

Does Inflationary Expectations affect the Services Sector in Nigeria?

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ABSTRACT

In an attempt to understand how the rising inflation in Nigeria due to the border closure and other internal factors affect the largest contributor to the gross domestic product of Nigeria, this paper is set out to investigate the effect of inflationary expectation on the services sector. Using the Autoregressive Distributed Lag (ARDL) estimation technique on data collected between 1981 and 2018, we provide useful insight on how expectation of future rise in price affect the services sector of Nigeria. The results obtained imply that the demand for the output of the service sector is inelastic while the supply is elastic. As a result, inflationary expectation affects the services sector positively in the long run as it induces more production in expectation of an increase in the general price level due to the possibility of increased profit. Therefore, inflationary expectation is growth enhancing for the services sector of Nigeria. The government of Nigeria should ensure that inflation is properly managed while targeting a moderately high single digit inflation rate, which in the long run, promotes the further growth of the services sector.

ملخص

تمثل هذه الورقة البحثية محاولة لفهم تأثير ارتفاع التضخم في نيجيريا على أكبر مساهم في الناتج المحلي الإجمالي لنيجيريا عقب إغلاق الحدود وبسبب بعض العوامل الداخلية الأخرى، كما تدرس تأثير توقعات التضخم على قطاع الخدمات. ويقدم هذا البحث بعض الرؤى حول الشكل الذي يساهم به توقع ارتفاع الأسعار في المستقبل على قطاع الخدمات في نيجيريا من خلال استخدام تقنية نموذج الانحدار الذاتي للإبطاء الموزع لتقدير البيانات التي تم جمعها بين عامي 1981 و 2018. وتشير النتائج التي تم الحصول عليها إلى أن الطلب على ناتج قطاع الخدمات غير مرن على عكس

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العرض. ونتيجة لذلك، يتبين أن للتوقعات التضخمية تأثير إيجابي على قطاع الخدمات على المدى الطويل إذ تحفز زيادة الإنتاج توقعاً لزيادة المستوى العام للأسعار وإمكانية زيادة الأرباح. لذلك، فإن التوقعات التضخمية تعزز نمو قطاع الخدمات في نيجيريا. يجب على حكومة نيجيريا ضمان إدارة التضخم بشكل صحيح مع استهداف معدل تضخم أحادي الرقم مرتفع نسبياً، والذي من شأنه أن يساعد في تعزيز نمو قطاع الخدمات على المدى الطويل.

ABSTRAITE

Pour tenter de comprendre comment la hausse de l'inflation au Nigéria due à la fermeture des frontières et à d'autres facteurs internes affecte le plus grand contributeur au produit intérieur brut du Nigéria, cet article vise à étudier l'effet des anticipations inflationnistes sur le secteur des services. En utilisant la technique d'estimation ARDL (Autoregressive Distributed Lag) sur des données collectées entre 1981 et 2018, nous fournissons des informations utiles sur la manière dont les anticipations de hausse future des prix affectent le secteur des services au Nigéria. Les résultats obtenus impliquent que la demande pour la production du secteur des services est inélastique alors que l'offre est élastique. Par conséquent, les anticipations inflationnistes affectent positivement le secteur des services à long terme car elles induisent une augmentation de la production dans l'attente d'une hausse du niveau général des prix en raison de la possibilité d'une augmentation des bénéfices. Par conséquent, les anticipations inflationnistes favorisent la croissance du secteur des services au Nigeria. Le gouvernement du Nigeria devrait veiller à ce que l'inflation soit correctement gérée tout en visant un taux d'inflation modérément élevé à un chiffre, ce qui, à long terme, favorise la poursuite de la croissance du secteur des services.

Keywords: Inflationary Expectation, Services Sector, Autoregressive Distributed Lag Model (ARDL)

JEL Classification: D84, L80

1. Introduction

The continuous and persistent increase in the general price level is widely known as inflation (Bawa, Abdullahi, & Ibrahim, 2016), and it is of high concern to policy makers, the government and other stakeholders. One of the major objectives of the central bank of any country is to stabilize the general price level. Stabilizing the prices means moderating the inflation

rate in the country. In doing this, one of the problems the bank will have to deal with is the fluctuations in the demand for major items in the country. Although considerable efforts have been successful in managing inflation rate, in recent times the issue of rising general price level has resurgence coupled with the inherent problem of inflationary expectation. Changes in inflation more often results to changes in inflationary expectations (Umoru, & Oseme, 2013), and inflation moving beyond target can cause inflationary or disinflationary pressures (Doh, & Oksol, 2018). For instance, the expectation of higher prices may result to increase in prices by businesses in order to offset future increase in cost of production. Similarly, the expectation of a fall in price by consumers may results to a fall in demand and a disinflationary period. Besides, inflationary expectation which is the expectations of consumers about the rate of inflation in the near future affects current demand. If consumers' inflation expectation is for higher inflation in the future, then there is an increase in demand in the immediate period and conversely if they expect lower rate of inflation in the future, the demand decreases in the current period. This effect of the inflationary expectations works through the changes in consumption expenditure to affect the aggregate demand (Orji, Ugbe & Ifeanyi, 2015).

