

The National Economic Empowerment and Development Strategy: Philosophy, Opportunities and Challenges

Edited by
**Olasupo Akano and
Kayode A. Familoni**



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Editors

S. O. Akano

K. A. Familoni

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Financial Sector Reforms, Monetary Policy Transmission Mechanism and Commercial Bank Credit

Adebiyi, M. A. and O. I. Lawanson

1. Introduction

Nigeria has an estimated population of about 125 million people and a land area of about 924 square kilometres, a large proportion of which is arable. It has large deposits of oil, gas and solid minerals and a sizeable educated and skilled workforce. Despite these, the country has not been able to effectively harness its endowment to develop the economy sufficiently to improve the welfare of its people. With an estimated population growth rate of 2.8 per cent and a GDP growth rate of about 2.5 per cent, per capita income growth was negative for the greater part of the 1990s. Nigeria's urbanisation rate of 5.3 per cent is one of the highest in the world leading to loss of virile labour force for agriculture. Besides, the rate of job creation has been far less than the rate of growth of the urban labour force. This combined with an education system that is not attuned to the production of the appropriate manpower required to support robust growth has led to high levels of unemployment and underemployment.

Income distribution in the country is also highly skewed such that probably less than 15 per cent of the population actually benefits from the GDP growth. The country has a debt overhang of about US \$30 billion with high servicing requirements. Currently about 65-70 per cent of the population live below the poverty line, half of which probably live on less than half a dollar per day. The situation rather than improve has been worsening over time. This has become a source of embarrassment for a country that is relatively so well endowed. The weakness of the Nigerian economy in the past three decades is not unrelated to its dependence on oil. Indeed, the country is a textbook example of an economy under the influence of the Dutch Disease with its deleterious impact on the development of other aspects of the real sector. Oil generates about 90 per cent of foreign exchange earnings and 75 per cent of government revenues. It contributes about 30 per cent of GDP but employs only about 3 per cent of the labour force.

For several years therefore, the development challenge for Nigeria became the diversification of the productive base away from oil. Successive governments took up this challenge in the design and implementation of several plans and policies. However, the attempts at achieving a more rapid growth of the industrial sector led to investment in several projects that turned out to be "white elephants". Two factors probably contributed to this development. First, the capacity to design/execute such projects was lacking. Secondly, the soft funds needed to sustain the projects after they were started dried up following the collapse of oil prices in the early eighties. But there is an even more significant development resulting from the attempt to put the economy right. Government inadvertently became the dominant force in the economy employing about one million people. The huge resources accruing to government turned it into a centre for rent seeking and corruption. Though Nigeria's rating in world corruption table is often contested, the government has acknowledged that the situation is sufficiently bad to warrant a frontal attack.

These provide the background for the 2004 launched economic reform agenda, the National Economic Empowerment and Development Strategy (NEEDS). This paper focuses on the banking reform aspect of the Strategy. Banks in Nigeria are highly liquid but they believe that lending to the real sector is very risky and increasing credit to the manufacturing sector, for instance, is not justified in terms of risk and cost (Olorunsola, 2001). The business environment, in general, is very risky and uncertain so firms may not be able to service debt. Apart from this, the judicial system is reportedly inefficient and banks cannot easily enforce contracts. Consequently, banks charge high interest rates, demand high levels of collateral and make few loans of more than a year in term. In addition to the above, high interest rate in the Nigerian financial system is a reflection of the extremely poor infrastructural facilities and inefficient institutional framework necessary to bring about substantial reduction in the risk associated with financing an extremely traumatized economy (World Bank, 2002).

This is the rationale for banking reform. Banking reform is aimed at strengthening and consolidating the banking system by promoting a diversified, strong and reliable banking sector which will ensure the safety of depositors' money, play active developmental roles in the Nigerian economy, and be competent and competitive players in the African regional and global financial system (Soludo, 2004). Against this background, this paper sets out to empirically investigate the impact of

banking reforms on commercial bank credit using the vector autoregressive modelling approach. The rest of the paper is structured as follows. Section 2 presents the theoretical framework and the literature review while section 3 explains the methodology, including sources of data, and methodological framework. The empirical result is discussed in section 4, with conclusion and recommendations provided in the last section.

