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THE ROLE ASYMMETRIES IN EXCHANGE RATE REGIMES AND MACROECONOMIC PERFORMANCE: THE CASE OF NIGERIA

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Abstract: *The role of exchange rate in the macroeconomic fundamentals of a country cannot be underestimated but the nonlinear (asymmetric) feature of the exchange rate movements becomes of importance when analyzing its role in macroeconomic performance. Thus, this study, using historical annual time series data from 1970 and 2020, and a nonlinear ARDL model investigated the nexus between exchange rate regimes and the macroeconomic performance in Nigeria. This model allows us to capture that the partial sum of positive exchange rate movements (exchange rate depreciations) and negative exchange rate movements (exchange appreciations). We found the potential exchange rate regime to cause declining inflationary pressure sensitive to whether the exchange rate regime is responding to depreciation or appreciation in its movement. But then, irrespective of whether the exchange rate is depreciating or appreciation, the exchange rate regimes exhibit little or no significant impact on output growth in Nigeria. Specifically, we find that an intermediate exchange rate regime based on exchange rate depreciations is viable for promoting trade surpluses, whereas intermediate exchange rate regime that is due to appreciation of exchange rate tends to cause to trade deficit. More importantly, we found that the magnitude of the role of the nonlinear feature of exchange rate on trade balance is relatively higher when the exchange rate is appreciating.*

Keywords: Exchange rate regimes, IMF –LYS, Macroeconomic performance, ARDL, Nigeria.

JEL Classification: B22, B27, E31, F31.

1. Introduction

Exchange rate management anywhere in the world plays an important role in the macroeconomic fundamentals of a country. But, despite the vastness of both theoretical and empirical literature on the impact of exchange rate regimes on key macroeconomic fundamentals, namely, economic growth, inflation, and trade balance, the question that has yet to be explored is whether the nonlinearity (asymmetric) feature of the exchange rates matters in the direction and magnitude of the impacts of exchange rate regimes on macroeconomic performance. For instance, the choice to fix the exchange rate or allow it to float is usually inform by movements in exchange rates, such as exchange rate appreciations and exchange rate depreciations. To this end, the innovation in this study is to understand the extent to which the effectiveness or otherwise of a particular exchange rate regime is sensitive to the inherent nonlinearities (asymmetries) features in exchange rate movements.

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There is no gainsaying that a number of empirical studies have been conducted to explain not only the determinants of exchange rates and exchange rate regimes in Nigeria but also the link between exchange rate regimes and macroeconomic performance (see, for example, Akinbobola, 2012; Adebiyi, 2007; Adewuyi, 2003; Obaseki, 2001; Ubok-Udom, 1999; Ogun, 1998; Ayodele, 1997; Ajakaiye, 1994; Olopoenia, 1993; Olopoenia, 1986; Oyejide, 1985). However, these studies gave little or no consideration to the likelihood of the impact of exchange rate regimes being influenced by the asymmetric feature of exchange rate movements. To bridge this important gap in the literature, this study uses the nonlinear variant of the ARDL model to test asymmetries matters in the relationship between the exchange rate regime and macroeconomic performance.

The use of the ARDL model, through its nonlinear variant, enables us to capture the partial sum of positive exchange rate movements (exchange rate depreciations) and negative exchange rate movements (exchange appreciations). The importance of this is that it will enable us to either validate or refute the hypothesis that the nonlinear feature of exchange rate movements matter in the relationship between exchange rate regimes and macroeconomic performance.

In addition to this introductory section, the rest of the paper is structured as follows: Section 2 present a brief literature review. Section 3 discusses the data and presents the methodology. Section 4 contains the results and discusses the findings while section 5 concludes the paper.

2. Brief Literature Review

In their analysis of the impact of exchange rate regime on the growth of 60 developed and developing countries, Bailliu et al. (2003) uses dynamic GMM technique to show that while there is a positive link between fixed regime and growth, an intermediate regime without an anchor on the other hand impact growth negatively. In a similar development Husain et al. (2005) use the case of emerging and developing economies to show that in developing countries more flexible regimes are associated with high inflation but do not lead to gains in output growth while fixed or near fixed regimes deliver lower inflation without sacrificing growth. In attempt to replicate the LYS growth regressions, For Miles (2006) uses a panel of annual data across a developing countries' subset of the LYS original sample to show that once a measure of domestic distortions is added to the model, exchange rate regimes exert no independent impact on the output growth.

