

Production, Employment, Policy Somersaults and the Road to a Recession

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Abstract

This paper examines the empirical contributions of unclear policies and/or detrimental policy somersaults of monetary authorities to the current economic recession in Nigeria in terms of employment and production. Using monthly data for 2014–2017 and a dummy variable for policy, a set of structural variables is articulated to model production and employment in Nigeria. The analysis comprises both the short and the long-run estimations using Ordinary Least Squares (OLS) and unrestricted Vector Autoregression (VAR) model of order 1. Evidence indicates the Purchasing Managers' Index (PMI) for employment which was already under 50 further worsened in line with Composite PMI with onset of recession and continued to worsen twelve months into the recession implying continued policy failures. The index for policy pre and post recession is shown to be significant and to affect production negatively which helps explain Nigeria's recession. Causality tests indicate feedback effects between policy and production as well as between policy and employment. Variance decomposition (VD) outputs indicate a shock to policy has the strongest and most lasting effect on both production and employment and that significant variations experienced by all the other variables are attributable to shocks in policy. Also, examination of policies and their subsequent reversals indicate apparent lack of understanding of the basic principles of money creation and the drivers of economic growth and development by monetary authority managers. We recommend necessary urgent review of the competencies of current crop of monetary authority managers and/or their re-training to minimize avoidable convoluted shocks to the economy.

Keywords: *Production, Employment, Economic Policy, Economic Recession.*

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Background to the Study

The policies of government are generally acknowledged as important in shaping national economic growth and development. This is because such policies may affect the macroeconomic environment and create the regulations and structures in which businesses operate within the economic space. According to the World Bank, “policies that expose individuals to new ways of thinking and alternative understandings of the world can expand the available set of mental models and thus play an important role in development”. The World Bank also considers a stereotype to be a mental model of a social group (World Development Report –WDR 2015) and Nigeria is fast becoming stereotyped a country of policy somersaults where nothing seems to work. Furthermore, stereotypes can affect opportunities accessible to a nation, could shape processes of social inclusion and exclusion and as a result, people from deprived or marginalized groups tend to underrate their abilities and may even underperform in situations where they are reminded of their group membership (Guyon and Huillery 2014). This in turn can strengthen the stereotype and become a basis for division and exclusion, in a vicious cycle (WDR 2015). Consequently, stereotypes could be self-fulfilling and are capable of strengthening economic differences among groups (Ridgeway 2011).

In Nigeria, government policies have been changed with unpleasant consequences from time to time and policy somersaults or inconsistencies in government policies have become the bane of the Nigerian economy. For instance, in a 2011 World Bank Assessment Report for Nigeria titled: “An Assessment of the Investment Climate in 26 States,” 40 % of Firms reported macroeconomic environment to be a major constraint, ranking it fifth in a rank of top ten constraints. This was 38% higher than what was reported in 2006 indicating the macroeconomic environment in Nigeria had become even more hostile to investment which critically affected productivity and competitiveness of businesses leading to Nigeria's recession in 2016.

The paper analyzes the inconsistencies in government policies and the impact on the economy in view of economic recession in Nigeria aimed at identifying related policy issues and drawing policy lessons from the findings and to stimulate policy discussions. Following from this introduction, Section 2 presents some related literature review while Section 3 contains the methodology employed. Section 4 discusses the estimation results while Section 5 concludes with some policy recommendations.

Literature Review

Conceptual Issues in Public Policy

The idea of a policy somersault connotes a policy that has been turned on its head or reversed or rolled over. However, the definition of what constitutes “policy” is multifaceted with variable meanings and uses ranging from a label for a field of activity, an expression of general purpose, decisions of government, a programme, formal authorization, specific proposals, a process, outcome, output, and a theory or model (Parsons 1995). Parsons also identifies about seven distinct but overlapping frameworks which provide perspectives on public policy. These frameworks include:

1. *Framework of welfare economics* derived from economics and characterized by rational technique focused on efficiency of utility.
2. *Framework of public choice* derived from economics and characterized by examination of bureaucratic and institutional behavior using political approach.

