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MODELING THE IMPACT OF INFLATION FACTORS ON ECONOMIC GROWTH IN NIGERIA USING NO DETERMINISTIC TREND AND QUADRATIC TREND ASSUMPTIONS

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Abstract

This study worked on modeling the impact of Inflation factors on Economic Growth in Nigeria using no deterministic trend and Quadratic trends assumptions. The problem of Inflation in the growth of many nations is never be overemphasized because inflation is the determinant factor. This study model the factors of inflation using factors such as money supply, interest rate, and exchange rate. Quarterly data from the period of 2003 to 2018 were used for this study which was obtained from the Central Bank of Nigeria. The summary statistic of the study variables was Real Gross Domestic Product (RGDP), Inflation rate, exchange rate, interest rate, and money supply. The Jarque-Bera probability values show that RGDP, EXCR INFLATOR variables were normally distribution at 5% except INTR and M2. The ADF test shows that all the variables were stationary at first difference. The results for the Johansen test for Cointegration were estimated to determine the multivariate time series models to be used and from the result of the Johansen test for Cointegration shows evident of Error Correction Model. The Error Correction Model was estimated due to the no spurious regression of the Cointegration indication. The coefficient shows a negative relationship and the impulse response of RGDP shows that Inflation rate, Exchange rate, and Interest rate behavior negatively to RGDP.

Keywords: Growth domestic product, Inflation, Exchange rate, interest rate & money supply

Introduction

The relationship that exists between inflation and economic growth is the most important variable in the field of macroeconomics. Definitely, inflation is one of the major macroeconomic goals which every country's government strives to minimize the stability of the domestic price level of their commodity. This goal is pursued in order to avoid the cost relations with inflation and uncertainties that follow where there is price instability [1]. Most especially, economists hold various divert researches and opinions about the impact and consequences of inflation on nations and people living within the structure. Although it is generally accepted that extremely high inflation rates, such as those during hyperinflation, stagflation, affect the economy negatively, many economists contend that low inflation is good for the economy. Analyzing similar arguments of numbers of economists, Marty and Thornton [2] concluded that a group of economists believe that moderate inflation is good for the economy.

Furthermore, different sectors of the national economy are not also left out from this prolonged infection of high rates of inflation. The high production cost can partially be attributed to one of these national problems, which makes it difficult to compete with their foreign counterparts, because of the higher price of their products hence some are out of business others are producing at aloss or break-even. Inflation is not only harmful due to its welfare cost as it wears down the value of financial assets that are not indexed but it also creates uncertainty in an economy in the long run, [3]. Arabi [4]defined inflation uncertainty as "a state of having limited knowledge where it is impossible to exactly describe an existing state or future outcome, more than one possible outcome". Kwame [5] argues that uncertainty about inflation causes businesses and consumers to make decisions that differ from the ones they would make if there is no uncertainty in the economy. The aim of this study is to model the impact of inflation factors on economic growth in Nigeria.

Literature review

Mallik and Chowdhury [6] used cointegration and error correction models to empirically examine the long and short-run dynamics of inflation and economic growth relationship for four south Asian countries using annual data. They employed a bivariate analysis for all

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four countries and found two motivating results. Firstly, the sensitive of inflation to change in the growth rate was larger than that of growth to changes in the inflation rate. Secondly, the relationship between the long and short-run between inflation and economic growth was found to be positive signs for all four countries. They concluded that the results have important implications in that, although moderate inflation promotes economic growth, faster economic growth absorbs into inflation by overheating the economy.

Ahmed and Mortaza [7] using an annual dataset on real GDP and CPI for the period 1980 -2005 and applying Co-integration and error correction models to explained inflation and growth nexus in Bangladesh, the empirical results demonstrate the existence of a long-run negative relationship between inflation and economic growth for the country. Furthermore, the estimate threshold models suggest six percent as the threshold level of inflation above which inflation unfavorably affects economic growth.

Yeh [8] estimated the causal interrelationship between inflation and economic growth within a simultaneous equations framework and obtained identification using a novel heteroscedasticity based method. Using cross-sectional data of 140 countries over the period of 1970 -2005, the study found a bilateral causal relationship between them. The result indicates that inflation is harmful to growth whereas the effect from growth to inflation is beneficial.

Mapenda [9] also used the Johansen approach and the Vector Error Correction Model to evaluate the long-run determinants of the exchange rate in Ghana and Nigeria, using the terms of trade, trade restrictions, domestic interest rates, foreign aid inflow, income, money supply, world inflation, government consumption expenditure, world interest rates, capital controls and technological progress. His empirical results for Ghana revealed that any increase in government consumption expenditure, the terms of trade, net foreign aid inflow and openness significantly led to currency depreciation, while an increase in world cocoa prices appreciated the Ghanaian currency. On the other hand, an increase in world oil prices and government consumption expenditure appreciated the Nigerian currency, whereas a rise in net foreign assets devalued the Naira. His work finally showed that the Naira exchange rate was overvalued within the period 1980 to1983 and undervalued within the period 1984 to 1991.