2. Theoretical Background and Literature Review

A number of empirical works on the transmission mechanism has been carried out using the vector autoregressive (VAR) approach. Sims (1992) estimates separate VARs for Germany, France, the United Kingdom and the United States using monthly data. His variables include industrial production, consumer prices, and short-term interest rate as measure of monetary policy, a measure of money supply, an exchange rate index and an index of commodity prices. He makes the identifying restriction that the interest rate variable potentially affects other variables contemporaneously, while the interest rate is not affected by innovations in any of the other variables. He finds that the response of output to interest rate innovations is similar in all the countries examined. Output has a hump shaped response to monetary policy shocks.

Bernanke and Blinder (1992) in their study on the credit channel in the US, use the federal funds rate, unemployment rate, logarithm of consumer price index, deposits, loans and securities. The assumption that they identified is similar to that of Sims (1992) so that monetary policy is predetermined. They find that both the conventional money demand and the credit mechanisms operate. A positive shock to the federal funds rate reduces the volume of deposits held by institutions immediately after the shock and peaks after nine months. After a period of two years, the entire long run impact of the decline in deposits is reflected in loans. They conclude that their findings support the operation of a credit channel. On the other hand, Rossiter (1995) and Miron, Romer and Weil (1995) suggest that the interest rate spreads are alternative focuses on monetary aggregates under the credit view. The reason is that not all financial assets are perfect substitutes and not all agents are identical.

Another interesting approach for testing the credit channel is provided by Kashyap, Stein, and Wilcox (1993). The authors establish a simple model that explains that two necessary conditions, which must be satisfied if monetary policy is to impact on aggregate demand in part, through a distinct lending channel. The first condition is that loans and commercial

papers must be imperfect substitutes to bank assets. Therefore, banks cannot just reduce commercial papers in order to keep the supply of loans unchanged. The second condition is that loans and commercial papers must be imperfect substitutes to corporate liabilities. Hence, firms must not be able to offset a decline in loan supply by issuing more paper without a cost. Their empirical evidence suggests that both conditions are satisfied. Similar to Kashyap, Stein, and Wilcox (1993), Giovanni (1993), observes that as in the Korea case, monetary tightening broadens the spread between marginal lending rates and corporate commercial paper rates for most of the banks. In addition, banks suffering from larger negative capital shocks also experience a more marked slow-down in the expansion of loans and disproportionately raise their lending rates.

In addition, empirical studies suggest that the following conditions must be satisfied in order to support credit channel. First, bank loans are important sources of funds for firms. Also, there is no perfect substitute for this kind of credit, such as certificates of deposit and/ or commercial papers or other sources of funds (Kashyap, Stein, and Wilcox (1993). Second, the Central Bank must be able to constrain the banks' ability to lend (Cecchetti, 1995). Third, there exist bank-dependent borrowers, for example, small or low net-worth firms, who have limited opportunities to substitute credit from other financial intermediaries but banks (Gertler and Gilchrist, 1993, 1994; Christiano, Eichenbaum and Evans, 1996). Finally, there must be imperfect price adjustments in order to allow the monetary policy to affect real activity.

Nannyonjo (2001) uses the VAR methodology to study the credit channel in Uganda. The index of industrial production and the consumer price index are the macro variables while the base money is the policy variable used in the study. The policy variable used is the base money. By looking at Granger causality tests and variance decompositions, she concludes that there is no significant role for either bank loans or the lending rate in the transmission of monetary policy shocks to output. She finds that output explains, as much as 37 per cent of variations in bank loans after two years, indicating demand driven lending in Uganda. The impulse responses estimated, however, indicate a positive though delayed effect of bank lending on output.

Mwenda (1993) looks at monetary policy effectiveness in Zambia. In his study, he evaluates the impact of switching to indirect monetary policy instruments on the growth and variability in broad money and inflation. The period of direct controls in the study covers January 1988 to October

1992. The period of indirect controls is between November 1992 and July 1997. He estimates autoregressive models to determine whether significant reductions in the growth of money supply and inflation have been observed since the switch to indirect policy instruments. He also examines the volatility in the two variables to see if there has been a reduction in the instability of these variables over the same period. He finds that whereas the growth of monthly inflation has fallen, money supply has continued to grow rapidly. The results also show that the switch in policy has been effective in reducing variability in both money supply and inflation.

