Niger Agric. J. 33 (2002): 1-9

INFLATION AND CHANGES IN OUTPUT AND CONSUMER PRICES OF FOOD IN NIGERIA

OBASI O. UKOHA*

AND

M.O. NYONG**

Department of Agricultural Economics*

Michael Okpara University of Agriculture

Umudike, P.M.B 7267

NIGERIA

Department of Economics**

University of Calabar,

Calabar.

ABSTRACT

The main objective of this study is to identify relationship between inflation, food production and changes in consumer prices of food in Nigeria. This study was carried out in the context of a macro-econometric model, which recognizes the inter-relationship among inflation and agricultural production. The study covered the period from 1970 to 1964 and data were obtained mainly from official sources. The study reveals that the major factors in the Nigerian inflationary process are mainly structural and manifest as cost-push pressures in the economy. The identified factors are lagging food supplies, persistent budget deficits, foreign exchange constraints, and increases in import prices as well as increases in consumer price of food. A combination of some aspects of exchange rate, fiscal, monetary and pricing policies including measures, which would boost food production, were recommended as a policy package for attaining simultaneously, price stability and growth of agricultural output in the country

INTRODUCTION

Inflation is one of the major macro-economic problems facing Nigeria since 1970s. The trend of inflation reveals that from 1970 to date, the rates of inflation have increased to alarming proportions (see Table1). The trend also shows that years of high rates of inflation

correspond to years of high growth rates of consumer price of food and vice versa. For example, in the period 1970-1974, the average annual growth rate of aggregate consumer price of food was 13.7 percent and the rate of inflation in the period was 10.28 percent. But with increase in the growth rate of aggregate consumer price of food to an annual average of 21.98 percent in the period, 1975-1979, the rate of inflation grew to 19.74 percent in the same period. A decline in the growth rate of aggregate consumer price of food from 21.98 percent in 1975-1979 to 19.07 percent in 1980-1985 was accompanied by a similar decline in the rate of inflation from 19.74 to 17.8 percent points in the corresponding periods. This pattern of trend relationship between inflation and consumer price of food follows for other years up to 1996.

The data on table I therefore suggest a positive relationship between food price movements an the rate of inflation in Nigeria. It might be that increases in food prices bring about increases in the rates of inflation or vice versa. On the contrary, there appears to be no trend relationship between the rate of inflation and output of food. The growth rates of aggregate food production, the commodity groups and the major staple food crops seem to show mixed behavour with the rate of inflation (See Table 1). The exact nature of the relationship between inflation, and changes in output and price of food is, therefore a subject for empirical investigation.

Objectives of the Study

The objectives of this study are to:

determine the nature of the relationship between inflation, food production and consumer prices of food in Nigeria; explain the Nigerian inflation based on the identified relationship between inflation, food production and consumer prices of food: and suggest policies for controlling inflation and ensuring price stability in the country

LITERATURE REVIEW

In economic literature, a number of theories explain inflationary trend. The major theories include the demand-pull, cost-push and the structuralist theories. The structuralists have propounded a theory explaining the relation-ship between inflation and agricultural production. The structuralists argue that inflation is caused by lack of balance between supplies and demands in different sectors of the economy. Inflation is then seen as the result of particular sector bottlenecks in the economy. Such bottlenecks include: the inelastic supply of foodstuffs; the foreign exchange constraints, and the government budget constraint (Thorp, 1971; and Kirpatrick and Nixson, 1976).

The first bottleneck; supply shortages from the agricultural sector, comes about as a result of urbanization and rising incomes which cannot be met by the agricultural sector in the short run. The supply response of the agricultural sector is poor because of structural constraints within the sector. This inelastic supply constitutes a structural inflationary factor. The reasoning of the structuralists starts from the premise of a total sectoral incompressibility of prices, so that any upward price pressure would result in a rise in the general price level (Meier, 1976)

The controversy over the causes of inflation has generated a vast empirical literature in Nigeria. A number of studies have identified structural factors

Table 1: Table Inflation and Changes in Output and Prices of Food in Nigeria-1970-1996 (%)