Victor and Dickson [10] investigated the determinants of the real exchange rate in Nigeria, where their main objective was to present a dynamic model ofreal exchange rate determination using data from 1970 to 2010. They considered government spending, GDP, terms of trade, capital flow, price level, technological progress, and nominal effective exchange rate. The Johansen co-integration test they applied suggested that a long relationship existed among the variables.

Kwame [5] investigates the relationship between inflation, inflation uncertainty and interest rate for the period 1984 to 2011 of Ghana using a monthly consumer price index and Treasury bill rate to proxy inflation and interest rate respectively. The Generalized Autoregressive Heteroscedasticity (GARCH) model was used and the method of maximum likelihood technique was used to estimate its parameters. The work was based on two procedures for the relationship between inflation, inflation uncertainty, and interest rate. Granger causality test and Cukierman-Meltzer hypothesis were used while GARCH models were estimated separately. The result shows that the two procedure yields the same result and established the relationship between inflation and interest rate.

Jayaraman*e.t al.* [11] models the inflation and growth in Fiji (Melanesia) by looking through the threshold of the inflation rate. They found out that the threshold level of inflation for Fiji, based on the past trends in growth and inflation is 3.6 percent. Therefore they conclude by saying as long as the inflation level is below this threshold level, the effect on growth would be positive and higher levels would adversely affect growth.

Dhungel [12] applied a vector error correction model to determine the short and long-run causality between the variable gross domestic product and remittance. The result from the analysis shows that the Evidence has not supported the hypothesis of remittance causes gross domestic product in the long run but there is strong evidence about the short-run causality running from remittance to gross domestic product. But the opposite is true in reverse order. The gross domestic product causes remittance in both the short and long run. Mozumdar and Marathe [13] have applied the vector error correction model (VECM) to explore the dynamic Granger causality. They found that per capita gross domestic product Granger causes per capita energy consumption.

Gorgi*et al.,* [14] develop a transparent methodology for the estimation of time-varying parameters in vector autoregressive models. Their analysis on a combination of time-varying autoregressive coefficient matrices depending on a flexible set of stochastic dynamic factors, and of time-varying variance matrices depending on score-driven factors. The resulting method for estimating static parameters and extracting the different factors is insightful, robust and computationally fast while being easy to implement. In a simulation study, we demonstrate the good performance of the method. A simulation study was carried out using a data set of U.S. macroeconomic and financial variables.

Methodology

The data for this study is secondary data obtained from the Central Bank of Nigeria (CBN). The period of this study is the 2003-2018 quarterly data. The Eviews Econometric software was used for the analysis. All the data were in Naira, the variables are Real GDP, Inflation Rate, M2 (Broad money), Exchange Rate (Dollars) and the interest rate

Stationarity Test

The ADF test is based on estimating the test regression

$$y_t = \beta' \mathcal{D}_t + \varphi y_{t-1} + \sum_{j=1}^{p} \psi_j \Delta y_{t-j} + \varepsilon_t \qquad (1)$$

Where $\mathcal{D}_t$ a vector of is deterministic terms (constant, trend, etc.). The p lagged difference terms, Δy_{t-j}, are used to approximate the ARMA structure of the errors, and the value of p is set so that the error ε_t is serially uncorrelated. The error term is also assumed to be homoscedastic. (Andreas *et. al.,* [15]).

Normality Test

The Jarque-Berra (JB) test will be used to determine whether the variables understudy in the model are normally distributed. This test measures the difference in kurtosis and skewness of a variable compared to those of the normal distributions. The JB statistic is given as:

$$JB = \frac{N-p}{6}\left[S^2 + \frac{(k-3)^2}{4}\right] \tag{2}$$

Where N is the number of observations, p is a number of estimated parameters, S is the Skewness and K is the Kurtosis of the variable.

VEC Model

A vector error correction (VEC) model is a restricted VAR designed for use with nonstationary series that are known to be Cointegrated. To take the simplest possible example, consider a two-variable system with one Cointegrating equation and no lagged difference terms. The Cointegration equation proposed by [16] is:

$$y_{2,t} = \beta y_{1,t} \tag{3}$$

The corresponding VEC model is:

$$\Delta y_{1,t} = \alpha_1 \left(y_{2,t-1} - \beta y_{1,t-1}\right) + \varepsilon_{1,t} \tag{4}$$

$$\Delta y_{2,t} = \alpha_2 \left(y_{2,t-1} - \beta y_{1,t-1}\right) + \varepsilon_{2,t} \tag{5}$$

Deterministic Trend Specification

To carry out the test, assumptions regarding the trend underlying the data must be made [17].

