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Dynamic interaction between natural resources and financial development in Nigeria: A disaggregated approach

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ABSTRACT
This study examined the dynamic interaction between disaggregated natural resource rents on financial development in Nigeria during the period 1980–2019. The study applied both traditional and modern unit root tests that accounts for structural breaks to examine the properties of the variables. The study also employed Nonlinear Autoregressive Distributed Lag (NARDL) model. The results indicated the presence of long run equilibrium relationship among the variables of the study. The results from both the long run and shortrun analysis revealed that oil and natural gas rents negatively affect financial development in Nigeria, thereby supporting resource curse hypothesis. However, the findings in respect of forest rent, mineral rent, institutional quality, economic growth and coal rents revealed a positive and insignificant impact on financial development in the longrun, opposing the resource curse hypothesis, while in the shortrun, economic growth, mineral and coal rents affect financial development negatively. The policy implication of the findings is that, different types of natural resource rents have different impact on Nigeria's financial development as evidenced in this study. It may be deduced from the fact that most of the resource rents sourced from the oil and natural gas resources have not been used judiciously during the period under study, hence the adverse effect on the nation's financial development. The study therefore recommends that, government should use the natural resource rents judiciously in order to stimulate growth, which will translate into financial development of the country. This is achievable through reinvesting the proceeds in other sectors of the economy that are growth enhancing such as the financial and manufacturing sectors of the economy.

Keywords:
Financial Development, Nigeria, NARDL, Natural Resources.

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1. INTRODUCTION

Every country of the world requires an efficient and sound financial system to stimulate its economic activities. A developed and efficient financial system enables an economy to stir economic growth and development (Pradhan, Bahmani, & Kiran, 2014). Countries with deeper financial system seems to grow faster and experience faster reductions in income inequality and the rate poverty. Financial sector development helps industries to grow faster and also helps enterprises, especially smaller ones, overcome financing constraints (Beck, 2010, Demirguc-Kunt and Huizinga, 2010). The empirical investigation of natural resources-financial development nexus is relatively new. Natural resources can be blessing or curse for financial development. It stimulates economic activities by providing financial resources for productive investment ventures and may affect finance-growth nexus which explains the natural resources-economic growth as well (Atil, Nawaz, Lahian, &Roubaud, 2020). The importance of natural resources in the resource-based developing countries are visible in the adjustment of their trade deficit, gives input to the production activities, contribute to the economy through exports of the primary goods, and improved financial development. Controlling corruption, institutional quality, and achieving political stability are some of the important factors that could be helpful in attaining higher rents through the utilization of natural resources (Asif, et al., 2020). However, the orthodox perspective on the natural resource curse as a barrier to achieving economic growth and development has been refuted by many scholars. For example, (Shahbaz, Muhammad, Muhammad, & Iqbal, 2017; Bakwenaand Bodman 2007; Asif et al. 2020) reported natural resources as a stimulus to financial development and proved it as a blessing rather than a curse. Therefore, the negative effect of the natural resource rents on the development of the financial sector has not always existed. Nigeria is a country blessed with abundance of natural resources. The country is most widely known for its vast hydrocarbons wealth. It has about 37.1bn barrels of proven oil reservesand (OPEC, 2021) and 209 trillion cubic feet of natural gas reserves (Guardian, 09 December, 2021). At current production rates, this will give the country another 43 years worth of oil exploration and revenues. Nigeria possesses much more than simply oil and gas. It is home to significant deposits of coal, iron ore, lead, limestone, tin, zinc, and as well, it has rich land and water resources that are ripe for further agricultural exploitation. Approximately 83.7% of Nigeria's land area is agricultural, but only 40% is arable. Substantial water resources also assist the agricultural sector. The country has 230bn cubicmetres of total renewable water resources (Oxford Business Group, 2016). There is a vast body of existing literature on the effect of natural resource rents on financial development globally, but very limited in Nigeria. Previous studies have focused mainly on the effect of natural resource abundance on financial development with education, globalization, foreign capital accumulation and capitalization. Against this backdrop therefore, the present study re-examined the disaggregated effect of natural resource rents on financial development in Nigeria over the period of 1980-2020. (ii), Institutional quality and economic growth are added as additional determinants of financial development. (iii), The traditional and structural break unit root tests were applied for examining the stationarity properties of the variables. (iv) Nonlinear ARDL approach was employed, and the robustness of cointegration relationship is tested by applying the bounds testing approach to cointegration. The rest of paper is organized as follows: Section II provided the review of studies in existing literature. Section III deals with methodological framework, while results are interpreted in Section IV. The concluding and policy implications are explained in Section V.

