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Fiscal Deficit and Nigeria Economic Growth (1990-2020)

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Abstract

This paper focuses on fiscal deficit and Nigeria's economic growth. To achieve the objective of this study diagnostic check and unit root test using Phillips perron was employed to investigate time series data and to test the stationarity of the time series of the variables. Johansen co-integration analysis and Error Correction Model (ECM) are employed to test for a relationship between or among variables. The paper concludes that the driving variables of economic growth in Nigeria were Public external debt-PEXD, total federal collection revenue-TFCR, and interest rate-INTR. The public deficit financing was determined based on the study by the variables of Government expenditure (GOVE), real GDP, exchange rate-EXCR. The best model of ECM to determine the impact of fiscal deficit in Nigeria is the interaction with economic growth performance measures in Nigeria. The findings confirm that one standard deviation of shocks of fiscal deficit has a significant influence on economic growth, hence confirming the long-run relationship. The search recommended that Government should set its priority rights, be more committed to the budget implementation, and pay more attention to capital expenditure geared towards economic growth.

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1 Introduction

Nigeria's economy is heavily dependent on one or few agricultural or mineral commodities. Our manufacturing sector is mostly at the infant stage and relies heavily on imported inputs. Nigeria equally depends on other countries for the supply of other imports and the finance needed for economic development. It is pertinent to note that the public sector plays an important role in initiating and financing economic growth. This background fact makes all public expenditure on manufacturing companies in Nigeria questionable because if so much has been invested then why are most of our manufacturing companies in Nigeria still at an infant stage. Because manufacturing companies in Nigeria and other non-oil revenue sources have not been utilized to full capacity except oil revenue, this necessitated government expenditure to exceed its revenue. Fiscal deficits arise because public spending rises while revenue remains unchanged (Onwioduokit, 2005).

Defined a fiscal deficit as an excess of government spending over its revenue. It arises from the government's expansionary fiscal policy that leads to revenue falling short of expenditure in a given fiscal year. Also stated that countries that achieved noticeable economic growth were those that have attained significant decline in their debts. It is no exaggeration to claim that Nigeria's huge debt burden was one of the hard knots of the Structural Adjustment Programme (SAP) introduced in 1986 by the Babangida administration. The high level of debt service payment prevented the country from embarking on a large volume of domestic investment, which would have enhanced growth and development (Ogunsakin & Lawal, 2015).

According to Ogunsakin & Lawal (2015), they asserted that fiscal deficits reduce national savings, consequently domestic investment which in the long run have the following effect: increased foreign borrowing, which can erode confidence in the economy both locally and internationally. Keynesian school of economic thought stated that government intervention is urgently needed when the government is unable to match her tax revenue with her public expenditure. According to this school of thought, an increase in government spending will help stimulate demand, increase domestic production, make the private sector better-off, and then lead to economic growth (Aero et al., 2018). The aims of a budget deficit according to O'Dwyer et al. (2011), includes Full employment, price stability, a better environment for public and private investment, and poverty reduction.

For any country to move from the category of developing countries to developed countries, there is a need for aggressive spending on social and economic infrastructure (Aero et al., 2018). Furthermore, the inadequate fund to provide for the essential growth-enhanced infrastructure was made worse by imprudent public spending and mismanagement of public funds (corruption) of the little available fund (Aero et al., 2018). The country is left with few options of financing its budget and one of the easiest ways is for the country to operate a deficit budget (Momodu & Monogbe, 2018; Ahmad, 2014). Deficit financing can be seen as the practice of seeking to stimulate a nation's economy by increasing government expenditures beyond revenue sources (Mordi et al., 2010).

Therefore, this study will investigate to determine the impact of fiscal deficit on Nigeria's economic growth. Generally, the impact of fiscal deficit on economic growth is one of the contentious issues both theoretically and empirically with no conclusion. However, the rest of the article is arranged as follows: Section 2 contains the related literature, which is broken down into conceptual review, theoretical, empirical, and gap section 3 presents the methodology, Section 4 discusses the results and discussion of findings which also houses the contribution to knowledge.

Related literature
Conceptual review

Jhingan et al. (2008), defines fiscal as a policy under which the government uses its expenditure and revenue programs to produce desirable effects and avoid undesirable effects on the national income, production, and employment. The term fiscal policy has conventionally been associated with the use of taxation and public expenditure to influence the level of economic activities. Fiscal policy through variations in government expenditure and taxation profoundly affect national income, employment, and output (Ogunsakin & Lawal, 2015). There are the different definition of fiscal deficit by different scholars, however, IMF which defines fiscal deficit mathematically as Fiscal deficit = {(revenue + grants) – (expenditure on goods and services + transfers) – (lending – repayments)}. It can be simply put as the excess of government expenditure over income in a given period usually a year. Fiscal deficit can be financed through domestic borrowing and external borrowing. It is expected that when the fiscal deficit is properly harnessed, there will be infrastructural and human capital development reduction in unemployment and recovery from depression/recession which in turn increase the average standing of living of the populace and consequently promotes economic growth.

However, when it is not more than 3 percent of the GDP which is the international benchmark then it can adversely affect the interest rate, inflation rate, deficit balance of payment, and deter economic growth (Anyanwu, 1997). It can reduce national savings which would have been used for private investment that is it crowds out private domestic investment. This will lead to a reduction in capital stock and national output. As such government should only borrow when there is a recession or high unemployment, or when there is a rise in private sector savings. It can also be detrimental to development when a larger percentage of the deficit budget is used to finance current consumption

A budget deficit is the type of budget in which government expenditure out weights its revenue. When there is an economic recession or depression, the government plans for the budget deficit which is often referred to as expansionary fiscal policy. In this situation, taxes (i.e. compulsory levies imposed by the government on individuals and corporate bodies) are reduced and government expenditure is increased. The implication of this is that by reducing taxes, the purchasing power of individuals is enhanced and the cost of production by corporate bodies reduces thereby improving their scale of operations.

Theoretical review

The analytical framework adopted for this research follows essentially the Keynesian framework and borrows extensively (Onwioduokit, 2012). In a simple Keynesian framework, desired aggregate demand relationship is specified in the goods market in the following behavioral equations:

$$Y = C + I + G + (X\text{-}M)$$

Y is total output at a particular period; C is total consumption; I is a total investment; G is total government expenditure and (X - M) represents net exports. Given that deficits motivate both consumption and national income, saving and capital accumulation need not be negatively affected. Thus, carefully timed deficits have advantageous consequences on economic growth. The fiscal policy represents a strong instrument which through public expenditure and taxes can influence aggregate demand of goods and services in the economy. The budget deficit policy, excessive public expenditure over-collected public revenues, is initiated because of its economic growth impact (Apergis & Payne, 2012; Kim, 2003).