In Nigeria, monetary policy has been identified to work through liquidity channel, credit channel and exchange rate channel (Uchendu, 1996). According to Uchendu (1996), when economic controls were relaxed as part of the Structural Adjustment Programme (SAP) launched in mid-1986, the inter-bank market rate became an important means for the transmission of monetary policy in Nigeria. In Nigeria, credit channel of monetary transmission works through the banks and the informal credit markets. Evidence on the credit channel of monetary policy in Nigeria has been investigated by analysing data on the composition of manufacturing firms' source of finance (Uchendu, 1996). It was found that "the level of interest rates did not accurately reflect genuine demand for credit in the early 1990s as distress borrowing intensified". It was also found that "credit availability could have influenced the lending behaviour of credit market during the period" (Uchendu, 1996: 617).

In exploring further the credit channel of the transmission of monetary policy to the real sector through manufacturing firms, the Lagos area segment of the National Business survey data for 1994 and 1995 were aggregated into three categories (small, medium and large) based on the value of the annual sales figure for the firms in those years. The results show that "small manufacturing firms relied more on their internal funds than other sources of financing. Larger manufacturing firms have greater access to bank financing than the smaller firms since all the three categories of firms faced the same monetary policy stance between 1994 and 1995" (Uchendu, 1996: 618, 619). The analysis provides significant evidence suggesting the existence of the credit channel of the transmission of monetary policy to the real sector.

Using two-equation system (1), we can write the system in terms of lag operator L as:

$$\begin{bmatrix} 1 - a_{11}L & -a_{12}L \\ -a_{21}L & 1 - a_{22}L \end{bmatrix} \begin{bmatrix} Y_{1t} \\ Y_{2t} \end{bmatrix} = \begin{bmatrix} E_{1t} \\ E_{2t} \end{bmatrix}$$

This gives the solution:

$$\begin{bmatrix} Y_{1t} \\ Y_{2t} \end{bmatrix} = \begin{bmatrix} 1 - a_{11}L & -a_{12}L \\ -a_{21}L & 1 - a_{22}L \end{bmatrix}^{-1} \begin{bmatrix} E_{1t} \\ E_{2t} \end{bmatrix}$$

$$= \frac{1}{\Delta} \begin{bmatrix} 1 - a_{22}L & -a_{12}L \\ -a_{21}L & 1 - a_{11}L \end{bmatrix} \begin{bmatrix} E_{1t} \\ E_{2t} \end{bmatrix} \quad (2)$$

where:

$$\Delta = (1 - a_{11}L)(1 - a_{22}L) - (a_{12}L)(a_{21}L)$$

$$= 1 - (a_{11} + a_{22})L + (a_{11}a_{22} - a_{12}a_{21})L^2$$

$$= (1 - H_1L)(1 - H_2L)$$

where H_1 and H_2 are the roots of the equation:

$$H^2 - (a_{11} + a_{22})H + (a_{11}a_{22} - a_{12}a_{21}) = 0$$

In order that we have a convergent expansion for Y_{1t} and Y_{2t} in terms of E_{1t} and E_{2t} we should have $|H_1| < 1$ and $|H_2| < 1$. Once the condition for stability is satisfied, we can express Y_{1t} (and Y_{2t}) as a function of the current and lagged values of E_{1t} and E_{2t} . These are known as the impulse response functions (Gujarati, 1995:747; Maddala, 1992: 578). They show the current and lagged effects over time of changes in E_{1t} and E_{2t} on Y_{1t} and Y_{2t} . Two results obtained from VARs that are useful for analysing transmission mechanisms are impulse response functions and forecast error variance decompositions. The impulse responses tell us how macro variables respond to shocks in the policy variables, while the variance decompositions show the magnitude of the variations in the macro variables due to the policy variables.

