AN ECONOMETRIC ANALYSIS OF CENTRAL BANK INDEPENDENCE AND INFLATION CONTROL IN NIGERIA

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Abstract
This study analyzed the impact of micro finance banks’ credit on macroeconomic variables in Nigeria using a quadratic regression model. The analysis indicates that through deposit mobilization and credit delivery, micro finance banks have significantly enhanced the development of the Nigerian economy through productivity growth, employment generation, poverty reduction and investment expansion. However, the poverty reduction effect of microfinance credit is yet to be all round significant in Nigeria. To sustain the significant impact, micro finance banks need to be strengthened in terms of a stronger capital base, enabling monetary and financial policies and operational guidelines and correspondent relationship with commercial banks.

Keywords: Credit, investment, productivity growth, employment, poverty index, agricultural output

Introduction
In recent years substantial changes have taken place in the operating structure of the Central Bank worldwide. First their independence in making decisions on monetary policy has been increased. In particular, over the past decade for example 34 industrial and developing countries legislated increases in the operational independence of their Central Banks as opposed to only three such during the 1980s (Maxified, 1997) second; more emphasis has been put on increase in the transparence of monetary policy and accountability of the central bank.

Countries have adopted or made progress toward adopting legislative proposals removing Central Bank from government control that is, making them more independent. Between 1989 and 1991, New Zealand, Chile, Canada enacted legislation that increased the independence of their CB. The 1992 treaty on European Union (Maastricht treaty) requires Europeans Community (EC) Members to give their Central Bank Independence as part of establishing the European Monetary Union (EMU). As a result EC countries that do not yet have strongly independent central banks have introduced legislation or announced their commitment to make their Central Bank more independent. Furthermore the governments of Brazil and Mexico have announced their intention to introduce legislation to create more independent central Banks. The broad objective is attempt to measure formal and actual degree of independence of the Central Bank of Nigeria. A specific objective of this paper is price stability.

Why is the idea of an independent Central Bank popular? Are there economic benefits of having an independent central bank? Empirical researchers have devised measures of independence to focus on the relationship between Central Bank independence and a country’s economic performance. Theoretical studies have modeled the strategic behavior of monetary and fiscal policy makers to be able to compare an economy’s performance when policy making cooperate in setting policies, with its performance when they do not cooperate. What is the level of this independence in the Central Bank of Nigeria as it relates to price stability and the turnover Governors?

Literature review
Economist and other practitioners in the area of monetary policy generally believed that the degree of independence of Central Bank from other parts of the government affect the rates of expansion of monetary aggregates and credit and through them important macroeconomic variables such as inflation and the budget and the budget deficit (Cukierman, 1992). Central Bank independence means that as in the case of Germany’s Bundes bank and the United State of America’s Federal Reserve, A Central Bank does not have to obey the government when ordered to print money to pay for Federal deficits. Instead, an independent Central Bank can follow a non-inflationary monetary policy and leave the government to borrow and pay for its deficits. Independence means also that a Central Bank can pay less attention when politicians, including those in the executive branch call for expansionary monetary policy to counter cyclical downturns in the economy.

Inflationary policies can sometimes spur higher output in the short run. But when they do, they run the risk of lowering long-run output. The reason is that inflation not only involves rising prices but more volatile prices. Numerous studies offer evidence that Central Bank independence and low inflation are closely linked, probably because inflation discourages investment and stifles long-run growth (Gruben and Widle, 1997). Central Bank independence literatures focus on the effect of the degree of independence of the Central Bank from the government upon the choice of monetary policy and macroeconomic performance. According to this literature government prefer lower levels of unemployment at the expense of higher inflation especially before election. Central Bank with more independence will, from the government will pressure higher monetary policy that try to push the economics downwards and to the right of Phillips curves. (Vitol, 1997).

According to de Haan and Kooi (1997) Central Bank independence refers to three areas in which the governments influence must be eliminated or at least restricted. These are (i) the independence of board numbers and the government, (ii) financial autonomy and (iii) the Central Bank independence over monetary policy. The first of the three largely refers to de jure appointment autonomy and this includes criteria such as the governments’ representation on the board, appointment procedures and terms of the office and dismissal procedures. The second, area concerns how easy it is for government to obtain direct or indirect Central Bank funding. The last area gives the Central Bank room for maneuver in formulating and implementing monetary policy.