1. The level data y_t have no deterministic trends and the Cointegrating equations do not have intercepts

$$H(r): \prod y_{t-1} + Bx_t = \alpha\beta' y_{t-1} \tag{6}$$

2. The level data y_t have quadratic trends and the cointegrating equations have linear trends

$$H(r): \prod y_{t-1} + Bx_t = \alpha\left(\beta' y_{t-1} + \rho_0 + \rho_{1t}\right) + \alpha_1\left(y_0 + y_{1t}\right) \tag{7}$$

Model selection criteria

we are employing the AIC models because it chooses a larger model than SIC.

$$\text{AIC} = 2K - 2\ln(L) \tag{8}$$

Forecasting Evaluation

we are employing the RMSE model because it penalizes the last value prediction more heavily than MAE & MPAE.

Root Mean Square Error (RMSE) given by,

$$\text{RMSE} = \sqrt{\frac{\sum_{t=T+1}^{T+K}\left(\hat{\sigma}^2{}_t - \sigma^2{}_t\right)^2}{K}} \tag{9}$$

Results

An initial descriptive statistic was obtained namely mean, standard deviation, skewness, kurtosis, Jarque-Bera, and the probability value. The result in Table 4.1 shows the summary statistic of the study variables. RGDP, Inflation rate, money supply (M2), Interest rate and exchange rate. RGDP, Inflation rate, and Exchange rate were normally distributed except Interest rate and M2 with the p-value greater than 0.05. All the variables were positively skewed, except RGDP. INFLAR, EXCR, INTR, and M2 were highly leptokurtic with kurtosis value greater than 3.

Table 1: Summary Statistic

	RGDP	INFLAR	EXCR	INTR	M2
Mean	9066154.	36.70391	597.1813	374.5356	2735.234
Median	13836619	34.89000	475.5000	347.1889	2743.000
Skewness	-0.180507	0.731270	1.608719	0.467218	0.192947
Kurtosis	1.122695	3.581327	4.144300	2.045094	1.783056
Jarque-Bera	9.745620	6.605242	31.09689	4.760040	4.346313
Probability	0.007652	0.036787	0.000000	0.092549	0.113818
Observations	64	64	64	64	64

EXCR: Exchange rate; INFLAR: Inflation rate, RGDP: Real GDP; INTR: Interest rate; M2: Money Supply;

Graphical Plot

Graphical representation of the variables. The plot shows evidently that the series is not stationary.

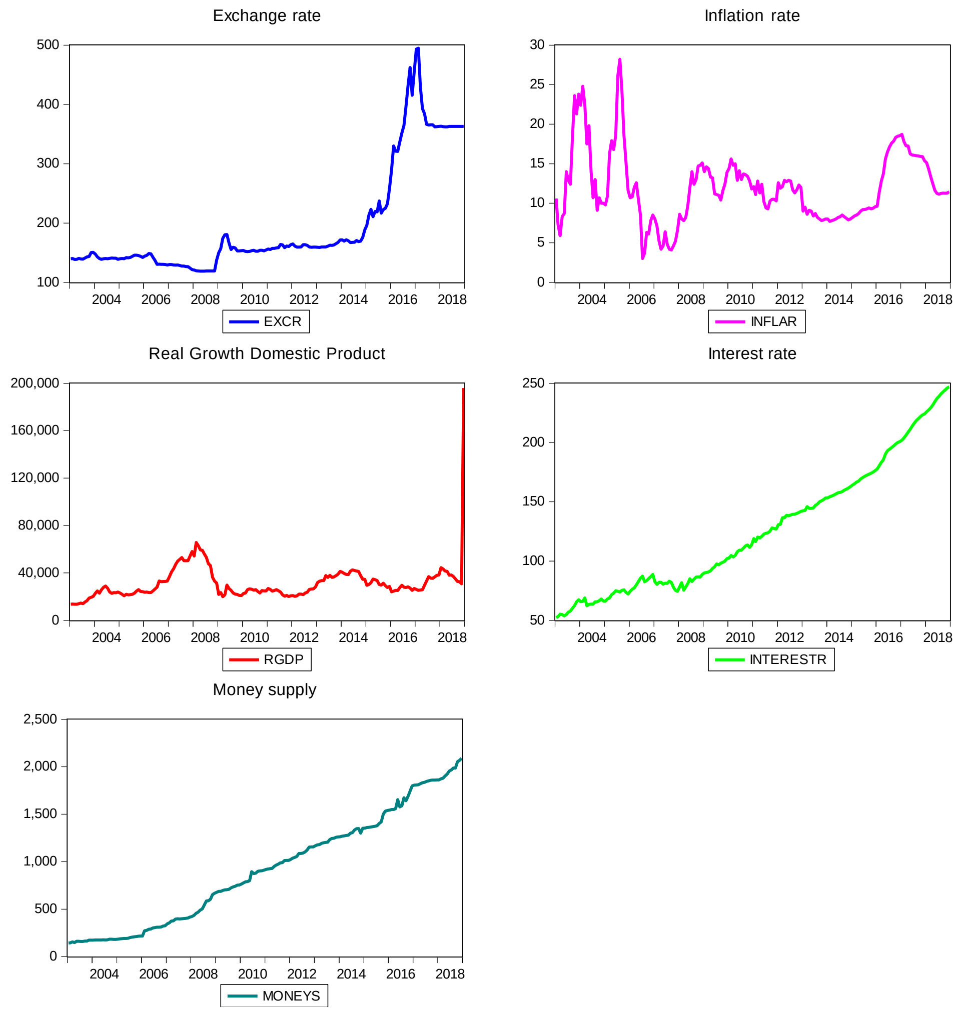

Figure 1: Graphical representation of the variables under study

Stationarity test

Table 2 shows that the ADF test for stationarity of the variable under study. From the result obtained, it shows a different level of stationarity of the variable with the ADF statistics and their p-value. All the variables were stationary at first difference.

