

Tax Policy, Inflation and Unemployment in Nigeria (1970 – 2008)

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Abstract

This study is concerned with the use of tax policy in the management of a real-world economy, the Nigerian Economy. It examines the attempts by successive Nigerian governments to use taxation to influence macroeconomic aggregates, especially inflation and unemployment, and covers the period 1970 to 2008. It is largely a secondary data study, focussing on the extent to which these variables responded to changes in government's tax measures. Data on these variables for the thirty-nine year period were analysed using both descriptive and inferential statistical techniques. The Ordinary Least Square (OLS) method was used for the estimations. The analysis shows that the historical trends in inflation and unemployment showed no significant response to tax policy between the period 1970 and 2008. Periods of lower taxes recorded lower inflation rate in some years and higher inflation rates in some years. Unemployment rates increased steadily in some years whether taxes were raised or lowered. Government in some years lowered taxes amidst high inflation rates in the economy. Taxes have a negative effect on the inflation rate in line with the theory, but with insignificant coefficient. In the case of unemployment rate, the regression results show a negative relationship between tax policy and unemployment, but with insignificant coefficient, which is contrary to the theory. The analysis shows that tax policy was not effective in controlling inflation, and tackling unemployment problems in the economy during the period of study largely because of inconsistency in the use of tax measures. It is recommended that government apply tax measures much more carefully than was observed over the period studied.

Keywords: Tax Policy, Inflation, Unemployment, Economic Management and Nigeria.

1. Introduction

Economic theory presents **taxation** as a major tool of macroeconomic management. The idea is that taxation, usually in combination with some other policy tools, can be used to steer the economy in the direction that is desired. It is argued that if, for instance, the economy is experiencing a depression, the government could use tax policy to stimulate the system and cause a recovery. If, on the other hand, the economy is experiencing inflationary pressures, tax policy could be used to reduce the pressures and stabilize the system. These arguments make taxation a particularly important management tool of economic management.

In Nigeria, taxation has been a major component of the policy measures of successive governments since independence in 1960. Between 1961 and 2008, several amendments – more than 29 tax acts – were enacted. Such actions, which form the basis of the government's fiscal policy are formulated to either “gear up” or stabilize the economy (Ukpong and Akpakpan, 1998).

In designing and implementing the tax policies mentioned above, successive Nigerian governments expected to achieve economic stabilization as promised by economic theory. In particular, they expected to achieve sustained low levels of unemployment and inflation over the years. But, as records show, the objectives of the governments were not achieved. Instead of stability, the Nigerian economy exhibited instability in the major economic aggregates – unemployment and price level (inflation). For instance, in the 2003 and 2004 annual budgets, the projected inflation rate was 9 percent, but the actual inflation rate stood at 10.01 percent by December 2003 and 11.57 percent in 2004 (CBN, Annual Report, 2004). A similar situation was observed with respect to unemployment rate, and the state of affairs in the last years of the period being studied - 2007 and 2008, were not different.

For a period of about 30 years, tax policy failed to steer the Nigerian economy in the direction that was desired by policymakers. From 1971 to 1974, a six months' ban was enforced on some selected items. Between 1975 and 1977, some import duty rates were raised while others were lowered. In 1980, there was a reduction rates from 10 – 25% to 5 – 15% to liberalize imports for certain specific commodities. In 1986 and 1987, adjustments were made in customs and excise tariff. These were to reduce the inflationary pressure consequent upon increased aggregate demand on the economy. Between 1987 and 1996, the terminal rate of personal income tax was reduced from 70% to 55% to encourage consumption and stimulate output leading to reductions in unemployment. Similarly, company tax rate was reduced from 45% in 1986 to 30% with effect from 1996. Value-added-tax (VAT) was introduced in 1994 at a flat rate of 5% to replace a variety of sales taxes that were imposed at state level. From 2000 to 2008, government desired to broaden the tax base, lower the tax rates on personal and corporate incomes, and reduce the tariffs on major raw materials inputs for a number of imported finished products. These were aimed at encouraging production through increased investment and consumption spending and the redressing of external disequilibrium.