Empirical and gap

Ogunsakin & Lawal (2015), studied the impact of fiscal deficit on the growth of the Nigerian economy using co-integration and error correction. Secondary data were gathered from various sources such as; the Central Bank of Nigeria statistical bulletin, economic and financial review monthly and annual reports, and statement of accounts for various years. The time-series property of the data employed, are first to be investigated. This is then followed by testing for co-integrated variables. From the unit root test, the results indicate that the variables are integrated of the same order at first difference. Also, from the multivariate co-integration test, within the Auto Regressive Distributed Lag (ARDL) the results indicate that there are, at most, two co-integrating vectors.

Ali et al. (2018), explored the impact of fiscal deficit on Nigeria's economic growth between the period 1981 and 2016. The study made use of the ARDL estimation technique to analyze the data. The result revealed that fiscal deficit inhibits economic growth in Nigeria. Sharma & Mittal (2019), explored the impact of fiscal deficit on economic growth in India throughout 1985 and 2015. The study employed the ARDL model and Granger Causality test. The result of ARDL revealed that fiscal deficit had negatively affected economic growth while Granger causality test showed that fiscal deficit affects economic growth through a mechanism channel i.e. a change in the value of fiscal deficit will cause the inflation rate to change which in turn leads to changes in the exchange rate as well as interest rate concurrently and they consequently influence economic growth.

2 Materials and Methods

Model specification

The model for the study assumes an underlying behavior of the real gross domestic product and fiscal deficit in Nigeria.

The model is specified as follows;

$$RGDP = f(GOVE, TFCR, PEXD, EXCR, INTR)$$

The explicit form of Equation 3 is represented as follows:

$$RGDP_t = \alpha_0 + \alpha_1 GOVE + \alpha_2 TFCR + \alpha_3 PEXD + \alpha_4 EXCR + +\alpha_5 INTR + \varepsilon_t$$

Where *GOVE* is government expenditure at period t; *TFCR* is total federation collection revenue at period t; *PEXD* is public external debt at period t; *EXR* is the exchange rate (naira to US dollar) at period t; *INTR* is interest rates at period t; α_s are parameters, while e is an error term. Based on Perron (1989), the equation for estimating unit root test for variable stationarity, the equation takes into account the existence of unit root equation and cointegration (Engle et al., 1989).

$$x_t = \alpha_o + \beta_t + \rho_{i-1} + \sum_{i=1}^{p} \phi x_{i-1} + e_t$$

The study used econometric tools in the analysis of the variables shown in the model specification. E-views package was used in the estimation process and results are presented in tables. The model for estimating vector error correction is expressed as:

$$\Delta RGDP_{t+1} = \alpha_0 + \alpha_1 \Delta GOVE_t + \alpha_2 \Delta TFCR_t + \alpha_3 \Delta PEXD_t + \alpha_4 \Delta EXCR_t + \alpha_5 \Delta INTR_t + \delta_t ECM(-1) + \varepsilon_t$$

$$\Delta PEXD_{t+1} = \alpha_0 + \alpha_1 \Delta GOVE_t + \alpha_2 \Delta TFCR_t + \alpha_3 \Delta RGDP_t + \alpha_4 \Delta EXCR_t + \alpha_5 \Delta INTR_t + \delta_t ECM(-1) + \varepsilon_t$$

The $ECM(\delta_t)$ part of equations 6 and 5 show the long-run equilibrium dynamics of the models. The sign Δ is the time series difference operator; ε_t is a white noise disturbance term. The equation points out that fiscal deficit tends to be influenced and explained by its previous level, thus it involves other disturbances or shocks.

Apriori expectations

The apriori expectation of the model suggests that GOVE, TFCR, PEXD impacts negatively on RGDP while INTR would impact RGDP positively (i.e $\alpha_{1.2} > 0$, and $\alpha_{3,5} < 0$). The exchange rate volatility variable would impact economic growth negatively ($\alpha_4 < 0.$).

Estimation technique

To achieve the objective of this study diagnostic check and unit root test using Phillips perron was employed to investigate time series data and to test the stationarity of the time series of the variables. Johansen co-integration analysis and Error Correction Model (ECM) are employed to test for a relationship between or among variables. Wald statistic test measures the long-run and short-run effects of fiscal deficit on economic growth. Impulse response and variance decomposition were used as well. More so, the ECM method has the merit of yielding consistent estimates of the long-run parameters that are asymptotically normal irrespective of the order of integration. Using the ECM, it is possible to estimate even when the explanatory variables are endogenous (Alam & Quazi, 2003). In this wise, ECM provides robust results in large sample sizes such as greater than 25 observations (Narayan, 2005).

3 Results and Discussions

The study examines the pattern of the fiscal deficit variables on economic growth in Nigeria. Table 1 below shows the results of the diagnostic check of the variables used in this study.

Table 1
Variables diagnostic check

Variables	Test	P-value	P>0.05	Conclusion
Normality Test	JB Statistic	0.1243	0.1243>0.05	Normally Distributed
Serial Correlation Test	Godfrey Breach	0.0003	0.0003<0.05	Presence of Serial Correlation
ARCH Test	LM Test	0.0414	0.0414<0.05	Presence of Heteroskedasticity
Stability Test	Ransom Reset	0.0003	0.0003<0.05	Functional Form

Variables of fiscal deficit measures (Real GDP-RGDP, Public external debt-PEXD, government expenditure-GOVE, total federal collection revenue-TFCR, exchange rate-EXCR, and interest rate-INTR) were normally distributed at a 5% level. The test of serial correlation and heteroscedasticity tests suggest serial correlation and heteroscedasticity presences. Variables adopted for the estimation are in functional form as the probability value 0.0000<0.05. However, the model parameters violated the assumptions of OLS for estimation then a test of stationarity of variables was carried in table 1.

Test of stationarity of variables

To complement the appropriate estimation process, stationarity tests may yield different conclusions due to their different power of stationarity. Test of presence or absence of unit root in the selected variables (real gross domestic product- RGDP, Public external debt-PEXD, government expenditure-GOVE, total federal collection revenue-TFCR, exchange rate-EXCR, and interest rate-INTR) was investigated using Phillips Perron (PP) test of the stationarity of the variables.

Table 2
Unit root test results

Variables	Order	PP	Critical value	P-value	Decision: P<0.05	Conclusion
GDP	I(1)	-5.3574	-2.9750	0.0000	No unit root	Stationary
DGOVE	I(1)	-4.0439	-2.9750	0.0000	No unit root	Stationary
DPEXD	I(1)	-5.4317	-2.9665	0.0000	No unit root	Stationary
DTFCR	I(1)	-5.1162	-2.9750	0.0000	No unit root	Stationary
EXAR	I(1)	-3.7097	-2.9750	0.0007	No unit root	Stationary
INTR	I(1)	-4.3584	-2.9650	0.0002	No unit root	Stationary

Source: E-views 9.0 Extracts

Real gross domestic product-LNRGDP, Public external debt-PEXD, government expenditure-GOVE, total federal collection revenue-TFCR, exchange rate-EXCR, and interest rate-INTR variables were stationary at the order I, I(1) as the PP test values greater than the critical value at 5% with the respective probabilities less than 0.05 at 5% level as shown in table 2 There is evidence of co-integration of variables for model estimation.

