



## A small macroeconometric model of the Nigerian economy



S.O. Olofin<sup>a</sup>, O.E. Olubusoye<sup>a</sup>, C.N.O. Mordi<sup>b</sup>, A.A. Salisu<sup>a,\*</sup>, A.I. Adeleke<sup>a</sup>, S.O. Orekoya<sup>a</sup>,  
A.E. Olowookere<sup>a</sup>, M.A. Adebiji<sup>b</sup>

<sup>a</sup> Centre for Econometric and Allied Research, Department of Economics, University of Ibadan, Nigeria

<sup>b</sup> Research Department, Central Bank of Nigeria, Abuja, Nigeria

### ARTICLE INFO

#### Article history:

Accepted 4 March 2014

Available online 4 April 2014

#### JEL classification:

C50

E27

E58

#### Keywords:

Macro-econometric models

Policy simulation

Nigerian economy

### ABSTRACT

This study develops and uses for forecast a small-scale macro-econometric model of the Nigerian economy. The effects of three policy scenarios built around the assumptions of the changes that the Central Bank of Nigeria is likely to make to the Monetary Policy Rate are proposed and analyzed. Trade-off among the scenarios is identified in terms of their potential impacts on key macroeconomic indicators like inflation, exchange rate, output and lending rate. The results show that the monetary authority has to make a choice between the objectives of maintaining a stable exchange rate and lowering the lending rate.

© 2014 Elsevier B.V. All rights reserved.

### 1. Introduction

Evidence-based policymaking requires the use of data and models to evaluate both current and future impacts of policies and make informed choices. This provides the policymaker with a more formal and rigorous approach to policy analyses than can be realized from reliance on conventional rule of thumb and intuition methods. Among those that tend to benefit immensely from this evidence-based policymaking are monetary authorities of countries. For instance, it is now a common practice for Central Banks to maintain and utilize a suite of models with which the effects and effectiveness of monetary policies are evaluated.

However, the decision of the Nigerian monetary authority had been at best ad-hoc in nature, with little or no consideration for evidence-based monetary policy decision making. This study therefore aims at supporting the current efforts of the Central Bank of Nigeria (CBN) to develop a pragmatic model that assists in the process of providing evidence-based monetary policy decisions. To the best of our knowledge, there is no functional model for Nigeria that is regularly updated to provide scientific basis for monetary policy decisions. This is the contribution of this study. The model presented and used in this study is essentially a small scale macro-econometric model (SSM) with a considerable theoretical content that is typically

designed for policy analysis. It is termed 'CBN MAC II' and is a revised edition of the CBN MAC I.<sup>1</sup>

This CBN MAC II model focuses on three specific objectives, namely: examining the interactions among the key macroeconomic variables; evaluating the response of these variables to adjustments in monetary policy rate; and providing some criteria for judging the various possible policy outcomes. On the basis of the estimated results and outcomes of the model simulations, some restrictions are imposed on the coefficients in order to generate more meaningful policy decisions and policy choices. Also, the model has been subjected to a wide range of sensitivity analysis and found to be quite robust in tracking developments regarding key macroeconomic indicators in the Nigerian economy. This study contains the result of the simulation conducted on three (3) alternative policy options proposed for the consideration of the monetary policy authority with the ultimate aim of basing policy choices on rigorous analytical framework as against other rule-of-thumb considerations.

The study therefore proposes and analyses the effects of 3 policy options or scenarios which are built around the assumptions of the changes that the CBN is likely to make to the Monetary Policy Rate (MPR). Trade-offs among the scenarios are identified in terms of their potential impacts on key macroeconomic indicators which include *inflation*, *exchange rate*, *output* and *lending rate*. In other words, these policy simulations should assist in determining what the likely impacts might be on the economy,

\* Corresponding author at: Centre for Econometric and Allied Research, Department of Economics, University of Ibadan, Oyo State, +234, Nigeria. Tel.: +234 803471169 (mobile).

E-mail addresses: [aa.salisu@mail.ui.edu.ng](mailto:aa.salisu@mail.ui.edu.ng), [aa.salisu@cear.org.ng](mailto:aa.salisu@cear.org.ng) (A.A. Salisu).

<sup>1</sup> CBN MAC I is a medium-scale macro-econometric model of the Nigerian economy that is capable of explaining inter-sectoral linkages and relationships among key macroeconomic variables.

with specific reference to these key macroeconomic indicators if the scenarios under consideration are implemented by the regulatory authorities. The period of policy simulation is 2013:Q3 to 2014:Q4.

Following this introduction section, the remaining sections of the paper are divided into five. Section 2 provides stylized facts on the Nigerian economy in relation to variables used in this study and Section 3 presents a brief review of previous studies. Section 4 gives the summary of the theoretical framework underlying the model and the methodology employed in its implementation. Section 5 presents the results of the effect of the scenarios and Section 6 is the conclusion.

## 2. Stylized facts on the Nigerian macro-economy

The Nigerian economy is the largest in the West African sub-region, particularly in terms of basic macroeconomic indicators. The economy, measured by GDP, is a total of \$207.12 billion in 2008, representing 73% and 19% of ECOWAS and Africa respectively (WDI, 2011). However, it is still a small open economy, accounting for less than 1% of the global economy while its exports sector is dominated by a single commodity – crude oil.

Table 1 presents some macroeconomic variables that are relevant to monetary policy analyses for the periods of 1980 to 2012. From the table, it is observed that economic growth was highly unstable throughout the period under review. On the whole, the economy growth rate hovered between –7% and 11% throughout the period. The growth rate in the economy which stood at –7.17% in the 1980 to 1985 period due to poor economic conditions improved to 5.29% between 1985 and 1989. Decaying infrastructure however took its toll on the economic performance with the growth rate declining from 3.19% in the 1990 to 1994 period further to 2.54% in the 1995 to 1999 periods.