2. LITERATURE REVIEW

2.1 Natural Resources

Natural resources entails materials, energy, and their attributes that are extracted from the ground and earth surface which are pivotal in the maintaining and improving human life equality of human life (Fatai, Adeolu, & Ayo, 2017). Conventionally, natural resources are the naturally occurring materials, such as energy resources and raw materials that are useful to industries and economic security of the country (Shahbaz, Muhammad, Muhammad, & Iqbal, 2017). However, different societies have different perspectives and valuations of natural resources as a result of cultural, economic, and technological diversities. Some societies regards natural resources such as landscape as an important natural resource, or value the spiritual attributes of a unique rock formation or the oldest tree in a forest (Freedman, 2001). Natural resource can be defined as a valuable component of the natural environment that contributes in serving human needs, e.g. soil, water, wildlife, etc. Centering on the economic definition of resources, the Organisation for Economic Co-operation and Development (OECD) classifies them as raw materials or "natural assets" valued according to their contribution to economic production or consumption. These assets provide benefits or potential future value and are "subject primarily to quantitative depletion through human use (Khan, Hussain, Shahbaz, Yang & Jiao, 2020).

2.2 Renewable and Nonrenewable Natural Resources

Renewable resources are those natural resources such as trees, water, sun and wind that can be replenished at about the same rate at which they are consumed. However renewable resources can be depleted if not properly conserved. Nonrenewable resources are those natural resources that are depleted more quickly than they can regenerate. For instance, fossil fuels like oil, natural gas and coal are formed over millions of years, and once mined and used completely, these resources are gone forever (Khan et al., 2020).

2.3 Financial Development

Resource development of any country requires a developed financial sector, and the financial sector development occurs through establishing and developing the institutions, instruments and markets that support the large investments and growth that help in poverty reduction (Kumar & Sekhar, 2019). Financial development is seen as the development of the size, efficiency and stability of financial markets along with increased access to the financial markets that have multiple advantages for the economy's resources (Mbulawa, 2015). For instance, a well-developed financial market in a resource endowed country mobilizes the savings of an economy to profitable investments in harnessing the country's natural resources, reduce information cost thereby leading to better allocation of capital (Bilquess, Mukhtar & Sohail, 2011) and also reduce the cost of corporate governance (Bittencourt, 2011). The world bank (2012) opined that, financial sector is the set of institutions, instruments, markets, as well as the legal and regulatory framework that allow transactions to be carried out by extending credit to investors. Fundamentally, financial sector development is about reducing the costs incurred in the financial systemin the course of acquiring information, enforcing contracts, and making transactions resulted in the emergence of financial contracts, markets, and intermediaries. According to World Bank (2012), there are five important roles of financialsector development; producing information regarding the possible investments opportunities and efficiently allocatecapital, monitoring investments and roll out corporate governance after providing the required finance, facilitate trading, economic diversification and risk management, mobilization of savings, simplifying the goods and services exchange. Financial sector development, therefore, happens when financial instruments, markets, and intermediaries ease the effects of information, enforcement, and transactions costs and therefore do a correspondingly better job at providing the relevant functions of the financial sector in the economy (Salari, Meidani, Koshalshahi, & Ayask, 2022).

3. METHODOLOGY

3.1 Data

This study examined the dynamic interaction between natural resources and financial development in Nigeria using annual time series data from the period 1980–2019. Specifically, GDP per capita (constant 2015 US$), oil rents (% of GDP), natural gas rents (% of GDP), mineral rents (% of GDP), coal rents (% of GDP), forest rents (% of GDP) and domestic credits to private sector (% of GDP) proxied for financial development were collected from the World Development Indicators of the World Bank, and institutional quality is measured with quality of government effectiveness indexsourced from the quality of government indicators of the World Bank.

