Macroeconomic Instability and Health Outcome in Nigeria

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1. Introduction

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in a number of social services e.g. health care services, given the instability of the variables like the rate of inflation, interest rate and exchange rate, can be linked to the wrong emphasis on the use of monetary policies such as currency reforms, structural adjustment programmes and the external economic shocks of the early 1980s resulting from the oil glut, the [illegible] and the deterioration in the terms of trade. For instance, since the debt problem emerged in 1982, the nation's external debt burden has continued to be grown, with debt arrears accumulating owing to inadequate foreign exchange inflows. By 2002, Nigeria's external debt stood at about US$28.5 billion and external debt service payments amounted to US$1.5 billion. The total debt outstanding as a proportion of GDP was 60 per cent, while debt service payment stood at 2.5 percent of GDP. Despite attempts to effectively manage the debt in recent times, it has continued to rise, persistently rising from US$ 9.0 billion in 2000 to US$29.8 billion in 1999 and about US$32.0 billion at the end of 2004. External debt service payment rose from US$1,724.5 million in 1985 to US$[illegible] in 1998 (UNDP 2006).

The instability of the nation's exchange rate regime may also had its toll on the nation's economy. For instance, the continuous depreciation of the country's currency from 24 kobo per US$ in 1982 to N120 per US$ in 1996, has made the nation's export cheaper and import dearer. Since the nation relied so much on foreign capital for its development, which has been affected over the years by the imbalances in international investment flows this has in fact discouraged the movement of investment capital to all sectors of the economy. Coupled to this, is the adverse effect it also has on international trade and the economy's external sector, its debt [illegible] services on international transactions (see Nnanna 2005, CBN 2006). The instability of these variables are also unfavourable since it has been recorded in some [illegible] which [illegible] adverse effect on their long term economic and health progress that determine the level of their health outcomes (Dert and [illegible] 1996, Agenor 2006, Agenor 2002).

Based on this, therefore, this paper therefore examines the relationship between macroeconomic instability and health outcome in Nigeria, using a multiple linear regression analysis. This [illegible] for the [illegible] of the [illegible] study and the long run consequences of the instability on health outcomes in Nigeria.

2. Macroeconomic Instability and Health Outcomes

2.1. Macroeconomic Instability: Meaning and Consequences

The issue of macroeconomic instability is often in the form of persistent and unstable increases in inflation rate, exchange rate volatility, fiscal deficits, to more than one-half of domestic [illegible], with the effect mostly falling on the public who are poor through changes in aggregate demand, output and employment; changes in the rate of economic growth, public sector layoffs and impact on the supply of workers; changes in income distribution; and cuts in government spending and increases in public sector prices (Hicks and Thomas 1984; [illegible] and [illegible] 1985; Dutt and [illegible] 1986; [illegible] and [illegible] 1990; Agenor 2002; [illegible] and [illegible] 2006; [illegible] 2006; [illegible] 2007).

Take the case of inflation, the overall effect of it is mainly felt on the incomes of households and expenditure patterns of the major sectors of the economy, including the public sector. For a start, the effect of inflation is mostly on its distribution, which is a result of two categories of factors: the allocation of assets (both real and financial) and their relative rates of return. The effect on the allocation of assets is by lowering the real value of nominal assets and liabilities, and the [illegible] of debtors and holders of real assets over lenders and owners of nominal assets, thus making some groups better off relative to others. The effect on relative rates of return is mostly felt if indexed assets and foreign currency denominated assets are held particularly by upper-income groups, while the lower income groups hold mostly their own cash. Thus, in such circumstances, it will increase inequality because the inflation tax will be borne by the poorest segments of society. [illegible] of expenditure is the increase in both private and public expenditure [illegible] to occur and [illegible] for the [illegible] [illegible] [illegible]. Both [illegible] will [illegible] the [illegible] of [illegible] [illegible] [illegible], [illegible] of which would affect the [illegible] [illegible] poor (Hicks 1986; Agenor 2002; [illegible] and [illegible] 2005).