Test of johansen cointegration of variables

The results of the cointegration test of the operational variables are shown in Table 3

Table 3
Co integrating variables

Date: 06/30/21 Time: 13:50
Sample: 1990 2019
Included observations: 28
Test assumption: Linear deterministic trend in the data
Series: RGDP GOVE TFCR EXCR INTR PEXD
Lags interval: 1 to 1

	Likelihood	5 Percent	1 Percent	Hypothesized

Eigenvalue	Ratio	Critical Value	Critical Value	No. of CE(s)
0.809389	105.6673	94.15	103.18	None **
0.548809	59.25668	68.52	76.07	At most 1
0.467343	36.97244	47.21	54.46	At most 2
0.269160	19.33588	29.68	35.65	At most 3
0.231491	10.55618	15.41	20.04	At most 4
0.107477	3.183685	3.76	6.65	At most 5

*(**) denotes rejection of the hypothesis at 5 % (1%) significance level L.R. test indicates 1 cointegrating equation(s) at 5% significance level
Source: E-views 9.0 Extracts

The results in table 3 reveal that there is co-integration at none with at least one co integrating equation among the variables (Real GDP-RGDP, Public external debt-PEXD, government expenditure-GOVE, total federal collection revenue-TFCR, exchange rate-EXCR, and interest rate-INTR). This suggests that Ho was rejected in favor of the alternative hypotheses at 5 percent since the probability values exceed the critical values at the 0.05 level implying that a long-run equilibrium relationship exists among the variables of fiscal deficit and economic growth in Nigeria.

Vector error correction (ECM) model estimates

Table 4
Vector error correction (ECM) model estimates of RGDP

LNRGDP	Coeff. (B)	SE(B)	t-cal	Prob.	Remark
C	-3052.591	-2327.41	(-1.31158)	0.1493	Not Significant
GOVE	-0.622486	-0.42004	(-1.48196)	0.3532	Not Significant
TFCR	0.382018	-0.15346	-2.48943	0.0116*	Significant
PEXD	0.452993	-0.16766	-2.70192	0.0021*	Significant
EXCR	3.374593	-9.94091	-0.33947	0.5142	Not significant
INTR	185.63	-118.395	-1.56788	0.0472*	Significant
D(RGDP(-2))	-0.296522	-0.23203	(-1.27794)	0.0624	Not Significant
D(RGDP(-1))	0.598009	-0.2302	-2.59781	0.0034*	Significant
ECM(-1)	0.004018	-0.02613	-0.15376	0.4517	Not significant

*sig. if the p-value<0.05 at 5% level of significance
Source: Author's VECM extracted results

Estimation Proc:
==========
EC 1 2 RGDP PEXD @ C GOVE TFCR EXCR INTR

VAR Model:
==========
D(RGDP) = A(1,1)*(B(1,1)*RGDP(-1) + B(1,2)*PEXD(-1) + B(1,3)) + C(1,1)*D(RGDP(-1)) + C(1,2)*D(RGDP(-2)) + C(1,3)*D(PEXD(-1)) + C(1,4)*D(PEXD(-2)) + C(1,5) + C(1,6)*GOVE + C(1,7)*TFCR + C(1,8)*EXCR + C(1,9)*INTR
VAR Model - Substituted Coefficients:
==========
D(RGDP) = 0.004017706882*(RGDP(-1) + 9.290348634*PEXD(-1) - 60243.08297) + 0.5980094541*D(RGDP(-1)) - 0.2965216907*D(RGDP(-2)) - 0.05669522084*D(PEXD(-1)) - 0.07350326483*D(PEXD(-2)) - 3052.590546 - 0.6224857752*GOVE + 0.3820184237*TFCR + 3.37459289*EXCR + 185.6299916*INTR

ECM equations in Table 4 indicated that Public external debt-PEXD, total federal collection revenue-TFCR, exchange rate-EXCR, and interest rate-INTR have a positive impact on economic growth (Real GDP) in Nigeria except for government expenditure (GOVE) but statistically significant at 5% level to the economic growth in Nigeria. In terms of the sign and magnitude of the variables, total federal collection revenue-TFCR, Public external debt-PEXD, exchange rate-EXCR, and

interest rate-INTR accounted for 38%, 45.2%, 37%, and 85% effects on economic growth. Government expenditure-GOVE impacted negatively on economic growth by 62%. The result reveals key factors influencing the level of economic growth in Nigeria within the period of study were Public external debt-PEXD, total federal collection revenue-TFCR, and interest rate-INTR because the variables demonstrated significant impact. However, there is no evidence of a long-run relationship between the fiscal deficit variables and economic growth in Nigeria as the coefficient of the ECM (-1) is positive but not significant at the 5% level.

Table 5
Vector error correction (ECM) model estimates of PEXD

PEXD	Coeff. (B)	SE(B)	t-cal	Prob.	Remark
GOVE	0.492831	-0.23536	-2.09394	0.0493*	Significant
TFCR	-0.103785	-0.08599	(-1.20700)	0.4212	Not Significant
RGDP	0.598009	-0.2302	-2.59781	0.0012*	Significant
EXCR	12.74266	-5.57017	-2.28766	0.0442*	Significant
INTR	94.34793	-66.3403	-1.42218	0.5621	Not significant
D(PEXD(-2))	-0.073503	-0.33767	(-0.21768)	0.0021*	Significant
D(PEXD(-1))	-0.056695	-0.29921	(-0.18948)	0.2634	Not significant
ECM(-1)	-0.043669	-0.01464	(-2.98250)	0.0021*	Significant

*sig. if the p-value<0.05 at 5% level of significance
Source: Author's VECM extracted results

ECM equations in Table 5 showed that government expenditure (GOVE), real GDP, government expenditure (GOVE), exchange rate-EXCR, and interest rate-INTR have a positive impact on Public external debt-PEXD in Nigeria except for total federal collection revenue-TFCR and not statistically significant at 5% level to the Public external debt-PEXD. Government expenditure (GOVE), real GDP, exchange rate-EXCR have a significant influence on Public external debt-PEXD. Government expenditure (GOVE), real GDP, exchange rate-EXCR, and interest rate-INTR accounted for 49%, 59%, 12.7%, and 85% effects on Public external debt-PEXD. Total federal collection revenue-TFCR negatively impacted Public external debt-PEXD by 10%. The determinant factors of Public external debt-PEXD in Nigeria within the period of study were Government expenditure (GOVE), real GDP, exchange rate-EXCR impacted significantly. Evidence of long-run relationship among the fiscal deficit variables and economic growth in Nigeria was notice based on the fact the coefficient of the ECM (-1) is negative and statistically significant at a 5% level.