3. *Framework of social structure* derived from sociology and characterized by lifecycle approach to social problems based on stagiest model which examines power relations and systems.
4. *Framework of political philosophy* derived from philosophy and characterized by a range of ethical, normative and methodological approaches.
5. *Framework of information processing* derived from psychology, organizational behavior, artificial intelligence as well as information science and characterized by examination of individual and organizational behavior focusing on problem solving.
6. *Framework of managerialism* derived from private sector management and characterized by applying private sector techniques to the public sector, being critical of bureaucracy and focusing on efficiency
7. *Framework of political/policy process* derived from political sciences and characterized by a range of approaches including – stagiest, pluralist-elitist, neo-Marxist, sub-systems, policy discourse and institutionalism.

In addition, Althaus, Bridgman and Davis (2013) define a framework that combines explanatory, ideal-type and normative points of view and offer three other conceptions of policy with attendant implications as follows:

1. *Policy as authoritative choice* – Policy decisions are authoritative because they are made by people with legitimate power i.e. policy-making entails the exercise of power by governments.
2. *Policy as hypothesis* – Policies make assumptions about behavior and contain incentives that promote one behavior over another, or disincentives to discourage certain activities. Policies are therefore based on theories about the world and models of cause and effect which create uncertainty in policy making and in reaching policy objectives. Hence, policy makers become skilled by identifying and correcting errors in policy assumptions and formulations, by drawing lessons from the policy experience and by applying such lessons in the next policy cycle.
3. *Policy as objective* – A policy lacking purpose serves no purpose and as such, the policy process must help decision-makers clarify their objectives by linking to goals that are attached to the wider purposes of government activity.

Theories of Public Policy

Given the multifaceted nature of policy, different theories on public policy have been identified to include Institutional, Rationalism, Incrementalism, Punctuated Equilibrium, Group/Pluralism, Elite, Rational Choice/Public Choice, Game theory, Systems theory and Stages Approach; some of which are briefly discussed below. *Institutional Theory*: When public policy is authoritatively determined and implemented by government agencies, such policy is seen as the product of Constitutional provisions, common law and judicial decisions or the traditional organization of government. This is the purview of Institutional Theory.

Rationalism Theory: When the yardstick for adopting a public policy is to minimize costs and maximize social benefits. This is the purview of Rationalism theory.

Group Theory: This is when policy is formulated based on the interaction of different interests groups in the society in a manner that will benefit the larger group.

System Theory: This is when the needs and influence from environment factors (economic, political, social, natural, legal etc) are the inputs in the process of policy formulation and the implementation of the policy formulated becomes the output or the feedback to the society.

Elite Theory: This theory assumes a few group of people (usually governing elites) govern and formulate policy for the ill-informed larger population. The elite theory sees elite group (government) as solely responsible for policy making and implementation and the policy formulated does not arise from mass demand unlike the group model which is based on the interest of the interest groups (Sanchawa 2015).

Incremental Theory: This theory relies on incremental or gradual decision making whereby new policies are only slightly different from old policies and past policies are accepted as legitimate since policy makers are too short on time and resources to make totally new policies. This theory was developed by Lindblom in 1959.

In all these theories, the idea of the steps or stages through which policy should be developed is outlined in the policy cycle which has four (4) stages:

1. **Agenda Setting:** This stage identifies and defines a problem on which action needs to be taken and sets the decision-making agenda regarding when and who will deal with the problem and in what form.
2. **Policy Formulation:** This stage identifies and analyzes alternatives; and applies a decision tool to make estimations and selections.
3. **Policy Implementation:** This stage executes selected options by translating policy mandates, prescriptions and goals into actions, desirable results and realities respectively. Implementation also converts inputs (financial, information, materials, technical, labor etc.) into outputs (goods and services).
4. **Policy Evaluation:** This stage determines the impact of policy on real life conditions by the estimation, assessment or appraisal of policy including its content.

Policy Somersaults in Nigeria

Nigeria has become a land of policy somersaults and copious literature is awash with this attestation. The Nigerian government is engaged in policy somersaults in all facets of the economy and a sample of Nigerian literature briefly reviewed herein as summarized in Table 1 tells some of the story.