Exploring the official (IMF) and four alternative de facto exchange rate regime classifications, Bleaney and Francisco (2007) concludes that floats have very similar growth rates to 'soft' (easily adjustable) pegs while 'hard' pegs (currency unions and currency boards) have slower growth than other regimes. The study by Raji (2013) on the impact of exchange rate misalignment on economic performance revealed that the WAMZ economy is exposed to asymmetrical correlation between real exchange rate misalignment and economic performance. On the relevance of exchange rate regime in restraining current account imbalance in Sub-Saharan African nations, Gnimassoun (2015) shows that flexible exchange rate regimes are more effective in preventing disequilibria. In another development, Nathaniel et al. (2019) uses the case of ECOWAS to concludes that exchange rate regimes have the potential to deepening economic integration.

Quite a number of the extant studies have also focused on the case of the Nigerian economy (see Adeoye & Atanda, 2010; Omojimite & Akpokodje, 2010; Mahmood& Ali, 2011; Dada & Oyeranti, 2012; Adesoye, 2012), among others. However, to the best of our knowledge, none of these studies has considered accounting for the role of asymmetries in the relationship between exchange rate regimes and macroeconomic performance. Thus, it should come as no surprise that the onus of resolving the question of whether or not there exists a link between a country's economic performance and exchange rate regimes has continued to produced mixed results. Essentially, there has been little or no concrete effort in the literature to understand the extent to which asymmetries matter in the impacts of exchange rate regimes on macroeconomic performance in Nigeria.

3. Methodology and Data

3.1 Data description and source

The variables used in the context of this study are selected based on their theoretical importance, performance measures of the economy, and their uses and findings in the previous empirical literature. More importantly, the data are annual frequency spanning between 1970 and 2020 and totaling 50 as the number of observations. The data were obtained from secondary sources including Central Bank of Nigeria (CBN) online databases, CBN annual statistical bulletin, and World Development Indicators (WDI) online database. The key variables of interest for instance macroeconomic performance are measures via three important indicators, namely, economic growth, inflation rate and a trade balance. The goal is to understand the extent to which the role of asymmetries in the relationship between exchange rate regimes and macroeconomic performance varies for alternative indicators of macroeconomic performance.

From the technical point of view, the output growth (YG)is measured as log of real GDP per capita, inflation rate (INFL) is measured as log of consumer price index, while trade balance (TB) measured as log of exports less log of imports of visible goods. In addition, the exchange rates (EXR) variable is measured as the log of the country's national currency (Naira) relative to dollar. Physical capital (PK) measured as log of gross fixed capital formation, human capital (HK) measured using secondary school enrolment as a ratio of total school enrolment and labour force (LAB) measured as log of total labor force are some of the control variables in the study. Others are government consumption (GC) measures as log of total government final consumption expenditure, trade openness (TOP) measured as the sum of export and import as a ratio of GDP, monetary policy rate (MPR), domestic income (DY) and foreign income (FY) measured as log of the Nigeria's real GDP log of world real GDP less log of Nigeria's real GDP, respectively.

Regarding the exchange rate regimes variables, the dummies for exchange rate regimes were classified into three major groups namely, pegged/fixed regime (FIX), intermediated regime (INTER) and floating/flexible regime (FLEX). Using the IMF's de jure -de facto exchange rate regime classification the dummies take the value of one if a specific exchange rate regime prevailed in a given period, and zero if otherwise. Saying it differently, irrespective of which of the alternative exchange rate regime classification method is under consideration, we create dummies for pegged/fixed, intermediate (INTER), and floating/flexible (FLEX) exchange rate regimes. However, FLEX was reflected as default benchmark so as to avoid running into the problem of dummy trap and more so to understand in relative term the extent to which economic performance respond differently to difference groups of exchange rate regimes.

