Mean	77.54379	4.290979	1.440000	12.46862
Median	77.30000	4.587210	1.520000	12.17000
Maximum	80.77000	6.149835	1.730000	15.27000
Minimum	76.93000	1.156881	0.910000	10.33000
Std. Dev.	0.763523	1.565718	0.206916	1.797158
Skewness	2.692063	-0.727383	-1.104331	0.220571
Kurtosis	11.97345	2.412586	3.279055	1.538505
Jarque-Bera	132.3265	2.974190	5.988567	2.816109
Probability	0.000000	0.226028	0.050072	0.244619
Sum	2248.770	124.4384	41.76000	361.5900
Sum Sq. Dev.	16.32308	68.64121	1.198800	90.43374
Observations	29	29	29	29

Source: *Author's computation from E-views 12 software*

The descriptive statistics in the table 4.1 shows that the mean value of female labor force participation (LFRW) is approximately 77.54%. The minimum value recorded is 76.93%, while the maximum is 80.77%, suggesting a narrow variation over time. Significant variety can be seen in health expenditure (HEXP), which has a mean value of 4.29%, a minimum value of 1.16%, and a maximum value of 6.15%. The availability of nurses and midwives (NURM) has a mean of 1.44%, with minimum and maximum values ranging from 0.91% to 1.73%. The proportion of wage and salaried workers in total employment averages 12.47%, with a minimum of 10.33% and a maximum of 15.27%. The standard deviation (1.80) suggests all the variables clustered around its mean values, as standard deviations were less than the mean values. In addition, the probability values of the Jarque-Bera statistics suggest that all the variables except female labor force participation are stationary at the 5% level of significance.

Unit Root Test

As a precondition to time series analysis, the unit root test was conducted using the KPSS method to ascertain the stationary process of the series. The results are presented in Table 4.2.

Table 4.2: KPSS unit root test results

Variable	KPSS statistic at levels	KPSS statistic at 1st difference	5% critical value	Order of integration
LFRW	0.286635	NA	0.463000	I(0)
HEXP	0.664315	0.217168	0.463000	I(1)
NURM	0.324330	NA	0.463000	1(0)
SALT	0.667176	0.293023	0.463000	1(1)

Source: *Author's computation using Eviews 12 software*

The KPSS (Kwiatkowski-Phillips-Schmidt-Shin) unit root test in the table 4.2., shows that female labor force participation (LFRW) has a KPSS statistic of 0.2866, below the 5% critical value of 0.4630, confirming stationarity at level, I(0). health expenditure (HEXP) exhibits a KPSS statistic of 0.6643 at levels, exceeding the critical threshold, indicating the presence of a unit root. However, after first differencing, the KPSS statistic drops to 0.2172, confirming stationarity at I(1). Furthermore, the analysis indicates that nurses and midwives (NURM) show a KPSS statistic of 0.3243, below the 5% critical value, revealing stationarity at level, I(0). In addition, the result show that wage and salaried workers (SALT) has a KPSS statistic of 0.6672 at levels, exceeding the critical threshold, confirming non-stationarity. After first differencing, the statistic drops to 0.2930, ensuring stationarity at I(1). The presence of a mixed order of integration justifies the use of the Autoregressive Distributed Lag (ARDL) model, which accommodates variables integrated of order I(0) and I(1) in examining the relationship between healthcare resources, employment structure, and female labor force participation. This modeling choice is supported by the KPSS test results, which indicate that female labor force participation and nurses and midwives are stationary at level, while health expenditure and wage and salaried workers become stationary after first differencing (Pesaran et al., 2001).

Bounds Cointegration Test

The bounds cointegration test followed the evidence of mixed integration from the unit root test The results are presented in Table 4.3.

Table 4.3: Summary of bounds cointegration test results

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	65.67373	10%	2.37	3.2
K	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

Source: *Author's computation from E-views 12 software*

Note: K denotes the number of regressors

The results of the ARDL bounds cointegration test, as presented in Table 4.3, indicate that the computed F-statistic (65.67373) exceeds both the lower bound value (2.79) and the upper bound critical value (3.67) at the 5% significance level. This outcome warrants the rejection of the null hypothesis of no long-run relationship among the variables, thereby confirming the existence of cointegration at the 5% significance level. Therefore, it follows from the results that female labor force participation has a long-run relationship with the independent variables used. Based on this finding, this study adopted the ARDL method of analysis.