This observed trend has however improved in the recent period, particularly since the 2000 fiscal year following the emergence of the civilian regime. The few recent drops in economic performance could be explained by the unstable pattern of oil income flows associated with the volatility in the world oil market. The collapse of world oil prices arising from the glut in the oil market and the recession in world economy caused the few breaks in the positive growth trend.

The Nigeria inflationary pressure experience has also been mixed since the 1980s. The table shows that inflation rate in Nigeria has majorly been in the double digits averaging 27.07% between 1985 and 1989 and further increasing astronomically to 36.26% in the 1990 to 1994 period. On the whole, the inflation rate hovered between 11% and 36% throughout the period under review and has been hanging around 13.1% in recent period. Many empirical studies on inflation in Nigeria have identified the weak revenue base of the country as the primary causal factor for the wide-ranging inflation performance (Oyaromade and Olubusoye, 2007).

Another major factor affecting the inflation rate in the country is that the economy is small and open. Given this feature, internationally generated inflation rates, especially from the international oil price volatility, often put pressure on the domestic price level. Other factors include: persistent increases in food and fuel prices, money supply growth (excess liquidity shocks) and large budget deficits financed by concessionary borrowing from the CBN. These have severally impaired the conduct of monetary policy for most of the past three decades.

The exchange rate of naira to dollar which was below N1 in the 1970s and in the early 1980s moved to an average of N3 during the period of 1985 to 1989 and further worsened to an average of almost N36 during the five-year period 1995 to 1999. The fall in the value of naira since the advent of the civilian regime followed the adoption of a more flexible exchange rate regime in this period. The average exchange rate of the naira in the period 2000 to 2004 deepened to N120 and further to an average of N152 for the years 2010 and 2012. However, the current efforts by the CBN have achieved some relative stability in the exchange rate.

One of the major tools of monetary policy is the interest rate and its emerging structure. The basic feature of the Nigeria interest rate behaviour is that the short term rates for savings are going down, while the rates for bank loans and loans for term lending remained high and sticky as a result of the high cost of funds mobilised by banks. Interest rate soared high from an average of 14.91% to 23.46% for years 1985 to 1989 and 1990 to 1994 respectively thus retarding and impairing investment in the economy. Interestingly however, since the monetary policy rate has become sensitive and responsive to economic variations, the monetary authority has begun experimenting with evidence-based policy formulation in fixing the rate to reflect the vision and goal of the government. Thus, following a consistent downward review in the monetary policy rate from average of 16.9% for the years 2000–2004 and further to as low as 7.5% average for years 2010 and 2012; the interest rate has followed suit with a fall from an average of 20.38% between years 2000 and 2004 to averages of 17.14% and 17.19 between years 2005 and 2009 and years 2010 and 2012 respectively as shown in the table.

Average money supply which stood at N16.93 million between 1980 and 1984 jumped to N33.78 million and N131.98 million in periods 1985 to 1989 and 1990 to 1994 respectively. This explains the observed high rate of inflation for the corresponding periods given that such was not accompanied by any observable growth in output. It further grew phenomenally to N1.64 billion, N6.03 billion and N12.52 billion respectively for periods 2000 to 2004, 2005 to 2009 and 2010 to 2012. This is in consonance with the monetary authority's objective to drive economic growth as reflected in the observed increase in the economy's average output for these periods.

## 3. Review of previous studies

The quest for a simple and dynamic mechanism for examining the implications of various monetary policy rules on inflation and output has led to the evolution of small scale macroeconomic models (SSMMs). One of the earliest examples of an open-economy SSMMs is that of Dornbusch (1976), which is made popular for its use of simple price setting behaviour (see Valadkhani, 2004 for a survey of earlier literature on SSMMs). A number of studies have modified the price setting specification of the IS–LM to include built-in inflation persistence (see for example, Stone et al., 2005). Some studies have also implemented the backward looking open economy (see Allen et al., 2003) and the forward looking open economy variants of this mode (see Doménech et al., 2001; and Tanuwidjaja and Meng, 2005). However, the recent developments in SSMMs involve the use of forward looking New Keynesian open economy framework (see Berg et al., 2006 and Wieland et al., 2012 for a survey of the literature).

**Table 1**  
Key macroeconomic variables in Nigeria, 1980–2012 (periodic average).

Period	GDP (N'm)	GDP growth rate (%)	Inflation rate (%)	Exchange rate (N/\$)	Interest rate (%)	Broad money (N'm)
1980–1984	205,033.19	–7.17	20.51	0.67	9.21	16,930.66
1985–1989	213,683.89	5.29	27.07	3.92	14.91	33,785.70
1990–1994	270,915.70	3.19	36.26	16.27	23.46	131,986.73
1995–1999	300,049.76	2.54	25.00	36.22	18.63	441,445.04
2000–2004	424,897.11	11.20	13.83	120.05	20.38	1,642,419.80
2005–2009	636,636.84	6.29	11.31	130.92	17.14	6,028,083.78
2010–2012	833,129.04	7.29	13.10	152.10	17.19	12,521,964.83

Source: computed by the authors from CBN statistical bulletin (various issues).

Download English Version:

<https://daneshyari.com/en/article/5054260>

Download Persian Version:

<https://daneshyari.com/article/5054260>

[Daneshyari.com](https://daneshyari.com)