3.2 Econometric model and Methods

In order to achieve the objective of the study, the model is specified as follows:

$$FD = \beta_0 + \beta_1 CRNT + \beta_2 FRNT + \beta_3 MRNT + \beta_4 INSQ + \beta_5 NGRNT + \beta_6 ORNT + \beta_7 LGDPP_t + +\varepsilon_t \ldots\ldots\ldots\ldots\ldots 1$$

where β_1- β_7 are the sequential coefficient of the explanatory variables. FD is the financial development, CRNT is the coal rents, FRNT is the forest rents, FRNT is the forest rents, MRNT is the mineral rents, INSQ is the institutional quality, ORNT is the oil rents, NGRNT is the natural gas rent, LGDPP is the logarithm of GDP per capita proxied for economic growth, and ε is the error term which is assumed to be normally distributed.

3.3 Unit root test

The study adopted the conventional unit root tests of augmented Dickey- Fuller (ADF), and Phillips Perron to test the stationarity status of the variables. However, most of the conventional unit root tests are biased in the presence of structural breaks as posited by Inuwa et al. (2021). Therefore, to avoid this problem, the study employed the Lee - Strazicich (2003) LM unit root test with two breaks because of its better size and higher power in addition to identifying structural breaks more accurately than Zivot and Andrews (1992), and Lumsdaine and Papell (1997) Inuwa et al. (2021).

3.4 The NARDL Approach

This study applied Non-linear Autoregressive Distributed Lag (NARDL) Model developed by Shin et al. (2014) which accounts for the possibility of asymmetric effects of positive and negative changes in the explanatory variables on the dependent variable compared with the Linear ARDL where the possible impacts of the explanatory variables remain the same (Sohail et al. 2021). Galadima and Aminu (2019) opined that, most economic relationships have changed from linear to nonlinear both in structure and dynamics, and, it is known in econometrics context that, functional misspecification of a model poses potential consequences for both estimation and statistical inference. Thus, this provides more credible methodological justification for using nonlinear techniques in this study.

Following the work of Majeed (2021), the model is decomposed into its cumulative sums of positive and negative changes as follows:

$$\Delta FD_t = \alpha_0 + \alpha_1 FD_{t-1} + \alpha_2^+ CRNT_{t-1}^+ + \alpha_3^- CRNT_{t-1}^- + \alpha_4^+ FRNT_{t-1}^+ + \alpha_5^- FRNT_{t-1}^- + \alpha_6^+ INSQ_{t-1}^+$$
$$+ \alpha_7^- INSQ_{t-1}^- + \alpha_8^+ MRNT_{t-1}^+ + \alpha_9^- MRNT_{t-1}^- + \alpha_{10}^+ NGRNT_{t-1}^+ + \alpha_{11}^- NGRNT_{t-1}^- + +\alpha_{12}^+ ORNT_{t-1}^+$$
$$+ \alpha_{13}^- ORNT_{t-1}^- + \alpha_{14}^+ LGDPP_{t-1}^+ + \alpha_{15}^- LGDPP_{t-1}^- + \sum_{I=1}^{q} \beta_1 \Delta FD_{t-1} + \sum_{I=0}^{K_4} \beta_2^+ \Delta CRNT_{t-1}^+ + \sum_{I=0}^{K_4} \beta_3^- \Delta CRNT_{t-1}^- +$$
$$\sum_{I=0}^{K_2} \beta_4^+ \Delta FRNT_{t-1}^+ + \sum_{I=0}^{K_2} \beta_5^- \Delta FRNT_{t-1}^- + \sum_{I=0}^{K_3} \beta_6^+ \Delta INSQ_{t-1}^+ + \sum_{I=0}^{K_3} \beta_7^- \Delta INSQ_{t-1}^- + \sum_{I=0}^{K_4} \beta_8^+ \Delta MRNT_{t-1}^+$$
$$+ \sum_{I=0}^{K_4} \beta_9^- \Delta MRNT_{t-1}^- + + \sum_{I=0}^{K_4} \beta_{10}^+ \Delta NGRNT_{t-1}^+ + \sum_{I=0}^{K_4} \beta_{11}^- \Delta NGRNT_{t-1}^- + \sum_{I=0}^{K_4} \beta_{12}^+ \Delta ORNT_{t-1}^+ + \sum_{I=0}^{K_4} \beta_{13}^- \Delta ORNT_{t-1}^-$$
$$+ \sum_{I=0}^{K_4} \beta_{14}^+ \Delta LGDPP_{t-1}^+ + \sum_{I=0}^{K_4} \beta_{15}^- \Delta LGDPP_{t-1}^- + \mu_t \quad \text{.....2}$$