Table 2: Stationarity Test

	ADF statistic	p-value	Comment
GDP	-7.9167	0.0000	At first difference
Inflation	-11.7763	0.0000	At first difference
EXCR	-10.1760	0.0000	At first difference
INTR	-13.6360	0.0000	At first difference
M2	-15.5024	0.0018	At first difference

EXCR: Exchange rate; INFLAR: Inflation rate, RGDP: Real GDP; INTR: Interest rate; M2: Money Supply;

Johansen Test for Cointegration

Table 3 illustrates the results of the Johansen test for Cointegration. The trace statistic was displayed for the Error Correction Model (ECM). This finding shows that the null hypothesis of no cointegration equations was rejected at r=3. In contrast, because the trace statistic at r=3 was less than its critical values, we could not reject the null hypothesis that there were three cointegration equations. We accepted r=3 as our estimate of the number of cointegration equations among the variables

Table 3: Results for Johansen Tests for Cointegration

Data Trend:	None	Quadratic
Test Type	No Intercept No Trend	Intercept Trend
Trace	3	3
Max-Eig	2	1

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.233278	149.3426	117.7082	0.0001
At most 1 *	0.168208	99.66959	88.80380	0.0066
At most 2 *	0.160143	65.22935	63.87610	0.0383
At most 3	0.086094	32.59336	42.91525	0.3571
At most 4	0.060986	15.75819	25.87211	0.5121
At most 5	0.021118	3.991318	12.51798	0.7434

(**Notes:** The symbol * denotes that there are 3 or fewer cointegrating equations in the model)

Error Correction Model Estimate Using No Deterministic Trend

Table 4 shows the result of the No Deterministic trend of Co-integration. The purpose of this equation is to determine the long-run relationship or co-movement between the series under consideration. Test results show that there is one co-integrating equation indicating a long-run relationship between variables. The result of the co-integration shows a significant in the INTR in the long run while the other variables show non-significant.

Co-integration regression is the fundamental requirement of ECM. Results of the cointegration test (Table 4) provide enough evidence on the long-run relationship between the variables under consideration as there is one co-integration equation. The result of ADF test provides enough evidence of stationarity of residual (Table 2) at level. Both these two conditions have proved that are co-integrated and non-spurious and formed a basis to estimate ECM. The results of ECM are given in Table 5. The ECM is no spurious regression model as indicated by the R-squared statistics. The coefficients were most negative indicating there is negative relationship in the short and long run.

Table 4: Analysis of No Deterministic trend specification

CointegratingEq:	CointEq1	CointEq2	CointEq3
RGDP(-1)	1.000000	0.000000	0.000000
INFLAR(-1)	0.000000	1.000000	0.000000
EXCR(-1)	0.000000	0.000000	1.000000
INTR(-1)	-711.3410	0.005916	-4.027008
	(459.048)	(0.15797)	(2.04937)
	[-1.54960]	[0.03745]	[-1.96500]
M2(-1)	26.72769	0.013615	0.409307
	(42.1891)	(0.01452)	(0.18835)
	[0.63352]	[0.93773]	[2.17314]
C	646.8370	-6.815086	201.9008
	(21135.2)	(7.27333)	(94.3554)
	[0.03060]	[-0.93700]	[2.13979]