In addition to changes in tax rates reviewed above, a review of some immediate past budget speeches of the Nigerian government reveal that the intention of government was to use taxation to stimulate the economy – using tax policy to influence purchasing power and production costs. Indeed, the broad policy objectives were to: ensure price stability; attain job creation and employment opportunities; and achieve balance of payments equilibrium.

As outlined in the introductory notes, the various tax measures failed to produce the expected conditions – they failed to stabilise the economy – and stabilisation remained the major objective of succeeding governments. But in their efforts to improve the performance of the economy, the governments have continued to stress tax policy with no indication as to why the society should expect better outcomes this time, and economic textbooks continue to emphasize the potency of taxation as a tool of economic management. This makes it necessary to investigate what was done in the use of taxation in controlling inflation and unemployment rates in the Nigerian economy during the period chosen for study. This is done in the following sections. Following the introduction, section 2 looks at the theoretical/conceptual issues. In section 3, the inflation and unemployment models of the Nigerian economy were specified. Section 4 presents and discusses the data and regression results, while section 5 presents the major findings and concludes the paper.

2. Theoretical/Conceptual Issues

Taxation plays an important role in economic management of nations. Economies all over the world employ tax policy to improve their fiscal and economic performance. In the short run policy-makers formulate tax policies to complement expenditure restraint aimed to contain macroeconomic imbalances (Bovenberg, 1985). Governments can regulate the economy (that is, encourage or discourage particular forms of social behaviour) by manipulating the incidence of taxation. Tax incentives, for example, tax reduction, tax holidays, are given usually to promote investment and boost output. The reverse also applies: a heavy tax on luxury goods is likely to reduce public demand for such items and shift productive resources to other areas (Smartrakalev, 2005).

By this brief analysis, Smartrakalev tries to explain that, taxes are at the foundation of public finances; they are the principal means by which governments fund their expenditures. Optimal tax policy goes beyond mere efficiency and funding considerations to encompass inevitable normative judgments about the amount of redistribution. This implies that taxation and tax policy can be used to control and direct economic management. The regulative role of taxation is one of the most pronounced roles from the fiscal policy proponents. “The optimal tax policy turns out to affect the economy countercyclically via procyclical taxes, that is, ‘cooling down’ the economy with higher taxes when it is ‘overheated’ due to a positive productivity shock” (Ljungqvist & Uhlig 2000). The explanation is that agents would otherwise end up consuming too much in boom times since they are not taking into account the “addiction effect” of a higher consumption level. In recessions, the effect goes the other way round and taxes should be lowered to “stimulate” the economy by bolstering consumption.

According to Wasylenko (1997), at one level, that tax policy influences economic behaviour has become a basic tenet for economic policymakers. For example, taxation is assumed to influence multinational firms’ financial decisions about repatriation of profits. The economics of Taxation, therefore, is about how best taxes of various forms can achieve their objectives. The purposes of taxation go beyond the raising of sufficient revenue to cover the cost of government operations; they include the stabilization of economic activity, achievement of full employment of resources, maintenance of a favourable balance of payments (BOPs), and promotion of economic growth.

A country’s tax is a major determinant of other macroeconomic indexes. Specifically, for both developed and developing economies, there exists a relationship between tax structure and the level of economic growth and development. Indeed, it has been argued that the level of economic development has a very strong impact on a country’s tax base and tax policy objectives vary with the stages of development (Hinricks, 1966; Musgrave, 1969) as quoted by Ariyo (1997). Similarly, the (economic) criteria by which a tax structure is to be judged and the relative importance of each tax source vary over time (Musgrave, 1969). For example, during the Colonial era and immediately after the Nigerian independence in 1960, the sole objective of taxation was to raise revenue. Later on, emphasis shifted to the infant industries’ protection and income redistribution objectives.

In his discussion of the relationship between tax policy and economic development, Musgrave (1969), according to Ariyo, (1997), divided the period of economic development into two: the early period when an economy is relatively underdeveloped and the later period when the economy is developed. The early period of economic development is characterized by the dominance of agricultural taxation which serves as a proxy for personal income taxation. Agricultural taxation substituted for personal income tax given the difficulty in reaching individual farmers and the availability to measure their tax liability accurately. This problem thereby necessitates the use of the ability-to-pay principle, effectively limiting personal income taxation to the wage income of civil servants and employees of large firms both of which account for an insignificant proportion of the total working population.