Real exchange rate variation is mostly felt if a depreciation is used and [illegible], and the depreciation of the currency will raise the domestic prices of imported goods and if the goods are consumed by the poor it would have a negative effect on their incomes. [illegible] a combination of [illegible] [illegible] [illegible] export [illegible], thus raising the incomes of [illegible] farmers and rural [illegible] and [illegible] the cost [illegible] of imports in the [illegible] sector because capital goods, machinery and equipment are often imported in developing countries. When this [illegible] it tends to [illegible] investment in [illegible] capital, which in turn reduces the demand for skilled workers ([illegible] and [illegible] 1990; [illegible] 1995; Agenor 2002; [illegible] and [illegible] 2005; [illegible] and [illegible] 2006).

In the case of foreign debt servicing, the effect can be viewed when compared with the debt to Gross Domestic Product (GDP) and [illegible] [illegible]; in most cases, [illegible] [illegible] [illegible] the ratio of GDP and [illegible] exports. With this [illegible], not only have inflationary and economic growth being slowed, the macroeconomic problems in recent times also led to instability [illegible] on the debt [illegible]. For instance, the marked increase in the debt stock and debt service payments will lead to under-utilisation of productive capacity and the scaling down in domestic investment and development projects, [illegible] unemployment rate due to the closure of industries, decline in government finance of social services, e.g. health care services, education and [illegible] services, [illegible] roads, electricity and water, [illegible] the government revenue is used to service the debt ([illegible] et al. 1995; Fernandez-Arias 1995; [illegible] 1997; [illegible] 1999).

Contributing to the question on the effects of macroeconomic instability, Fischer and Easterly (1990) observed that fiscal policy is key to successful macroeconomic policy because of its direct macroeconomic effects on the [illegible] allocation of resources and because of methods of financing a budget deficit [illegible] affect the macroeconomic effects [illegible]. Its excessive use in a situation of printing more money and running down the reserves, borrowing at home and abroad. For instance, excessive printing [illegible] money above the [illegible] demand for it [illegible] inflation, running down foreign exchange reserves will create a foreign exchange crisis, domestic borrowing can lead to high interest rate and crowd out the [illegible] of higher interest rate would lead to a [illegible] and [illegible] foreign borrowing can lead to an external debt crisis. Applying a restrictive monetary policy to [illegible] curtail the [illegible] could also be [illegible] to the whole economy, [illegible] would produce high real interest rates that would [illegible] investment and [illegible] to external debt crisis (see also [illegible] 1988; [illegible] and Schmidt-Hebbel 1994; Easterly et al. 1994).

In the case of Nigeria's [illegible] instability, many factors could contribute to it which include [illegible] public spending [illegible] which [illegible] led to a rapid expansion of fiscal deficits that [illegible] were financed with foreign borrowing. As foreign borrowing [illegible] inflation and debt [illegible]. A [illegible] through [illegible] capital flight. Repressive financial policies that usually follow [illegible] financial institutions [illegible] interest rate [illegible] higher [illegible] in comparison [illegible] the risk of [illegible] could not be [illegible] capital flight and the cost of [illegible] credit [illegible] financial institutions became weaker. The [illegible] a more efficient allocation of resources, which raises an overall productivity (Lucas, 1998).

2.2. Health outcomes: Meaning and Indicators

a. Meaning

Health outcomes are [illegible] death, morbidity, fertility, [illegible], disability and mortality. It encompasses not just the health of young children, but also the health of older children and adults. It also comprises reproductive health (i.e., the health of women during and after pregnancy and [illegible]). A useful way of determining health outcomes is to focus on the lifecycle of the people which starts in pregnancy and moves through birth, infancy, childhood, the school years, adolescence, adulthood and aging, which is the expected life of [illegible] (Charmes, et al. 2001).

It is important to note that at every stage of the lifecycle there are risks to health and associated with each is a corresponding outcome indicator. For instance, during the first year of life (infancy), there are risks of illness, poor nutrition, slow growth and development, [illegible] impairment and even death. The corresponding indicators include the incidence of specific illness such as diarrhea or diseases such as polio and diphtheria, low weight-for-age (underweight), low height-for-age (stunting) and death (infant mortality) (Charmes, et al 2001; FMH 2006; World Bank 2005a; World Bank 2005b; 1996, 2006).