Note: () is the standard error and [] is the t-statistic

Table 5: Analysis of Error Correction Using No Deterministic trend

Error Correction:	D(RGDP)	D(INFLAR)	D(EXCR)	D(IINTR	D(M2)
CointEq1	-0.228715	-1.89E-05	-7.11E-05	-1.18E-05	9.91E-05
	(0.07947)	(1.0E-05)	(6.6E-05)	(1.1E-05)	(0.00012)
	[-2.87791]	[-1.81407]	[-1.08520]	[-1.08096]	[0.81302]
CointEq2	-187.9507	-0.177667	0.077258	-0.017626	0.147819
	(268.610)	(0.03518)	(0.22160)	(0.03680)	(0.41212)
	[-0.69972]	[-5.05004]	[0.34864]	[-0.47892]	[0.35868]
CointEq3	-16.01217	0.009799	-0.018478	0.004913	0.050801
	(16.1754)	(0.00212)	(0.01334)	(0.00222)	(0.02482)
	[-0.98991]	[4.62550]	[-1.38469]	[2.21684]	[2.04700]
D(RGDP(-1))	-0.070751	-2.65E-05	-0.000306	-0.000107	-0.001205
	(0.37692)	(4.9E-05)	(0.00031)	(5.2E-05)	(0.00058)
	[-0.18771]	[-0.53619]	[-0.98375]	[-2.06762]	[-2.08289]
D(RGDP(-2))	0.237138	-7.75E-05	-0.000338	5.65E-05	-0.000566
	(0.38219)	(5.0E-05)	(0.00032)	(5.2E-05)	(0.00059)
	[0.62048]	[-1.54796]	[-1.07277]	[1.07909]	[-0.96560]
D(INFLAR(-1))	129.2195	0.230623	0.325137	0.155038	-0.020892
	(535.906)	(0.07019)	(0.44211)	(0.07343)	(0.82223)
	[0.24112]	[3.28566]	[0.73542]	[2.11141]	[-0.02541]
D(INFLAR(-2))	346.6881	0.078737	0.230793	0.091999	0.249804
	(549.746)	(0.07200)	(0.45353)	(0.07532)	(0.84346)
	[0.63063]	[1.09352]	[0.50889]	[1.22137]	[0.29617]
D(EXCR(-1))	-76.71078	0.002069	0.262488	-0.005050	-0.135814
	(87.8814)	(0.01151)	(0.07250)	(0.01204)	(0.13483)
	[-0.87289]	[0.17979]	[3.62053]	[-0.41940]	[-1.00727]
D(EXCR(-2))	-19.17450	-0.004838	-0.090873	-0.006577	-0.035059
	(88.5723)	(0.01160)	(0.07307)	(0.01214)	(0.13589)
	[-0.21648]	[-0.41705]	[-1.24364]	[-0.54196]	[-0.25799]
D(INTERESTR(-1))	-349.9546	-0.074623	-0.513396	-0.133531	-0.043661
	(548.530)	(0.07184)	(0.45252)	(0.07516)	(0.84159)
	[-0.63799]	[-1.03868]	[-1.13452]	[-1.77667]	[-0.05188]
D(INTERESTR(-2))	-431.0299	0.208140	0.026049	-0.120702	0.511017
	(543.063)	(0.07113)	(0.44801)	(0.07441)	(0.83321)
	[-0.79370]	[2.92628]	[0.05814]	[-1.62214]	[0.61332]
D(MONEYS(-1))	28.90342	-0.002601	0.088048	-0.001813	-0.208208
	(50.4879)	(0.00661)	(0.04165)	(0.00692)	(0.07746)
	[0.57248]	[-0.39329]	[2.11393]	[-0.26208]	[-2.68787]
D(MONEYS(-2))	142.1300	-0.002896	0.145093	-0.004207	-0.108904
	(49.8966)	(0.00654)	(0.04116)	(0.00684)	(0.07655)
	[2.84849]	[-0.44319]	[3.52480]	[-0.61529]	[-1.42256]
R-squared	0.092297	0.208246	0.193261	0.170787	0.087364
Adj. R-squared	0.030408	0.154263	0.138256	0.114250	0.025139

Note: () is the standard error and [] is the t-statistic

Error Correction Model Estimate Using Quadratic Trend

Table 6 shows the result of the Quadratic trend of Co-integration. The purpose of this equation is to determine the long-run relationship or co-movement between the series under consideration. Test results show that there is one co-integrating equation indicating a short-run relationship between variables. The result of the co-integration shows a significant in the M2in the long run while others show non-significant.

Co-integration regression is the fundamental requirement of ECM. Results of cointegration test (Table 6) provide enough evidence on the long-run relationship between the variables under consideration as there is one co-integration equation. The result of ADF test provides enough evidence of stationarity of residual (Table 2) at level. Both these two conditions have proved that are co-integrated and non-spurious and formed a basis to estimate ECM. The results of ECM are given in Table 4.7. The ECM is no spurious regression model as indicated by the R-squared statistics. The coefficient was most negative indicating there is a negative relationship in the short and long run. The quadratic trend @TREND(03Q1) coefficient indicating between RGDP, INFLR, M2, and INTR meaning that every quarter the long-run relationship will increase slightly significant.

Table 6: Analysis of Quadratic trend

CointegratingEq:	CointEq1	CointEq2	CointEq3
RGDP(-1)	1.000000	0.000000	0.000000
INFLAR(-1)	0.000000	1.000000	0.000000
EXCR(-1)	0.000000	0.000000	1.000000
INTERESTR(-1)	265.6475	-0.047877	-5.167555
	(678.660)	(0.08245)	(1.21657)
	[0.39143]	[-0.58070]	[-4.24764]
MONEYS(-1)	-253.5746	-0.024307	0.054283
	(108.423)	(0.01317)	(0.19436)
	[-2.33876]	[-1.84537]	[0.27929]
@TREND(03M01)	2378.466	0.306121	3.037779
C	-60904.13	-13.21432	114.1399