Cukiemann (1992) provides three indicators of Central Bank independence, of which two (The LVA U LVAIN and TOR indices) have been widely cited and used in the subsequent literature. The first of these (LVAN - LVAN) which has been calculated for some 70 countries is characterized as a strictly legal index. Although it only gives partial assessment of actual Central Bank independence, it is still a useful and comprehensive index. He points out that among the seven countries with the highest autonomy score, four are OECD countries while of the lowest seven, six are developing countries. The average level of autonomy for the entire sample (0133) is not far from that of developed countries alone. Cukiemann warns that a low TOR could be mistakenly perceived to be a sign of independence especially in the case of Central Bank that is relatively subordinate to the executive branch and consequently, tends to leave its position unchanged for a long period however, the TOR is still a useful indicator based on the assumption that at least above a certain threshold – a higher TOR does point to lower Central Bank independence. In particular, in the event of a high TOR the term in office of the governor may be shorter than the average term of a government which dissuades; the Central Bank from taking a long term view of monetary policy.

The last of the three indicators (QVAN and QVAN) (QVAN) is a sample defector index while QVAN is a weighted index, reported in Cukierman (1992), constructed on the basis of responses given to a questionnaire by qualified personnel at 24 Central Banks. The questionnaire explores various aspects of Central Bank independence. It serves as an indicator of defector autonomy, since the questions focus on Central Bank practices. The questions not only investigate the legal aspect of Central Bank independence and de jure objectives of monetary policy (for which a partial with legal
indices is permissible) but most importantly, focus on the instruments that are under the control of the Central Bank and the practices that are followed when they differ from the law. Theories that attribute inflation to the dynamic inconsistency of low inflation monetary policy are difficult to test. The theories suggest that inflation is related to such variable as the cost of inflation, policy makers’ ability to commit, their ability to establish reputations, and the extent to which policy is delegated to individuals who particularly dislike inflation. All of these are hard to measure (Romer, 2000) one variable that received considerable attention is the independence of the Central Bank. Alesina (1988) argues that Central Bank Independence provides measures of the delegation of policy making to intuitively, the greater the independence of the Central Bank, the greater the government ability to delegate policy to individual who especially dislike inflation empirically, Central Bank Independence is generally measured by qualitative members based on such factor as how the bank’s governor and board are appointed and dismissed, whether there are government representative on the board and the government’s ability to veto or directly control the bank’s decisions.

The issue of Central Bank independence has been the subject of importance. The basic point is that the legal provisions are necessary but not sufficient to ensure Central Bank independence. The incentives to circumvent the legal framework, with a view to influencing the behaviour of the Central Bank are always booming. Central Bank independence is a way to protect policy makers against the temptation of using monetary policy in a distortionary way. There is ample empirical evidence that Central Bank independence brings about lower inflation which ensures a more stable environment for economic and employment for economic and employment growth (Lorenzo Bini Smaghi, 2007). In the European Union the principle of Central Bank independence has a quasi-constitutional basis. Article 108 of treaty establishing the European community states that: neither the ECB nor a national Central bank. Shall seek or take instructions or bodies from any government of a member state or from any other body. Article 7 of the statute of the ESCB echoes this statement. The treaty previous on Central Bank independence apply to all Eu member states (except the United Kingdom, which has a special derogation, irrespective of Euro area members) countries are thus expected to have couple led the process of granting their Central Bank full institutional independence by the time of accession to the EU. In practice however this is not the case. Central Bank Independence is instead often considered only as a pre-condition for adopting the euro.

Four categories of Central Bank independence can be considered: functions institutional personal and financial. In addition, three other issues that are released to or may affect Central Bank independence: Central Bank involvement in product supervision; the nexus between independence and accountability and the cooperation and dialogue with other economic policy makers. An independent Central Bank should be face to set its policy instrument with the arm of achieving its objective. Functional independence thus return that the primary objective of the Central Bank of Nigeria be set in clear and legally certain way and be fully in line with the primary objective of price stability established by the government. From the optional view pound this implies that the Central Bank should have full autonomous power in setting the level of the short-term interest rate in the money market. With modern financial systems, monetary policy normally operates through changes in the obstacle to the ability of central banks to affect market interest rates should be considered as an obstacle to their independence. An example of such an obstacle would be the obligation for a Central Bank to directly finance budget deficits, which would clearly reduce the ability to influence market conditions in the direction it deems most appropriate for the pursuit of price stability. More generally government can undermine the independence of monetary policy by conducting an excessively profligate and hence unsustainable fiscal policy.