Table 1: Selected Nigerian Literature on Policy Somersaults

Athour(s)	Topic/Area	Results/Conclusion
The Scoop (2015)	Policy somersault: Customs lifts ban on rice	Victory for the Rice Mafia
Agronews (2016)	Wheat: government policy inconsistency	Frustrating self-sufficiency
Codewit (2010)	Central Bank of Nigeria in Policy Somersault	Re-licensed Specialized Banks
The Guardian Newspaper (2012)	Policy Somersault Bane of Nigeria's Industrial Development	Preference for foreign companies and lack of protection of nascent home industries Discouraged savings habit by citizens Multiplicity of taxes and levies imposed on businesses
Abba Moro (2015)	Policy Somersault Bane Of Nigeria Under-development	Abandoned inherited projects
Akusoba C. C (2013)	Polymer banknotes and policy somersault: CBN in a familiar trademark.	National Economic wastages
Ajibefun I. (2007)	Policy Somersault, Bane of Nigerian education	Globally-uncompetitive education sector
The Guardian Newspaper EDITORIAL (2016)	The Tenure Policy Somersault	Unnecessary retrogression Building strong men in place of strong institutions
Akano S. O. (2016)	Policy somersault responsible for Nigeria's underdevelopment	Underdeveloped science and technology. Promoting the interest of foreigners at the expense of citizens' welfare
The Republican News (2016)	The Lifting of Ban On Domiciliary account: Is This a Somersault In Government's Policy?	Trial and error monetary and fiscal policies Systemic and endemic corruption
Premium Times (2017)	Cashless Policy: CBN suspends charges on large withdrawals	Trial and error monetary and fiscal policies Systemic and endemic corruption

Methods and Materials**The Model and Modeling Procedure**

The methodology involves Granger Causality Tests, Vector Autoregression (VAR) and Vector Error Correction (VEC) Models in the spirit of Engle and Granger (1987), Johansen (1988; 1995), Lutkepohl (2009) and Juselius (2006). The modeling procedure consists of the following estimation steps:

1. Time series analysis and Augmented Dickey-Fuller (ADF) unit root tests to determine stationarity.
2. Unrestricted VAR specification analysis, including lag length to analyze the dynamic impact of random disturbances on the system of variables.
3. The VAR based cointegration test methodology developed by Johansen (1991; 1995). This addresses the question of long-run determinants of production and employment as well as other system variables.
4. The VAR based Block Exogeneity Granger Causality Tests. The Block Exogeneity tests indicate the joint significance of each of the other lagged endogenous variables in that equation as well as Pair-wise causality.

5. Variance decomposition (VD) analysis on the basis of step 2. This estimates the relative significance of each random innovation in affecting the variables in the VAR if policy does not change and looking ahead.
6. VEC to determine the dynamic adjustment of Error correction system variables toward the long-run equilibrium model in response to various structural shocks.

The attraction of the VAR approach to a researcher is that it avoids the need for structural modeling in systems of interrelated time series; since every endogenous variable in the system is treated as a function of the lagged values of all of the endogenous variables in the system.

Variable Definitions and Ordering

The endogenous variable for the OSL model is CPMI while the endogenous variables for the VAR model are CPMI, EPMI, PLC, IPC, and OPC as defined in Box 1. According to data sources, the composite PMI (CPMI) is computed as the *weighted average* of five diffusion indices for manufacturing sector: production level, new orders, supplier delivery time, employment level and raw materials inventory, with assigned weights of 25%, 30%, 15%, 10% and 20%, respectively. The diffusion index is computed as the percent of positive responses plus one-half of the percent of those reporting no change. The choice of variables is motivated by both the background discussion above and the findings in the literature. For convenience the system variables are ordered according to an assumed decrease in exogeneity. The rationale for the ordering is to facilitate structural factorization in addition to the Cholesky vector autoregressive ordering. Only the constant is used as exogenous variable to enable isolating maximum block exogenous effects.

Box1: Variable Definitions	
Variable	Definition
<i>CPMI</i> -for Production	Composite Purchasing Managers' Index for Manufacturing
<i>EPMI</i> -for Employmt	Employment Purchasing Managers' Index
<i>PLC</i> -for Policy	A binary variable with the value of 1 and 0 pre and post 2016 economic recession respectively

Data

The analysis uses monthly data for July 2014 – April 2017 from the Central Bank of Nigeria and pertinent derivatives there from.