Owing majorly to the border closure among other factors, the inflation rate of the Nigerian economy rose to 11.98% in December 2019 from 11.85% in November. This marks the 4th consecutive month of rising inflation. As a result of the rise in the general price level and a possibility of a rising inflationary expectation, policy makers and stakeholder are concerned on the effect of this rising inflationary expectation on key sectors of the economy. Inflationary expectations affect every sector of the economy involved in monetary exchange. In Nigeria which is the case study, finance and manufacturing sector has clearly been bedeviled by the adverse effect of mere guesses about the trend of inflation which cumulate into inflationary expectation. However, the structural shift in the global economy has led to the growth of the service sector over and above many sectors. This means that there has been shift to higher value added activities which enables economies to progress (Besley, 2007).

More specifically, the services sector is observed to be the fastest growing sector of the Nigerian economy, followed closely by the Agricultural sector. Using a five-year average, statistics shows that the sectorial contribution to the economy and the percentage change in the agricultural

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sectors have experience a decline on the average, although, the average output value is observed to have increased. Similar trend is observed for the industrial sector. Between 2000-2004 and 2005-2009, the percentage contribution dropped by 4% on the average and declined further to -3% in 2015-2018 from an average percentage contribution of 14%. The services sector however shows an increase in the contribution to the economy in terms of average value, although the average percentage contribution dropped 40% between 2010-2014 and 2015-2018. This investigation reveals that aside the agricultural sector and services sector, the contribution of other sectors is negligible.

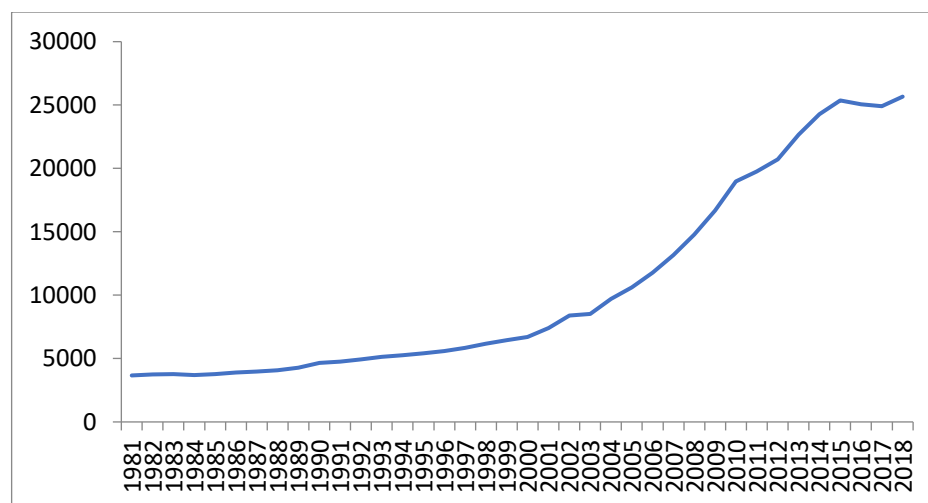
In this paper, we anticipate a buildup of inflationary pressures in subsequent months in Nigeria, and therefore attempt to examine how this inflationary expectation affects the fastest growing sector of the Nigerian economy. The research question that this study will address is does inflationary expectation affect the services sector performance in Nigeria? The null hypothesis to be tested is that inflationary expectation does not significantly affect the performance of services sector in Nigeria. The impact inflationary expectation would have on the services sector in Nigeria is not known as this area has been ignored in literature. Related studies in Nigeria include Iwegbu and Adeoye (2020) who examined the effect of inflationary expectations on stock market returns in Nigeria. Umoru and Oseme (2013) who did an econometric assessment of the relationship between inflation expectation and interest rate variation in Nigeria. Orji, Ugbe and Ifeanyi (2015) examined inflation uncertainty and output growth in Nigeria. Olubusoye and Oyaromade (2008) examined the main determinant of inflation fluctuation in Nigeria. Saidu (2016); Abdullahi & Ibrahim (2016) among others. However, non to the best of our knowledge have examined how inflationary expectation affect the service sector. The problem, nonetheless, is whether or not consumers' expectations about the future inflation do affect the demand for goods and services in the service sector. Following this introductory section, the study is divided into five sections. Section 2 presents the stylized facts on inflation and the service sector in Nigeria. This is followed closely by the sections on the review of previous literature. Section 4 presents the methodology and data analysis while section five concludes with policy implications.

2. Stylized Fact on Inflation Rate and the Service Sector in Nigeria

Figure 1, 2 and 3 shows the trend of the growth of services sector output over the time period 1981 to 2018. In recent times, the services sector has emerged as the fastest growing sector in Nigeria. Data series on the sectoral contribution shows an increasing and upward sloping trend. The trend can be divided into two periods (pre year 2000 and post year 2000). Figure 1 shows that the output of the service sector pre-2000 shows the contribution of the sector to be increasing at a marginal rate. However, post-2000 particularly from 2003 the sector contribution which stood at 31,709.45 billion naira started increasing at an increasing rate before the effect of the rebasing of the Nigerian economy which took place in 2010.

Figure 2 presents a comparative study between the service sector and other sectors of the economy between 2008 and 2018 shows that service sector since 2008 has overtaken the Agricultural sector as the largest contributor to the GDP. Between 2009 and 2018 more than half of the gross Domestic product is from the service sectors. By 2018 the share of GDP in the service sector stood at 52.01%.