Estimation Proc:
==========
EC 1 2 RGDP PEXD @ C GOVE TFCR EXCR INTR

VAR Model:
==========
D(PEXD) = A(2,1)*(B(1,1)*RGDP(-1) + B(1,2)*PEXD(-1) + B(1,3)) + C(2,1)*D(RGDP(-1)) + C(2,2)*D(RGDP(-2)) + C(2,3)*D(PEXD(-1)) + C(2,4)*D(PEXD(-2)) + C(2,5) + C(2,6)*GOVE + C(2,7)*TFCR + C(2,8)*EXCR + C(2,9)*INTR
VAR Model - Substituted Coefficients:
==========
D(PEXD) = - 0.04366875244*(RGDP(-1) + 9.290348634*PEXD(-1) - 60243.08297) - 0.05011842479*D(RGDP(-1)) - 0.07500057249*D(RGDP(-2)) + 0.4529930187*D(PEXD(-1)) - 0.1405867067*D(PEXD(-2)) - 3455.992373 + 0.4928308595*GOVE - 0.1037850717*TFCR + 12.74266108*EXCR + 94.34793461*INTR

Table 6
Short run from public deficit to real gross domestic product result

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	1.224736	(3, 20)	0.3267
Chi-square	3.674207	3	0.2989

Null Hypothesis: C(3)=C(5)=C(9)=0
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(3)	-0.095973	0.108933
C(5)	0.170569	0.163168
C(9)	-2001.904	1855.696

Restrictions are linear in coefficients.
Source: E-views 9.0 Extracts

The results from the ECM short-run models, the result indicates that exchange and inflation rate fluctuations interaction do not influence economic growth in the short run and are not significant at 0.05 level as probability values of the Wald test statistic were greater than 0.05 at 5% level.

Impulse and response (IR) and variance decomposition (VD) analysis

The result of the Impulse and Response Analysis of the model is illustrated in figure 1 and variance decomposition analysis is in figure 1.

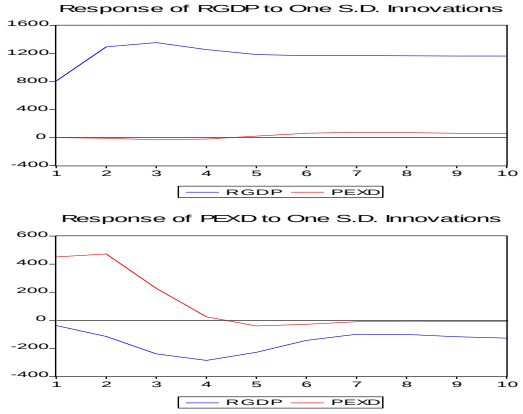

Figure 1. Impulse and response analysis of public external debt to economic growth in Nigeria

The trend analysis suggested the impulse response analysis of economic growth (RGDP) and public external debt (PEXD) in Nigeria. One standard deviation shock to a unit of public external debt results in an increase in economic growth within the periods of 1 to 4 years. Looking further into the future, there is the relative stability of economic growth in the face of fiscal deficit in Nigeria. A shock to a unit of economic growth by one standard deviation accounts for a decrease in public external debt financing in Nigeria during the periods 1 through to 7 and becomes stable in the rest of the periods as show in figure 1.

Table 7
Variance decomposition analysis of economic growth to public external debt
Response of RGDP

Period	RGDP	PEXD	GOVE	TFCR	EXCR	INTR
1	541.8544	0.000000	0.000000	0.000000	0.000000	0.000000
2	1031.839	-15.22915	-502.6513	132.6736	299.9709	-57.59488
3	1311.882	-185.3559	-793.3910	265.6040	536.6490	-42.94021
4	1610.799	-246.3777	-719.1819	525.5716	787.2037	-61.47161
5	1884.079	-143.1790	-563.7243	521.6526	925.0666	-65.82107
6	2135.224	113.5657	-248.5931	314.1339	950.7393	-101.9235
7	2329.049	376.4723	135.2127	36.26306	899.7724	-120.6589
8	2502.942	637.6423	634.6304	-262.9854	844.4554	-158.5235
9	2703.535	940.2245	1339.224	-678.7808	774.8358	-190.0959
10	2938.115	1324.349	2421.135	-1217.644	657.3788	-244.3974

Cholesky Ordering: EXTR EXCHR
Source: E-views 9.0 Extracts

In table 7 shows that percentage of the forecast error of variance of economic growth (RGDP) in the short run of period 1, about 541.8 percentage of forecast variance in economic growth (RGDP) explained by itself. In the long run of period 10, the percentage of the forecast error variance becomes 2938.1% revealing the economic growth (RGDP) variable tends to increase significantly into the future concerning fiscal deficit variables-Public external debt-PEXD, government expenditure-GOVE, total federal collection revenue-TFCR, exchange rate-EXCR and interest rate-INTR in Nigeria (Jalil et al., 2014; Khandelwal, 2015).

Table 8
Variance decomposition analysis of public external debt to economic Growth Response of PEXD

Period	RGDP	PEXD	GOVE	TFCR	EXCR	INTR
1	-141.5854	539.2536	0.000000	0.000000	0.000000	0.000000
2	-338.8007	964.5688	-6.582007	-259.7190	42.86135	65.50703
3	-323.1001	1207.761	347.4980	-552.7595	-24.36312	57.83872
4	-318.0091	1257.088	813.9552	-669.1002	-149.2705	33.72430
5	-265.3189	1407.105	1192.721	-903.2506	-275.3392	11.55462
6	-191.0859	1635.891	1615.255	-1248.348	-362.9958	-14.70011
7	-120.2251	1836.292	2277.867	-1602.229	-478.2818	-38.81772
8	-9.489172	2101.140	3208.947	-2024.803	-636.0700	-85.51085
9	158.4597	2533.575	4412.862	-2677.546	-852.7530	-140.7585
10	373.5852	3128.953	6016.528	-3572.335	-1154.576	-217.5380

Cholesky Ordering: EXTR EXCHR
Source: E-views 9.0 Extracts

Percentage of the forecast error of variance of Public external debt-PEXD shows that percentage of the forecast error of variance of Public external debt-PEXD in the short run of period 1, about 141.58 negative percentage of forecast variance in Public external debt-PEXD explained by itself. In the long run of period 10, the percentage of the forecast error variance becomes 373.58% revealing the Public external debt-PEXD variable tends to increase significantly into the future concerning economic growth in Nigeria.

