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RESEARCH ARTICLE

THE NEXUS BETWEEN THE EXTERNAL SECTOR AND INFLATION IN NIGERIA, 1985 -2018

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Abstract

The interaction between different economies in the global market could have impact on their key economic variables. Hence, this study set out to examine the impact of the external sector on a key economic variable in Nigeria being Inflation. The study utilized time series data from 1985 to 2018 which was subjected to Augmented Dickey Fuller Test. The next step was to subject the data to an ARDL cointegration test. The result showed that in the short run and long run external sector variables do not have any significant impact on inflation in Nigeria. The paper suggests that money supply and fiscal policy should be used to control inflation in Nigeria.

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Introduction:-

Inflation is a concern to government's, businesses, and individuals. To the ordinary man, inflation is seen as a rise in the general price level in society (Arjun, 2014, p.67). Why would an ordinary man be familiar with the rise in the price level in the economy? This is because he is also a functioning man within the society. To function, he interacts at different levels which leads him to engage in transactions or financial and social discussions.

Firms, industries, and households are also affected by prices in their daily activities. A rise in the price of transportation can affect the final cost of raw materials and the cost of an individual's daily expenditure. Specifically speaking, higher prices can erode business profit, amplify losses, and reduce the disposable income of households. Basically, higher prices (inflation), has the potential to affect society to a large extent.

One of the major roles of any government is to ensure economic stability. Inflation, GDP (Gross Domestic Product) and exchange rate act as barometers that enable any government to determine the level of economic stability in the country. The major economic barometer that is of interest to this paper is inflation. For a government to stabilize inflation, it is important that the government understands what triggers inflation in both the theoretical and realistic sense as it relates to their country.

There are a variety of theories on the causes and impacts of inflation on the economy. One of the pronounced theories in this regard is Fishers 'Quantity theory of money'. Fisher recognizes that money supply has a direct impact on inflation. Therefore, the higher the money supply, the higher the inflation rate and vice-versa. However, money supply also has its own origins. It could be done through fiscal policy where government expenditure and open market operations are used to control money supply. It can also be done through monetary policy where the central bank manipulates the interest rate, direct lending to banks and the banks reserve to determine money supply.

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Beyond the use of fiscal and monetary policy to determine money supply there is the money supply that flows in and out of an economy due to its interaction with the external sector because of globalization. These forms of money flows include foreign direct investment, direct exports, direct imports, foreign debt repayment and direct remittances by foreigners abroad. These types of financial flows have the possibility of affecting the amount of money supply in an economy and the inflation rate.

This paper is going to examine the relationship between the external sector and inflation in Nigeria from the years 1985 to 2018. This will help the Nigerian government determine the impact of importation (given that Nigeria is a highly import dependent country) on inflation. It will also give clarity to the relationship between other external sector variables and how they impact on inflation thereby enabling the government to make policy decision that will enhance stability in the Nigerian economy.

The rest of this paper will contain a literature review which will review theories that apply to the research and review empirical literature that is relevant to this paper. After that, the method of analysis that will be used in this paper will be discussed. Then the analysis will be done; and the results explained. Finally, the paper will be concluded with policy prescriptions that can be derived from the results generated.

Literature Review:-

This section will review different literature on the impact of the external sector on inflation. The review will cover, the theoretical framework and empirical literature that are relevant to the study.

Conceptual Clarification

External Sector

The external sector refers to everything that is beyond a country's boundaries. Due to globalization and international trade, a country engages the external sector. This engagement with the external sector for the purpose of this paper can be broken down into two broad categories being the 'Goods market' and 'financial market'. The goods market deals with the movement of goods and services in and out of the country. This is generally referred to as import and export. The financial market refers to the movement of money in and out of a country. The activities that fall under the financial market category in Nigeria include: the foreign exchange market, the capital account, the current account, the external debt profile, external reserve, and balance of payment.

Inflation

The desire of any government is for stability of its economy. When prices in an economy are stable it allows for proper economic planning by firms, household, and government. Inflation is a key economic indicator. It tells us the rate of increase in the general price level of an economy over time. Inflation is measured in different forms. It could either be the consumer price index (CPI), the rate of increase in the CPI (inflation rate) or PCE (Personal consumption expenditure). In Nigeria the CPI and the inflation rate are the common measures used for policy making.