3.2 Econometric Method and Estimation Procedure

To answer the question of whether the nonlinear feature of exchange rate matters in the relationship between exchange rate regimes and macroeconomic performance, the ARLD model in equation (1) is represented in a nonlinear form (NARDL).

$$\Delta \ln Z_t = \varphi + \alpha_1 \ln Z_{t-1} + \alpha_2 \ln X_{t-1} + \alpha_3^+ \ln EXR_{t-1}^+ + \alpha_4^- \ln EXR_{t-1}^- + \sum_{j=1}^{p} \beta_{1j} \Delta \ln Z_{t-j} + \sum_{i=0}^{q1} \beta_{2i} \Delta \ln X_{t-i} + \sum_{i=0}^{q2} \left(\Delta \beta_i^+ \ln EXR_{t-i}^+ + \Delta \beta_i^- \ln EXR_{t-i}^- \right) + \sum_{n=1}^{k} \lambda_n D_{nt} + \varepsilon_t \quad (1)$$

The nonlinearity in equation (1) is reflected by decomposing changes in exchange rate into positive change (depreciation) and negative change (appreciation). These decomposed prices are defined theoretically as:

$$EXR_t^+ = \sum_{j=1}^{t} \Delta EXR_j^+ = \sum_{j=1}^{t} \max\left(\Delta EXR_j, 0\right) \quad (2a)$$

$$EXR_t^- = \sum_{j=1}^{t} \Delta EXR_j^- = \sum_{j=1}^{t} \min\left(\Delta EXR_j, 0\right) \quad (2b)$$

In order to counter any notion that the decomposed exchange rate series are included in the nonlinear ARDL model merely as addition variables, we further extended the specification in equation (1) to capture the probable of the nonlinear (asymmetric) feature of exchange rates influencing the impact of exchange regimes on economic performance via an interaction term.

$$\Delta \ln Z_t = \varphi + \alpha_1 \ln Z_{t-1} + \alpha_2 \ln X_{t-1} + \alpha_3^+ \ln(EXR*D)_{t-1}^+ + \alpha_4^- \ln(EXR*D)_{t-1}^- + \sum_{j=1}^{p} \beta_{1j} \Delta \ln Z_{t-j} + \sum_{i=0}^{q1} \beta_{2i} \Delta \ln X_{t-i} + \sum_{i=0}^{q2} \left(\Delta \beta_i^+ \ln(EXR*D)_{t-i}^+ + \Delta \beta_i^- \ln(EXR*D)_{t-i}^- \right) + \sum_{n=1}^{k} \lambda_n D_{nt} + \varepsilon_t \quad (3)$$

Equation (3) is our extended nonlinear ARDL model, where the probable influence of the nonlinear feature of exchange rates on the nexus between exchange rate regime and economic performance is captured via interaction term. We can re-specify equation (3) to include an error correction term as below.

$$\Delta \ln Z_t = \varphi + \eta ECT_{t-1} + + \sum_{j=1}^{p} \beta_{1j} \Delta \ln Z_{t-j} + \sum_{i=0}^{q1} \beta_{2i} \Delta \ln X_{t-i} + \sum_{i=0}^{q2} \left(\Delta \beta_i^+ \ln(EXR*D)_{t-i}^+ + \Delta \beta_i^- \ln(EXR*D)_{t-i}^- \right) + \sum_{n=1}^{k} \lambda_n D_{nt} + \varepsilon_t \quad (4)$$

In equation (4), the error-correction term that captures the long run equilibrium in the nonlinear ARDL (NARDL) model represented as ECT_{t-1} while its associated parameter (η) [the speed of adjustment] measures how long it takes the system to adjust to its long run when there is a shock. The error correction term can be expressed as $ECT_{t-1} = Z_{t-1} - \phi_0 - \phi_1 (EXR*D)_{t-1}^+ - \phi_2 (EXR*D)_{t-1}^-$ wherein the parameters $\phi_1 \left(= -\frac{\alpha_3}{\alpha_1} \right)$ and $\phi_2 \left(= -\frac{\alpha_4}{\alpha_1} \right)$ represent the long run parameters for positive and negative changes in exchange rates respectively while the short run parameters are β_i^+ and β_i^-

Just as applicable in the conventional linear ARDL model, the long run parameters will only be estimated if there is presence of cointegration. Thus, pre-testing for cointegration is necessary also in NARDL and this involves the Bounds testing that is *F* distributed. However, the underlying hypotheses for cointegration involve the long run asymmetric parameters. In other words, the null hypothesis of no cointegration expressed as