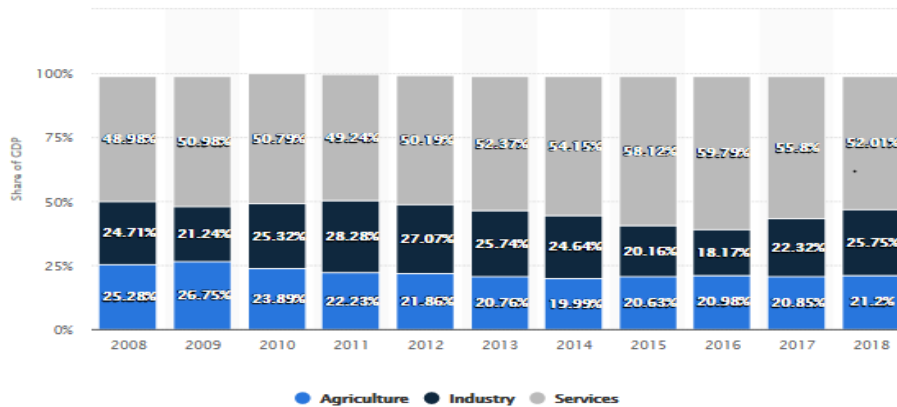
Figure 1: Trend of Service Sector Output in Nigeria (1981-2018)



Source: Central Bank Statistical Bulletin, 2018

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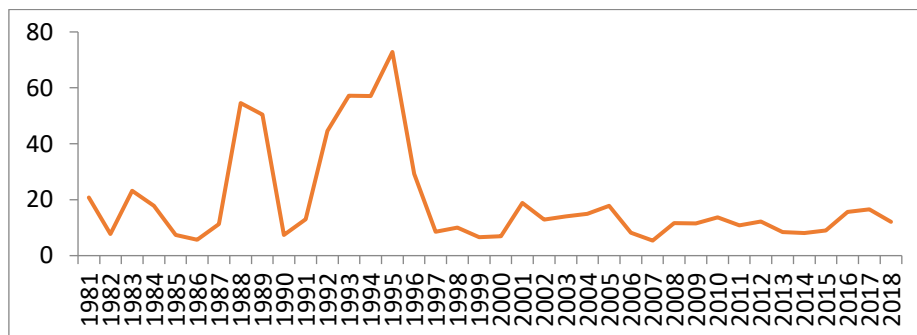
Figure 2: Sectoral Contribution to Gross Domestic Product



Source: Central Bank Statistical Bulletin, 2018

Additionally, figure 3 presents the trend of inflation rate between 1981 and 2018 using the annual percentage change of the consumer price index. This figure shows the volatile nature of the inflation rate in the Nigerian economy. Between 1981 and 1995 the rate of increase in the general price level is 27% on the average before reaching the peak of 72% in 1995 majorly due to the inability to contain the general price level by the monetary authority after the advent of structural adjustment programme (SAP) in 1986. From 1996 the inflation rate dropped to a single digit of 8.53% and maintained the single digit before 2001 where the digit stood at 18.87%. From then onward the federal government through the monetary authority has made price stability and maintaining a single digit inflation rate a major watch word.

Figure 3: Trend of Inflation rate in Nigeria (1981-2018)



Source: Central Bank Statistical Bulletin, 2018

3. Review of Previous Literature

The review of literature shows that more points to the increasing need for more analysis of inflation and inflationary expectation on a key and growing sector such as the service sector. This indicates that studies on the effect of inflationary expectation on the service sector are very few across the globe and studies in Nigeria have to a large extent ignored the effect of inflation on the service sector of the economy.

On studies that considered inflation and the service sector we have Kroch (1991) who did a study on tracking inflation in the service sector in the US. He surveyed the methods used to measure prices in service sector and the measurement of inflation in the three sampled service sector: housing, medicals and education. The study used descriptive statistics of tables and charts and found that in all the three service sector of interest, service inflation is overstated. The author suggested that the intuition of the study is that consumer services inflation in real life situation is lower than the measured rate by the Federal Reserve Bank. Besley (2007) observed that there is an increasing trend of shift from the manufacturing sector to the service sector in the United Kingdom which could possibly mean that the current inflationary pressure may be coming from the service sector due to constraint on resources. Thus, the study examined the trend of inflation and the service sector using descriptive analysis. The study found that changes in inflation in the economy mostly depend on the balance of demand and supply determinants. Thus, the study concluded that the current inflationary pressure is not an aftermath of the shift from manufacturing to service sector.