Note: () is the standard error and [] is the t-statistic

Table 7: Analysis of Error Correction Using Quadratic trend

Error Correction:	D(RGDP)	D(INFLAR)	D(EXCR)	D(INTR)	D(M2)
CointEq1	-0.074413	-3.01E-06	1.59E-05	-1.43E-05	0.000136
	(0.03869)	(5.1E-06)	(3.2E-05)	(5.3E-06)	(5.8E-05)
	[-1.92347]	[-0.59141]	[0.49467]	[-2.70340]	[2.35464]
CointEq2	-224.2248	-0.179325	0.148105	-0.000749	0.382634
	(257.605)	(0.03384)	(0.21425)	(0.03534)	(0.38548)
	[-0.87042]	[-5.29867]	[0.69129]	[-0.02118]	[0.99261]
CointEq3	-50.52268	0.006848	-0.031285	0.006064	0.035725
	(21.9333)	(0.00288)	(0.01824)	(0.00301)	(0.03282)
	[-2.30347]	[2.37646]	[-1.71504]	[2.01533]	[1.08846]
D(RGDP(-1))	-0.083974	-2.83E-05	-0.000337	-9.78E-05	-0.001222
	(0.37599)	(4.9E-05)	(0.00031)	(5.2E-05)	(0.00056)
	[-0.22334]	[-0.57347]	[-1.07850]	[-1.89687]	[-2.17253]
D(RGDP(-2))	0.209185	-8.06E-05	-0.000392	6.86E-05	-0.000631
	(0.38175)	(5.0E-05)	(0.00032)	(5.2E-05)	(0.00057)
	[0.54796]	[-1.60759]	[-1.23390]	[1.30932]	[-1.10410]
D(INFLAR(-1))	88.94072	0.224276	0.314555	0.141408	0.041690
	(532.608)	(0.06997)	(0.44296)	(0.07306)	(0.79700)
	[0.16699]	[3.20520]	[0.71012]	[1.93544]	[0.05231]

D(INFLAR(-2))	346.4128	0.078274	0.194821	0.077752	0.113686
	(544.459)	(0.07153)	(0.45282)	(0.07469)	(0.81473)
	[0.63625]	[1.09430]	[0.43024]	[1.04102]	[0.13954]
D(EXCR(-1))	-45.65573	0.005114	0.271265	-0.005669	-0.146653
	(87.9455)	(0.01155)	(0.07314)	(0.01206)	(0.13160)
	[-0.51914]	[0.44265]	[3.70869]	[-0.46990]	[-1.11436]
D(EXCR(-2))	32.42491	2.13E-06	-0.078183	-0.007893	-0.050692
	(89.7128)	(0.01179)	(0.07461)	(0.01231)	(0.13425)
	[0.36143]	[0.00018]	[-1.04785]	[-0.64136]	[-0.37760]
D(INTERESTR(-1))	-285.1680	-0.071995	-0.508732	-0.123545	0.074750
	(543.908)	(0.07146)	(0.45236)	(0.07461)	(0.81391)
	[-0.52429]	[-1.00753]	[-1.12462]	[-1.65583]	[0.09184]
D(INTERESTR(-2))	-377.5679	0.209088	0.043359	-0.115722	0.683420
	(539.680)	(0.07090)	(0.44884)	(0.07403)	(0.80758)
	[-0.69961]	[2.94900]	[0.09660]	[-1.56313]	[0.84625]
D(MONEYS(-1))	16.88426	-0.004253	0.079703	-0.002558	-0.204031
	(49.9218)	(0.00656)	(0.04152)	(0.00685)	(0.07470)
	[0.33821]	[-0.64851]	[1.91967]	[-0.37359]	[-2.73121]
D(MONEYS(-2))	134.3538	-0.004025	0.137342	-0.004648	-0.110987
	(49.4840)	(0.00650)	(0.04116)	(0.00679)	(0.07405)
	[2.71509]	[-0.61917]	[3.33718]	[-0.68473]	[-1.49885]
C	-1926.641	0.149845	-0.986265	0.312581	5.476496
	(1837.78)	(0.24144)	(1.52845)	(0.25210)	(2.75007)
	[-1.04835]	[0.62063]	[-0.64527]	[1.23989]	[1.99140]
@TREND(03M01)	20.99248	-0.001815	0.002942	0.010656	0.078160
	(18.0482)	(0.00237)	(0.01501)	(0.00248)	(0.02701)
	[1.16314]	[-0.76558]	[0.19601]	[4.30388]	[2.89401]
R-squared	0.108533	0.217633	0.194749	0.183712	0.147376
Adj. R-squared	0.036806	0.154684	0.129958	0.118033	0.078774

Note: () is the standard error and [] is the t-statistic

Model Selection Criteria

Table 8 shows the model selection criteria using the AIC and SIC model for No Deterministic trend and Quadratic trend. From the result obtained, No deterministic trend shows a better fit in the computation of the Error Correction Model (ECM) with the least value of 45.7330.