In using VAR model, the selection of lag order, p , is very essential. Without a formal method, the selection of lag order in a VAR model will be arbitrary and could lead to specification error (See Fair and Schiller, 1990; and Funke, 1990). Several criteria, similar to those used in the distributed lag models, are suggested to determine the model dimension (Judge, *et al.*, 1985; and Lutkepohl, 1985). In this paper, the minimum Akaike Information Criteria (AIC) determines the optimum lag length (see Judge, *et al.*, 1988). VAR models are routinely used to perform impulse response analysis which allows us to measure the various period impact of the X_{t-1} on Y_t and X_t . Impulse response analysis requires a vector moving average (VMA) representation of a VAR. The VMA allows us to trace out the time path of the various shocks on the variables of the VAR system. To produce reliable VAR estimates and impulse response analysis, variables of the model are required to be stationary, i.e., not have unit roots.

4. Empirical Analysis

Unit Root Test

In literature, most time series variables are non-stationary and using non-stationary variables in the model might lead to spurious regressions (Granger and Newbold 1977). The first or second differenced terms of most variables will usually be stationary (Ramanathan 1992). All the variables are tested at levels, first and second differences for stationarity using the Augmented Dickey-Fuller (ADF) test. All the variables except inflation rates are not stationary at level but all are stationary at first or second-order first difference (see Table 13.1).

Table 13.1: Augmented Dickey-Fuller Unit Root Test: 1986:1- 2002:4.

Variables	Trend	At Level	1st Difference	2nd Difference
CMS	with	-2.09	-2.68	-5.04*
ER	with	-0.17	-4.12**	-6.22*
RLr	without	-1.66	-3.28**	-6.49*
INF	without	-3.47**	-5.66*	-6.59*
IRSP	without	-0.20	-4.54*	-6.91*

* Significant at 1 per cent level

** Significant at 5 per cent level

Critical value with trend: 1 per cent -4.31; 5 per cent -3.57

Critical value without trend: 1 per cent -3.66; 5 per cent -2.96

Note: IRSP is the interest rate spread; rLR represents real lending rate; bank credit to manufacturing sub-sector is denoted by CMS; INF represents inflation rate, while ER is exchange rate.

Forecast Error Variance Decomposition (FEVD)

Forecast error variance decomposition (FEVD), which provides complementary information on the dynamic behaviour of the variables in the system. It is possible to decompose the forecast variance into the contributions by each of the different shocks. When calculated by the structural shocks as in the present case, the FEVD provides information on the importance of various structural shocks explaining the forecast error variability of index of manufacturing production and its determinants.

Table 13.2 gives the fraction of the forecast error variance for each variable that is attributable to its own innovations and to innovations in other variables.

Table 13.2: Variance Decomposition of Real Lending Rate (RLR)

	S.E.	CMS	IRSP	INF	ER	RLR
Period						
1	6.776391	0.020367	0.176845	92.51450	0.005687	7.282599
2	10.12690	0.037647	0.618945	94.52638	1.125161	3.691869
3	12.22436	0.215795	0.897534	95.41432	0.926207	2.546140
4	3.60527	0.328424	1.203817	95.56637	0.749895	2.151491
5	14.53689	0.458420	1.420524	95.06713	0.799800	2.254127
6	15.18881	0.585000	1.535367	93.99182	1.123909	2.763905
7	15.66671	0.707959	1.567934	92.42355	1.709263	3.591291
8	16.03661	0.820808	1.543709	90.49298	2.520183	4.622320
9	16.33977	0.918332	1.494642	88.33986	3.507898	5.739264
10	16.60176	0.997412	1.448932	86.09687	4.622485	6.834296

Source: Own computations

From Table 13.2, "own shocks" constitute an insignificant source of variation in real lending rate (rLR) forecast errors decomposition ranging from 6.83 per cent to 7.28 per cent over the 10 quarters horizon. The persistence of inflation rate shocks after ten quarter of the shocks explains 86 per cent of the variance in real lending rate, while exchange rate (ER) and interest rate spread account for 5 per cent and 1 per cent respectively. The salient feature of the variance decomposition results, in this Table, is that the predominant source of real lending rate fluctuations is due largely to inflation rate.