Other related studies include; Ciccarelli, Garcia and Montes-Galdon (2017) investigated the effect of US Federal Reserve unconventional monetary policy on anchoring inflation expectations. The study used structural vector autoregressive (SVAR) model and found that since the late 2008, anchoring of inflation expectations weakened significantly and the growth of US Federal Reserve contributed significantly to the reversal of the de-anchoring during the recession. The authors concluded that it is essential to accommodate news effects in the US Federal Reserve unconventional monetary policy analysis. Iwegbu and Adeoye (2020) examined the impact of inflationary expectations on Nigeria's stock market. The study employed the Autoregressive Distributed Lag Model and found that the Fisher's hypothesis is rejected and thus, stocks do not

hedge over inflation as expectations which are built up by economic agents significantly impacts of stock returns. Umoru and Oseme (2013) did an econometric assessment of the relationship between inflation expectation and interest rate variation in Nigeria. The study used generalized method of moment estimator for its empirical analysis and found that interest rate variation has significant but negative effect on inflation expectation in Nigeria. Also Chaudhry, Ayyoub and Imran (2013) empirically analyzed the impact of inflation on Pakistan sectoral growth. The study focused on agriculture, manufacturing and service sectors using annual time series data from 1972 to 2010. The study used descriptive statistics and ordinary least squared technique to examine the causal impact. It found different impact of inflation on different sector. They found that inflation have positive and significant impact on both agriculture and service sectors growth. Conversely, the effect of inflation is negative on the growth of manufacturing sector. Orji, Ugbe and Ifeanyi (2015) examined inflation uncertainty and output growth in Nigeria. To examine this relationship, the study used ordinary least square and granger causality approach. It found that Nigerian economy is not a rational economy as the high degree of uncertainty does not reduce its economic growth. Thus, the study suggested that Nigeria is rather an adaptive expectation economy instead of rational expectation economy. Olubusoye and Oyaromade (2008) examined the main determinant of inflation fluctuation in Nigeria. The study used error correction model and found that real exchange rate, lagged value of CPI, inflationary expectation and crude oil prices are the main determinants of inflationary processes in Nigeria. The study concluded that price of crude oil in the international market will continue to distrust the processes of price stability in the country since it is an oil dependent economy. Saidu (2016) used two-stage least squares (2SLS) technique to examine the effect of inflation targeting for economic growth. The study found that inflation targeting is potent marginally in determining economic growth in Nigeria. Bawa, Abdullahi and Ibrahim (2016) analysed the inflationary dynamics in Nigeria between 1981 and 2015. Using the autoregressive distributed lag model, the study found that inflationary process in Nigeria is strongly influenced by monetary policies, past inflation, average rainfall and prices of crude oil in the international market. Hence, the study concluded that there is need to factor in inflationary expectations into the monetary policy formulation. Saidu and Muhammad (2015) examined the substantial effect of inflation and unemployment on economic growth. The study used three methodologies: the ordinary least square, the

augmented dickey fuller and the granger causality test. The results show that unemployment is determined by economic growth level and inflation and as well, economic growth causes inflation. The study suggests that there is a substantial effect of inflation on economic growth but slight effect of unemployment on economic growth.

4. Methodology and Data Analysis

4.1. Theoretical Framework

Loley and Gurov (2010) observed that rationality and adaptability of economic agents are keys among the theories on inflation expectation. The theoretical foundation of this study is based on adaptive expectation theory of inflation expectation. The adaptive expectation theory is chosen as the theoretical framework of for this study as against rational expectation which is void of systematic prediction error by shifting focus from the variable history. This is so following the findings of Orji, Ugbe and Ifeanyi (2015) who examined the effect of inflation uncertainty on the Nigerian economy and observed that Nigeria is a rather inflationary adaptive than otherwise.

The theory was formally developed by Milton Friedman, Phillip Cagan and Marc Nerlove in the 1950s. Adaptive expectation as an inflation theory states that people adjust their expectations of future prices based on past price level. That is, if the economy has been experiencing downward trend, people will mostly expect the economy to continue that way since that is the trend in the recent past.

Theoretically, the adaptive expectation hypothesis takes the form of:

$$P_t^e = P_{t-1}^e + \lambda (P_{t-1} - P_{t-1}^e) \quad (1)$$

Where P_t is the actual current price, P_t^e is the future expected price and λ is the coefficient of price expectations which lies between 0 and 1. The model says that the present expectations of the future inflation rate is a function of the past expectations and error correction term where present expectations are expressed as the difference between the actual inflation and previous expectations of inflation. Similarly, the adaptive expectation theory can be applied to all previous periods so that the expected inflation is a weighted average of all past inflation and the weight diminishes as period date backward. This adaptive expectation model was used to

model inflation expectation in the analysis of the expectation augmented Phillip curve in the 1960s and 1970s (Evans & Honkapohja, 2001).

This study will examine the role of inflationary expectations in the service sector in Nigeria in the framework of the adaptive expectation. The adaptive expectations theory in the service sector suggests that service sector players will formulate their inflation expectations based on the recent past information about the price level. For instance, inflationary expectations are likely to affect the service sector in a number of ways based on the adaptive expectations hypothesis. A service sector player may expect that based on the current trend of prices across different sector or within its sector, there is going to be an increase in the future inflation rate and this will affect its service delivery. The firm, most likely, may incorporate the expected hike into its current charges (to account for the expected losses in the present value of the real payment) thereby creating an increase in prices and lowering the demand for its services. Similarly, the increase prices of the services will be transferred to other sectors that use the service as input into production and their production cost become higher. This creates a continuous chain of inflationary expectations across the interlinked sectors.