Theoretical Framework

Fishers' quantity theory of money was propounded in the year 1911 in his paper with Brown titled 'The purchasing power of money'. The theory states that the general price level of goods and services in the society is proportionally related to the money supply in the economy (Fisher 1911). According to this theory, if the money supply in the economy should double, then the price level in society should also double. Equation 1 below can be used to further explain Fishers' quantity theory of money:

$$MV = PT \dots\dots\dots (2.1)$$

Where:

- M is the quantity of money in existence.
- V is the velocity of money (number of times money changes hands)
- P is the average price level.
- T is the volume of trade.

V and T are assumed to be constant. This means that M and P have a directly proportional relationship.

Equation 1 above also shows fishers perception of the relationship between the demand and supply of money. The left side of the equation being 'MV' tells us that money supply depends on the volume of money in circulation and

the number of times the money changes hands. The right side of the equation tells us that money demand depends on the average price level and the volume of trade in the economy.

Theoretically speaking, it is expected that increase in money inflow from the external sector should lead to an increase in the inflation rate in Nigeria and vice-versa. This forms the basis of the null hypothesis of this paper.

Empirical Literature Review

There is a vast literature on the relationship between the external sector variables and the inflation rate in Nigeria. In this section of the paper, we are going to review some of the literature available.

Mustafa (2019) examined the relationship between foreign direct investment (FDI) and inflation in Sri Lanka between the years 1978 and 2017. The study employed the Johansen cointegration analysis technique. The result showed the existence of a long run relationship between inflation and FDI. The nature of this relationship is negative meaning that a rise in FDI, would lead to a fall in the inflation rate in Sri Lanka. A causality test carried out in the analysis showed a one-way causal relationship from FDI to inflation. This implies that FDI can be used to control inflation in Sri Lanka.

Aderemi et al (2020) carried out an empirical investigation into 'The determinants of foreign direct inflows in Nigeria' between the years 1990 and 2017. Data sourced from the World bank and the CBN statistical bulletin were analysed using the ARDL regression technique. The study found market size, exchange rate and GDP growth rate to be the major drivers of FDI in Nigeria. This study also agrees with Mustafa (2019) as it discovered the existence of a negative relationship between inflation and FDI in Nigeria. The paper concludes that inflation discourages foreign direct investment and encourages the Nigerian government to work on reducing its inflation rate to attract more foreign direct investment.

A different angle to the relationship between inflation and FDI is presented by Kelvin and Oliver (2019). They studied the relationship between inflation and FDI then related it to economic growth. Their study was on 'Moderating the effects of inflation on foreign direct investment and economic growth in Nigeria'. The aim of the study was to determine the impact of inflation on FDI in Nigeria between the years 1981 and 2017. The study employed the Johansen cointegration technique to determine the long run relationship between inflation and FDI. The results shows that the relationship between inflation and FDI is non-linear. It was also discovered that when inflation was at 2.8 per cent and lower, there was a positive relationship between FDI and growth and vice-versa. This paper therefore advises that government policy should target maintaining the inflation rate at a maximum rate of 2.8%.

Trade openness is one of the variables that is also identified in this paper as an external sector variable. Musibau (2017) studied the relationship between trade openness and inflation in Nigeria between the years 1980 to 2015. The study was done using the Autoregressive Distributed Lag (ARDL) method of analysis. The result of the bounds test showed the presence of a long-run relationship between trade openness and inflation in Nigeria. The nature of this long-run relationship is positive. As the Nigerian economy becomes more open to trade in the long run there would be a rise in the inflation rate and vice-versa. The result also showed a totally opposite situation in the short run. In the short run there is a negative relationship between inflation and the trade openness. As the Nigerian economy becomes more open to trade, there is a fall in the inflation rate in the short run.

A similar study was done in India by Megha and Qamar (2020) where they used the ARDL method of analysis to investigate the relationship between trade openness and inflation. Time series data covering the period of 1974 to 2016 was used for the analysis. The result showed the presence of a positive relationship between inflation and trade openness in India. Therefore, the more open the economy is to trade, the more inflation there will be in the economy. The aim of the paper was to test the Romer's hypothesis which state that there is a negative relationship between inflation and trade openness. This paper by Megha and Qamar (2020) clearly negates the Romer hypothesis.