Model Estimation

Table 4.4 presents the estimation results of the ARDL (Autoregressive Distributed Lag) model, offering a comprehensive analysis of both the short-run and long-run effects of Health Expenditure (HEXP), Nurses and Midwives per 1,000 People (NURM), and Wage and Salaried Workers as a Percentage of Total Employment on the dependent variable

Table 4.4: ARDL short and long run analysis

Short-run results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LFRW(-1))	0.071702	0.446078	0.160738	0.8768
D(LFRW(-2))	-0.293504	0.466167	-0.629612	0.5489
D(LFRW(-3))	-2.025502	0.468298	-4.325242	0.0035
D(HEXP)	0.145812	0.062073	2.349037	0.0512
D(HEXP(-1))	0.211550	0.061318	3.450016	0.0107
D(NURM)	-0.025786	0.113675	-0.226840	0.8270
D(NURM(-1))	-0.390286	0.140409	-2.779645	0.0273
D(NURM(-2))	-0.441760	0.184898	-2.389209	0.0482
D(NURM(-3))	0.850951	0.215698	3.945095	0.0056
D(SALT)	-1.449180	0.241782	-5.993747	0.0005
D(SALT(-1))	-1.571255	0.204533	-7.682164	0.0001
D(SALT(-2))	0.132070	0.224816	0.587458	0.5753
D(SALT(-3))	-4.842967	0.151882	-31.88645	0.0000
CointEq(-1)*	-1.822160	0.080216	-22.71581	0.0000

Long-run results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HEXP	0.062402	0.090290	0.691124	0.5117
NURM	0.139546	0.206260	0.676552	0.5204
SALT	-0.024822	0.068032	-0.364850	0.7260
C	77.91121	0.628893	123.8862	0.0000

R-squared 0.993113; Adjusted R-squared 0.984974

Source: *Author's computation from E-views 12 software*

In the short run, the estimated coefficients for health expenditure in both the contemporaneous period and at the first lag are positive and statistically significant, with the effect being more pronounced at lag one. Specifically, a one-unit increase in health expenditure is associated with a 0.145 and 0.211 unit rise in female labor force participation in Nigeria, respectively. Conversely, the long-run coefficient for health expenditure remains positive but does not attain statistical significance, indicating that a one-unit increase in health spending is associated with a modest 0.062 unit increase in female labor force participation over the long term. This outcome is consistent with the study's a priori expectation and the human capital theory, which states that increasing investments in healthcare and education improve worker efficiency, resulting in higher labor force participation and pay. This finding is also consistent with the empirical results of Detraz and Peksen (2017), who discovered that the government's fiscal commitment to social welfare measures, such as health, is positively associated with greater levels of women's involvement in the labor force.

The short-run estimates demonstrate that the coefficients for nurses and midwives in the contemporaneous period, as well as at the first and second lags, are negative and statistically significant, most notably at lags one and two. Specifically, a one-unit increase in the number of nurses and midwives is associated with reductions in female labor force participation of 0.025, 0.390, and 0.449 units, respectively. However, the coefficient at the third lag is both positive and statistically significant, indicating that a one-unit increase in this variable corresponds to a 0.850 unit rise in female labor force participation in the short run. In the long-run specification, the effect of nurses and midwives remains positive but fails to reach statistical significance, with a coefficient of 0.139. This pattern of results aligns with the study's theoretical expectations.

Similarly, the short-run ARDL estimates for wage and salar!ed workers indicate that the coefficients at the current period, lag one, and lag three are negative and statistically significant, suggesting that a one-unit increase in this variable reduces female labor force participation by 1.449, 1.571, and 4.842 units, respectively. The coefficient at lag two, while positive, is not statistically significant, implying a modest increase of 0.132 units that lacks robustness. Over the long run, the relationship remains negative but statistically not significant, with a coefficient of –0.024. This result is consistent with the study's a priori expectations and labor market segmentation theory, which states that women in emerging economies often face low remuneration, job instability, and limited upward mobility in formal employment sectors.