4.2. Empirical Framework

The empirical framework follows the rationalization of Koyck model. This model assumes that economic agents will adopt their expectations in the light of past experiences and learn from them. Adapting Cagan and Friedman postulation suppose we have a model below;

$$SGDP_t = \phi + \phi_2 INF_t^* + U_t \quad (2)$$

Where ϕ_2 = Coefficient of expected inflation rate; $SGDP_t$ = Output of the service sector; INF_t^* = Equilibrium expected long run inflation rate at time t. The expected inflation rate are formed in the following way since INF_t^* is not directly measurable.

$$INF_t^* - INF_{t-1}^* = \gamma (INF_t - INF_{t-1}^*) \text{ such that } 0 < \gamma \leq 1 \quad (3)$$

Where INF_{t-1}^* = Equilibrium expected long run inflation rate at time t-1; γ = Coefficient of expectation and INF_t = real or actual inflation rate at time t.

Equation (3) is called the inflation adaptive expectation model and can be estimated using Koyck transformation approach. Using the Koyck to distributed lag model (1954);

From equation (3),

$$\begin{aligned} INF_t^* - INF_{t-1}^* &= \gamma INF_t - \gamma INF_{t-1}^* \\ INF_t^* &= \gamma INF_t + INF_{t-1}^* - \gamma INF_{t-1}^* \\ INF_t^* &= \gamma INF_t + (1 - \gamma) INF_{t-1}^* \end{aligned} \quad (4)$$

Substitute equation (4) into (2)

$$\begin{aligned} SGDP_t &= \beta_0 + \beta_1 [\gamma INF_t + (1 - \gamma) INF_{t-1}^*] + U_t \\ SGDP_t &= \beta_0 + \beta_1 \gamma INF_t + \beta_1 (1 - \gamma) INF_{t-1}^* + U_t \end{aligned} \quad (5)$$

Following Koyck transformation, lagging equation (2) by one period, we have

$$SGDP_{t-1} = \beta_0 + \beta_1 INF_{t-1}^* + U_{t-1}$$

Multiply through by $(1 - \gamma)$

$$(1 - \gamma)SGDP_{t-1} = (1 - \gamma)\beta_0 + (1 - \gamma)\beta_1 INF_{t-1}^* + (1 - \gamma)U_{t-1} \quad (6)$$

Subtract equation (6) from (5)

$$SGDP_t - (1 - \gamma)SGDP_{t-1} = \beta_0 - (1 - \gamma)\beta_0 + \beta_1 \gamma INF_t + (1 - \gamma)\beta_1 INF_{t-1}^* - \beta_1 (1 - \gamma) INF_{t-1}^* + U_t - (1 - \gamma)U_{t-1}$$

$$SGDP_t = \gamma \beta_0 + \gamma \beta_1 INF_t + (1 - \gamma)SGDP_{t-1} + V_t \quad (7)$$

Where $V_t = U_t - (1 - \gamma)U_{t-1}$

From equation (7), estimating it with OLS will break down because $SGDP_{t-1}$ is correlated with $SGDP_t$ and it is stochastic. We use instrumental variable technique to estimate the model. We then employ instrumental variable technique in estimating equation (7). Given that

$$SGDP_t = \gamma \beta_0 + \gamma \beta_1 INF_t + (1 - \gamma)SGDP_{t-1} + V_t$$

Using the instrumental variable GDP_{t-2} to replace GDP_{t-1} , the equations below shows that GDP_{t-2} is non stochastic and hence can be used.

$$PROOF: To show \text{Cov}(V_t SGDP_{t-2}) = 0 \quad (8)$$

$$\text{Given that } SGDP_t = \gamma\beta_0 + \gamma\beta_1 INF_t + (1 - \gamma) GDP_{t-1} + U_t - (1 - \gamma) U_{t-1}$$

Lagging it with two periods, we have

$$SGDP_t = \gamma\beta_0 + \gamma\beta_1 INF_{t-2} + (1 - \gamma) GDP_{t-3} + U_t - (1 - \gamma) U_{t-3} \quad (9)$$

$$\text{But } \text{Cov}(V_t SGDP_{t-2}) = E(V_t SGDP_{t-2})$$

$$\text{Cov}(V_t SGDP_{t-2}) = E(U_t - (1 - \gamma)U_{t-1} SGDP_{t-2}) \quad (10)$$

Substituting equation (9) into (10)

$$\begin{aligned} & E(U_t - (1 - \gamma)U_{t-1})(\gamma\beta_0 + \gamma\beta_1 INF_{t-2} + (1 - \gamma)SGDP_{t-3} + U_t - (1 - \gamma)U_{t-3}) \\ &= E[\gamma\beta_0 U_t + \gamma\beta_1 INF_{t-2} U_t + (1 - \gamma)SGDP_{t-3} U_t + U_t U_t - (1 - \gamma)U_{t-3} U_t - (1 - \gamma)\gamma\beta_0 U_{t-1} - (1 - \gamma)\gamma\beta_1 INF_{t-2} U_t - (1 - \gamma)^2 SGDP_{t-3} U_{t-1} - (1 - \gamma)U_{t-1} U_{t-2} + (1 - \gamma)^2 U_{t-1} U_{t-3}] \\ &= \gamma\beta_0 E(U_t) + \gamma\beta_1 INF_{t-2} E(U_t) + (1 - \gamma)SGDP_{t-3} E(U_t) + E(U_t U_t) - (1 - \gamma)E(U_{t-3}) - (1 - \gamma)\gamma\beta_0 E(U_{t-1}) - (1 - \gamma)\gamma\beta_1 INF_{t-2} E(U_{t-1}) - (1 - \gamma)^2 SGDP_{t-3} E(U_{t-1}) - (1 - \gamma)E(U_{t-1} U_{t-2}) + (1 - \gamma)^2 E(U_{t-1} U_{t-3}) \end{aligned}$$