Δ is the first difference of the variables of the study in the short-run. The parameter β_i, indicates short-term coefficients, while long-term coefficients are denoted by α_i with i= 1....n.FD_t is the dependent variable with optimal lag q, while k_i is the optimal lags for the independent variables.

All variables are decomposed into positive and negative sums as follows:

$$\chi_t^+ = \sum_{i=1}^{t} \Delta\chi_t^+ = \sum_{i=1}^{t} \max(X_i, 0) \quad \text{.....3}$$

$$\chi_t^- = \sum_{i=1}^{t} \Delta\chi_t^- = \sum_{i=1}^{t} \min(X_i, 0) \quad \text{.....4}$$

where X_t represents the independent variables.

4. EMPIRICAL RESULTS

4.1 Descriptive Statistics

The summary of the statistical properties such as mean, median, maximum, minimum and standard deviation of all the variables is given in Table 1.

Table 1. Descriptive Statistics

Variables	FD	FRNT	INSQ	GDPP	MRNT	NGRNT	ORNT
Mean	9.285428	2.135235	-0.540663	7.504084	0.005014	0.472813	12.13668
Median	8.201661	1.660416	-0.908200	7.421588	0.001208	0.273824	11.78277
Maximum	19.62560	5.253100	0.000000	7.896652	0.027965	1.817130	26.42849
Minimum	4.957522	0.693466	-1.214644	7.236004	0.000000	0.001153	1.447166
Std. Dev.	3.542454	1.283417	0.524702	0.239713	0.007588	0.515129	6.157954
Observations	40	40	40	40	40	40	40

Source: Author's Compilation using Eviews 10.

Table 1 presents the results of the descriptive statistics. The standard deviations analysis revealed higher volatility in oil rent, followed by financial development and forest rent, while, the economic growth and mineral rent recorded lowest volatility.

4.2 Unit Root Test

This study applied ADF, and Phillips-Perron unit root tests to examine the stationarity properties of the variables, and the results are presented in Table 2.

Table 2. Augmented Dickey Fuller (ADF) Unit Root Test Result

Variables	T-Statistics	Critical Values			Remarks
		1%	5%	10%	
FD	-5.397859	-4.234972	-3.540328	-3.202445	I(1)
FRNT	-6.944332	-4.219126	-3.533083	-3.198312	I(1)
INSQ	-22.23001	-4.219126	-3.533083	-3.198312	I(1)
LGDPP	-3.673569	-4.234972	-3.540328	-3.202445	I(1)
MRNT	-5.207734	-3.621023	-2.943427	-2.610263	I(1)
NGRNT	-6.503258	-4.226815	-3.536601	-3.200320	I(1)
ORNT	-7.527880	-4.226815	-3.536601	-3.200320	I(1)
CRNT	-4.348001	-4.211868	-3.529758	-3.196411	I(0)

Source: Author's computation using Eviews 10

Table 3. Philips-Perron (PP)Unit Root Test Result

Variables	T-Statistics	Critical Values			Remarks
		1%	5%	10%	
FD	-5.772235	-4.219126	-3.533083	-3.198312	I(1)
FRNT	-6.944332	-4.219126	-3.533083	-3.198312	I(1)
INSQ	-7.522831	-4.211868	-3.529758	-3.196411	I(0)
LGDPP	-3.963739	-4.211868	-3.529758	-3.196411	I(0)
MRNT	-4.967832	-4.211868	-3.529758	-3.196411	I(0)
NGRNT	-5.922466	-4.219126	-3.533083	-3.198312	I(1)
ORNT	-3.985100	-4.211868	-3.529758	-3.196411	I(0)

CRNT	-4.464628	-4.211868	-3.529758	-3.196411	I(0)

Source: Author's computation using Eviews 10

From the ADF and PP unit root test results in table 2 and 3, the variables are combination of both I(0) and I(1) and none of them is of I(2). Thus, the variables are qualified to run for NARDL approaches to co-integration.