**Empirical Evidence
Series Characteristics**

Table 2: VAR Lag Order Selection Criteria

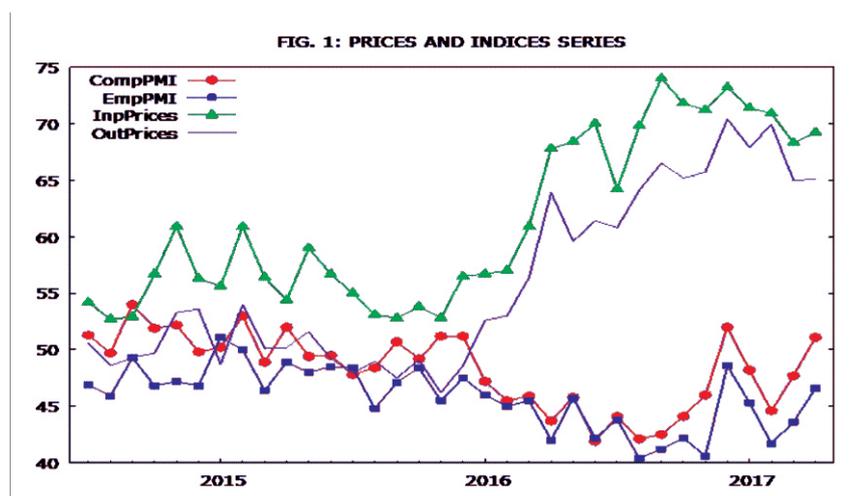
Lag	LogL	LR	FPE	AIC	SC
0	-302.8201	NA	290.0594	19.85936	20.09065
1	-234.4703	110.2416*	18.13673*	17.06260*	18.45033*
2	-215.9567	23.88852	31.59471	17.48108	20.02525
3	-196.6014	18.73092	67.02475	17.84525	21.54586

Where * indicates optimal lag order selected by the information criterion, FPE = Final prediction error,

AIC = Akaike information criterion, SC = Schwarz information criterion and LR = sequential modified LR test statistic (each test at 5% level).

A maximum lag order 3 is selected based on the cube root of the sample size. However, all the information criteria, AIC, SC report the optimal lag to be (1) as presented in Table 2.

Figure 1 plots the series used for this study and indicates multiple trends with a point of divergence heralding the onset of recession and thereafter, strong evidence of drift. The trends in output and input prices run together after divergence generally trending upwards while series in production and employment run together in opposite direction generally trending downwards after the divergence. Also, the series for production and employment do not seem to deviate far apart whereas the series for input and output prices seem to run parallel at a distance. From Figure 1, it is possible the series for production and employment follow a long-run equilibrium relationship they turn to return to over time.



OLS Estimation, Unit Root Tests and Cointegration Analysis
Table 3: OLS, Dependent Variable: CPMI

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EPMI	0.863445	0.154965	5.571859	0.0000
PLC	-2.082399	1.092039	-1.906891	0.0665
IPC	-0.237510	0.169078	-1.404740	0.1707
OPC	0.290284	0.164721	1.762276	0.0886
C	8.101823	9.260607	0.874870	0.3888
R-squared	0.748876	Adjusted R-squared	0.714238	

The results in Table 3 indicate about 75% of production is explained by the selected variables all of which have expected signs except for policy which has a significant negative co-movement with production contrary to economic expectations. This provides evidence of the impact of defective policies on production leading to the current two-year recession. Also, employment is shown to have a highly significant positive co-movement with production.

The results of Tables 4-5 indicate the series are Difference Stationary (DS) series and are cointegrated.