Gani (2008) further states that health outcomes can be summarized through health and nutrition status, and the use of health care services. The measure of health status includes the rate of child and mortality and fertility. The measure of nutritional status includes the rate of weight of household members, while health care services are summarized by the extent of vaccination coverage, child health care, visits to hospitals/clinic, and use of family planning and maternity related services. The outcome of health care can also be determined through the characteristics of health facility as well as the availability of drugs and services and personnel (Charmes, et al 2001; FMH 2006; World Bank 2005a; World Bank 2005b).

b. Some Indicators of Health Outcomes

(i) Access to Health Care Services: According to the WHO (2002, 2003, 2005) and the World Bank (2005a, 2005b) access to health care services refers to the percentage of the population that can reach appropriate local health care services by the local means of transport in no more than one hour. In Nigeria, it is conceptualised as the number of health care services (primary, secondary and tertiary) or beds per 1000 patients

In other words, how many health care centres are available for each of a thousand persons in Nigeria. Related to the above is the availability of health care services, which is usually measured by the number of hospital beds and doctors per 1000 people (see also NISER 2001).

(vi) U5 Dependency or [illegible] Mortality Rate: This is measured as the number of [illegible] newborn [illegible] the [illegible] prevailing patterns of mortality at the time of birth were to stay the same throughout [illegible] life. It is a measure of [illegible] which is [illegible] generally [illegible] to be a good indicator of [illegible] countries (ADB 2002, 2006; World Bank 2005a, 2005b).

(vii) Infant Mortality Rate: This is used as [illegible] for the [illegible] year of life. It is the number of infants dying before one year [illegible] per 1000 live births (UNDP 2001; ADB 2002, 2003, 2006; World Bank 2005a, 2005b).

2.3 Macroeconomic Instability and Health Outcomes in Nigeria

The instability of macroeconomic conditions in Nigeria can be linked to the global economic crisis of the 1980s caused by external debt overhang, economic mismanagement of the economy, [illegible] in terms of trade, rising interest rates, [illegible] spending [illegible] which leads to a rapid expansion of fiscal deficit and the oil glut of the late 1970s, followed by the negative effects of austerity measures and structural adjustment programme introduced in 1982 and 1986 ([illegible] 1985; CBN 1992; Faruque 1994; Ojo 1998; NISER 2001).

The economic crisis and debt burden faced by Nigeria has become a major obstacle to human development, especially in terms of [illegible] health care services. Nigeria [illegible] in some cases, three to five times more on external debt servicing than on basic social services. [illegible] the end 2002, Nigeria's external debt stood at about US$25.8 billion and external debt service payments amounted to US$1.3 billion. Because of this heavy debt servicing, the country is [illegible] in health care services that making it impossible to achieve many of its development goals (see also [illegible]).

The [illegible] effects of structural adjustment programme were much felt by the poor [illegible] the government had to cut spending on social [illegible]. For instance, before the structural adjustment programme in 1986, the share of public expenditure on the health sector was [illegible] percent of the GDP, but with the introduction of the programme it dropped to [illegible] percent in 1990. By 1999 it rose to 4.5 percent but dropped again to [illegible] percent in 2000 (ADB 2002; CBN 2004). The devaluation of the naira's exchange rate from [illegible] per US$ in 1985 to N[illegible] per US$ in 2004 has also made the importation of medical equipment and drugs expensive. These situations not only affect the quantity of health care services, but the quality as well. Other consequences of macroeconomic instability resulting from the negative effects of structural adjustment programme on health sector are the inadequacy of hospitals and medical clinics especially in the rural areas, coupled with the high cost of medical services, thus making health care services beyond reach of many people. It is also known that where patients managed to pay for hospital bills, essential drugs were often not available. [illegible] public practice as a result of poor remuneration, which has also led to increase in child and maternal mortality, increase in crude birth rates, low birth weight, increase in prevalence of child malnutrition and low life expectancy at birth (years) when compared with some African countries like Egypt, Morocco and Mauritius (see Table 1).