Another key external sector variable identified is the exchange rate. Abiodun et al (2016), carried out a research titled 'Exchange rate pass-through to inflation in Nigeria'. The aim of thier paper was to check if the persistent fall in the naira caused by both intentional devaluation by the Nigerian government and the effects of the interaction of demand and supply in the foreign exchange market, would lead to inflation in Nigeria. The study utilized the

Johansen cointegration test to check for the existence of long-run relationship between inflation and exchange rate. It went on to carry out a vector error correction mechanism which showed that there is no pass-through of exchange rate into inflation. The result of the analysis showed that exchange rate influences imports and not inflation.

Sanam and Fetullah (2017) also investigated the relationship between the exchange rates and inflation in Iran. Time series data that was used in this research covered the years 1976 to 2012 and was analysed using the Hendry method. Quarterly data covering 1997 third quarter to 2011 fourth quarter was also analysed using the VAR (Vector Autoregression) method. The results showed the existence of a direct relationship between inflation and the exchange rate in Iran. Therefore, the higher the exchange rate, the higher the inflation rate and vice-versa. The result of the analysis also showed that money supply has more influence on the inflation rate in comparison with the exchange rate.

The final external sector variable that is key to this paper is trade balance. Muhammed and Muhammed (2015) investigated the impact of financial development on trade balance in Pakistan. The aim of the investigation was to determine the nature of the relationship between financial development, trade balance, exchange rate and inflation. Time series data was used for this research which was subjected to a unit root test. The result of the unit root test suggested that the ARDL method of analysis should be applied in the paper. The regression result showed the presence of a positive relationship between inflation and trade balance in both the short run and in the long run.

The dynamics of inflation rate, exchange rate and trade balance in Uganda was analysed by Zelealem and Jacob (2018). The aim of the analysis was to determine the nature of the relationship between inflation and the exchange rate and how it affects trade balance in Uganda. The time series data used in this paper was subjected to the ARDL regression technique. The results showed that in the long run, inflation and real depreciation had no impact on trade balance. The ECM was generated to determine the short run result which showed that inflation has no impact on trade balance in the short run. The study suggests to policy makers that actions targeted at controlling the inflation rate and exchange rate will have no impact trade balance in Uganda.

The theoretical foundation of this paper hypothesizes that an increase in money supply should lead to an increase in the inflation rate. This implies that the inflow of funds from the external sector should lead to an increase in the inflation rate. The literature reviewed which covers both Nigeria and other countries has shown different results for different countries where some agree, and others disagree with the theoretical foundation of this paper. This inconsistency between the theoretical framework and the literatures reviewed gives further justification for this research. This paper will now go on to investigate the situation specific relationship that exists between the external sector and inflation in Nigeria between the years 1985 and 2018.

Methodology:-

This section is going to explain the data collection and analytical method that is used to analyze the impact of the foreign sector on inflation rate in Nigeria. This section lays out the empirical steps to be followed in this study.

Model Specification

The analytical framework is derived from the quantity theory of money in which an increase in money supply will lead to an increase in the rate of inflation in an economy. Going by this theory, if there is an increase in money supply in the country due to the activities in the foreign sector, then there will be an increase in the rate of inflation within the country. It is based on this theoretical framework that the following model is specified:

$INFLATION =$

$$f(EXCHANGERATE, FOREIGNDIRECTINVESTMENT, TRADEOPENNESS, TRADEBALANCE) \quad (3.1)$$

Equation 3.1 above shows a two-sided equation. The left side showing the dependent variable being inflation. The right side of the equation shows the independent variables which jointly represent the external sector.

The Equation 3.1 above will be changed into an econometric and then log linear form for analysis purposes.

$$INFR_i = \beta_0 + \beta_1 EXH_i + \beta_2 FDI_i + \beta_3 TOP_i + \beta_4 TB_i + \mu_i \quad (3.2)$$

The log linear form of the equation is written below:

$$INFR = \log \beta_0 + \beta_1 \log EXH_i + \beta_2 \log FDI_i + \beta_3 \log TOP_i + \beta_4 \log TB_i + \mu_i \quad (3.3)$$

$$\beta_1 > 0; \beta_2 > 0; \beta_3 > 0; \beta_4 > 0; \beta_5 > 0;$$

Where INFR is inflation rate, EXH is exchange rate, FDI is foreign direct investment, TOP is trade openness, TS is trade surplus and μ_i is the white noise error term. β_0 is the constant in the model. $\beta_1, \beta_2, \beta_3$ and β_4 are the parameter estimators of EXH, FDI, TOP and TB respectively.