Optimality of fiscal deficit and economic growth models

In testing the performance of models, selecting the best model, and finding the predicting power of the model based on the economic development and Public external debt-PEXD, the results were shown in Table 9

Table 9
Global statistic, optimal model selection, and predicting power

Global Statistics	R-squared	Adj. R-squared	Sum sq. resides	S.E. equation	F-statistic	
Model 1 RGDP	0.686748	0.520909	17606026	1017.668	4.141051	
Model II PEXD	0.783192	0.668411	5527716	570.2278	6.823372	
Global Statistics	Log-likelihood	Akaike AIC	Schwarz SIC	Mean dependent	S.D. dependent	Predicting Power
Model 1 RGDP	-219.0482	16.96653	17.44647	1917.32	1470.271	0.7668*
Model II PEXD	-203.4089	15.80807	16.28801	314.0058	990.2581	

*significant

Economic growth and fiscal deficit ECM models indicated that about by 52.09% total variation in the economic growth (Real GDP-RGDP) was explained by Public external debt-PEXD, government expenditure-GOVE, total federal collection revenue-TFCR, exchange rate-EXCR, and interest rate-INTR. About and 66.8% total variation in fiscal deficit was explained by other variables and the economic growth in Nigeria. However, 47.91% and 21.7% variation in economic growth and public external debt as measures of fiscal deficit were not accounted for due to some factors such as government, policy issues, and political instability. The model of economic development and public external debt were highly fitted at 68.6% and 33.2% in the study periods. In the two models, a significant-high correlation existed between economic growth and public external debt in Nigeria at 76% and 88.8% respectively (Hinchliffe, 1989; Boadway et al., 1998).

The choice of selecting the best model depends on the model selection criteria. A model with smaller values of Log-likelihood, Akaike and Schwarz Information Criteria represents the best model selection. In this paper, findings revealed that public external debt as a measure of fiscal deficit is better in estimation from the 1999 to 2019 period under study. This implied that steady growth in the Nigeria fiscal deficit financing was evident in Nigeria. Although, the most predicting model between the two estimated models is the economic growth model at 76.7% as compared to the model of fiscal deficit measures in Nigeria (Mauro, 1998; Halkos & Paizanos, 2013).

Summary

This paper focuses on the fiscal deficit on economic growth measures of fiscal deficit variables (Public external debt-PEXD, government expenditure-GOVE, total federal collection revenue-TFCR, exchange rate-EXCR, and interest rate-INTR) on economic growth in Nigeria from 1990 to 2020 to determine the effect and influencing factors. The variables were stationary strictly at order 1 and co-integrated at none. The findings confirm that there is no long-run relationship between the variables of fiscal deficit in Nigeria. However, there is no significant evidence of a long-run relationship between economic growth determinants.

Contribution to knowledge

The study contributed to knowledge with the techniques used for analysis, the ECM was used for a long-run relationship, impulse response and variance decomposition was used as part of the analysis methods (Acemoglu, 2012; Arrow et al., 1995).

4 Conclusion

The paper concludes that the driving variables of economic growth in Nigeria were Public external debt-PEXD, total federal collection revenue-TFCR, and interest rate-INTR. The public deficit financing was determined based on the study by the variables of Government expenditure (GOVE), real GDP, exchange rate-EXCR. The best model of ECM to determine the impact of fiscal deficit in Nigeria is the interaction with economic growth performance measures in Nigeria. The findings confirm that one standard deviation of shocks of fiscal deficit has a significant influence on economic growth, hence confirming the long-run relationship. Economic growth model estimates indicate model optimality selection based on the finding (Dilliana et al., 2019; Anike et al., 2017).

Recommendations

Government should set its priority rights, be more committed to the budget implementation, and pay more attention to capital expenditure geared towards economic growth. In the same manner, Government should decisively be proactive and concise about capital investments to avoid abandoned projects. Also, financing of such investment should be within the optimal fiscal deficit level. This will in turn cause the fiscal deficit to bring about a positive impact on economic growth.

Conflict of interest statement
The author declared that he have no competing interests.

Statement of authorship
The author have a responsibility for the conception and design of the study. The author have approved the final article.

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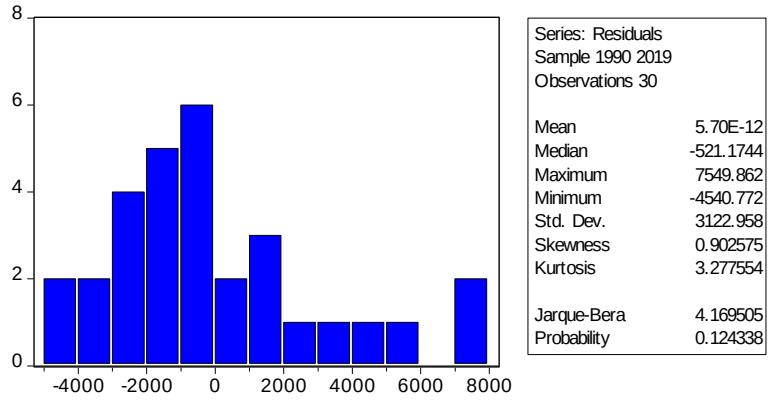
Appendix

Dependent Variable: RGDP
Method: Least Squares
Date: 06/30/21 Time: 13:44
Sample: 1990 2020
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GOVE	5.768777	1.138613	5.066496	0.0000
TFCR	0.833134	0.417816	1.994021	0.0576
EXCR	109.1117	25.38022	4.299086	0.0002
INTR	100.6557	238.8880	0.421351	0.6772
PEXD	-2.790856	0.541934	-5.149807	0.0000
C	17032.61	5155.596	3.303713	0.0030
R-squared	0.974546	Mean dependent var		40536.60
Adjusted R-squared	0.969243	S.D. dependent var		19574.30
S.E. of regression	3432.887	Akaike info criterion		19.29705
Sum squared resid	2.83E+08	Schwarz criterion		19.57729
Log-likelihood	-283.4557	F-statistic		183.7739
Durbin-Watson stat	0.759600	Prob(F-statistic)		0.000000



Breusch-Godfrey Serial Correlation LM Test:

F-statistic	12.00411	Probability	0.000299
Obs*R-squared	15.65474	Probability	0.000399

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 06/30/21 Time: 13:45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GOVE	-0.509581	0.829897	-0.614030	0.5455
TFCR	0.122024	0.347883	0.350761	0.7291
EXCR	5.221475	21.89012	0.238531	0.8137
INTR	-4.738526	173.4915	-0.027313	0.9785
PEXD	0.005865	0.422309	0.013888	0.9890
C	-207.6095	3725.724	-0.055723	0.9561
RESID(-1)	0.945467	0.194380	4.864012	0.0001
RESID(-2)	-0.494449	0.237760	-2.079612	0.0494
R-squared	0.521825	Mean dependent var		5.58E-12
Adjusted R-squared	0.369678	S.D. dependent var		3122.958

S.E. of regression	2479.404	Akaike info criterion	18.69260
Sum squared resid	1.35E+08	Schwarz criterion	19.06626
Log-likelihood	-272.3890	F-statistic	3.429747
Durbin-Watson stat	2.227802	Prob(F-statistic)	0.012400

ARCH Test:			
F-statistic	3.628233	Probability	0.041356
Obs*R-squared	6.298925	Probability	0.042875