The constant term (C) is highly significant (77.91121), indicating a baseline level of female labor force participation that is not explained by the included variables. The error correction term (CointEq(-1)), which represents the rate of adjustment back to equilibrium, is highly significant (-1.822160, p-value = 0.0000), indicating that approximately 82.2% of deviations from the long-run equilibrium are corrected annually, implying a relatively fast adjustment process in response to short-term shocks. The R-squared value of 0.993113 suggests that 99.31% of the variability in female labor force participation is explained by the independent variables. Additionally, the Adjusted R-squared value of 0.984974, which accounts for degrees of freedom, indicates a strong model fit after adjusting for the number of predictors.

Residual Diagnostics Tests

The residual diagnostic tests conducted in the study titled The Impact of Healthcare Resources and Employment Structure on Female Labor Force Participation in Nigeria provide critical insights into the reliability and robustness of the estimated Autoregressive Distributed Lag (ARDL) model. The diagnostic assessments evaluate key econometric properties, including serial correlation, heteroskedasticity, normality of residuals, and the structural stability of the model.

Serial Correlation LM Test

The Breusch-Godfrey test was conducted to detect the presence of serial correlation in the residuals of the ARDL model

Table 4.5: Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.551639	Prob. F(2,5)	0.6075
Obs*R-squared	4.519205	Prob. Chi-Square(2)	0.1044

Source: Author's computation using Eviews12 software

The Breusch-Godfrey Serial Correlation LM Test findings in table 4.5 indicate an F-statistic of 0.551639 with a matching p-value of 0.6075, and an Obs*R-squared value of 4.519205 with a p-value of 0.1044. Both p-values are much exceeding the standard significance limit of 0.05, indicating that we fail to reject the null hypothesis of no serial correlation in the residuals (Breusch, 1978; Godfrey, 1978). This suggests that the residuals are not serially correlated, which is a desirable property for the model. The absence of serial correlation implies that the model is well-specified and that the estimates are efficient.

Heteroskedasticity Test

The Breusch-Pagan-Godfrey test was used to determine heteroskedasticity in the residuals.

Table 4.6: Breusch-Pagan-Godfrey

F-statistic	0.288880	Prob. F(17,7)	0.9828
Obs*R-squared	10.30765	Prob. Chi-Square(17)	0.8902
Scaled explained SS	1.013305	Prob. Chi-Square(17)	1.0000

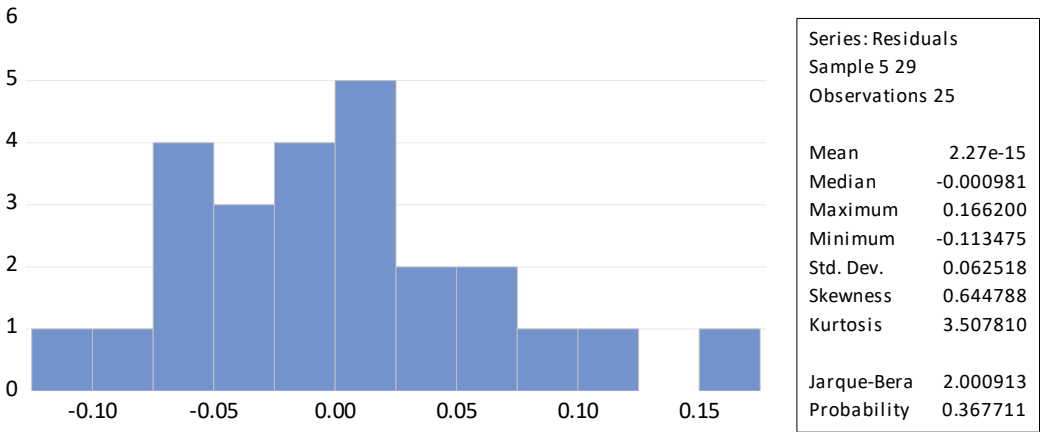
Source: Author's computation using Eviews12 software

Table 4.6 presents the results of the Breusch-Pagan-Godfrey heteroskedasticity test, yielding an F-statistic of 0.288880 (p-value = 0.9828), an Obs*R-squared value of 10.30765 (p-value = 0.8902), and a scaled explained sum of squares statistic of 1.013305 with a p-value of 1.000. Given that all associated p-values substantially exceed the conventional 0.05 significance threshold, we fail to reject the null hypothesis of' homoskedasticity. These findings indicate that the variance of the residuals is constant, thereby supporting the assumption of homoskedasticity in the estimated model (Breusch and Pagan, 1979; Godfrey, 1978). This indicates that the residuals have constant variance, which is a key assumption for the validity of the regression model. The absence of heteroskedasticity suggests that the model's coefficient estimates are unbiased and efficient.