Table 13.3: Variance Decomposition of Commercial Banks Credits to Private Sector (CMS)

Period	S.E.	CMS	IRSP	INF	ER	RLR
1	4.810434	100.0000	0.000000	0.000000	0.000000	0.000000
2	5.998912	99.22085	0.088093	0.578574	0.062887	0.049598
3	7.094146	97.51094	1.921666	0.453120	0.061887	0.052387
4	7.987720	96.29450	3.152231	0.402146	0.064627	0.086495
5	8.783127	94.37117	4.765618	0.647821	0.139155	0.076239
6	9.514523	92.28780	6.172143	1.165104	0.309941	0.065010
7	10.19849	89.93370	7.499833	1.851626	0.654352	0.060490
8	10.85031	87.41465	8.704228	2.593007	1.225805	0.062306
9	11.47861	84.74880	9.814166	3.295235	2.075603	0.066200
10	12.09216	81.95460	10.84794	3.892774	3.236881	0.067810

Source: Own computations

From Table 13.3, "own shocks" constitute a significant source of variation in commercial banks' credit to the private sector (CMS) forecast errors in the short run, ranging from 81.95 per cent to 100 per cent over the 10 quarters horizon. The persistence of interest rate spread (IRSP) shocks after ten quarter of the shocks explains 10.8 per cent of the variance in CMS, while exchange rate (ER) and inflation rate (INF) account for 3.2 per cent and 3.89 per cent respectively. The salient feature of the variance decomposition results, in this Table, is that the predominant source of commercial banks' credit to private sector fluctuations is due largely to own shocks.

Table 13.4: Variance Decomposition of Interest Rate Spread (IRSP)

Period	S.E.	CMS	IRSP	INF	ER	RLR
1	1.531929	9.059377	90.94062	0.000000	0.000000	0.000000
2	1.610957	10.22671	89.34625	0.024541	0.168114	0.234389
3	1.757816	11.91242	3.78818	0.035116	1.563828	2.700458
4	1.833615	12.36606	79.64246	0.038679	2.874915	5.077895
5	1.912348	12.88434	74.72916	.120909	4.627658	7.637929
6	1.979221	13.21294	70.51053	.314358	6.480222	9.481954
7	2.038882	13.57186	66.85524	0.633674	8.312133	10.62710
8	2.091886	13.93308	3.76085	1.066610	10.03445	11.20501
9	2.139489	14.30508	61.11739	.604206	11.58372	11.38960
10	2.182874	14.67401	8.82759	2.231573	12.93202	11.33480

Source: Own computations

The persistence of the past interest rate spread (IRSP) shocks after ten quarter of the shocks explains 58.8 per cent of the variance in the current interest rate spread, while exchange rate (ER), credit to the private sector

(CMS), real lending rate (RLR) and inflation rate (INF) account for 12.9 per cent, 14.7 per cent, 11.3 per cent and 2.2 per cent respectively. Own shocks also constitute a significant source of variation in interest rate spread.

Impulse Response Analysis

The impulse response functions are reported in Figure 1. Impulse response analysis is a device to display the dynamics of the variables tracing out the reaction of each variable to a particular shock at time t . Figure 1 shows the results of the impulse response analyses derived from the estimated VAR models. The response of commercial banks' credit to the private sector to one standard innovation in interest rate spread is statistically insignificant in the short-run. This implies that interest rate spread has no effect on commercial banks, credit to the private sector in the short-run. This is also true of exchange rate and real lending rate.

A shock in the real lending rate has no effect on the commercial banks' credit to the private sector in the long-run. The explanations for this result are not far-fetched. In Nigeria, commercial banks specialise in short-term lending and they usually shy away from the area of financing long-term projects due to inability of manufacturing firms to fulfil conditions such as collateral security. According to Bigstern *et al* (1999), about 90 per cent of small firms are refused loans when applied for from the formal financial intermediaries due to this reason. Available statistics reveal that manufacturing sub-sector in Nigeria placed heavy reliance on internally generated funds, with self-financing accounting for about 66.5 per cent followed by bank loans (short-term) which recorded just 24.4 per cent between 1989-1998 (Olorunsola, 2001; Adebisi, 2004).

A shock in inflation rate, exchange rate and real lending rate has no effect on interest rate spread in the short-run. This explains that the factors responsible for interest rate spread should be sought outside these factors. However, inflation and exchange rates appear to be significant in influencing exchange rate spread in the long-run. High inflation and depreciation of naira tend to raise interest rate spread in the long-run.