Table 4. Unit root test with structural breaks

Variables	Lee Strazicich LM at Level		Lee Strazicich LM at first difference	
	T-statistic	Break points	*T*-statistic	Break points
FD	-5.986601*	1990 2005	-6.612609**	2009 2014
FRNT	-8.594248***	1991 2004	-	1991 2004
INSQ	-11.72657***	1995 2008	-	1995 2008
LGDPP	-6.157940**	1994 2011`	-	1994 2011
MRNT	-2.632324	2006 2009	-7.145952***	1992 2008
NGRNT	-3.705421**	1999 2013	-	1999 2013
ORNT	-4.941046***	1999 2015	-	1999 2015
CRNT	-7.371954***	1993 2008	-	1993 2008

***, ** and * show significance at 1%, 5% and 10% levels respectively

Source: Author's computation using Eviews 10.

This paper applied the Lee Strazicich LM unit root test to overcome the structural breaks in the data as presented in table 4, which is capable of accounting for two breaks points that is, innovative and additive outliers, with additive outliers as the most preferable because it plugs out sudden changes in the mean of the variables (Inuwa et al. 2021). The results confirm the findings obtained from the previous tests (i.e. ADF and PP) that the variables are combination of both I(0) and I(1), hence the use of NARDL model.

4.3 Lag Length for F- Bound Cointegration Test

The result of the optimal lag length is presented in the table below:

Table 5. Lag Length Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-78.33352	NA	7.141839	4.796307	5.148200	4.919127
1	-71.60689	10.08995	5.212758*	4.478160*	4.874040*	4.616333*
2	-65.88626	8.263129*	4.026975	4.215903	4.655770	4.369428
3	-63.65386	3.100553	3.779986	4.147437	4.631290	4.316314
4	-63.52088	0.177310	3.991663	4.195604	4.723444	4.379835

Source: Author's computation using Eviews 10.

Table 5 presents the lag order selection by five different criteria. All the lag selection criteria except LR suggest that a lag length of one (1) is optimal for the F-bound cointegration test. Therefore, this study used a lag length of one for the cointegration test.

4.4 Bound Test for Cointegration

Co-integration test was conducted using bound test techniques to determine whether the variables included in the model are related in the long run or not.

Table 6. Bound Test for Cointegration

H_0: *No cointegration*

F-Statistic	Significance Level	Bound Critical Values		K
		I(0) Bound	I(1) Bound	
3.733318	1%	2.54	3.86	14
	2.5%	2.28	3.5	
	5%	2.06	3.24	
	10%	1.83	2.94	

Source: Author's computation using Eviews 10

The result of the F-bound test of cointegration shows that the value of F-statistics is 3.733318 and is higher than both the lower and the upper bound critical values at 5% level of significance. Hence, the null hypothesis of no cointegration is rejected, and concluded that, the variables havelongrun equilibrium relationship.

4.5 Non-Linear ARDL Longrun Response

Table 7 shows the result of the nonlinear response of financial development to changes in disaggregated natural resource rent, institutional quality and economic growth in Nigeria with positive and negative responses in the longrun.