Normality Test

The Jarque-Bera test was conducted to assess whether the residuals of the ARDL model are normally distributed.

Figure 4.1: Jarque Bera



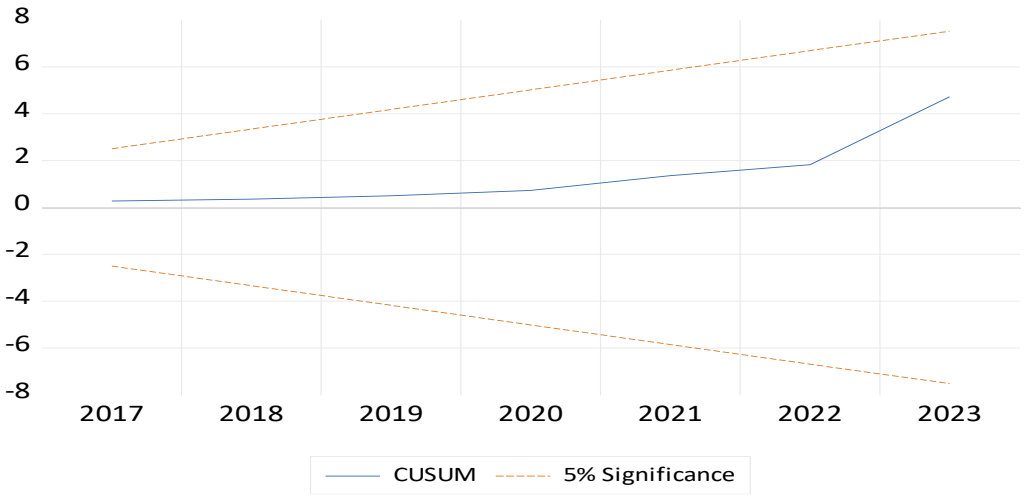
Source: Author's computation using Eviews12 software

Normality of residuals is a crucial assumption for the validity of hypothesis tests and confidence intervals in regression analysis (Jarque and Bera, 1987). The test in figure 4.1 reports a Jarque-Bera statistic of 2.000913 with a p-value (0.367711), greater than 0.05, we fail to reject the null hypothesis that the residuals are normally distributed.

Stability Test

The CUSUM (Cumulative Sum) test was performed to evaluate the stability of the coefficients in the ARDL model over time.

Figure 4.2: CUSUM Test



Source: Author's computation using Eviews12 software

The CUSUM plot test in Figure 4.2 shows whether the cumulative sum of recursive residuals remains within the 5% significance bounds. The result show that the CUSUM line stays within these bounds, indicating that the model's parameters are stable over the sample period (Brown, Durbin, and Evans, 1975). This stability is essential for the reliability of the model's estimates and predictions, as it indicates that the relationship between the dependent and independent variables has not changed significantly over time.

5.1 Conclusion

The ARDL model estimation highlights the relationship between healthcare resources, employment structure, health expenditure, and female labor force participation (LFRW) in Nigeria reveals that health expenditure (HEXP) exerts a positive and statistically significant influence on women's participation in the labor force in the short run, but its long-run effect, while positive, is not statistically significant. Nurses and midwives (NURM) exhibit a mixed short-run effect, with initial negative impacts turning positive at lag 3, while the long-run effect remains positive but not significant. Wage and salaried workers (SALT) negatively affect LFRW in both the short and long run, aligning with labor market segmentation theory, which underscores structural barriers such as low wages and job insecurity for women. The model's strong explanatory power (R-squared = 0.993) and rapid error correction (82.2% annually) confirm the robustness of these findings.

5.2 Recommendations

1. The government should prioritize increasing health expenditure. This can include investments in healthcare infrastructure, training of healthcare professionals, and public health campaigns. Such investments can improve the overall health and well-being of women, making them more likely to participate in the labor force.
2. Policymakers should prioritize appropriate allocation and continuing professional development of healthcare staff to guarantee that their deployment has long-term positive impacts on female labor force participation.
3. Policies should aim to improve job security, wages, and career advancement opportunities for women in the wage and salaried sector. This can include implementing gender-sensitive labor laws, promoting equal pay, and providing training and development programs to enhance women's skills and career prospects.

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