	Items	1970-1974	1975-1979	1980-1985	1986-1989	1990-1996
	Inflation rate (%)	10.28	19.74	17.8	23.7	19.76
Growth rate of food Production						
a.	***Aggregate food production***	3.5	-10.38	6.18	12.51	1.26
b.	***Staple food crops***	-1.62	-10.13	3.56	14.92	15.55
i)	Maize	-17.94	13.74	38.55	66.69	23.99
ii)	Rice (Milled)	19.15	-9.47	5.95	111.54	1.20
iii)	Cassava	-5.1	-15.81	354.62	6.94	10.08
iv)	Millet	20.17	-11.96	7.93	7.74	3.44
c.	Livestock	0.18	2.85	3.97	3.18	6.42
d.	Fishery	6.17	2.53	11.24	10.01	1.15
Growth rate of Food Prices (%)						
a.	***Aggregate consumer price of food***	13.70	21.98	19.07	35.25	38.43
b.	***Staple food crops***					
i)	Maize	11.89	11.63	31.86	42.12	40.52
ii)	Rice (Milled)	13.15	15.39	24.72	30.97	37.43
iii)	Garri	7.57	43.84	16.54	184.17	37.39
iv)	Millet	29.12	15.63	16.85	43.63	45.34
Exchange rate						
	(₦/USS$)	0.67	0.62	0.70	4.49	17.57

Sources: Computed from Data in: CBN. 1998; Statistical Bulletin, 9(2): 1177, 121-122, 144-145, 151, 180 – 181; CBN. 1997: Bullion, 21 (2): 53; CBN. 1998: Annual Report and statement of Accounts, December 3 100. 1996 edition: 98

as important in Nigerian inflation. For example, Ojo (1982) carried out a study to ascertain the relative contribution of monetary and structural factors to the pace, rate and dimensions of inflation in Nigeria. The results show that export instability, foreign exchange scarcity and agricultural bottleneck are important factors in Nigerian inflation. Similarly, Asogu (1991) in his study discovered that increases in real domestic product or supply situation, especially food and low cost of production of consumables, tend

to ameliorate inflation. In their study, Afolabi and Efunwoye (1995) obtained a result, which shows that structural rigidities such as foreign exchange constraints and inadequate food supply are indeed relevant in the process of inflation in Nigeria.

The causes of inflation have also been investigated in order countries. For example, Chhiber *et al* (1989) have built an econometric model to identify both monetary and structural factors influencing inflation in Zimbabwe. The results reveal that monetary growth; foreign prices, exchange and interest rates, unit labour cost and real income are the determinants of inflation in Zimbabwe.

London (1989) examined the inflationary process in 23 African countries, in the period 1974-1985. The results revealed that growth of money supply, expected inflation, real income and exchange rate were significant determinants of inflation in the sample countries. However, the growth of the money supply played a decreasing role in the course of inflation on the continent. This possibly suggests that structural elements have been the immediate cause of inflation in recent years.

Another relevant study was carried out by Ahluwalia (1980) in which he analyzed the Indian experience with respect to output supply constraints arising from the agricultural sector. This was done within the framework and a macroeconometric model, which explains the determination of relative as well as absolute prices, and real output in the economy. We need a similar study in Nigeria, for understanding output and price behaviour in the economy. Nevertheless, no in-depth analysis was carried out for agricultural production. This study is therefore an attempt to fill the gaps in the previous studies.

METHODOLOGY

The data used for the study were got from the publications of the Central Bank of Nigeria, Federal Office of Statistics and Federal Ministry of Agriculture and Natural resources, etc. The data cover the period 1970 –1996. On the basis of my literature review, I hypothesize the following equations to explain the inter-relationships between inflation, food production and food prices in Nigeria

Inflation Equation:

$INFLA_t = F(\Delta CPF_t, EXCH_t, \Delta IMP_t, INFLA_{t-1}, \Delta FP_t, \Delta FO_{t-1}$. -------(1)

Aggregate Food price Equation:

$\Delta CPF_t = F(INFLA_t, EXCH_t, \Delta VFMP_t, \Delta CPF_{t-1}, \Delta FO_t, \Delta FO_{t-1}, SAP)$----------(2)

Aggregate Food Production Response Equation:

$\Delta FO_t = F(INFLA_t, \Delta CA_t, \Delta AF_t, \Delta GEA_t, \Delta WH_t, \Delta FO_{t-1}, SAP)$ ---------- (3)