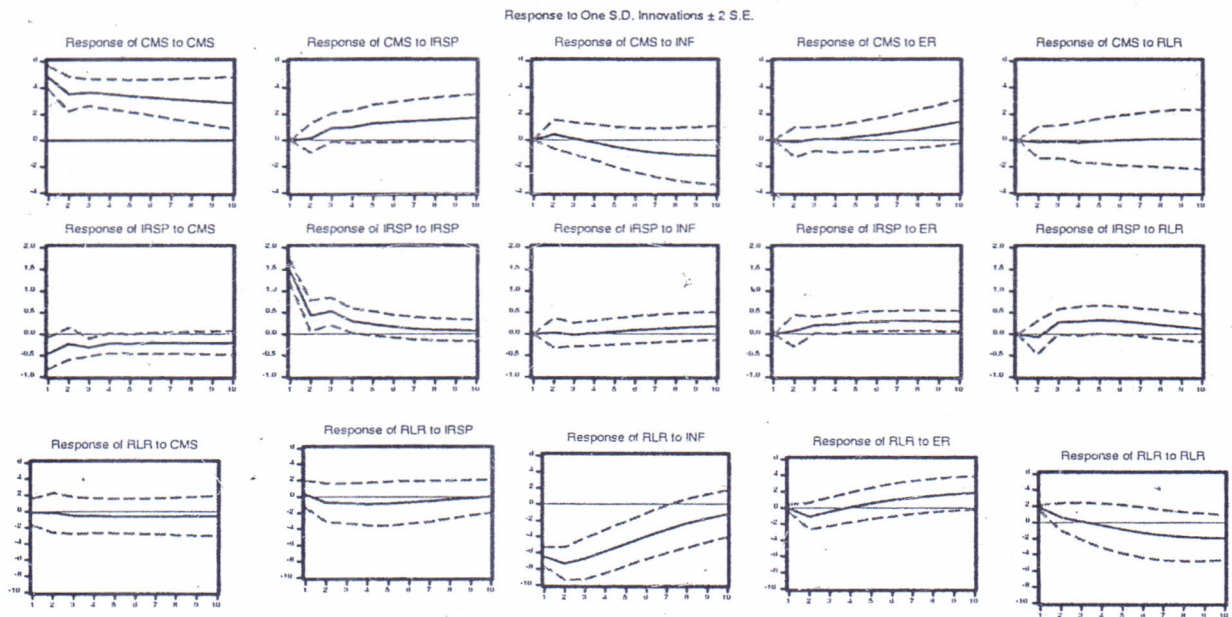


Figure 1: Generalized Impulse Response to one Standard Error shock in its Explanatory Variables. The Size is 5 per cent

The response of real lending rate to one standard innovation in inflation rate is negative and declining in the short-run. An increase in inflation rate reduces real lending rate, which is in conformity with economic theory. The impulse responses show that there is no long-run impact of interest rate spread on real lending rate. That is, in the long-run interest rate spread is insensitive to real lending rate.

5. Summary and Concluding Remarks

In this study, we set out to empirically investigate the relationship between financial sector reforms and commercial banks credit using quarterly time series data from 1986:1 to 2002:4. Some statistical tools are employed to explore the relationship between these variables. The study examines the effects of stochastic shocks of each of the endogenous variables explored, using Vector Autoregressive (VAR) models and impulse response analysis. The evidence from the impulse response analysis shows that interest rate spread, exchange rate and real lending rate have no significant effects on commercial banks credits in the short-run between 1986:1 and 2002:4. The forecast error variance decomposition shows that the predominant source of commercial banks' credit to private sector fluctuations is due largely to own shocks. Also, the predominant source of real lending fluctuations is due largely to inflation.

The implication of these findings shows that in analysing commercial banks' credits to the private sector, too much emphasis should not be placed on macroeconomic and monetary policy indicators, but other qualitative factor such as the environment in which the banks operate, should be considered as well.

Also, in order to reduce inflationary expectation, government should promote policy transparency. Transparency tends to lower inflationary expectations by providing an implicit commitment mechanism on the part of the Central Bank. This makes the policy to become more credible and the public can form expectations that are closer to the policy targets. Lastly, high cost of borrowing is due to high interest rate spread. The reduction of the margin between lending and deposit rate to 7.5 per cent is in the right direction.

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