At this stage of economic development, direct taxes cannot be important because there are few home-based industries. The same principle applies to excise tax (an indirect tax) on locally manufactured goods. Both will increase in relative importance as economic development progresses due to growth or non-static nature of the bases of these taxes. Several retail outlets also make a sales tax system difficult to implement and a multiple-stage sales tax system even more so (Musgrave 1969). Further, the rudimentary nature of the economy precludes retail form of taxes.

Economic development brings with it an increase in the share of direct taxes in total revenue. This is consistent with the experience of developed economies in which direct taxes for example, personal income tax becomes important as the share of employment in the industrial sector increases. Also, as the dominance of the agricultural sector decreases, sales tax may be broadened because a great deal of output and income will go through the formal market as the economy becomes more monetized.

Musgrave (1969) as cited in Ariyo (1997), noted that at this stage taxes might be imposed on firms or individuals on expenditures or receipts, and on factor inputs or products, among others. He further argued that there would be a tendency to shift from indirect to direct taxes. His theory relates to a normal development process. However, to Ariyo (1997), the theory does not consider a situation where the sudden emergence of an oil-boom provides an unanticipated source of huge revenue. Taxes in which ever form, should possess some good qualities for fairness and equitability.

Adam Smith and other classical economists, in their canon of taxation, had documented what should constitute a good tax. A good tax, ipso facto, should possess the following attributes:

- a) The distribution of the tax burden should be equitable i.e., everybody should pay his/her fair share;
- b) Taxes should be chosen so as to minimize interference with economic decisions in otherwise efficient markets. Such interference imposes “excess burden” which should be minimized;
- c) Where tax policy is used to achieve other objectives such as to grant investment incentives, this should be done so as to minimize interference with the equity of the system;
- d) Tax structure should facilitate the use of fiscal policy for stabilization and growth objectives;
- e) The tax system should permit fair and non arbitrary administration and it should be understandable to the tax payer;
- f) Administration and compliance cost should be as low as is compatible with the other objectives (Musgrave and Musgrave 1989:216).

The various objectives are not necessarily in agreement and where they conflict, tradeoffs between them are needed. Thus, equity may require administrative complexity and may interfere with neutrality, efficient design of tax policy may interfere with equity, and so forth.

Adawo (2001), in support of the classical attributes of taxes, maintained that a tax system should be equitable i.e., each tax payer should contribute his/her ‘fair share’ to the cost of government. But the term ‘fair share’ is not easy to define. In particular, two strands of thought may be distinguished. One approach rests on the benefits principle. According to this theory, an equitable tax system is one under which each tax payer contributes in line with benefits, which he/she receives from public services. The benefit criterion, therefore, is not one of tax policy only but of tax-expenditure policy. Here economics of the public sector is viewed as involving a simultaneous solution to both its revenue and its expenditure aspects.

The other strand rests on the ability-to-pay principle. Here the tax problem is viewed by itself independent of expenditure determination. A given revenue is needed and each tax payer is asked to contribute in line with his or her ability to pay. This approach leaves the expenditure side of the public sector dangling and is thus less satisfactory from the economists’ point of view (Musgrave and Musgrave, 1989:219). But actual tax policy is largely determined independent of the expenditure and an equity rule is needed to provide guidance. The ability to pay principle is widely accepted as a guide.

However, neither approach is easy to interpret or implement. For the benefit principle to be applied, expenditure benefits for particular tax payers must be known. For ability-to-pay approach to be applicable, it is necessary to know how this ability is to be measured. These are difficulties and neither approach wins on a practical ground. Moreover, neither approach can be said to deal with the entire function of tax policy.

The benefit approach will allocate that part of the tax bill which defrays the cost of public services, but it cannot handle taxes needed to finance transfer payments and serve re-distributional objectives.