Table 7. Non-Linear ARDL Longrun Response

Variables	Coefficient	Std. Error	t-Statistic	Prob.
LFRNT_POS	0.420608	1.929357	0.218004	0.8311
FRNT_NEG	-0.327390	1.413870	-0.231556	0.8208
INSQ_POS	0.767513	1.183273	0.648635	0.5288
INSQ_NEG	2.127982	1.001357	2.125099	0.0550
CRNT_POS	2.918018	0.722165	4.040652	0.0016
CRNT_NEG	-2.112112	0.953085	-2.216078	0.0468
LGDPP_POS	21.46386	9.465991	-2.267471	0.0426
LGDPP_NEG	23.81908	31.17929	0.763939	0.4597
MRNT_POS	0.202580	0.348730	0.580907	0.5721
MRNT_NEG	0.133946	0.232474	0.576175	0.5751

NGRNT_POS	-1.889630	1.623574	-1.163870	0.2671
NGRNT_NEG	0.888170	1.585673	0.560122	0.5857
ORNT_POS	-0.009507	0.078184	-0.121594	0.9052
ORNT_NEG	-0.017731	0.105999	-0.167276	0.8699

Source: Author's computation using Eviews 10

The longrun result shows that, A per cent increase in forest rent increases financial development by 0.42%, while 1% decrease in forest rent raises financial development by 0.32%. This suggests that the response of FD to positive changes in FRNT is different from its response to negative changes in FRNT, confirming the findings of Asif et al. (2020). Also, the response of financial development to positive and negative changes in institutional quality (INSQ) is positive and statistically insignificant (0.767513 and 2.127982 respectively). This shows that FD increases by 0.77% when INSQ increases by at least 1 per cent, while decrease in INSQ by 1 per cent results in 2.1 per cent increase in FD in the longrun. This is consistent with the study of Chaudhry et al (2021). For coal rent (CRNT), the response of FD to positive changes is positive but statistically insignificant in explaining the change in FD. The result shows that 1 per cent increase in CRNT increases FD by 2.9%, whereas the result shows an inverse relationship between CRNT and FD. A percentage decrease in CRNT increases FD by 2.1%. A per cent increase in GDPP increases FD by 21.4%, while a fall in GDPP reduces FD by 23.8% as found by Asif et al (2020) and Chaudhry et al (2021). The long-term result also shows that, the response of financial development (FD) to positive and negative changes in minerals rent (MRNT) are positive but statistically insignificant. A per cent increase in MRNT increases financial development by 0.2%, while 1 per cent decrease in MRNT reduces FD by 0.1%. The response of FD to positive changes in natural gas rent (NGRNT) is negative, while the negative change is positive and statistically insignificant (-1.889630 and 0.888170), implying that FD decreases by 1.89% when NGRNT increases by at least 1%, while decrease in NGRNT by 1% results in 0.89% increase in FD in the longrun. For oil rent (ORNT), the response of FD to positive and negative changes are negative but statistically insignificant in explaining the change in FD. The finding shows that, a per cent increase in ORNT reduces the growth in financial development by 0.01%, while a decline in ORNT also reduces financial development by at least 0.009%, confirming the results of Elhannani et al. (2016), Nathaniel (2021) and Khan et al. (2020).

4.6 Nonlinear ARDL shortrun Response

Table 8 presents the result of the shortrun asymmetric coefficients of the FRNT, INSQ, CRNT, MRNT NGRNT, and ORNT with all the positive and negative responses in explaining the changes in FD in Nigeria.

Table 8. Nonlinear ARDL shortrun Response

Variables	Coefficient	Std. Error	t-Statistic	Prob.
C	239.2182	18.85555	12.68689	0.0501
D(FRNT_POS)	15.89412	1.535125	10.35363	0.0613
D(FRNT_NEG)	-14.48462	1.356268	-10.67976	0.0594
D(INSQ_POS)	19.54283	1.559755	12.52943	0.0507
D(INSQ_NEG)	21.57059	1.607908	13.41531	0.0474
D(CRNT_POS)	16.30978	1.162450	14.03052	0.0453
D(CRNT_NEG)	-8.942137	0.721878	-12.38732	0.0513
D(LGDPP_POS)	-2.750601	21.53838	-13.22061	0.0481
D(LGDPP_NEG)	21.19056	53.12790	12.25703	0.0518
D(MRNT_POS)	-6.208574	0.501054	-12.39103	0.0513
D(MRNT_NEG)	2.052968	0.225926	9.086904	0.0698
D(NGRNT_POS)	-19.78538	1.631980	-12.12354	0.0524
D(NGRNT_NEG)	6.636978	0.952530	6.967733	0.0907
D(ORNT_POS)	-1.063393	0.092565	-11.48806	0.0553
D(ORNT_NEG)	-0.105268	0.056655	-1.858044	0.3143
ECM(-1)*	-0.727621	0.136516	12.65506	0.0502