$$\text{But } E(U_i) = 0, E(U_i U_j) = 0, \text{ (OLS Assumption)}$$

$$\text{Cov}(V_t SGDP_{t-2}) = 0$$

The final model for inflationary expectation is

$$SGDP_t = \gamma\beta_0 + \gamma\beta_1 INF_t + (1 - \gamma) SGDP_{t-2} + V_t$$

$$\gamma\beta_1 = \text{Coefficient of actual inflation rate}$$

$$\gamma\beta_0 > 0, \gamma\beta_1 < 0, (1 - \gamma) > 0$$

4.3. Model Specification

Following from the empirical frame-work and adapting the model used by Bawa, Abdullahi and Ibrahim (2016); Orji, Ugbe and Ifeanyi (2015), we used the past values of inflation to measure inflation expectation. The model of service sectoral growth is presented below with the inclusion of some control variables:

$$LSGDP_t = \varphi_0 + \varphi_1 LSGDP_{t-2} + \varphi_2 INF_t + \varphi_3 EXR_t + \varphi_4 LINV_t + \varphi_5 OPN_t + V_t$$

Where $LSGDP_t$ the logarithm of output of service sector is used as a proxy for the service sector at time t, INF_t is the expected inflation measured by the past values of inflation rate on the average at time t, EXR_t is the exchange rate a proxy for macroeconomic stability at time t, $LINV_t$ is measured by the logarithm of gross capital formation which is a proxy of the capital stock in the economy at time t, while OPN_t measures the degree of openness a proxy for globalization at time t. Expected inflation, exchange rate are a priori expected to have negative impact on the service sector while investment and degree of openness are expected to have a positive effect on the service sector.

4.4. Data Sources

The data for this study were sourced from central bank statistical bulletin (2018) and WDI (2018) on the data series used in the study between the periods of 1981 to 2018. The extracted data include gross fixed capital formation, service sector output, exchange rate, inflation rate, gross domestic product, export and import. Some variables were transformed through logarithm transformation to ensure they are suitable for analysis.

5. Estimation and Discussion of Results

5.1. Stationarity Test

Table 1 presents the stationarity result using Augmented Dickey Fuller test. The result shows that there is a mixed order of integration in the series used for the study. More specifically, the logarithm of service sector outputs is stationary after first difference at 5% level of significance. This implies that the series is integrated at order one or I(1). Inflation rate on the other hand is stationary at levels at 5% level of significance implying

that the series is integrated at levels. More so, the exchange rate series is integrated after first difference at 1% level of significance. Similarly, degree of openness and logarithm of investment is observed to be integrated at order one I(1) or after first difference. This mixed stationarity result given by the unit root tests employed is what necessitated the use of Autoregressive Distributed Lag model technique of analysis.

Table 1: Unit Roots Test Results

Variable	Level			Difference		
	Constant	Constant & Trend	None	Constant	Constant & Trend	None
LSDP	0.360037	-2.4962	2.49821	-3.1048**	-3.1906	-1.1369
INF	2.884731**	-3.9625**	-1.897**	-5.5938***	-5.522980***	-5.6758***
EXR	1.728342	-1.945782	3.29740	-4.2168***	-4.548282***	-3.68970***
OPN	0.140663	-2.778777	1.39549	-4.7109***	-4.763693***	-4.3569***
LINV	-0.597724	-1.926512	1.50921	-3.9979***	-3.499791**	-3.7615***

- a) *, ** and *** denote the rejection of the null hypothesis of a unit root at 10%, 5% and 1% respectively
 b) * ADF- Augmented Dickey Fuller

5.2. Test for Co-integration

We further test for the long run relationship among the series using the bounds co-integration test following the stationarity test. This test is essential since we observe a mixture of non-stationary and stationary series at levels. In this study we employ the bounds co-integration test which allows for mixed integrated series. Table 2 presents the result of the bounds co-integration test. The result shows that there is a long run equilibrium relationship at 5% level of significance since the f-statistics of 4.013537 is greater than the upper bound critical value at 10% and 5%.