Where:

$INFLA_t$ = Inflation rate in the current period (%)

$INFLA_{t-1}$ = Inflation rate in the immediate past period (%)

ΔCPF_t = Changes in the consumer price of food in the current period (%)

ΔCPF_{t-1}= Changes in the consumer price of food in the immediate past period (%)

ΔAF_t = Changes in area under food crop production

$EXCH_t$= Exchange rate (Naira per US Dollar)

ΔIMP_t = Changes in import price (%)

ΔFO_t = Changes in output of food in the current period (%)

ΔFO_{t-1} = Changes in output of food in the immediate past period (%)

$\Delta VFMP_t$= Changes in volume of food imports (%)

ΔCA_t = Changes in credit to agriculture (%). (Credit to agriculture is measured by the addition of all agricultural credit outstanding by the entire commercial and Merchant- Banks and Nigerian Agricultural and Cooperative Bank (NACB)

ΔWH_t = Weather condition (proxied by changes in average annual rainfall).

ΔGEA_t= Changes in government capital expenditure on agriculture.

SAP = A dummy variable for Structural Adjustment Programme (SAP=0 from 1970 to 1985, and SAP = 1 from 1986 to 1996)

Equation (1)-(3) are jointly determined and constitute a simultaneous equations model. The model was tested for identification and found to be over-identified. The Two-State Least Squares (2SLS) method was used to estimate the model (see Johnston, 1972 and Koutsoyiannis, 1977). Model (see Johnson, 1972 and Koutsoyiannis (1977).

RESULTS AND DISCUSSION

Results:

Discussion of Results

The results of econometric analysis show that a simultaneous relationship exists between inflation and the consumer price Other variables identified in the analysis, which explain the Nigerian inflationary process, are exchange rate, inflationary expectation, lagged output of food (one period lag) and import price. These variables jointly account for 73.96 percent of inflation in the country.

Furthermore, Table 2 indicates that the consumer price of food is explained by the current rate of inflation, Structural Adjustment Programme (SAP) and exchange rate. Contrary to expectation, data analysis reveals that there is no direct simultaneous relationship between inflation and output of food in the country. Although lagged food output (one period lag) explains inflation, as could be seen from Table 2, on the country, inflation does not explain food production. In fact, inflation is not a statistically significant explanatory variable in the food production response equations. The aggregate food production is explained by credit supply to agriculture government capital expenditure on agriculture, weather conditions and the structural Adjustment Programme (SAP). The current year consumer price of food has a positive effect on the rate of inflation in the country.

One method of measuring the impact of food price changes on the general price level is to compare the contributions of various consumer items including the food component to aggregate change in all in the all-items price index for a particular period. This contribution is measured by weighting changes experienced by each consumer item, where the resulting product is expressed as proportion of all aggregated weighed change of all the consumer items in the commodity mix (CBN, 1970). The results of the computations are shown on Table 3.The results show that food price changes since 1970s have exerted much impact on domestic inflation. For example, in the period from 1970 to 1975, food price changes contributed to 64.2 percent of the changes in all-items index, a figure that is about double the contributions of all other consumer items.

Table 2: Inflation, Food Price and Output Equations:

Dependent Variables	Inflation ($IFLA_t$)	Food Price (ΔCPF_t)	Aggregate Food Production (ΔFO_t)
Explanatory Variables	Coefficients and t-ratios	Coefficients and t-ratios	Coefficients and t-ratios
Intercept	19.41* (3.79)	-3015 (-0.72)	8.85** (1.94)
$\Delta\hat{CPF}_t$	0.47** (4.3)		-
ΔCPF_{t-1}		-0.18 (0.78)	-
$\hat{INFLA}_t$		1.72** (7.87)	0.26 (0.79)
$INFLA_{t-1}$	0.24* (3.06)		-
$EXCH_t$	2.1** (5.03)	1.49** (2.17)	-
ΔIMP_t	0.14** (3.08)	-	-
$\Delta\hat{FO}_t$	0.017 (0.097)	-0.15 (-1.07)	-
ΔFO_{t-1}	-0.42** (-3.28)	-0.22 (-0.20)	-0.68 (-0.24)
$\Delta VFMP_t$		-0.66 (-1.68)	-
SAP	-	13.85** (2.03)	1.66** (2.48)
ΔWH_t			0.94*(3.36)
ΔAF_t			0.12 (0.59)
ΔCA_t	-		0.13* (2.45)
ΔGEA_t			0.012* (2.32)
R^2	0.7396	0.924	0.68
F	33.26**	16.58*	20.0**
DW	2.1	2.2	2.08