For benefit taxation to be equitable, it must be assumed that a ‘proper’ state of distribution exists. In practice, there is no separation between the taxes used to finance public services and the taxes used to redistribute income. The ability-to-pay approach meets the redistribution problem but leaves the provision for public services undetermined.

But as Musgrave and Musgrave (1989:219), have argued, both principles have important, if limited, application in designing an equitable tax structure, one which is acceptable to most people and preferable to alternative arrangement.

In a modern economy, taxes are not just designed to raise revenue for government, it is in addition, an instrument of economic management, an instrument for controlling the economy. The control consists in regulating spending to ensure that the right levels are achieved; that is, levels that enable the system to avoid recession and inflation (Akpakpan, 1999).

To be able to manage the economy in such a way that neither a recession nor an inflation occurs, the government must assess the economic situation. It must determine accurately whether the economy needs to be stimulated, and to what extent; whether it needs to be restrained, and to what extent; or whether things are all right. The assessment of the economy in this wise, determines the kind of taxes to be introduced, which will in turn determine, to a large extent, the state of the economy. Where the government's assessment suggests that the economy needs to be stimulated, a lower tax rate is usually introduced to boost spending where it suggests that it needs to be restrained, a higher tax rate is usually introduced to reduce spending.

With taxes, government can control the working of the economy in terms of encouraging or discouraging spending, reducing inflation and unemployment rates, and maintaining a favourable balance of payments.

2.1 Tax Policy and the Control of Inflation and Unemployment

The government can use taxation to steer the economy in a desired direction (Akpakpan, 1999). If the government wishes to stimulate the economy, it could do so by cutting taxes. A tax cut leaves more money in the hands of people to spend. This simple policy prescription of reducing taxes will increase spending, making production to go up and creating employment, tax revenue will also rise. If the government wishes to restrain the economy, it could do so by increasing taxes. By so doing disposable income will fall leading to a fall in spending and production. In this case, a tax increase will shift the consumption function down by the amount of the tax and reduce the level of income by a multiplier effect. A tax cut, on the other hand, raises consumption and exerts a multiplier effect on the level of income (Iniudu, 1996). During a recession (when the economy is deflationary) government can stimulate aggregate demand by cutting taxes, which should bring about more jobs and reduce unemployment rate and deflationary gap in the economy. If the economy is inflationary, to dampen the inflationary pressure, the policy prescription is to contract the economy indirectly by raising taxes to discourage consumption. Writing in these mould are Essien (2007), Iniudu (1996), McConnell and Brue (1999), Akpakpan (1999), Anyanwu (1997), Ukpogon and Akpakpan (1998), Cobham, (1981), Ekpo (2005) among others.

Strong theoretical underpinnings have been provided for tax policy as an instrument of fiscal policy in controlling inflation and unemployment, but empirical investigation into the matter have been rather scanty.

In a study, Anyanwu (1997), investigated the effect of taxes on inflation and unemployment rates in Nigeria between 1981 and 1996. Using data on taxes, inflation and unemployment rates during the period of study, the results of his log-linear regression reveal a positive relationship between taxes and inflation rate, but with insignificant coefficient. Based on this result, he concluded that taxes fuelled Nigeria's inflation rather than reducing it. On the unemployment rate, his findings reveal that different taxes affect Nigeria's unemployment for the different period between 1981-1996. He concluded that taxes vary negatively with unemployment, and with the coefficient of unemployment being insignificant.

3. Model Specification

The analysis is done using both descriptive and inferential statistics. The descriptive statistics involved plain description using statistical tools like averages, percentages, tables and graphs, while inferential statistics involved the use of econometrics method of analysis.

Apart from the time series data on the individual taxes, total tax revenue and GDP, estimation of tax effects on target variables requires a specification of the potential proxy for tax policy. For this study, we will follow Angelopoulos, Economides and Kammass (2007), in using average tax rate (i.e. total tax revenue over GDP) as a measure of tax policy (this is as in the literature).