$H_0: \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = 0$ will be tested against the alternative hypothesis of cointegration given as $H_1: \alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq 0$.
In addition, the study would also employ the Wald test for testing restrictions to ascertain whether the nonlinear feature of exchange matters in the impact of exchange rate regime on economic performance both in the long run and short run. For the Wald test, the null hypothesis of no asymmetries - $H_0: \alpha_3 = \alpha_4$ (for long run) and $H_0: \sum_{i=0}^{q2} \beta_i^{+} = \sum_{i=0}^{q2} \beta_i^{-}$ (for short run) is tested against the alternative of presence of asymmetries - $H_1: \alpha_3 \neq \alpha_4$ (for long run) and $H_1: \sum_{i=0}^{q2} \beta_i^{+} \neq \sum_{i=0}^{q2} \beta_i^{-}$ (for short run).
The preference for the ARDL framework compared to other alternative econometric methods in the literature hinge on the flexibility of its application regardless of whether the variables are stationary or become stationary through the first difference. Also, and according to Pesaran et al. (2001), the selection of the optimum ARDL model involves automatic correction of the residual serial correlation and of the endogeneity problem.

4. Result Presentation and Discussion

4.1 Preliminary Results
A cursory look at table 1 shows that average output growth in Nigeria when measured is 220.8 US billion dollars for the period between 1970 and 2020. However, the average interest rates over the same period were 15% while the positive sign on the mean value of the trade balance (TB) is an indication that the country has be maintaining a trade surplus over the period between 1970 and 2020. Further presented in Table 2 is unit testing results. For robustness and consistency purposes, we considered both the basic Augmented Dickey-Fuller (ADF) test and its extended variant for instance Dickey-Fuller GLS test. Both the ADF and DF-GLS tests revealed the integration properties of series to hover between I(0) and I(1) thus further re-enforces our preference for the ARDL technique as the most appropriate in this study.

Table 1: Descriptive/Summary Statistics

	Mean	***Std. Dev.***	**N-Std. Dev.**	**Skewness**	**Kurtosis**	**J-B**
YG	220.79	127.72	0.58	0.99	2.42	9.12(0.01)
INFL	52.81	76.74	1.45	1.65	4.85	30.28(0.00)
INTR	15.32	6.10	0.40	0.12	2.48	0.69(0.71)
TB	1.04	1.20	1.16	0.27	2.01	2.71(0.26)
EXR	78.25	95.57	1.22	1.09	3.20	10.17(0.01)
PK	51.66	16.41	0.32	-0.76	3.55	5.57(0.06)
HK	26.54	12.60	0.47	-0.08	2.60	0.39(0.82)
GC	9.41	11.94	1.27	1.01	2.24	9.93(0.01)
TOP	33.32	11.91	0.36	-0.46	2.33	2.78(0.25)
FY	46481	19739	0.42	0.44	1.99	3.83(0.15)
MPR	11.72	4.54	0.39	0.53	3.36	2.67(0.26)

Note: Std. Dev. denotes standard deviation while N-Std. Dev. is the normalized variant of the standard deviation statistic standard deviation/mean. The values in parenthesis are probability values associated with Jaque-Bera (JB) statistics.

Table 2: Unit root test results

Variable	Model with Constant			Model with Constant & Trend		
	Level	First Difference	I(d)	Level	First Difference	I(d)
Test type: ADF Unit Root Test						
YG	0.600	-2.297***	I(1)	1.429	-2.486***	I(1)
INFL	-1.384	-4.099***	I(1)	-1.519	-4.272***	I(1)
INTR	-1.621	-6.682***	I(1)	-0.927	-6.881***	I(1)
TB	-2.612*	-	I(0)	-2.575	-7.322***	I(1)
EXR	-0.363	-5.618***	I(1)	-1.444	-5.555*	I(1)
PK	-3.302**	-	I(0)	-6.005***	-	I(0)
HK	-1.788	-2.772*	I(1)	-2.547	-5.966**	I(1)
GC	-0.231	-7.227**	I(1)	-1.778	-7.230**	I(1)
TOP	-2.866*	-	I(0)	-2.827	-7.871**	I(1)
FY	-1.761	-5.354**	I(1)	-4.494*	-	I(0)
MPR	-2.111	-8.634***	I(1)	-2.198	-8.591***	I(1)
Test type: DF-GLS Unit Root Test						
YG	1.294	-2.072***	I(1)	-1.377	-2.695	I(1)
INFL	0.420	-4.146***	I(1)	-1.701	-4.343***	I(1)
INTR	-0.906	-6.685***	I(1)	-1.086	-6.952***	I(1)
TB	-2.496**	-	I(0)	-2.579	-7.445***	I(1)
EXR	0.374	-5.427***	I(1)	-1.314	-5.616***	I(1)
PK	-0.4661	-2.769***	I(1)	-1.789	-3.321**	I(1)
HK	-0.807	-2.818***	I(1)	-2.900*	-	I(0)
GC	0.252	-7.282***	I(1)	-1.625	-7.385***	I(1)
TOP	-2.413**	-	I(0)	-2.777	-7.937***	I(1)
FY	0.868	-4.867***	I(1)	-2.711	-5.506***	I(1)
MPR	-1.493	-8.707***	I(1)	-2.180	-8.752***	I(1)