Note: * * and * mean significant at the 5% & 10% levels, respectively. The symbol $\hat{}$ & indicates estimates from equations, whereas $\hat{\hat{}}$ stands for 2SLS estimates. The numbers in parentheses are t-ratios

Similarly, in the periods (1976-1885) and (1986-1996), food price changes contributed 46.8 percent and 46.2 percent respectively, to the changes in all-item index. In order words, in each of the two periods, food price changes had almost the same effect on the rate of inflation as other consumer inputs put together.

The consumer price of food also influences inflation through the impact of exchange rate depreciation (See Table 2). As exchange rate depreciates, the consumer price of food rises, but the rate of growth is faster than the corresponding rate of inflation. This could be seen from Table 4 where the growth rate of consumer price of food is higher than the corresponding rate of inflation in all the years. A possible explanation for this relationship is that since the consumer price of food is a determinant of inflation, for the rate of inflation to rise, the consumer price of food must rise faster. The coefficient of lagged output of food (One year Lag), is statistically significant at the 5 percent level and has a negative sign. This implies that inadequate food production in the immediate past period results ir increase in the rate of inflation in the current period. That is, relatively low output of food precedes high rate of inflation in Nigeria. In other words, lagging food supplies plays some role in the inflationary spiral in the country.

RECOMMENDATIONS

The findings of this research suggest the need to increase the productive base of the economy, particularly, the food sub-sector. Since lag in food supply causes inflation, measures, which ensure sustainable food production, will dampen the rate of inflation in the country and result in price stability. Therefore, government policies should provide enough incentives to boost food production in the country. Food processing and preservation measures will take care of seasonal scarcities in food supply. Furthermore, measures, which forestall exchange rate depreciation and ensure a sound and realistic exchange rate, should be adopted. Examples include the avoidance of persistent deficit financing, the dovetailing of monetary and fiscal policies to prevent excessive monetary growth. Other measures are the discouragement of Nigerians resident in the country from running foreign exchange bank accounts outside the country, and conservation of foreign exchange through restrictions on imports of some selected commodities. Unrestricted imports put much demand on the available foreign exchange and results in exchange rate depreciation.

Imported inflation is also put under control. The absolute dependence on market forces for getting a realistic exchange rate in a structurally distorted economy with imperfect market situations like Nigeria, may never get the "price right".

The Central Bank of Nigeria should be empowered to adopt guided deregulation. There should be selective government intervention in agriculture in the form of input subsidies. In the fishery sub-sector, for example, the high cost of foreign exchange affects the supply of fishing boats and other inputs and calls for government intervention in the fishery sub-sector This study has highlighted the importance of structural factors in the Nigerian inflation, and has revealed that inflation and consumer prices of food are jointly determined, with each reinforcing the other. Other structural factors are lag in food production, import prices and foreign exchange constraint. It is hoped that if the measures suggested in this paper are adopted the economy will enjoy a non-inflationary growth

Table 3. Relative Contributions of Consumer items to average Changes in All-items Index

			Changes in all-items index			*% Contribution to change in All-items Index*		
	Item	*Weights*	1970-1975	1976-1985	1986-1996	1970-1975	1976-1985	1986-1996
i	All-items	1000	13.6	17.4	36.7	100.0	100.0	100.0
ii	Food	455	19.2	17.9	37.3	62.2	46.2	46.2
iii	Clothing	94	11.2	20.2	36.0	7.7	10.9	9.2
iv	Drinks	8.4	10.3	14.7	34.9	6.1	6.8	11.2
v.	Tobacco and kolanuts	37	3.3	19.3		0.9	4.1	
vi.	Accommodation	112	2.6	10.5	37.5		9.8	15.2
vii	Fuel & Light	37	10.9			3.0		
viii	Transport	65	10.7	13.8	39.4	5.1	5.2	7.0
ix.	Household goods and other purchases	86	11.2	19.7	40.2	7.1	9.7	9.4
x.	Medical care and Health expenses	63			44.6			7.7
xi.	Recreation. Entertainment. Education & Cultural Services	63	6.1	20.3	62.2	2.8	7.4	5.7
xii.	Other services	63			33.1			5.7