Table 8: Models Selection Criteria

Trends	Log-Likelihood	AIC	SIC
No Deterministic	-4243.491	45.7330	47.2066
Quadratic	-4232.398	45.7397	47.2834

Impulse response on No Deterministic Trend

The figure below shows the impulse response interaction between individual variables against two or more variables. However, in this study, this shows the impulse between RGDP, INFLR, EXCR, INTR, and M2. For example, the response of RGDP shows that Inflation rate, Exchange rate, and Interest rate behavior negatively to RGDP.

Impulse Response on No Deterministic Trend

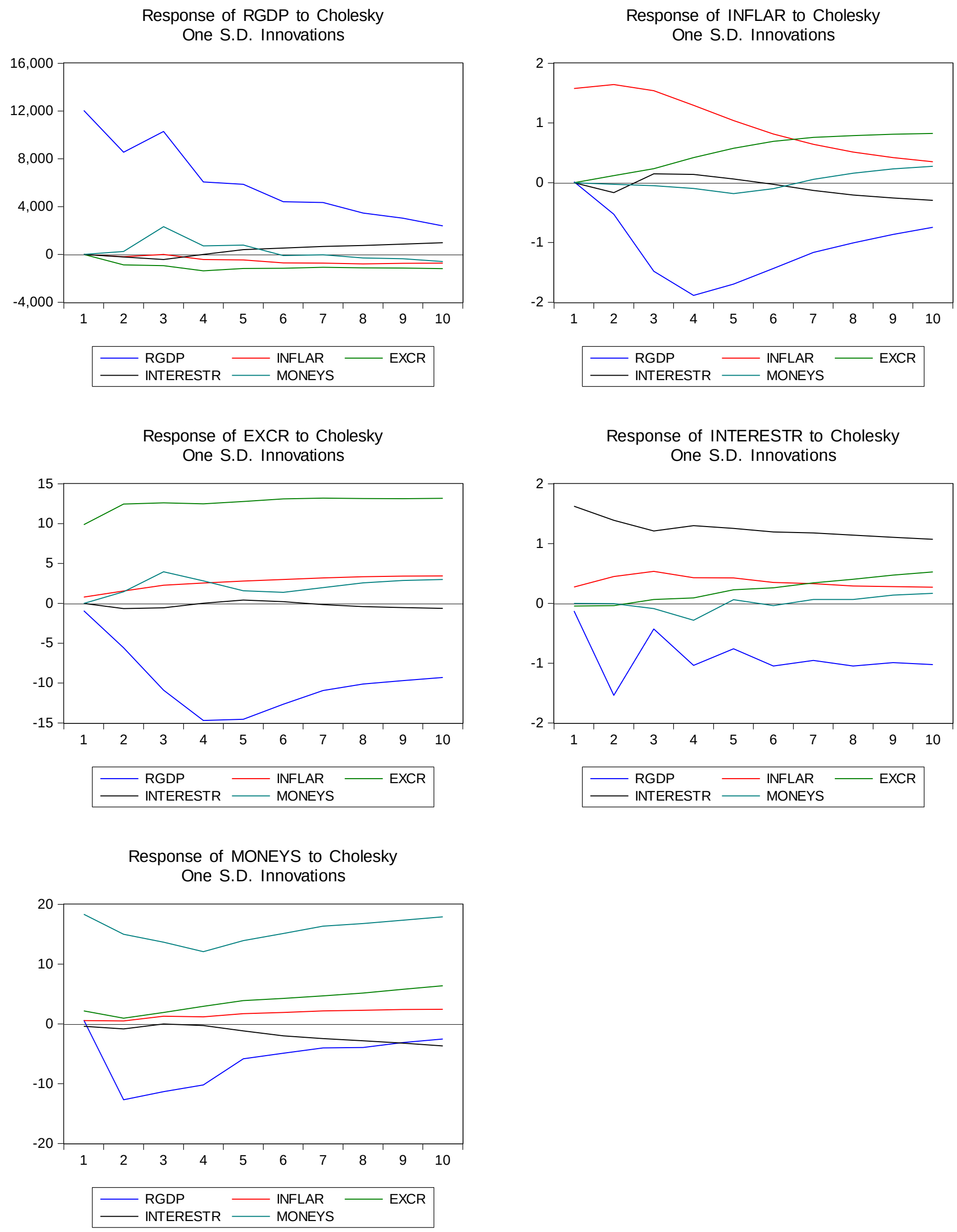

Figure 2: mpulse Response on No Deterministic Trend

Impulse response on Quadratic Trend

The figure below shows the impulse response interaction between individual variables against two or more variables using quadratic trend. However, in this study this shows the impulse between RGDP, INFLR, EXCR, INTR, and M2. The response of RGDP shows that Inflation rate, Exchange rate behavior negatively to RGDP