Given the Central Bank experience when it had to report through the minister of Finance to the president the new status by which it was to report directly to the president appeared to be a more
welcome position. But subsequent events showed that it was a mere change in its channel of communication rather than a status autonomy. Apart from this tricky situation, the new law itself was more comprehensive than any previous laws and conferred on the Bank considerable powers to exercise supervisory control over the institutions of the financial sector. However in situations when the Bank needed to take prompt and critical decisions to resolve some problems, the mandatory requirement that it had to obtain approved of the Head of state suggested that the bank was for from been autonomous.

**Theoretical framework and methodology of the research**

The study investigates and provides an empirical insight on the measure of Central Bank of Nigeria Independence using data spanning the period 1970 to 2008. The study adopts the Jenkins (1996) variable measure. Also, the relationship between central bank independence and inflation is examined. The indices used to proxy Central Bank independence were mainly based on Central Bank law analysis. The most widely known and frequently used indices are those discussed in Bade and Parkin (1977); Alesina (1988, 1989) Grilli Masacciandoro and Tabellini (1991) Cukierman (1992) and Eijffinger and Schauling (1993). We refer to the measure as the “base indicators” of de Jure Central Bank autonomy.

Campillo and Miron, (1997) argue that the previous analysis of the difference unlooked key factors that could reasonably determinant of this performance in addition to taking into account the degree of CB antinomy, the level of trade openness, political instability and the income level, past inflation performance and the annual of traction. The results of the anther empirical test are as fathers: another produced empirical evidence including that the institutional characteristic of momentary policy and especially CB autonomy, and the foreign exchange regime, have no importance by themselves with respect to inflation performance. The variables that seem to play key role are the degree of trade openness, debt as a percentage of GDP; the level of the inflation tax, political instability, and the level of income, previous

Inflation experience especially in developed countries, also has a positive effect on inflation. Brume has challenged Campillo and Miron’s view on an empirical uncoupling between Central Bank independence and inflation, arguing that their estimation techniques did not account for the measurement error that, inevitably lines in the complex measure of the LVAVW. BRUMN [NUO, 2002] argue that; [i] the use of legal proxies for CB autonomy as a as a substation for actual independence is dubious; [ii] directly substitution a measured proxy for a latent theoretical construct in a recursion aeration may yield undesirable consequences. By employing an alter nature technique [the analysis of covariance structure instead of this regression] and adding Cukiemans’s TOR or and Cukiemans’s and Webb’s vulnerable indicators, Brumn shows that strong negative correlation between CB indigents and inflation is restored. Further, Brumn argues that Posen [[1993, 1995] result as well as those of Posen [1996] may be questionable on the same grounds.

Sturm and de Han [2001] analyzed the relationship between Jon and inflation napes by constructing a new sample that is heavily tune the size of Cukiemans’s [1992] sample. The sample is based on data. From same 97 developing countries and also includes data from the 1990s. following Cukiemans’s [1992] and De Haan and koori [2000s], the ardors use a dependent variable the percentage rate of change in price level, and the TOR in a multivariable model by adding as control variables the degree of openers to trade within the economy, a political instability variable, for the case of a fixed exchange rate and the ratio of government debt to GDP. In other to compare results to those of Cukiemans’s [1992], the time sample is divided into two subs. Periods, from 1980 to 1989 and from 1990 to 1998. Sturm and de Han find results that are highly constituent with previous studies. With regard to vicariate regressions, the coefficient of TOR is highly significant for both sub periods, and has the anticipated positive sign [a higher TOR results in higher inflation]. However as already observed b y de Han and koori[200], the result is significant only if high inflation countries are included, moving them to a multivariable analysis, the
coefficient of $T$ or based on the broader sample is not significantly different from zero. However by applying Cukieman’s sample, the result improves slightly: the variables that exhibit statistically significant coefficients are instant the degree of openness in the economy, the exchange rate and the ratio of debt to GDP, and as in the case of vicariate regressions, the result obtained remains significant only if with high inflation rate are included.