Table 3.1:- Description Of Variables.

VARIABLES	MEASUREMENTS	SOURCES OF DATA
INFLATION RATE (INFR)	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods.	International Monetary Fund, International Financial Statistics, and data files.
EXCHANGE RATE (EXH)	Official exchange rate refers to the exchange rate determined by the national authorities or the legally sanctioned exchange market	International Monetary Fund, International Financial Statistics.
Foreign Direct Investment (FDI)	Foreign direct investment refers to direct investment equity flows into the economy	World bank Development Indicators, International Monetary Fund, International Financial Statistics and OECD.
Trade Openness (TOP)	This is the sum of imports and exports normalized by GDP.	World bank Development Indicators 2019.
Trade Surplus (TB)	This is the amount by which the value of country's exports exceeds the cost of its imports.	World bank Development Indicators 2019.

Source: authors compilation.

All data are secondary in nature and were collected from 1985 to 2018.

Method of Data Analysis:-

This study will adopt the Auto-Regressive Distributed Lag (ARDL) regression technique for this analysis. The technique was developed by Pesaran et al (2001). The ARDL/Bound is unique when compared to other analysis techniques as it can be applied in the event that there are mixed stationarity levels or orders of integration (i.e. I(0) and I(1)). It is also efficient in small samples and generates both the short and long-run. The following steps below will be used to carry out the ARDL technique.

Unit Root Test

Granger and Newbold (1974) observed that running regressions without analyzing the unit root will lead to spurious results. It is therefore advisable for empirical studies that unit root analysis be applied before running regressions. For the purposes of this paper, the Augmented Dickey-Fuller approach (Dickey and Pantula, 1987) will be used to test for unit root. This method of unit root testing has control for serial correlation in the model and performs well asymptotically.

There are three strands to unit root testing using the ADF approach. This paper will adopt the complete version with trend and intercept as is seen below:

$$\Delta Y = \beta_0 + \beta_1 t + \sum_{t=1}^t \rho Y_{t-1} + \sum_{t=1}^t \Delta Y_{t-1} + \epsilon \quad (3.3)$$

When conducting the unit root test the following hypothesis are used:

H_0 ; $\rho=0$: Y has a unit root.

H_1 ; $\rho<0$ Y does not have a unit root.

The test will be carried out at 5% significance level.

Co-integration Test

After getting the results of the unit root test, the next step to take is to check if the relationship among the variables being analyzed have a long run relationship. The econometric method of checking this is called co-integration test. The ARDL model makes use of the 'Bounds approach technique' which was developed by Pesaran et al (2001) to examine co-integration among the variables within the model. The ARDL/Bound testing model is specified below as follows:

$$\ln \Delta X_i = \beta_0 + \sum_{t=i}^{t=n} \varphi_i \Delta X_{it-1} + \sum_{t=i}^{t=n} \gamma_i X_{it-1} + V_i \quad (3.4)$$

Where:

ΔX_i is the vector of the first difference of the dependent variables;

ΔX_{it-1} is the lag values of the difference of the dependent variables;

X_{it-1} are the first lag of the independent variables;

φ is the short run coefficient;

γ_i is the long run coefficient;

Σ is the summation sign;

V_i is the error term.

The F-statistics generated by the bounds test is compared with the upper and lower bounds outputs at a 5% probability level (Pesaran et al 2001). If the F-statistics is greater than the upper critical bound the null hypothesis of no co-integration is rejected. However, if the F-statistics is lower than the lower bound then we cannot reject the null and there is no co-integration in the model. When the F statistics is between the upper and lower bound then the cointegration test is said to be inconclusive and therefore the short run and long run results should be analyzed.

Table 3.1:- Proposed Diagnostics Tests.

S/N	Test	Techniques	Maintain Hypothesis
1	Residual Normality	Jacque-Bera(JB)	H_0 : estimated residuals have normal distribution
2	Autocorrelation	Breusch-Godfrey (BG)	H_0 : there is no auto-correlation among estimated residuals
3	Heteroskedasticity	ARCH	H_0 : estimated residuals have constant variance over time

Source: Researcher's compilation

Empirical Results and Discussions:-

The results of the empirical analysis will be discussed in this section of the paper.