Table 1: Indicators of Health Outcome in Nigeria and Some Other African Countries ([illegible])

Country	Life expectancy at birth (years)	Infant mortality (Per 1,000)	Low birth weight %	Maternal mortality (Per 100,000)
Nigeria	[illegible]	[illegible]	[illegible]	[illegible]
Egypt	[illegible]	[illegible]	[illegible]	[illegible]
Mauritius	[illegible]	[illegible]	[illegible]	[illegible]
Morocco	[illegible]	[illegible]	[illegible]	[illegible]
South Africa	[illegible]	[illegible]	[illegible]	[illegible]
Tunisia	[illegible]	[illegible]	[illegible]	[illegible]

Source: [illegible]

3. Data Source and Methodology

3.1. Data Source

Time series data covering the period [illegible] on some key macroeconomic variables (e.g., exchange rate, inflation rate, interest rate, deficit finance and debt servicing) and health outcome proxied with life expectancy at birth (years) in Nigeria were used for this study. The data were obtained from the Central Bank of Nigeria Statistical Bulletin for the year [illegible], African Development Bank Gender, Poverty and Environmental Indicators on African Countries for the year [illegible], and World Bank African Development Indicators for the year [illegible].

3.2 Methodology

a. The Model

In specifying the model for this study, emphasis is placed on whether the relationship between macroeconomic variables (e.g. gross domestic product, inflation rate, exchange rate, deficit finance and debt service) has any significant influence on health outcomes in Nigeria.

Having established this link, the model is formulated as:

HO = f(Macro) (1)

Where Macro = f(Gross, Infla, Exch, Defi, Debt) (2)

Following Engle and Granger 1987, Dickey and Fuller 1981, [illegible] and [illegible] 2001; [illegible] and Lee 2003, [illegible] and [illegible] 2005, Dash and Nwaobi 2005, estimating equation (1) with time series data may give spurious and misleading results if the variables are non-stationary. In order to avoid this problem, integration test is carried out to determine the stationarity of the variables. Several methods can be used to test the stationarity of the variables, e.g. [illegible] and [illegible], but in this study the [illegible] test is used, which [illegible] that if the values of the variables are greater than the Dickey-Fuller (ADF) critical value, the variables are said to be stationary. The order of integration is then based on the number of times the series is differenced before it becomes stationary. If the series is stationary at level and the differenced series are stationary, the original first difference series is therefore said to be integrated of order one I(1), while the first difference data is integrated of order zero I(0) (see Engle 1987 and Ashley and Adewusi 2001).

An extension of the above can be carried out in order to determine whether long-run or equilibrium relationship exists between the dependent variable and each of the independent variables using the cointegration test. The cointegration test is a test of stationarity of the residuals generated from running a static regression (in levels) of each of the independent variables on the dependent variable (see Engle and Granger 1987, Nwaobi 2002, [illegible] and [illegible] 2003 and Dash and Nwaobi 2005). The existence of cointegration is also a sufficient condition for the formulation of a model that allows for the incorporation of an Error Correction Mechanism (ECM). The ECM embodies both the short-run dynamics and the long-run relationship among the series together. ECM also shows how the system converges to the long-run equilibrium position. Therefore, to estimate the cointegrating relationship, the residuals from the static regression of the long-run KH [illegible] are tested for stationarity. Therefore to determine the long-run relationship, the following equation (3) below is therefore estimated.

$\Delta BD = \alpha_0 + \alpha_1 \Delta Exchrate + \alpha_2 \Delta Infrate + \alpha_3 \Delta Intrate + \alpha_4 \Delta logDebtRes + \alpha_5 \Delta logDebt + ecm_{t-1} + Z$ (3)

Where:

ΔBD = change in bank deposits compared with the expectation of both types of

ΔExcrat = change in exchange rate (in Naira)

ΔInfra = change in inflation rate (in percentage)

ΔIntra = change in interest rate (in percentage)

ΔLogDebtR = Rate of change in debt reserves (in millions of Naira)

ΔLogDebt = Log of change in debt services (in millions of Naira)

ecm_{t-1} = The error correction factor whose use is most important to ascertain and statistically ... is used here to support the existence of cointegration. It helps to ... the feedback mechanism ... (see for Engle and Granger 1987; ... and Bhattacharya 2001; Bhattacharya and ... 2005; and Dash and ... 2006).

Z = the error term

α_0 = the intercept

$\alpha_1 ... \alpha_6$ = the parameter estimates.

The a priori expectations on the expected pattern of behaviour of the independent variables (macroeconomic variables) on the dependent variable (bank's deposits) are: $\alpha_1 > 0$; $\alpha_2 < 0$; $\alpha_3 > 0$; $\alpha_4 < 0$; and $\alpha_5 < 0$.