Note: The exogenous lags are selected based on Schwarz info criteria while ****, **, * imply that the series is stationary at 1%, 5% and 10% respectively. The null hypothesis is that an observable time series is not stationary (i.e., has unit root).

4.2 Regression Results

Starting with inflation (INFL) as a measure of macroeconomic performance, a look at Table 3 shows that the decision on whether to reject or do not the null hypothesis of no long run relationship was inconclusive when the estimated NARDL model is in terms of positive changes in exchange rate, but otherwise for the NARDL that include negative changes in exchange rate. However, while the coefficients on both EXR^+ and $EXR^-$are positively signed, the extent to which asymmetries matters in the impact of exchange rate regimes on inflation appears to be only statistically evident in the short run. For instance, compared to a floating exchange rate regime, a fixed regime that is due exchange rate depreciation has the potential of causing increasing price level (inflation) at least in the short run situation.

Presented in Table 4 is the empirical estimates obtained from the NARDL model when the macroeconomic performance was measured in terms of output growth. Compared to our earlier finding of significant impact of exchange rate regimes on inflation, deciphered from the empirical estimates in table 4 is evidence of no significant relationship between exchange rate regimes and output growth. Saying it differently, irrespective of whether the nonlinear exchange rate was due to exchange rate depreciations or exchange rate appreciations; the nonlinearity feature has no significant influence on the impact of

exchange rate regime on output growth. This result appears to be consistent both for fixed exchange rate regime and intermediate exchange rate regime.
With macroeconomic performance further measured as trade balance (TB), the regression results in Table 5 seems to be suggesting that the impacts of exchange rate regimes on macroeconomic performance is relatively more pronounced when the latter is measured in terms trade balance (TB). However, the consistency of this latter finding seems to statistically viable mainly when the exchange rate management was under intermediate regime.

Table 3: NARDL estimates when the macroeconomic performance is measured in terms of inflation

Long Run Equation	**Positive change in exchange rate**			**Negative change exchange rate**		
	Coefficient	**SE**	**T-stat**	**Coefficient**	**SE**	**T-stat**
YG	-1.0073	0.8222	-1.2251			
EXR^{+}	0.7499**	0.3064	2.4469			
$EXR^{+}FIX$	2.3819	3.9519	1.4424			
$EXR^{+}INTER$	-0.0476	0.0753	-0.6321			
EXR^{-}						
$EXR^{-}FIX$				Not Applicable (NA)		
$EXR^{+}INTER$						
Short Run Equation						
Constant	0.5159	0.4051	1.2738	0.9274*	0.5455	1.6999
$\Delta INFL_{t-1}$	-0.1191**	0.0528	-2.2542	-0.0573	0.0592	-0.9667
ΔYG	-0.1199	0.0991	-1.2102	-0.1860	0.1354	-1.3743
ΔEXR^{+}	0.0893**	0.0341	2.6195			
$\Delta EXR^{+}FIX$	4.7241*	1.2817	1.9023			
$\Delta EXR^{+}INTER$	-0.0057	0.0079	-0.7101			
ΔEXR^{-}				0.1606	0.5267	0.3051
$\Delta EXR^{-}FIX$				1.8321	1.1348	1.6145
$\Delta EXR^{+}INTER$				0.1100	0.1293	0.8512
ECT_{t-1}	-0.1191***	0.0271	-4.3450	Not Applicable (NA)		
Bound Test Cointegration Results						
Level of Significance	F-statistic	I(0)	I(1)	F-statistic	I(0)	I(1)
10%		3.03	4.06		3.03	4.06
5%	3.45	3.47	4.57	2.33	3.47	4.57
1%		4.40	5.72		4.40	5.72
Diagnostic and Post-Estimation Results						
Adjusted R^2		0.98		0.98		
F-statistics		4897.091(0.000)		5612.104 (0.000)		
Autocorrelation test (Q-Stat)		14.801(0.101)		15.879(0.079)		
Heteroscedasticity test (ARCH LM)		11.212(0.210)		3.649(0.800)		
Normality test (Jaque-Bera)		15.596(0.000)		11.985(0.249)		

Note: The value in parenthesis represents the probability values for the various post estimation tests performed, while ***, ** and * denote 1%, 5% and 10% level of significance.