Table 2: Bounds co-integration test Result

Growth Model: $LSGDP = f(Inf, Exr, Linv, opn)$		
F-stat	4.013537	
Critical Values		
Significance levels	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source: Authors' Computation from E-views

5.3. Results and Interpretation

We used the Autoregressive Distributed Lag model (ARDL) following the co-integration result to estimate the relationship between expected inflation and the service sector. Table 3 presents the result of the model estimation. We employed the VAR lag selection criteria to determine the lag length used in the estimation. The result of the estimation shows that there is a long run positive relationship between expected inflation and the output of the service sector at 10% level of significance. However, in the short run although a positive relationship is observed it is not statistically significant. More specifically, the impact coefficient is 0.002624 and with a p-value of 0.0745 which indicate a significance at 10%. By implication 1% increase in expected inflation by the people will generate an increase in output growth of the service sector by 0.0026% on the average. Additionally, the result shows that exchange rate affect the service sector positively both in the short run and long run. In the short run an increase in the exchange rate by 1% will generate an increase in the growth of service sector output by 0.000603% on the average. In the long run an increase in the exchange rate by 1% will exert an increase in the service sector output by 0.002751% on the average. Furthermore, using the wald test to examine the significance of investment on the service sector in the short run, the result shows that in the short run and long run investment does not significantly affect the service sector. On the contrary, the degree of openness exerts a negative and significant impact on the service sector in the short run and a positive and significant impact in the long run. The short run is coefficient is -0.3601 which implies that an increase in the degree of openness by 1% will decrease the service sector output by 0.3601% on the average. While in the long run the coefficient is 4.0017 which imply that an increase in the degree of openness increases by 4% on the average when the degree of openness is increased by 1%. The error correction term conforms to a priori expectation of been negative and significant at 1% level of significance. This validates the presence of the co-integrating relationship among the variables in the model. The magnitude of the error correction term is -0.219327; meaning that about 21.9% of the disequilibrium caused by a disturbance in the previous year is corrected for in the current year. This suggests a speed of adjustment of service sector output to the long run equilibrium following a shock or disequilibrium in the short run.

Table 3: Autoregressive Distributed Lag (ARDL) Model

Short Run Coefficients			
Variable	Coefficient	T – Statistic	P – Value
D(LSGDP(-1))	0.269474*	1.729080	0.0961
D(EXR)	0.000603**	2.311949	0.0293
D(INF)	0.000575	1.526416	0.1395
D(OPN)	0.028070	0.197224	0.8452
D(OPN (-1))	-0.388168**	-2.062774	0.0497
D(LINV)	-0.008091	-0.277885	0.7834
D(LINV (-1))	0.069989***	2.980207	0.0063
ECT(-1)	-0.219327***	-2.859629	0.0084
Long Run Coefficients			
Variable	Coefficient	T-Statistic	P-Value
<i>EXR</i>	0.002751***	4.783388	0.0001
<i>INF</i>	0.002624*	1.861522	0.0745
<i>OPN</i>	4.001740***	5.636512	0.0000
<i>LINV</i>	-0.167958	-1.217431	0.2348
<i>C</i>	13.152511***	3.314449	0.0028
Post Estimation Test²			
Breusch-Godfrey Serial Correlation LM Test:	3.001716 [0.0524]		
Heteroskedasticity Test: Breusch-Pagan-Godfrey	0.772853[0.6532]		
Normality Test	1.561658 [0.458026]		
RAMSEY Reset Test	1.934329 [0.1770]		

Note: ***, **, * indicate the statistical significance of coefficients at 1%, 5% and 10% respectively; the values in block brackets is and the probabilities

Findings from the study give significant direction for policy makers. On the effect of expected inflation on the service sector results show that inflationary expectation affects the service sector positively and significantly. This is against our a priori expectation. We expect that inflationary expectation should affect the service sector negatively. The implication of this is that inflationary pressure induces the supply side via increased production while the degree of responsiveness of demand to the output of the service sector is inelastic. Findings also shows that exchange rate positively affect the service sector in the short run and long run. The implication of this result is that with an increase in exchange rate (depreciation or devaluation) of naira, the output of the service sector

² The post estimation test shows that the results of the study are free from any form of serial correlation, misspecification, non-constant variance and non-normal distribution.

becomes less expensive compared to the international goods. This generates a multiplier effect and further increase the output of the sector as a rise in the demand is expected. Lastly, findings show that globalization affect the service sector negatively in the short run while the effect in the long run is positive.

6. Conclusion and Policy Implications

Findings provide useful effect on the service sector of the Nigerian economy. Using the ARDL model findings show that the demand for the output of the service sector is inelastic while the supply is elastic. As a result inflationary expectation affects the service sector positively in the long run as it induces more production in expectation of an increase in the general price level due to the possibility of increased profit. Findings from the study give significant direction for policy makers and create awareness on how essential inflation and by extension inflation expectation are as macroeconomic indicators. Therefore the government should ensure that inflationary expectation is properly managed so as to ensure a moderately high single digit inflation rate, which in the long run promotes the further growth of the service sector.