4. Results and Discussion

The analysis of the model starts with an examination of the nature of the time series (whether they are stationary or not). Using the method of augmented Dickey-Fuller (DF) analysis, the stationarity of the variables was determined.

The results of the stationarity test are presented in Table 2 and show that all the data points used were stationary or integrated of the same order I(1) having differenced them once, since the first difference did not give the desired results. It can thus be stated that the values of the first difference variables are greater than the Dickey-Fuller (DF) critical value 2.9446 at 5 percent level of significance. The results of the cointegration test as presented in Table 3 support the long run relationship between the independent variables and the dependent variable. The DF value of ... is statistically significant because it is greater than the critical value (-4.23) at 5 percent level of significance.

The result of the error correction mechanism in Table 4 is negative and statistically significant, thus supporting the existence of cointegration between bank's deposits and macroeconomic variables. The error correction [illegible] also provides the dynamic of the short-run behaviour of the independent variables and the speed of the [illegible] convergence towards or divergence away from the long-run equilibrium position (see [illegible] and [illegible]; and [illegible] 20[illegible]). The coefficients [illegible] and [illegible] [illegible] of independent variables, towards or away from the estimated long-run equilibrium position [illegible] 2005 and [illegible] 20[illegible]).

Of all the macroeconomic variables under study, it is the exchange rate which has diverged away from the long-run equilibrium position. An indication that it is the only variable that has [illegible] affected the outcome of health [illegible] in Nigeria. Inflation rate, [illegible] deficit finance and [illegible] to the outcome of [illegible] [illegible] of [illegible]. One reason that can be traced [illegible] the continuous [illegible] of the naira [illegible] economy that has impeded international [illegible] flows, impeded the purchase of sufficient and up to date medical equipment and drugs, and [illegible] the effective allocation of resources into all the sectors of the Nigeria economy including the health sector. This [illegible] is consistent with the [illegible] of Nelson ([illegible]) and [illegible] ([illegible]).

Table 2. Testing the Order of Integration of the [illegible] test of the variables

Variable	DF	Decision
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

The critical value of [illegible] at 5 percent level of significance is [illegible]

Table 3. Testing the Order of Cointegration of the variables

Dependent Variable	Independent Variables	[illegible]	Decision
[illegible]	[illegible] [illegible] [illegible] [illegible] [illegible]	[illegible]	Accepted

The critical value of [illegible] at 5 percent level of significance is [illegible]

Table 4: Error Correction Mechanism Result on Cointegration Regression of Health Outcome Function

Variables	Coefficients and t-values
Intercept (β)	
RGDP (β)	
ΔRINTR (β	[illegible]
ΔINFR (β	[illegible]
ΔEXR (β	[illegible]
ΔDefR (β	[illegible]
ΔDsrr (β	[illegible]
ecm_{t-1} (β	
	[illegible]
R^2	[illegible]
F	[illegible]

t-values in parentheses

*Statistically significant at 5 percent level

5. Conclusion and Recommendations

This paper provided an empirical analysis of the impact of instability of some key macroeconomic variables such as exchange rate, inflation rate, interest rate, deficit finance and external debt servicing on health outcome in Nigeria, by first testing the stationarity of the variables and the long-run implication of the variables, using the unit root test, cointegration and error correction mechanism.

The results of the unit root test show that the variables integrated are of the same order. The results of the cointegration support the long-run equilibrium relation of the independent variables on the dependent variable. The error correction mechanism also supports the existence of cointegration between the variables and health outcome and the extent of adjustment of the individual independent variables from the short-run disequilibrium position to the long-run equilibrium position, with only the exchange rate diverging away from the long-run equilibrium position, thus fulfilling the a priori theoretical expectation, which shows that the more unstable the nation's exchange rate regime the less will be the outcome of health care delivery in Nigeria.

Given the above result, the government should embark on a stable flexible exchange rate regime that would enhance the importation of essential goods needed for the health sector. The government should also adopt a flexible fiscal policy which has the tendency of stabilizing the value of exchange rate and controlling the supply of money in accordance with the level of economic activities and prices of goods and services such as health services. These measures if adopted will go a long way in improving health outcome and productivity in this country.

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