Table 4: NARDL estimates when the macroeconomic performance is measured in terms of output growth

Long Run Equation	Positive change in exchange rate			Negative change exchange rate		
	Coefficient	**SE**	**T-stat**	**Coefficient**	**SE**	**T-stat**
PK	-0.3841	0.3494	-1.0993	-0.0831	0.1615	-0.5144
HK	0.0007	0.0112	0.0624	0.0095	0.0069	1.3677
GC	0.1129	0.1445	0.7815	0.1316*	0.0718	1.8330
INFL	-0.3817*	0.2176	-1.7542	-0.3259***	0.0949	-3.4321
TOP	0.0186**	0.0085	2.1985	0.0117***	0.0038	3.0524
EXR^+	0.0876	0.1547	0.5662			
EXR^+FIX	-1.8962	1.3293	-0.7376			
EXR^+INTER	0.0309	0.0444	0.6962			
EXR^-				3.3954***	1.0121	3.3550
EXR^-FIX				0.7745	2.2160	0.3494
EXR^+INTER				-0.1667	0.2612	-0.6384
Short Run Equation						
Constant	0.6053**	0.2664	2.2726	0.9184***	0.2251	4.0804
ΔYG_{t-1}	-0.1348**	0.0639	-2.1064	-0.2214***	0.0116	-3.5939
ΔPK	-0.0518	0.0346	-1.4966	-0.0184	0.0331	-0.5562
ΔHK	9.45E-05	0.0015	0.0627	0.0021	0.0014	1.5145
ΔGC	0.0152	0.0275	-1.8691	0.0291	0.0184	1.5864
ΔINFL	-0.0515*	0.0275	-1.8691	-0.0722***	0.0256	-2.8238
ΔTOP	0.0025***	0.0009	2.8548	0.0026***	0.0007	3.7261
ΔEXR^+	0.0118	0.0188	0.6279			
ΔEXR^+FIX	-1.8337	2.2544	-0.6940			
ΔEXR^+INTER	0.0042	0.0056	0.7462			
ΔEXR^-				0.7518***	0.2243	3.3526
ΔEXR^-FIX				0.1715	0.4757	0.3605
ΔEXR^+INTER				-0.0369	0.0582	-0.6344
ECT_{t-1}	0.1348***	0.0208	-6.4683	0.2214***	0.0279	-7.9466
Bound Test Cointegration Results						
Level of Significance	F-statistic	I(0)	I(1)	F-statistic	I(0)	I(1)
10%	3.86**	2.26	3.34	5.822***	2.26	3.34
5%		2.55	3.68		2.55	3.68
1%		3.15	4.43		3.15	4.43
Diagnostic and Post-Estimation Results						
Adjusted R^2	0.98			0.98		
F-statistics	647.367(0.000)			803.589(0.000)		
Autocorrelation test (Q-Stat)	7.958(0.159)			5.890(0.317)		
Heteroscedasticity test (ARCH LM)	0.498(0.776)			0.831(0.536)		
Normality test (Jaque-Bera)	0.935(0.626)			0.414(0.813)		

Note: The value in parenthesis represents the probability values for the various post estimation tests performed, while ***, ** and * denote 1%, 5% and 10% level of significance.