Table 4: Unit Root Test on the Variables

Variables	Test in	ADF Test Statistic	<i>p</i>	Phillips-Perron Test Statistic	<i>p</i>	Order of Integration
CPMI	1 st difference	-7.65487	0.000	-8.197359	0.000	I(0)
EPMI	1 st difference	-6.79301	0.000	-13.17394	0.000	I(0)
PLC	1 st difference	-5.56776	0.000	-5.567764	0.000	I(0)
IPC	1 st difference	-5.40404	0.000	-6.176546	0.000	I(0)
OPC	1 st difference	-7.67668	0.000	-7.490192	0.000	I(0)

Table 5: Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.645230	79.06049	69.81889	0.0076
At most 1	0.462869	45.89939	47.85613	0.0755
At most 2	0.458517	26.01096	29.79707	0.1284
At most 3	0.159588	6.380771	15.49471	0.6505
At most 4	0.025212	0.817136	3.841466	0.3660

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values

Vector Autoregression Estimation

Table 6: Roots of Characteristic Polynomial

Root	Modulus
0.872967	0.872967
0.813724	0.813724
0.429407	0.429407
0.082223 - 0.146967i	0.168404
0.082223 + 0.146967i	0.168404

No root lies outside the unit circle. VAR satisfies the stability condition.

Table 7: Vector Autoregression Estimates

	CPMI	EPMI	PLC	IPC	OPC
CPMI(-1)	0.668558 ***	0.358825	0.031573 *	0.012378	0.254895
EPMI(-1)	-0.591344 **	-0.262573	-0.046217 **	-0.052625	-0.174288
PLC(-1)	-3.947297 ***	-2.464966 *	1.026599 ***	4.055951 **	5.612180 ***
IPC(-1)	-0.193099	-0.098189	0.011191	0.476007	0.316962
OPC(-1)	0.193574	0.032398	-0.019950	0.205347	0.371952
C	45.98354 ***	45.89405 ***	1.039443	20.86993	9.050226
R-squared	0.669134	0.553312	0.905652	0.863729	0.902985
Adj. R-squared	0.607863	0.470592	0.888180	0.838494	0.885019

Where: ***denotes significance at 1%, **denotes significance at 5% and *denotes significance at 10%

Tables 6-7 presents results of the VAR estimation and indicate the estimated VAR is stable (stationary) with policy being significant for all system equations. Again, policy has a highly significant negative co-movement with production contrary to economic expectations.

Granger Causality Block Exogeneity Tests based on VAR

Table 8: VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable:	CPMI - Eq1	EPMI- Eq2	PLC- Eq3	IPC- Eq4	OPC- Eq5
Excluded:					
CPMI	-	2.633586 (0.1046)	2.999681 (0.0833)	0.001499 (0.9691)	0.809155 (0.3684)
EPMI	5.095408 (0.0240)	-	4.795847 (0.0285)	0.020211 (0.8869)	0.282282 (0.5952)
PLC	8.109997 (0.0044)	3.312550 (0.0688)	-	4.288563 (0.0384)	10.45517 (0.0012)
IPC	0.884153 (0.3471)	0.239449 (0.6246)	0.457575 (0.4988)	-	1.519240 (0.2177)
OPC	0.902959 (0.3420)	0.026492 (0.8707)	1.477810 (0.2241)	0.508924 (0.4756)	-
All	16.62092 (0.0023)	17.80157 (0.0013)	5.677406 (0.2246)	7.471792 (0.1130)	13.51546 (0.0090)

Chi-sq coefficients (Prob. in parentheses)

The results of Block Exogeneity tests presented in Table 8 indicate that for Eq1, policy with its lag granger causes production at 1% while employment with its lag granger causes production at 5%. Taken together, all explanatory variables with their lags granger cause production at 1%. For Eq2, policy with its lag granger causes employment at 10%. Taken together, all explanatory variables with their lags granger cause employment at 1%. For Eq3, production and employment with their lags granger causes policy at 10% and 5% respectively but taken together, all explanatory variables with their lags do not granger cause policy. For Eq4, policy with its lag granger causes input-prices at 5% but taken together, all explanatory variables with their lags do not granger cause input-prices. For Eq5, policy with its lag granger causes output-prices at 1% and taken together, all explanatory variables with their lags granger cause output-prices at 1%. In Summary, there is Bi-directional causality between policy and production as well as between policy and employment indicating feedback effects between the variables. There is Uni-directional causality from policy to input-prices; from policy to output-prices and from employment to production.