Source: Author's computation using Eviews 10

Table 8 shows the result of the shortrun asymmetric coefficients of the independent variables. Ceteris paribus, 1% increase in FRNT increases FD by 15.89%. Whereas 1% increase in FRNT results in 14.48% increase in FD. Again, positive changes in INSQ have positive relationship with FD. 1% increase in INSQ increases FD by 19.54%, while a percentage decrease in INSQ reduces FD by 21.57%. Increase in CRNT by 1% also increases FD by 16.30%, while a decrease in CRNT by 1%increases FD by 8.94%. However, positive shocks in GDPP has negative and significant impact on financial development. 1% rise in GDPP decreases FD by 2.75%, while, 1% decrease in GDPP reduces FD by 21.19%. The finding also suggests that, a rise in MRNT by 1 per cent raises FD by about 6.20%. In the same vein, a decrease in MRNT by 1% results in 2.05% fall in FD. The result also shows that an increase in NGRNT by 1 per cent leads to a fall in FD by 19.8%, whereas, 1% increase in NGRNT decreases FD by 6.6%. While a rise in ORNTby 1% decreases FD by 1.06%, a fall in ORNT by 1% reduces FD by 0.1%. The results are consistent with the findings of Asif et al (2020), Salari et al. (2022), Shahbaz et al. (2020), Khan et al. (2020), Dwumfour and Ntow-Gyamfi (2018) and Atil et al. (2020). Finally, the Error Correction Mechanism *ECMt(-1)* is negative and statistically significant, implying that, for every disequilibrium, in the longrun, there will be convergence or correction toward equilibrium by 72 per cent.

4.7 Longrun Asymmetry: Wald Test

Table 9 presents the result of longrun asymmetric relationship of the Wald test between the dependent variable (FD) and the independent variables (FRNT, CRNT, INSQ, MRNT, GDPP and ORNT). The null hypothesis states that H_o: there is no long-term asymmetric relationship.

Table 9. Longrun Asymmetry: Wald Test

Variables	Equation	T-stats	Chi- Square	F-stats	Prob.
FRNT	NARDL	1.291303	1.667464	1.667464	0.2129
INSQ	NARDL	-3.428221	11.75270	11.75270	0.0030
CRNT	NARDL	2.142604	4.590750	4.590750	0.0461
GDPP	NARDL	-2.892965	8.369247	8.369247	0.0097
MRNT	NARDL	-0.707399	0.500413	0.500413	0.4884
NGRNT	NARDL	-0.959460	0.920563	0.920563	0.3500
ORNT	NARDL	2.326977	2.760869	2.760869	0.0201

Source: Author's computation using Eviews 10

From the table, if the F-statistics value is statistically significant at 5% level, then reject the null hypothesis and conclude that there is longrun asymmetric relationship. Therefore, from table 9, there is evidence of longrun asymmetry between the dependent variable (FD) and all the explanatory variables except FRNT, MRNT and NGRNT which are statistically insignificant. Therefore, the study rejects the null hypothesis and conclude that there is evidence of longrun asymmetric relationship between the dependent variable (FD) and the explanatory variables (INSQ, CRNT, GDPP, ORNT).

4.8 Diagnostic Tests

Table 10 presents diagnostic tests of the results to confirm whether the model is stable, robust and efficient, and can give a good forecast. The first test is the Jaque Bera (normality test) developed by Jaque and Bera (1980) to test for the normality distribution of the residuals. The null hypothesis (H_o) is that the residuals are normally distributed.