Table 5: NARDL estimates when the macroeconomic performance is measured in terms of trade balance

Long Run Equation	Positive change in exchange rate			Negative change exchange rate		
	Coefficient	**SE**	**T-stat**	**Coefficient**	**SE**	**T-stat**
FY	1.6583**	0.1211	2.6669	1.1594**	0.3744	2.4372
DY	0.1287	0.9365	0.9365	-2.0040	1.1960	-1.6757
TOP	0.0041	0.0147	0.2772	0.0121	0.0199	0.6091
EXR^+	0.4126	0.3083	1.3382			
EXR^+FIX	0.2120	0.9327	-0.4556			
EXR^+INTER	0.3478***	0.0643	5.4101			
EXR^-				1.4226**	0.4469	0.6091
EXR^-FIX				-1.3858	1.6940	-0.9775
EXR^+INTER				-1.0783***	0.0266	-3.8282
Short Run Equation						
Constant	-6.9790**	2.3051	-2.5910	-1.0154**	0.0672	-2.2838
ΔTB_{t-1}	-0.8249***	0.1484	-5.5585	-0.5815***	0.1268	-4.5866
ΔFY	1.8678**	0.8182	2.6206	1.5369**	0.3990	2.3702
ΔDY	0.1062	0.7778	0.1365	-1.1653*	0.6609	-1.7633
ΔTOP	0.0034	0.0121	0.2800	0.0070	0.0114	0.6154
ΔEXR^+	0.3404	0.2676	1.2719			
ΔEXR^+FIX	1.4435	3.5729	-1.4630			
ΔEXR^+INTER	0.2869***	0.0744	3.8546			
ΔEXR^-				0.6420*	0.2916	0.6154
ΔEXR^-FIX				-0.7835	0.1235	-0.9581
ΔEXR^+INTER				-2.9529***	0.9461	-3.1213
ECT_{t-1}	-0.8250***	0.1260	-6.5486	-0.5815***	0.1054	-5.5193
Bound Test Cointegration Results						
Level of Significance	F-statistic	I(0)	I(1)	F-statistic	I(0)	I(1)
10%	5.34***	2.53	3.59	3.80*	2.53	3.59
5%		2.87	4.00		2.87	4.00
1%		3.60	4.90		3.60	4.90
Diagnostic and Post-Estimation Results						
Adjusted R^2	0.66			0.60		
F-statistics	12.922(0.000)			10.428(0.000)		
Autocorrelation test (Q-Stat)	7.068(0.216)			4.816(0.439)		
Heteroscedasticity test (ARCH LM)	0.346(0.882)			0.454(0.808)		
Normality test (Jaque-Bera)	9.730(0.077)			10.436(0.054)		

Note: The value in parenthesis represents the probability values for the various post estimation tests performed, while ***, ** and * denote 1%, 5% and 10% level of significance.

5. Concluding Remark

This study uses historical annual frequency spanning 1970 and 2020 to hypothesize that asymmetries matter in the nexus between exchange rate regimes and macroeconomic performance. Considering different indicators of macroeconomic performance, the study also hypothesized that the extent to which asymmetries matters in the nexus between macroeconomic performance and exchange rate regimes is sensitive to the indicators of macroeconomic performance that is under consideration. Exploring a nonlinear ARDL model, we find the potential exchange rate regime to cause declining inflationary pressure sensitive to whether the exchange rate regime is responding to depreciation or appreciation in exchange rate movement. Whereas a fixed exchange rate regime that is due to depreciation in exchange rate movement tends to induce inflationary pressure rather than reducing it. In another development, an intermediate exchange rate regime that is due to depreciation in exchange rate tends to induce trade surplus, but the reverse appears to be the case when the intermediate regime is due to appreciation of the exchange rate. These, among other, tend to give credence to the hypothesis that asymmetries matter in the nexus between exchange rate regimes and macroeconomic performance. Validating the study's second hypothesis is the fact that the significance and the magnitude of the role of the nonlinear feature of exchange rate on the impact of exchange rate regimes on macroeconomic performance is relatively more pronounced when the latter is measured in terms of trade balance.

5.1 Limitation to the study

This study set out to offer new evidence-based insights on the nexus between economic performance and exchange rate regimes, particularly from the perspective of whether the impact of exchange rate regimes on economic performance varies for different economic performance indicators. The study categorized the indicators of economic performance into internal and external measures. However, the study's limitation is the limited number of indicators explored as external measures of economic performance compared to the number of internal measures of economic performance indicators.

5.2 Suggestions for Further Research

The study centered on the IMF's *de jure – de facto* approach and considered the LYS approach as another alternative even though there are more than one alternative in the literature. In view of this, we suggest that further studies should consider exploring additional indicators of external measures of economic performance. Effort can also be made to consider a number of alternatives approach to exchange rate regimes classification in addition to the IMF *de – jure* to *de - facto* and LYS statistical method already considered in this study.

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