Arone, Laurens and Sega lotto [2006] present an update of the Grill Masuander_Tablein [GMT] index of Central Bank autonomy, based on Central Bank legislation as of end 2003. The index is applied to set of OECD and developing countries, and emerging market economics. For a smaller set of countries, the paper present a reconstruction of the GMT index based on Cukierman’s [1992] and it assesses changes in Central Bank autonomy between 1992 and 2003. Overall, the picture provided by the autonomy, measures presented confirms a sharp move towards greater CB autonomy in OECD countries. A preliminary comparison of the data to GMT [1991] against the current data for the same group of OECD countries shows substantial changes in term of both economic and political autonomy. In most cases these changes are attributable to the implementation of the ESCB model to those central banks that had shown the lowest autonomy in the earlier evaluation by GMT. Three features of the ESCB standard have plunged a leading role: the adoption of price stability as a sole objective of monetary policy; the insulation of the Central Bank from political interference; and the prohibition for the central banks to provide direct credit to governments. Similar trends can be observed in emerging economics and developing countries. Some of these countries have reached levels of autonomy that compare well with these observed in OECD countries using the GMT methodology.

Using data from Cukierman’s [1992] legal measure, we could. Track the evolution of legislation in these countries as well as. The results autonomy doubled during the period under review. It appears that in a number of emerging market and developing countries, CB autonomy gained momentum in the course of the last decade. This has been accomplished through a consistent political regime and a strong interest in Central Bank return heading to rapid progress both in terms of policy and instrument autonomy. These developments were underpinned by the growing consensus among developed and developing countries about the benefits for the overall economic performance to be expected from assigning price stability as the primary objective of the central bank and limiting the scope for the monetization of public deficits. As a consequence, today we can see an approximately equal distribution of autonomy among countries, irrespective of the level of economic development. The analysis suggests a three-stage modernization process. Such a process which can be observed in all the three categories of countries has involved moving from a basic stage in which foundations are laid for basic de jure autonomy (i.e. price stability as the objective of monetary policy, clauses to protect the Central Bank from political interferences) a second stage involves the development of an autonomous operating capacity. The final stage involves further expansion of political autonomy in terms of both policy formulation and the appointment of senior management.

Model specification
Following Cukierman et al (1992) we have used the transformation inflation rate $D$ in order to reduce heteroskedasticity of the error in the regression presented in this section. $D$ is defined as the inflation rate ($p$) divided by one plus the inflation rate.

$$D = \frac{p}{1+p} \quad (3.1)$$

In estimation form the model can be represented as follows:

$$D_{\text{inf}} = \alpha + \alpha_t \text{Avgtor} + E_t + U_t$$

Where $D_{\text{inf}}$ is De Haan inflation rate, Avgtor is the average turnover rate of governors and $E$ is the error term, $U_t$ is the stochastic variable.

Empirical results and discussion
Descriptive statistics
The summary statistics for the dataset used is presented in Table 1 below. The simpler measures of central tendency (such as the mean and median) as well as the standard deviation are precluded from the subsequent interpretation as their implications are not unfamiliar. However, parametric estimations typically require that the variables of interest follow a normal distribution. Skewness and Kurtosis offer an indication as to the nature of distribution of variables. The former measures the extent of lack of symmetry while the former shows whether the variable peaks or flattens out relative to a normal distribution with expected value of 3. The skewness for a normal distribution is zero and so a value near zero often implies that the data is symmetric. In Table 1, the adjusted inflation variable (DHINF) has a negative sign indicating skewness to the left while the other two variables (inflation- INF and Average Turnover- AVTOR) are right skewed. It is worth noting though that only the average turnover rate of central bank governor has a skewness value indicative of some degree of symmetry. With respect to kurtosis, both measures of inflation have values greater than 3.

Table 1: Descriptive statistics of the variables

<table>
<thead>
<tr>
<th>Statistics/Variables</th>
<th>DHINF</th>
<th>AVTOR</th>
<th>INF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.922513</td>
<td>0.403910</td>
<td>19.73077</td>
</tr>
<tr>
<td>Median</td>
<td>0.932000</td>
<td>0.375000</td>
<td>13.80000</td>
</tr>
<tr>
<td>Maximum</td>
<td>0.986000</td>
<td>0.625000</td>
<td>72.80000</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.762000</td>
<td>0.125000</td>
<td>3.200000</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.049826</td>
<td>0.152277</td>
<td>16.52822</td>
</tr>
<tr>
<td>Skewness</td>
<td>-1.036203</td>
<td>0.400417</td>
<td>1.559246</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>4.048096</td>
<td>2.075938</td>
<td>4.760163</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>8.764232</td>
<td>2.429743</td>
<td>20.83765</td>
</tr>
<tr>
<td>Probability</td>
<td>0.012499</td>
<td>0.296748</td>
<td>0.000030</td>
</tr>
</tbody>
</table>

| Sum                  | 35.97800       | 15.75250       | 769.5000     |
| Sum Sq. Dev.         | 0.094340       | 0.881155       | 10380.92     |
| Observations         | 39             | 39             | 39           |

Also, as seen from Table 1, the Jarque-Bera (JB) show high values for all variables hence the rejection of non-normality for all variables indicative of their possession of unconditional normal distributions. Finally, the ratio of the mean to the median is close to one for each of the variables while the standard deviations show low variability except for inflation. The crux of this empirical enquiry is the association between the average rate of turnover of the central bank governor and inflation outcomes specifically for Nigeria. Before we turn to the presentation and interpretation of regression estimates, a few clarifications are apposite.