Variance Decomposition

The results of the Forecast Error Variance Decomposition (FEVD) indicate that in the period right after a shock, production (CPMI) explains 100 percent of its own shocks, employment (EPMI) about 59 percent of its own, policy (PLC) about 99 percent of its own, input prices (IPC) about 95 percent of its own and output prices (OPC) about 35 percent of its own shocks. The fact that their movements are largely explained by past values indicates they have a significant lagged effect but the lagged effect on production, policy and input prices seems more absolute. Own shock has the strongest and most lasting effect on production although after period 5, the contribution of policy to production also appears significant and lasting.

Production instantly explains over 40 percent of the shocks in employment with lasting effects although after period 5, the contribution of policy to employment also appears significant and lasting. The results indicate a shock to policy has the strongest and most lasting effect on both production and employment and that significant variations experienced by all the other variables are attributable to shocks in policy. Shocks in output prices are mostly explained by input prices with lasting effects.

Vector Error Correction Estimation

Table 9: Vector Error Correction Estimates

Error Correction:	D(CPMI)	D(EPMI)	D(PLC)	D(IPC)	D(OPC)
CointEq1	-0.375573 **	-0.245468	0.003903	-0.578524 **	0.005445
D(CPMI(-1))	0.018072	0.321385 **	0.040428 **	0.504560 *	0.195855
D(EPMI(-1))	-0.261937	-0.613484	-0.044050 **	0.063140	-0.080280
D(PLC(-1))	-0.017919	2.141985	0.043618	4.507160	3.871656
D(IPC(-1))	0.273804	0.117711	0.004057	0.566707 *	0.293143
D(OPC(-1))	-0.436935 *	-0.219102	-0.018050	-0.666486 **	-0.577410 *
C	0.095307	-0.025442	0.036227	0.488264	0.539059
R-squared	0.396753	0.308751	0.276366	0.325727	0.244587
Adj. R-squared	0.251974	0.142852	0.102694	0.163902	0.063288

Where: ***denotes significance at 1%, **denotes significance at 5% and *denotes significance at 10%

From the VEC results of the system variables, past policies, employment and output prices all negatively affect production in Nigeria but only the effect of output prices is significant.

Box2: Closing Adjustment Gap

$$t = -\frac{\ln(1 - \lambda)}{\alpha}; \alpha = 0.376;$$

$$\lambda = 0.5 \therefore t = 1.84 \text{ for production}$$

$$t = -\frac{\ln(1 - \lambda)}{\alpha}; \alpha = 0.579;$$

$$\lambda = 0.5 \therefore t = 1.20 \text{ for input price}$$

Where: λ = the adjustment ratio

α = is the estimated loading parameter or speed of adjustment.

The result indicates both equation one (production) and equation four (input prices) are significant at 5 percent and their coefficients of Error Correction (CointEq1) are negative as required, indicating the existence of dynamic stability. The speeds of adjustment suggests 37.6 percent of the deviation of production from long-run equilibrium is corrected every year, so that it takes almost two years to cut the gap in half and that 57.9 percent of the deviation of input prices from long-run equilibrium is corrected every year, so that it takes about a year to cut the gap in half (see Box2).

Conclusion

We employ monthly data for 2014–2017 and a set of articulated variables to model production and employment in Nigeria. Evidence indicate the Purchasing Managers' Index (PMI) for employment which was already under 50 further worsened in line with Composite PMI with onset of recession and continued to worsen twelve months into the recession implying continued policy failures. The index for policy pre and post recession is shown to be significant and to affect production negatively and Causality tests indicate feedback effects between policy and production as well as between policy and employment. Variance decomposition (VD) outputs indicate a shock to policy has the strongest and most lasting effect on both production and employment and that significant variations experienced by all the other variables are attributable to shocks in policy.

Policy Recommendation

Examination of policies and their subsequent reversals indicate apparent lack of understanding of the basic principles of money creation and the drivers of economic growth and development by monetary authority managers. We recommend necessary urgent review of the competencies of current crop of monetary authority managers and/or their re-training to minimize avoidable convoluted shocks to the economy.

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