Table 10. Diagnostic Tests

Tests	F- statistics	Obs*R-squared	Prob.
Jaque Bera	---	---	0.570034
Serial Correlation	1.966183	0.525634	0.8605
Heteroskedasticity	1.174059	23.00437	0.3811
RAMSEY RESET	4.322914	---	0.0610

Source: Author's computation using Eviews 10

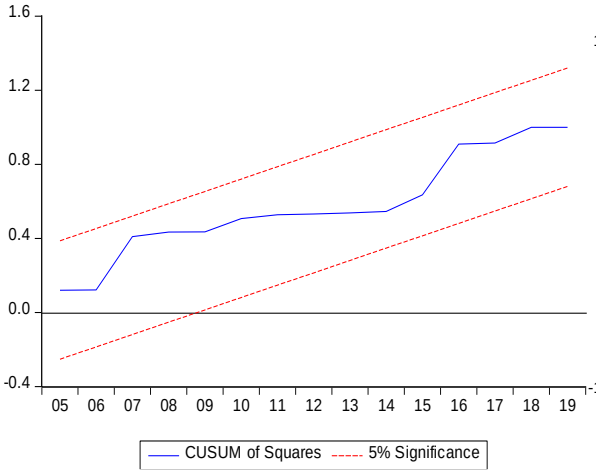

Fig.1. Cusum Test
Source: Author's computation using Eviews 10

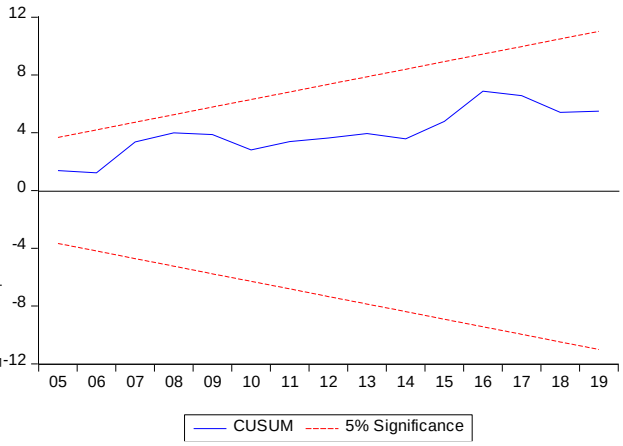

Fig.2 Cusum of Squared Test
Source: Author's computation

Lastly, the results of diagnostics tests were presented in table 4.10 which showed that the error terms are normally distributed. Similarly, the model is free from serial correlation and heteroscedasticity, and also well specified based on the Ramsey rest test. Similarly, the model has no problem and the residual are normally distributed. Stability of both the short and long run parameters have been checked using CUSUM and CUSUMsq and the result is presented in Figs. 1 and 2, which revealed that the plots are within the 5% critical bounds and justify the stability of the models during the study period.

5. CONCLUSION AND POLICY IMPLICATIONS

This study examined the dynamic interaction between disaggregated natural resource rents on financial development in Nigeria during the period 198–2019. The study applied Nonlinear Autoregressive Distributed Lag (NARDL) model. The results revealed that oil and natural gas rents negatively affect financial development in Nigeria both in the shortrun and longrun, supporting the resource curse hypothesis. However, the findings in respect of forest rent, mineral, institutional quality, economic growth and coal rents revealed a positive but insignificant effect on financial development in the longrun, contradicting the resource curse hypothesis, while in the shortrun, economic growth, mineral and coal rents affect financial development negatively. The policy implication of the findings is that different types of resource rents have different impact on financial development as evidenced in this study. It may not be unconnected with the fact that most of the rents generated from the oil and natural gas resources have not been put into proper usage during the period of study, hence the adverse effect on the Nigerian financial development and the economy at large. Therefore, the study suggests that government should use the rents judiciously in order to stimulate growth, which will translate into financial development. This is achievable through reinvesting the proceeds in other sectors of the economy that are growth enhancing such as the financial sector of the economy. Finally, institutional quality plays a vital role in Nigeria's financial development as evidenced in this study hence, policy makers should design and judiciously implement policies that will enhance and sustain the good use of the rents obtained from the natural resources (coal, oil, mineral and natural gas) so that they will continuously serve as blessing rather than curse on the Nigerian financial development.

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