One, the historical inflation series performance is relatively poor as the key statistics make clear. Hence, we constructed and adopted the adjusted-inflation variable in the spirit of De Haan and Kooi (2000). To ascertain that the choice of this transformed series is not entirely ad hoc the correlation matrix of the variables is displayed in Table 2.

Table 2: Correlation Matrix of the Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>DHINF</th>
<th>AVTOR</th>
<th>INF</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHINF</td>
<td>1.000000</td>
<td>0.089043</td>
<td>0.755073</td>
</tr>
<tr>
<td>AVTOR</td>
<td>0.089043</td>
<td>1.000000</td>
<td>0.273544</td>
</tr>
<tr>
<td>INF</td>
<td>0.755073</td>
<td>0.273544</td>
<td>1.000000</td>
</tr>
</tbody>
</table>
For both inflation variables the correlation coefficient is about 0.76 implying that they are both highly correlated and the use of DHINF instead of INF in the subsequent estimation is quite appropriate. It is now ubiquitous, especially in the time series literature, to conduct tests of stationarity on variables before econometric estimation and the attendant inferential procedures are implemented. This typically is with a view to avoiding spurious regressions as non-stationary variables may follow a random-walk hence possibly non-mean-reverting at their levels. The Augmented Dickey Fuller (ADF) and Phillips Perron (PP) unit root tests conducted indicate that both measures of inflation are I(0). While the average turnover rate only settles down to its mean value on differencing once. Table 3 shows the results of the Ordinary Least Squares regression of inflation on the average turnover rate of the central bank governor for Nigeria between 1970 and 2008.

Table 3: Regression between the transformed inflation rate and average TOR

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(AVTOR)</td>
<td>-0.024426</td>
<td>0.099294</td>
<td>-0.245998</td>
<td>0.8071</td>
</tr>
<tr>
<td>C</td>
<td>0.922183</td>
<td>0.008300</td>
<td>111.1101</td>
<td>0.0000</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.001678</td>
<td>Mean dependent var</td>
<td>0.92263</td>
<td></td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>-0.026053</td>
<td>S.D. dependent var</td>
<td>0.050470</td>
<td></td>
</tr>
<tr>
<td>S.E. of regression</td>
<td>0.051123</td>
<td>Akaike info criterion</td>
<td>-3.057958</td>
<td></td>
</tr>
<tr>
<td>Sum squared resid</td>
<td>0.094089</td>
<td>Schwarz criterion</td>
<td>-2.971769</td>
<td></td>
</tr>
<tr>
<td>Log likelihood</td>
<td>60.10120</td>
<td>F-statistic</td>
<td>0.060515</td>
<td></td>
</tr>
<tr>
<td>Durbin-Watson stat</td>
<td>1.351616</td>
<td>Prob(F-statistic)</td>
<td>0.807081</td>
<td></td>
</tr>
</tbody>
</table>

The coefficient on the turnover variables is negative as the CBI literature suggests. This implies that a higher turnover is indicative of lower independence of the monetary authorities and hence higher inflation outcome often due to political interference (Sturm and De Haan, 2001). Specifically, a 100% increase in the rate at which the central bank governor’s appointment is terminated would lead, ceteris paribus, to a rise in inflation of about 2%. It is however important to note that the diagnostics of the above regression are not overly impressive. For instance, the R² and adjusted R² are quite low while the Durbin-Watson statistic shows that the possibility of first-order serial autocorrelation in the regression residuals exists.¹

Conclusion
This paper extends the literature on the consequences of central bank independence in a number of ways. Based on the information provided by the IMF and the central bank of Nigeria we used De Haan’s new indicator for central bank independence (CBI) based on the turnover rate of central bank governors over the period 1970-2008. Using this indicator we analyzed the robustness of previous findings on the relationship between CBI and inflation control. We conclude that there is a significant relationship between central bank independence and inflation variability in Nigeria.

References