Descriptive Statistics

The statistical properties of the regression data are examined using descriptive statistics. This analysis tells us the different statistical properties of the data to enable us to determine if the data can be used for regression analysis. The results of the descriptive statistics of the different variables are presented below:

Table 4.1:- Descriptive Statistics of the Variables in the Model.

Description	INFR	EXCH	FDI	TOP	TS
Mean	17.34375	98.87916	2.98E+09	50.55853	1.15E+10
Median	10.67683	114.8886	1.88E+09	54.44000	4.76E+09
Maximum	75.40165	306.0837	8.84E+09	81.81000	8.53E+10
Minimum	0.686099	0.893774	1.93E+08	21.12000	-9.25E+09
Std. Dev.	15.45061	86.41662	2.58E+09	17.70828	1.83E+10
Skewness	1.937272	0.687772	0.945776	-0.297508	2.248976
Kurtosis	7.250605	2.902563	2.645814	1.982762	8.904556
Jarque-Bera	46.86297	2.693951	5.246506	1.967489	78.05175
Probability	0.000000	0.260025	0.072566	0.373908	0.000000
Sum	589.6875	3361.892	1.01E+11	1718.990	3.92E+11
Sum Sq. Dev.	7877.810	246438.5	2.20E+20	10348.25	1.11E+22
Observations	34	34	34	34	34

Source: E-views computer output

There are 34 (thirty-four) observations in the table above. Inflation has a mean of 17.3% per annum, a maximum and minimum value of 75.40% per annum and 0.69% per annum respectively.

As it is shown in Table 4.1 above, we also see that there are 34 annual exchange rates between the years 1985 and 2018. These exchange rates have a mean of 99.88 Naira to the American dollar. The maximum annual official exchange rate for the same period is 306 Naira to the American dollar; and the minimum annual official exchange rate is 0.89 naira to the American dollar.

Foreign direct investment has a mean of 298 million American dollars per annum between the years 1985 and 2018. The maximum foreign direct investments that has been received by the Nigerian government between the years 1985 to 2018 is 884 million American dollars and the minimum foreign direct investment that the Nigerian government has received between the years 1985 to 2018 is 193 million American dollars.

Trade openness has a mean of 50% between the years 1985 and 2018. The maximum value for trade openness between those years is 81% and the minimum value for trade openness between those years is 21%.

Finally, Trade Surplus has a mean of eleven billion, five hundred million dollars between the years 1985 to 2018. The minimum value being a trade deficit of nine billion, two hundred and fifty million dollars only. The maximum value with the same period is eighty-five billion and three hundred million dollars only.

Unit Root Test Results

The unit root test was conducted with both the Augmented Dickey-Fuller (ADF) test. This test is used to check for the existence of trend in the data using trend and intercept. The results are presented in the table below:

Table 4.1:- Augmented Dickey-Fuller Unit Root Test.
Trend and Intercept @ Levels

SERIES	ADF TEST STATISTIC	5% CRITICAL VALUES	10% CRITICAL VALUES	ORDER	REMARKS
INFR	-3.551669	-3.552973	-3.209642	I(0)	Non-stationary
EXCH	-2.239951	-3.557759	-3.212361	I(0)	Non-stationary
FDI	-3.755781	-3.587527	-3.229230	I(0)	Stationary
TOP	0.036027	-3.595026	-3.233456	I(0)	Non-stationary
TS	-2.852304	-3.595026	-3.233456	I(0)	Non-stationary

The result presented in table 4.1 above shows that only FDI is stationary at level I(0) after being subjected to the Augmented Dickey-Fuller unit root test, while INFR, EXCH, TOP and TS are not stationary at level. This is because the calculated statistics for FDI is greater than the critical values at both 5% and 10% level of significance integrated at order I(0). However, the calculated statistics for INFR, EXCH, TOP and TS are less than their associated critical values at both 5% and 10% level of significance which means that these variables are not stationary.