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 06/30/21 Time: 13:46
Sample(adjusted): 1992 2020
Included observations: 28 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6813823.	3196410.	2.131711	0.0430
RESID^2(-1)	0.532621	0.199599	2.668462	0.0132
RESID^2(-2)	-0.185634	0.199197	-0.931913	0.3603
R-squared	0.224962	Mean dependent var		10083508
Adjusted R-squared	0.162959	S.D. dependent var		14772878
S.E. of regression	13515702	Akaike info criterion		35.77756
Sum squared resid	4.57E+15	Schwarz criterion		35.92030
Log-likelihood	-497.8858	F-statistic		3.628233
Durbin-Watson stat	1.992010	Prob(F-statistic)		0.041356

Ramsey RESET Test:			
F-statistic	8.526950	Probability	0.000348
Log-likelihood ratio	29.85738	Probability	0.000005

Test Equation:
Dependent Variable: RGDP
Method: Least Squares
Date: 06/30/21 Time: 13:46
Sample: 1990 2019
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GOVE	-27.26611	76.91619	-0.354491	0.7267
TFCR	-5.418944	11.39623	-0.475503	0.6396
EXCR	-683.4479	1500.741	-0.455407	0.6537
INTR	-662.0483	1367.577	-0.484103	0.6336
PEXD	19.07711	37.84035	0.504147	0.6197
C	-22528.66	137441.1	-0.163915	0.8714
FITTED^2	0.000190	0.000737	0.258606	0.7986
FITTED^3	-2.15E-09	1.90E-08	-0.113620	0.9107
FITTED^4	1.18E-14	2.28E-13	0.051810	0.9592
FITTED^5	-6.36E-20	1.03E-18	-0.061777	0.9514
R-squared	0.990591	Mean dependent var		40536.60
Adjusted R-squared	0.986357	S.D. dependent var		19574.30
S.E. of regression	2286.310	Akaike info criterion		18.56847
Sum squared resid	1.05E+08	Schwarz criterion		19.03553
Log-likelihood	-268.5270	F-statistic		233.9657
Durbin-Watson stat	1.557399	Prob(F-statistic)		0.000000

PP Test Statistic	-5.357382	1% Critical Value*	-3.6959
		5% Critical Value	-2.9750
		10% Critical Value	-2.6265

*MacKinnon critical values for rejection of the hypothesis of a unit root.

Lag truncation for Bartlett kernel: 3 (Newey-West suggests: 3)
Residual variance with no correction 1154059.
Residual variance with correction 665444.8
Phillips-Perron Test Equation
Dependent Variable: D(RGDP,3)
Method: Least Squares
Date: 06/30/21 Time: 13:47
Sample(adjusted): 1993 2020
Included observations: 27 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RGDP(-1),2)	-1.029538	0.199348	-5.164534	0.0000
C	44.76174	215.1083	0.208089	0.8368
R-squared	0.516183	Mean dependent var		-9.214065
Adjusted R-squared	0.496830	S.D. dependent var		1573.869
S.E. of regression	1116.416	Akaike info criterion		16.94482
Sum squared resid	31159591	Schwarz criterion		17.04081
Log-likelihood	-226.7551	F-statistic		26.67241
Durbin-Watson stat	2.009939	Prob(F-statistic)		0.000024

PP Test Statistic	4.043905	1% Critical Value*	-3.6752
		5% Critical Value	-2.9665
		10% Critical Value	-2.6220

*MacKinnon critical values for rejection of the hypothesis of a unit root.

Lag truncation for Bartlett kernel: 3 (Newey-West suggests: 3)
Residual variance with no correction 61937.15
Residual variance with correction 75568.93

Phillips-Perron Test Equation
Dependent Variable: D(GOVE)
Method: Least Squares
Date: 06/30/21 Time: 13:47
Sample(adjusted): 1991 2020
Included observations: 29 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GOVE(-1)	0.132959	0.029179	4.556657	0.0001
C	17.17556	68.45532	0.250902	0.8038
R-squared	0.434710	Mean dependent var		240.0404
Adjusted R-squared	0.413774	S.D. dependent var		336.8682
S.E. of regression	257.9246	Akaike info criterion		14.00968
Sum squared resid	1796177.	Schwarz criterion		14.10398
Log-likelihood	-201.1404	F-statistic		20.76312
Durbin-Watson stat	1.627753	Prob(F-statistic)		0.000100

PP Test Statistic	-5.116171	1% Critical Value*	-3.6852

		5% Critical Value	-2.9705
		10% Critical Value	-2.6242

*MacKinnon critical values for rejection of the hypothesis of a unit root.

Lag truncation for Bartlett kernel: 3 (Newey-West suggests: 3)
Residual variance with no correction 2094659.
Residual variance with correction 1575732.

Phillips-Perron Test Equation
Dependent Variable: D(TFCR,2)
Method: Least Squares
Date: 06/30/21 Time: 13:48
Sample(adjusted): 1992 2020
Included observations: 28 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TFCR(-1))	-0.998879	0.196131	-5.092914	0.0000
C	362.5255	291.4600	1.243826	0.2247
R-squared	0.499401	Mean dependent var		25.27181
Adjusted R-squared	0.480147	S.D. dependent var		2083.094
S.E. of regression	1501.928	Akaike info criterion		17.53564
Sum squared resid	58650459	Schwarz criterion		17.63079
Log-likelihood	-243.4989	F-statistic		25.93777
Durbin-Watson stat	1.999428	Prob(F-statistic)		0.000026

PP Test Statistic	-3.770969	1% Critical Value*	-3.6852
		5% Critical Value	-2.9705
		10% Critical Value	-2.6242

*MacKinnon critical values for rejection of the hypothesis of a unit root.

Lag truncation for Bartlett kernel: 3 (Newey-West suggests: 3)
Residual variance with no correction 358.9280
Residual variance with correction 322.9744

Phillips-Perron Test Equation
Dependent Variable: D(EXCR,2)
Method: Least Squares
Date: 06/30/21 Time: 13:48
Sample(adjusted): 1992 2020
Included observations: 28 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXCR(-1))	-0.722741	0.188607	-3.831995	0.0007
C	7.656289	4.223197	1.812913	0.0814
R-squared	0.360931	Mean dependent var		-0.036832
Adjusted R-squared	0.336351	S.D. dependent var		24.13387
S.E. of regression	19.66057	Akaike info criterion		8.863856
Sum squared resid	10049.98	Schwarz criterion		8.959013
Log-likelihood	-122.0940	F-statistic		14.68418
Durbin-Watson stat	1.934761	Prob(F-statistic)		0.000723

PP Test Statistic	-4.358429	1% Critical Value*	-3.6752
		5% Critical Value	-2.9665
		10% Critical Value	-2.6220

*MacKinnon critical values for rejection of the hypothesis of a unit root.