Impulse Response on Quadratic Trend

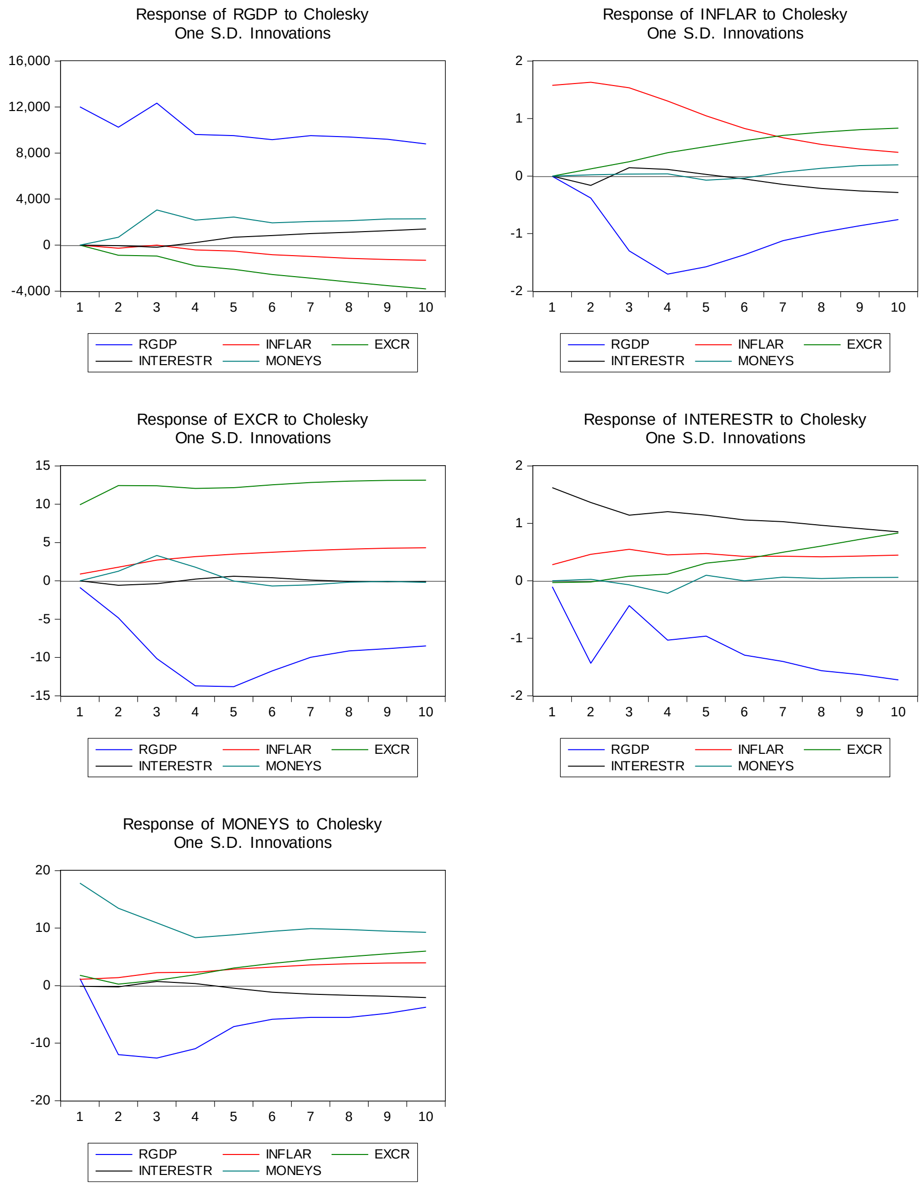

Figure 3: mpulse Response on Quadratic Trend

Forecasting Evaluation

Table 9 shows the results of the obtained forecasting performance evaluation of No Deterministic trend and quadratic trendof Error Correction Model (ECM). The value with the least forecasting measure is considered to be the best in forecasting accuracy. Results show that the Quadratic trend gives the best forecasting accuracy in modeling the inflation factors to economic growth.

Table 9:Forecasting Performance Evaluation Criteria

Trends	RMSE
No Deterministic	12231.91
Quadratic	12221.64

RMSE: Root Mean Square Error.

Conclusion

The aim of this study is to model the impact of inflation factors to economic growth in Nigeria using No deterministic trend assumption and Quadratic trend. A descriptive statistic was obtained showing the summary statistic of the study variables. GDP, Inflation rate, Exchange rate, Interest rate, and Money Supply were all the variables are normally distributed and GDP, inflation and exchange rate show evidence of leptokurtic. The ADF test for stationarity of the variable shows all the variables are stationary at first difference meaning stationary at the mean.

The Johansen test for Cointegration shows that the null hypothesis of no cointegration equations was rejected at r=3. In contrast, because the trace statistic at r=3 was less than its critical values, we could not reject the null hypothesis that there were one or fewer cointegration equations. We accepted r=3 as our estimate of the number of cointegration equations among these five variables, namely GDP, Inflation rate, Exchange rate, Interest rate, Money Supply. The Error Correction Model was estimated due to the no spurious regression of the Cointegration indication. The coefficient shows evident of negative relationships.

The impulse response using the no deterministic and Quadratic trend shows the responses of an individual variable against the other variables.

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