Shrestha and Bhatta (2018) suggest that taking the first difference of a non-stationary variable can make it stationary. Therefore, the next step is to proceed to take the first difference of the variables that were not stationary at level. This is seen in the table 4.2 below:

Table 4.2:- Augmented Dickey-Fuller Unit Root Test
Trend and Intercept @ 1st Difference

SERIES	ADF TEST STATISTIC	5% CRITICAL VALUES	10% CRITICAL VALUES	ORDER	REMARKS
INFR	-6.804008	-3.557759	-3.212361	I(1)	Stationary
EXCH	-4.260426	-3.557759	-3.212361	I(1)	Stationary
TOP	-4.124981	-3.612199	-3.243079	I(1)	Stationary
TS	-9.352154	-3.557759	-3.212361	I(1)	Stationary

From the table above, the result of the Augmented Dickey Fuller Test at trend and intercept shows that the calculated statistics for INFR, EXCH, TOP and TS are greater than their critical values at both 5% and 10% level of significance. This implies that these variables are stationary after first differencing. When time series variables in a model are stationary at different levels, the model is to be analyzed using the Autoregressive Distributed Lag Model (ARDL) (Shrestha and Bhatta, 2018).

ARDL Bound Test Approach

To proceed with this analysis, we are going to engage the ARDL bound testing approach which was developed by (Persaran, Shin and Smith 2001) to check for the existence of long-run relationship among the variables within the model. The table below contains the results of the ARDL bounds test:

Table 4.3:- ARDL Bound Test Estimates.

K	F-Statistic	Significant	Lower Bound, I(0)	Upper Bound, I(1)
4	3.029607	10%	2.696	3.898
		5%	3.276	4.63
		1%	4.59	6.368

The result of the bounds test shows that the calculated F-statistics of 3.029607 is in-between the lower and upper bound at 10% and lower than the lower bound at both 5% and 1%. This result suggests that both results for the short-run and long-run will be presented to understand the relationship between the external sector and inflation in both the short-run and the long-run. This paper now proceeds to estimate the long-run model.

Table 4.4:- Long Run Estimation Output.

Variable	Coefficient	Std. Error	T-statistic	P-Value
EXCH	-0.120325	0.060679	-1.982969	0.0606
FDI	-1.47E-09	2.28E-09	-0.642992	0.5272
TOP	-0.116077	0.288183	-0.402790	0.6912
TS	-2.55E-10	3.13E-10	-0.812578	0.4256

The table above shows the long run results on the relationship between inflation and the external sector. In the table we see that Exchange rate has a negative relationship with inflation. A rise in the exchange rate (the lower the value of the naira) will lead to a fall in the inflation rate and vice-versa holding all factors constant. A 1% increase in the exchange rate will cause inflation rate to fall by 0.12%. However, this negative relationship between exchange rate and the inflation rate is insignificant in the long run.

Foreign direct investment also has a negative and insignificant relationship with inflation during the period under review. The result on FDI above implies that in the long run, a 1% increase in foreign direct investment will lead to a (1.47E-09) % decrease in the level of inflation in the economy in the period under review.

In the table above, we can see that Trade Openness has a negative and insignificant relationship with inflation in the long run. This implies that for a 1% increase in trade openness in the economy will lead to a fall in the inflation rate by 0.116077% in the period under review.

From the table above, we can see that the relationship between Trade Surplus and inflation in the long run is negative and insignificant. The implication is that a 1% increase in Trade Surplus will lead to a (-2.55E-10) % decrease in the inflation rate.

The results in table 4.4 generally tells us that in the long run there is no significant relationship between the different variables which together make the external sector and inflation. Therefore, in the long run the external sector is insignificant in determining the inflation rate in Nigeria.

We will now proceed to examine the short-run relationship between inflation and the external sector.

Table 4.5:- Short Run Coefficients.

Variable	Coefficient	Std. Error	t-Statistic	P-Value
D(TOP)	-0.248218	0.185335	-1.339292	0.1948
D(TOP(-1))	-0.589896	0.194693	-3.029887	0.0064
D(TOP(-2))	-0.337934	0.201620	-1.676094	0.1085
D(TS)	3.63E-11	1.17E-10	0.310885	0.7590
CoinEq(-1)*	-0.62830	0.158441	-4.246572	0.0004

Source: E-view computer output

The short run effects of the Nigerian external sector in the inflation rate in Nigeria is presented in Table 4.5. From this table we can see that in the short run, the external sector variables that affect inflation in Nigeria are only, trade openness and trade surplus. The result shows that in the short run, trade openness has a negative but insignificant relationship with inflation. Therefore, in the short run, a 1% increase in trade openness will lead to a decrease in inflation by approximately 0.25%.