Lag truncation for Bartlett kernel: 3 (Newey-West suggests: 3)
Residual variance with no correction 8.800228
Residual variance with correction 8.762260

Phillips-Perron Test Equation
Dependent Variable: D(INTR)
Method: Least Squares
Date: 06/30/21 Time: 13:49
Sample(adjusted): 1991 2020
Included observations: 29 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INTR(-1)	-0.765335	0.175551	-4.359614	0.0002
C	14.07231	3.358154	4.190489	0.0003
R-squared	0.413123	Mean dependent var		-0.354828
Adjusted R-squared	0.391387	S.D. dependent var		3.940882
S.E. of regression	3.074426	Akaike info criterion		5.150586
Sum squared resid	255.2066	Schwarz criterion		5.244882
Log-likelihood	-72.68349	F-statistic		19.00623
Durbin-Watson stat	2.150630	Prob(F-statistic)		0.000170

PP Test Statistic	-5.431654	1% Critical Value*	-3.6959
		5% Critical Value	-2.9750
		10% Critical Value	-2.6265

*MacKinnon critical values for rejection of the hypothesis of a unit root.

Lag truncation for Bartlett kernel: 3 (Newey-West suggests: 3)
Residual variance with no correction 761742.9
Residual variance with correction 403937.7

Phillips-Perron Test Equation
Dependent Variable: D(PEXD,3)
Method: Least Squares
Date: 06/30/21 Time: 13:50
Sample(adjusted): 1993 2020
Included observations: 27 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PEXD(-1),2)	-1.051450	0.202543	-5.191237	0.0000
C	42.49334	175.1625	0.242594	0.8103
R-squared	0.518758	Mean dependent var		-33.12728
Adjusted R-squared	0.499509	S.D. dependent var		1282.088
S.E. of regression	907.0183	Akaike info criterion		16.52939
Sum squared resid	20567057	Schwarz criterion		16.62538
Log-likelihood	-221.1468	F-statistic		26.94894
Durbin-Watson stat	2.007717	Prob(F-statistic)		0.000023

Date: 06/30/21 Time: 13:50
Sample: 1990 2019
Included observations: 28
Test assumption: Linear deterministic trend in the data
Series: RGDP GOVE TFCR EXCR INTR PEXD
Lags interval: 1 to 1

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.809389	105.6673	94.15	103.18	None **
0.548809	59.25668	68.52	76.07	At most 1
0.467343	36.97244	47.21	54.46	At most 2
0.269160	19.33588	29.68	35.65	At most 3
0.231491	10.55618	15.41	20.04	At most 4
0.107477	3.183685	3.76	6.65	At most 5

*(**) denotes rejection of the hypothesis at 5%(1%) significance level
L.R. test indicates 1 cointegrating equation(s) at 5% significance level

Unnormalized Cointegrating Coefficients:

RGDP	GOVE	TFCR	EXCR	INTR	PEXD
4.77E-05	-0.000628	0.000141	-0.008740	0.006334	0.000187
-4.74E-05	-0.000215	0.000251	0.006131	0.037509	-8.22E-05
3.07E-05	-0.000493	7.05E-05	-7.59E-05	-0.055126	8.39E-05
-1.04E-05	0.000297	4.92E-05	-0.004994	0.055294	0.000152
1.13E-05	0.000111	-2.80E-05	-0.000367	0.040392	-0.000101
-8.04E-05	0.001186	1.86E-05	-0.009283	-0.055413	9.05E-05

Normalized Cointegrating Coefficients: 1 Cointegrating Equation(s)

RGDP	GOVE	TFCR	EXCR	INTR	PEXD	C
1.000000	-13.18519	2.949818	-183.4060	132.9108	3.926522	-18926.77
	(1.74512)	(0.92102)	(49.6376)	(212.139)	(0.93395)	

Log-likelihood -1033.422

Normalized Cointegrating Coefficients: 2 Cointegrating Equation(s)

RGDP	GOVE	TFCR	EXCR	INTR	PEXD	C

1.000000	0.000000	-3.188559	-143.2023	-554.3738	2.295627	-3246.311
		(0.98477)	(71.5455)	(305.472)	(1.33403)	
0.000000	1.000000	-0.465551	3.049156	-52.12550	-0.123691	1189.247
		(0.08322)	(6.04625)	(25.8151)	(0.11274)	
Log-likelihood	-1022.279					
Normalized Cointegrating Coefficients: 3 Cointegrating Equation(s)						
RGDP	GOVE	TFCR	EXCR	INTR	PEXD	C
1.000000	0.000000	0.000000	-448.3821	2783.678	4.789654	-48166.06
			(130.657)	(4352.81)	(2.92063)	
0.000000	1.000000	0.000000	-41.50914	435.2523	0.240453	-5369.336
			(18.2265)	(607.209)	(0.40742)	
0.000000	0.000000	1.000000	-95.71089	1046.884	0.782180	-14087.79
			(40.0295)	(1333.57)	(0.89479)	
Log-likelihood	-1013.461					
Normalized Cointegrating Coefficients: 4 Cointegrating Equation(s)						
RGDP	GOVE	TFCR	EXCR	INTR	PEXD	C
1.000000	0.000000	0.000000	0.000000	-3088.201	10.41563	-3668.881
				(8596.14)	(7.49993)	
0.000000	1.000000	0.000000	0.000000	-108.3390	0.761280	-1249.993
				(678.178)	(0.59170)	
0.000000	0.000000	1.000000	0.000000	-206.5174	1.983092	-4589.496
				(1599.35)	(1.39540)	
0.000000	0.000000	0.000000	1.000000	-13.09570	0.012547	99.23941
				(25.2375)	(0.02202)	
Log-likelihood	-1009.071					
Normalized Cointegrating Coefficients: 5 Cointegrating Equation(s)						
RGDP	GOVE	TFCR	EXCR	INTR	PEXD	C
1.000000	0.000000	0.000000	0.000000	0.000000	0.632042	-41464.76
					(15.5368)	
0.000000	1.000000	0.000000	0.000000	0.000000	0.418056	-2575.933
					(1.45051)	
0.000000	0.000000	1.000000	0.000000	0.000000	1.328833	-7117.021
					(3.58018)	
0.000000	0.000000	0.000000	1.000000	0.000000	-0.028941	-61.03629
					(0.05345)	
0.000000	0.000000	0.000000	0.000000	1.000000	-0.003168	-12.23880

	(0.00559)
Log-likelihood	-1005.385

Date: 06/30/21 Time: 13:52
Sample(adjusted): 1993 2020
Included observations: 27 after adjusting endpoints
Standard errors & t-statistics in parentheses