Source:(1) CBN, 1998, Statistical Bulletin, 9 (1):150; (2) CBN, Annual Report and Statement of Accounts for years indicated; (3) CBN, 1970: Economic and Financial Review, 8 (1)

Note: (1) Clothing and foot footwear are combined as one item, under item (ii), in the 1986-1996 indices; (2) Accommodation, fuel and light are combined as one item in the 1976- 1996 indices; (3) Items (X), (XI) and (XII) are combined as one item in 1970–1985 indices

Table 4: Exchange Rate Depreciation, Consumer Price of Food and Inflation in Nigeria (1970 – 1976).

Item		1970-1974	1975-1979	1980-1985	1986-1996
i	Rate of depreciation (+)/appreciation (-) of exchange rate	-3.2	-21.5	+6.3	+22.3
ii	Growth rate of consumer price of food (%)	13.7	22.0	21.4	37.3
iii	Rate of inflation (%)	10.28	19.8	19.4	33.9

Source: Computed from data in: 1) CBN, 1996: Statistical Bulletin, 7(1): 147 and 250; and 2) CBN, 1997: Major Economic, Financial and banking Indicators, P.2

REFERENCE

AFOLABI, A. J. and B. EFUNWOYE (1995): "Causes of High Inflation in Nigeria", NDIC Quarterly, 5(4): 14-31.

AHULWALIA, I. .J. (1980): "An Analysis of Price and Output Behaviour in the Indian Economy 1951 – 1973)", in Coats Warren L. Jr. and R. Khatkhate Deena, *Money and*

Monetary Policy in less Developed Countries A survey of Issues and Evidence. Oxford, New York, Toronto

ASOGU, J.O. (1991): "An Econometric Analysis of the nature and causes of Inflation in Nigeria", *Economic and Financial Review*, 29 (2): 138 – 155.

CENTRAL BANK OF NIGERIA (1970): "Movement of Consumer Prices between 1960 and 1968", *Economic and Financial Review*, 8 (1) (JUNE).

CENTRAL BANK OF NIGERIA (1974): "Origins and Development of Inflationary Trends in African Countries: Impact on their Growth", *Economic and Financial Review*, 12(2): 5-59.

CHHIBER, A. J. CONTANI;: R. FIRUZABADI AND M. WALTON (1989): "Inflation, Price Controls and Fiscal Adjustment in Zimbabwe", *World Bank Working Papers*, WPS 192, (April).

EGWAIKHIDE, F.O.; L.N. CHETE, and G.O. FALOKUN (1994); *Exchange rate Depreciation Budget Deficit and Inflation: The Nigerian Experience*, African Economic Research Consortium, Research Paper twenty-six (November).

JOHNSTON, J. (1972): *Econometric Methods*, New York: MC Graw-Hill International Book Company

KIRKPATRICK, C. and F. NIXSON (1976): "Inflation and Stabilization Policy in LDCs", in Parkein, M. ZIS G Eds.: *Inflation in an Open Economy*; UK: University of Manchester Press.

KOUTSOYIANIS, A. (1977): *Theory of Econometrics*, London and Basingstoke: Macmillian.

LONDON, A. (1989): "Money, Inflation, and Adjustment Policy in Africa: Some Further Evidence", *African Development Review*, Vol. 1: 87 –111.

NWADE, T.E. and B. A. OKE (1977): "Growth of Money Stock, 1973 – 1977", *Economic and Financial Review*, 13(2) (December): 5-11.

OJO, O. (1982); "Causes of Inflation in Nigeria: Comments" in Awosika, K. and Onitiri, H.M. (Eds), *Inflation in Nigeria*, Proceedings of a National Conference, Ibadan: NISER, 156 –164.

THORP, R. (1971); "Inflation and Financing of Economic Development", in Griffin, K. (ed.), *Financing Development in Latin America*, London and Basing stoke: Macmillan Press Ltd.