The result also shows that in the short run there is a negative and significant relationship between inflation and trade openness after one-year lag. Therefore, a 1% increase in trade openness will lead to an approximately 0.59% fall in inflation rate after one-year lag.

There is also a negative but insignificant relationship between trade openness and inflation after two days lag. For a 1% increase in trade openness, there will be a 0.34% decrease in inflation after a two-year lag.

Trade surplus has a positive and insignificant relationship with inflation. This implies that a 1% increase in trade surplus will lead to a (3.63E-11) % increase in the inflation rate.

The coefficient of the Error Correction mechanism (CointEq (-1)*) is negative and statistically significant. The coefficient of the error correction mechanism is appropriately signed and significant. The absolute value of the coefficient, -0.62830, implies that the speed of adjustment of the model to the long run equilibrium value is approximately 6% within the year.

Post Estimation Test

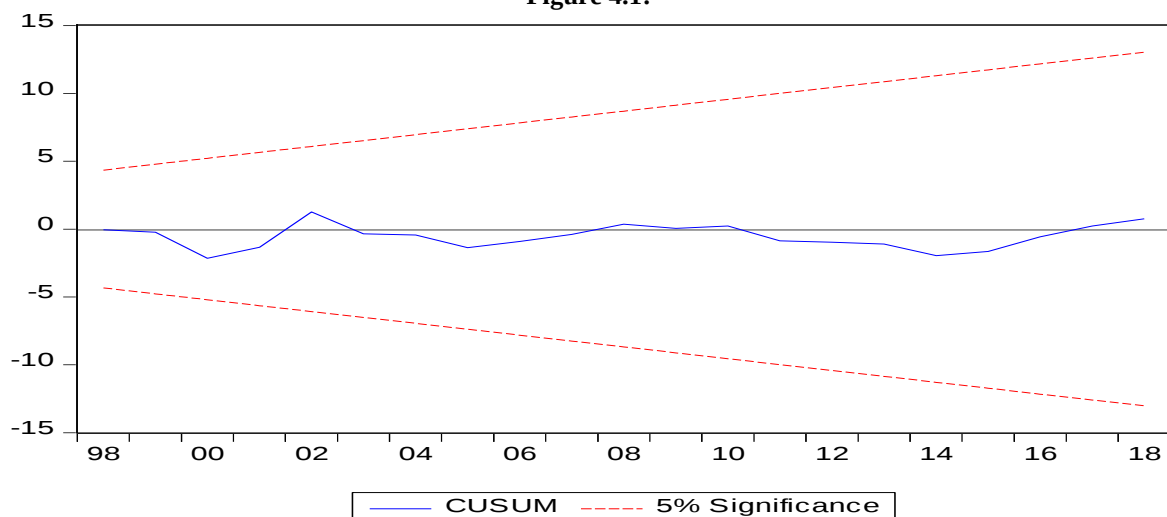
We use post estimation tests to check the integrity of the analysis:

Table 4.6:- Post-Estimation.

Test	Techniques	Statistic	P-Value	Remarks
Residual Normality	Jacque-Bera	Jacque-Bera	0.052266	Accepted
Serial Correlation	Breusch- Godfrey	χ^2	0.6507	Accepted
Heteroskedasticity	Breusch- Pagan- Godfrey	χ^2	0.6799	Accepted

The results of the post-estimation tests are presented in table 4.6 above. The results show that the estimated residuals of the model are normally distributed. Serial correlation test also shows that there is no presence of serial correlation among the error terms. Heteroskedasticity test supports the acceptance of the null hypothesis at 0.05 level of significance. Therefore, there is no evidence of heteroskedasticity among the estimated error terms. In figure 4.1 below, we see the result of the CUSUM test. The test shows that the model is within the 5% significance level which is desirable.

Figure 4.1:-



Implication of Results

From the results discussed above, the external sector does not have any significant impact on inflation in Nigeria. It therefore implies that inflation cannot be controlled by policies affecting the external sector variables in Nigeria. Theoretically, as prescribed by the quantity theory of money, inflation should be controlled using money supply. It is therefore implied that using money supply to control inflation in Nigeria should be considered as the external sector variables are not significant to explaining inflation in Nigeria.

Conclusion and Recommendations:-

Conclusion:-

The general objective of this paper is to examine the relationship that exists between the external sector and inflation in Nigeria. The specific objective is to determine if there is a long-run relationship between the external sector variables and inflation in Nigeria within the years 1985 to 2018.