Cointegrating Eq:	CointEq1	
RGDP(-1)	1.000000	
PEXD(-1)	9.290349	
	(5.18646)	
	(1.79127)	
C	-60243.08	
Error Correction:	D(RGDP)	D(PEXD)
CointEq1	0.004018	-0.043669
	(0.02613)	(0.01464)
	(0.15376)	(-2.98250)
D(RGDP(-1))	0.598009	-0.050118
	(0.23020)	(0.12899)
	(2.59781)	(-0.38856)
D(RGDP(-2))	-0.296522	-0.075001
	(0.23203)	(0.13001)
	(-1.27794)	(-0.57687)
D(PEXD(-1))	-0.056695	0.452993
	(0.29921)	(0.16766)
	(-0.18948)	(2.70192)
D(PEXD(-2))	-0.073503	-0.140587
	(0.33767)	(0.18921)
	(-0.21768)	(-0.74303)
C	-3052.591	-3455.992
	(2327.41)	(1304.11)
	(-1.31158)	(-2.65008)
GOVE	-0.622486	0.492831
	(0.42004)	(0.23536)
	(-1.48196)	(2.09394)
TFCR	0.382018	-0.103785
	(0.15346)	(0.08599)
	(2.48943)	(-1.20700)
EXCR	3.374593	12.74266
	(9.94091)	(5.57017)

	(0.33947)	(2.28766)
INTR	185.6300	94.34793
	(118.395)	(66.3403)
	(1.56788)	(1.42218)
R-squared	0.686748	0.783192
Adj. R-squared	0.520909	0.668411
Sum sq. resides	17606026	5527716.
S.E. equation	1017.668	570.2278
F-statistic	4.141051	6.823372
Log-likelihood	-219.0482	-203.4089
Akaike AIC	16.96653	15.80807
Schwarz SC	17.44647	16.28801
Mean dependent	1917.320	314.0058
S.D. dependent	1470.271	990.2581
Determinant Residual Covariance		1.33E+11
Log-Likelihood		-422.3609
Akaike Information Criteria		32.91562
Schwarz Criteria		33.97149

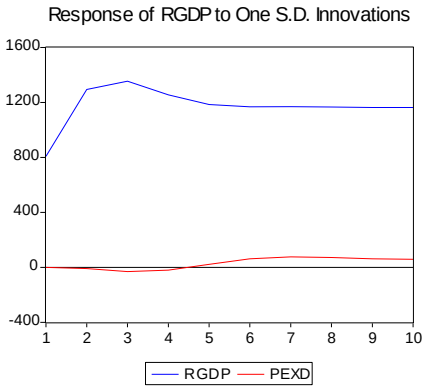
Estimation Proc:
==========
EC 1 2 RGDP PEXD @ C GOVE TFCR EXCR INTR

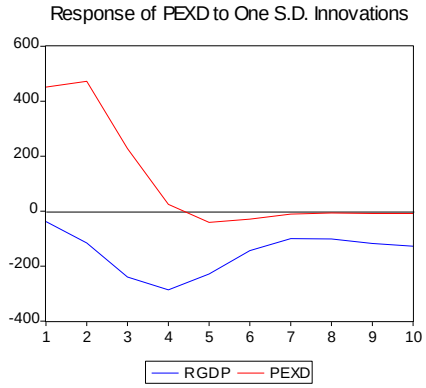
VAR Model:
==========
D(RGDP) = A(1,1)*(B(1,1)*RGDP(-1) + B(1,2)*PEXD(-1) + B(1,3)) + C(1,1)*D(RGDP(-1)) + C(1,2)*D(RGDP(-2)) + C(1,3)*D(PEXD(-1)) + C(1,4)*D(PEXD(-2)) + C(1,5) + C(1,6)*GOVE + C(1,7)*TFCR + C(1,8)*EXCR + C(1,9)*INTR

D(PEXD) = A(2,1)*(B(1,1)*RGDP(-1) + B(1,2)*PEXD(-1) + B(1,3)) + C(2,1)*D(RGDP(-1)) + C(2,2)*D(RGDP(-2)) + C(2,3)*D(PEXD(-1)) + C(2,4)*D(PEXD(-2)) + C(2,5) + C(2,6)*GOVE + C(2,7)*TFCR + C(2,8)*EXCR + C(2,9)*INTR

VAR Model - Substituted Coefficients:
==========
D(RGDP) = 0.004017706882*(RGDP(-1) + 9.290348634*PEXD(-1) - 60243.08297) + 0.5980094541*D(RGDP(-1)) - 0.2965216907*D(RGDP(-2)) - 0.05669522084*D(PEXD(-1)) - 0.07350326483*D(PEXD(-2)) - 3052.590546 - 0.6224857752*GOVE + 0.3820184237*TFCR + 3.37459289*EXCR + 185.6299916*INTR

D(PEXD) = - 0.04366875244*(RGDP(-1) + 9.290348634*PEXD(-1) - 60243.08297) - 0.05011842479*D(RGDP(-1)) - 0.07500057249*D(RGDP(-2)) + 0.4529930187*D(PEXD(-1)) - 0.1405867067*D(PEXD(-2)) - 3455.992373 + 0.4928308595*GOVE - 0.1037850717*TFCR + 12.74266108*EXCR + 94.34793461*INTR





Response of RGDP:						
Period	RGDP	PEXD	GOVE	TFCR	EXCR	INTR
1	541.8544	0.000000	0.000000	0.000000	0.000000	0.000000
2	1031.839	-15.22915	-502.6513	132.6736	299.9709	-57.59488
3	1311.882	-185.3559	-793.3910	265.6040	536.6490	-42.94021
4	1610.799	-246.3777	-719.1819	525.5716	787.2037	-61.47161
5	1884.079	-143.1790	-563.7243	521.6526	925.0666	-65.82107
6	2135.224	113.5657	-248.5931	314.1339	950.7393	-101.9235
7	2329.049	376.4723	135.2127	36.26306	899.7724	-120.6589
8	2502.942	637.6423	634.6304	-262.9854	844.4554	-158.5235
9	2703.535	940.2245	1339.224	-678.7808	774.8358	-190.0959
10	2938.115	1324.349	2421.135	-1217.644	657.3788	-244.3974
Response of PEXD:						
Period	RGDP	PEXD	GOVE	TFCR	EXCR	INTR
1	-141.5854	539.2536	0.000000	0.000000	0.000000	0.000000
2	-338.8007	964.5688	-6.582007	-259.7190	42.86135	65.50703
3	-323.1001	1207.761	347.4980	-552.7595	-24.36312	57.83872
4	-318.0091	1257.088	813.9552	-669.1002	-149.2705	33.72430
5	-265.3189	1407.105	1192.721	-903.2506	-275.3392	11.55462
6	-191.0859	1635.891	1615.255	-1248.348	-362.9958	-14.70011
7	-120.2251	1836.292	2277.867	-1602.229	-478.2818	-38.81772
8	-9.489172	2101.140	3208.947	-2024.803	-636.0700	-85.51085
9	158.4597	2533.575	4412.862	-2677.546	-852.7530	-140.7585
10	373.5852	3128.953	6016.528	-3572.335	-1154.576	-217.5380