References

- Bawa, S., Abdullahi, I. S. & Ibrahim, A. (2016). Analysis of inflation dynamics in Nigeria. *CBN Journal of Applied Statistics*, 7(1), 225-276.
- Besley, T. (2007). Inflation and the Service Sector. Bank of England Research Paper Series. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=978749## on 12th January 2020.
- Chaudhry, I. S., Ayyoub, M. & Imran, F. (2013). Does Inflation Matter for Sectoral Growth In Pakistan? *Pakistan Economic and Social Review*, 51(1), 71-92.
- Ciccarelli, M., Garcia, J. A. & Galdón, C. M. (2017). Unconventional Monetary Policy and the Anchoring of Inflation Expectations. *European Central Bank Working Series*, No. 1995, January.
- Evans, G.W. & Honkapohja, S. (2001). Learning and Expectations in Macroeconomics. Princeton University Press, Princeton.
- Fatukasi, B. (2012). Determinant of Inflation in Nigeria: An Empirical Analysis, *International Journal of Humanities and Social Sciences*, 1 (18), 262-271.
- Feridun, M. & Adebisi, M. A. (2005). Forecasting Inflation in Developing Economies: The Case of Nigeria. *International Journal of Applied Econometrics and Quantitative Studies*, 2(4), 103-132.
- Idoko, C. U. & Wada, E. O. (2018). Inflationary and Recessionary Pressure in Nigeria (Coharane Orcutt Iterative and ARIMA Model Methods). *Global Journal of Arts, Humanities and Social Sciences*, 6(5), 29-47.
- Ikechukwu, K. & Olaniyi, E. (2015). Inflation Targeting as a Possible Monetary Framework for Nigeria. *The International Journal of Business and Finance Research*, 9(5), 71-81.
- Iwegbu, O. & Adeoye, B.W. (2020). Effect of inflationary expectations on stock market returns in Nigeria. *Journal of Economic Studies*, 17(1), 27 – 42.
- <https://nauecojournals.com/index.php/stage/pdfreader/113>.

- Kroch, E. (1991). Tracking Inflation in the Service Sector. *FRBNY Quarterly Review/Summer*, 30-35.
- Loley A. & Gurov, I. (2010). The process of formation of inflation expectations in an information economy. A chapter in Proceedings of the IFC Conference on “Initiatives to address data gaps revealed by the financial crisis”, Basel, 25-26 August 2010, 34(1), 104-127. From Bank for International Settlements.
- Mubarik, Y. A. (2005). Inflation and growth: An estimate of the threshold level of inflation in Pakistan. *SBP Working Paper Series*, 1(1), 35-44.
- Odusanya, I.A. & Atanda, A.A. (2010). Analysis of Inflation and its Determinants in Nigeria, MPRA Paper No. 35837.
- Okoroafor, D. O. K., Adeniji, S. O. & Olasehinde, T. (2018). Estimating and Forecasting the Impact of Inflation on Economic Growth in Nigeria Using Threshold Analysis. *CBN Journal of Applied Statistics*, 9(1), 1-22.
- Olubusoye, O.E. & Oyaromade, R. (2008). Modelling the Inflation Process in Nigeria, AERC Research Paper 182, *African Economic Research Consortium*, Nairobi, Kenya.
- Orji, U. O., Ugbe, S. N. & Ifeanyi, O. M. (2015). Inflation Uncertainty and Output Growth in Nigeria. *Journal of Research in Humanities and Social Science*, 3(1), 32-41.
- Otto, G. & Ukpere, W. I. (2016). Inflation in Nigeria: Possible Determinants and Remedies to Tackle it in Nigeria. *Risk governance & control: financial markets & institutions*, 6(2), 35-43.
- Saidu, B. M. & Muhammad, A. A. (2015). Do Unemployment and Inflation Substantially Affect Economic Growth? *Journal of Economics and Development Studies*, 3(2), 132-139.
- Saidu, B. Z. (2016). Inflation Targeting and Economic Growth in Nigeria. *Pyrex Journal of Business and Finance Management Research*, 2(10), 196-218

Tumala, M. M., Olubusoye, O. E., Yaaba, B. N., Yaya, O. S. & Akanbi, O. B. (2018). Forecasting Nigerian Inflation using Model Averaging methods: Modelling Frameworks to Central Banks. MPRA Paper No. 88754.

Umoru, D. & Oseme, A. S. (2013). Inflation Expectation and Interest Rate Variation in Nigeria: An Econometric Assessment of the Evidence. *International Journal of Development and Economic Sustainability*, 1(2), 1-12.

Doh, T., & Oksol, A. (2018). Has the anchoring of inflation expectations changed in the United States during the past decade?. *Economic Review-Federal Reserve Bank of Kansas City*, 103(1), 31-58.

Appendix

Year	Agric	% Change AGRIC	Industry	% Change IND	Construction	% Change CON
1981-1985	2,446.80	-	6,028.35	-	590.79	-
1986-1990	3,168.75	30%	6,895.41	14%	394.13	-33%
1991-1995	3,765.25	19%	8,058.03	17%	497.47	26%
1995-1999	4,319.10	15%	8,309.10	3%	574.85	16%
2000-2004	6,987.20	62%	9,906.94	19%	751.39	31%
2005-2009	10,934.73	56%	11,382.10	15%	1,123.63	50%
2010-2014	14,187.78	30%	12,948.25	14%	2,043.82	82%
2015-2018	16,820.80	19%	12,554.75	-3%	2,588.09	27%

Year	Trade	% Change TRD	Service	% Change SERV
1981-1985	1,761.88	-	3,737.38	-
1986-1990	2,028.34	15%	4,176.89	12%
1991-1995	2,392.47	18%	5,102.68	22%
1995-1999	2,518.15	5%	5,899.29	16%
2000-2004	3,129.28	24%	8,153.90	38%
2005-2009	6,402.16	105%	13,409.67	64%
2010-2014	10,024.19	57%	21,280.91	59%
2015-2018	11,596.72	16%	25,253.68	19%