To achieve these objectives the study engaged ex-post facto research design using Nigeria's data obtained from the World Bank covering the time of 1985 to 2018. The foundational empirical test carried out on the data was the Augmented Dickey-Fuller test. The results of the Augmented Dickey Fuller test informed the use of the Autoregressive Distributed Lag (ARDL) bounds test to check for the existence of long-run relationship. The next step was to present the short-run and long-run results from which the error correction mechanism was designed. It was found that in both the short-run and long-run there is no significant relationship between external sector variables and inflation in Nigeria. It is therefore imperative to conclude from the results that the external sector has no significant impact on inflation in Nigeria. Going by the theoretical framework of the quantity theory of money, this paper would urge the Nigerian government to utilize domestic money supply and fiscal policy to control inflation in Nigeria.

References:-

1. Abiodun, S. B., Ajibola, I. O., Inuwa A, T., Idowu, P., Sani, B., Anigwe, J. O., and Udoko, C. O., (2016). Exchange rate pass-through to inflation in Nigeria, CBN Journal of Applied Statistics 7(1): 49-70
2. Aderemi, T. A., Adeniran, B. G., Sokunbi, G. M., & Bako, Y. A., (2020). The determinants of Foreign Direct Inflows in Nigeria: An Empirical Investigation, Acta Universitatis Danubius (Economica), 16(3), 134-142.
3. Arjun, Y. P. (2014). Manipulation Theory of Inflation: A Research Study on Components of General Price Rise, Pragati Journal of Indian Economy 1(2): 66-82. DOI:10.17492/pragati.v1i2.2507.
4. Dickey, D. A., & Pantula, S. G., (1987). Determining the order of differencing in autoregressive processes, Journal of Business and Economic Statistics 5(4), 455-461. <https://doi.org/10.2307/1391997>.
5. Fisher, I., and H. G. Brown (1911). The Purchasing Power of Money, New York; Macmillan (2nd ed. 1913) as repr. In Barber et al Vol 4.
6. Granger, C. W. J., & Newbold, P., (1974). Spurious regressions in econometrics, Journal of Econometrics, Volume 2(2), 111-120. [https://doi.org/10.1016/0304-4076\(74\)90034-7](https://doi.org/10.1016/0304-4076(74)90034-7).
7. Kelvin, K. K., & Oliver, E. O., (2019). Moderating effects of inflation on foreign direct investment and economic growth relationship in Nigeria, Journal of Economics and Allied Research 3(2), 69-80.
8. Megha, C., & Qamar, A., (2020). An empirical study of trade openness and inflation in India, Decision: Official journal of the Indian Institute of Management Calcutta, 1(7), 79-90.
9. Muhammad, A., & Muhammad, M., (2015). Impact of Financial Development on Trade Balance: An ARDL Cointegration and Causality Approach for Pakistan, Global Business Review 19(1) (February 2018).
10. Musibau, A. B., (2017). Trade openness and inflation in Nigeria: A Nonlinear ARDL Analysis, Journal of Economics and Sustainable Development, 8(24), 129-148.
11. Mustafa, A. M. M. (2019). The Relationship between Foreign Direct Investment and Inflation: Econometric Analysis and Forecasts in the Case of Sri Lanka, Journal of Politics and Law Volume 12 No. 2, 44-52. 10.5539/jpl.v12n2p44.
12. Pesaran, M. H., Shin, Y., & Smith, R. J., (2001). Bounds testing approaches to the analysis of level relationships, Journal of Applied Econometrics, Volume 16(3), 289-326. <https://doi.org/10.1002/jae.616>.
13. Sanam, S. M., & Fetullah, A., (2017). The Relationship between exchange rates and inflation: The case of Iran, European Journal of Sustainable Development Volume 6, No. 4, 329-340. DOI: 10.14207/ejsd2017.v6n4p329.
14. Shrestha, M. B., & Bhatta, G. R., (2018). Selecting Appropriate Methodological Framework for Time Series Data Analysis. The Journal of Finance and Data Science, 4, 71-89. <https://doi.org/10.1016/j.jfds.2017.11.001>.
15. Zelealem, Y., and Jacob, M., (2018). The dynamics of inflation, exchange rates and the trade balance in a small economy: The case of Uganda, International Journal of Development Issues, Emerald Group Publishing, Vol 17(2), 246-264.