3.1 The Inflation Equation

Inflation function was here specified in an equation form, using the variables identified as determinants of inflation in Ekpo, Ndebbio, Akpakpan and Nyong (2004). It is given as:

$$INF = r_0 + r_1ATR + r_2EXCH_t + r_3MGS_t + r_4OPN + r_5INF_{-1} + e_{32t} \quad \dots (3.1)$$

Apriori expectations are:

$$r_1 < 0, r_2, r_3, r_4, r_5 > 0$$

where:

ATR_t = Average Tax Rate measured as the ratio of tax revenue to GDP

OPN_t = Openness of the economy measured as $\frac{\text{Export} + \text{Import}}{\text{GDP}}$

INF_t = Current rate of inflation

$EXCH_t$ = Current exchange rate

INF_{-1} = Expected rate of inflation

MGS_t = Money Supply Growth rate

3.2 Unemployment Equation

Ekpo, Ndegbo, Akpakpan and Nyong (2004), specified the unemployment equation as:

$$UN = d_0 + d_1ATR + d_2EXCH + d_3MGS + d_4OPN + d_5INF + U_4 \quad \dots (3.2)$$

Where

ATR = Average Tax Rate

EXCH = Current Exchange Rate

MGS = Money Supply Growth rate

OPN = Openness of the Economy

INF = Inflation Rate

Apriori expectation: $d_2, d_3, d_5 < 0$; $d_1, d_4 > 0$

4. Taxation, Inflation and Unemployment

In 1970 and 1971 inflation rates were 2.69 and 2.97% respectively and it attained its maximum value in 1993 when it hit 76.76% against the targeted rate of 25% in that year's budget, when the average tax rate (ATR) was approximately 0.12 in 1970 and 0.2 in 1971 (See Appendix 1). Though there was a drastic reduction in the rate of inflation in 1977, 1978, 1981, 1984, 1989 and 1998, it increased from 9.69% in 1986 to 61.21 and 61.26% in 1987 and 1992 respectively. Whereas single digit was targeted in those years' budget. ATR was approximately 0.04 in 1986 and increased to 0.084 in 1987 and to 0.27 in 1992. The rate of inflation declined from 14.21% in 1995 to 10.21% in 1996 and later dropped to 6.56% in 2006 against the targeted figure of 9% in those years budget while the ATR which was 0.63 in 1996 dropped to 0.40 in 1997 and then rose to 4.5 in 2006. It was only in the 1997, 2004 and 2005 that a double digit (i.e. 10%) inflation rate was targeted in the annual budget. However, this target was only achieved in 2005 when the actual inflation rate stood at 8.57%, while ATR rose steadily during these years. The erratic behaviour of prices in the economy cast doubt on the use of tax policy as a tool for stabilizing prices in the Nigerian economy.

This analysis is represented graphically in Appendix II (a). The figure shows that the historical trends in inflation rate in Nigeria have not moved in any direction with that of tax policy between 1970 and 2008. Periods of high ATR may witnessed periods of high or low inflation rate.

A discernable pattern that emerges from the table in Appendix 1 is that Average Tax Rate (ATR) relates negatively with the rates of unemployment. Periods of high average tax rate (ATR) are also marked by low rates of unemployment. For example, between 1974 and 1980, the rate of unemployment decreased from 6.2% to 1.9%, while ATR increased from approximately 0.05 to 0.35. In 1982, unemployment rate was 4.2% and attained its maximum value in 2000 when it hit 18.1% and dropped to 15.8% in 2008. ATR dropped from 0.35 in 1980 to 0.08 in 1999 and then rose to 4.5 in 2006. These figures are conservative estimates considering the fact that the labour market is grossly inefficient and not all job seekers get registered. From that table, the response of unemployment to changes in tax policy in Nigeria is questionable.

The above analysis is graphically represented in Appendix II (b). Appendix II (b) presents the relationship between unemployment rate and Average Tax Rate (ATR) over time. The figure shows that unemployment rate and Average Tax Rate (ATR) tends to move in the opposite direction. That is, periods of low average tax rate are preceded by periods of high unemployment rate.

4.1 Time Series Properties of the Data

4.1.1 Unit Root Test

Some macroeconomic Time series data are usually non-stationary and thus conducive to spurious regression result. We conducted a test for stationarity of a time series at the outset of cointegration analysis. For this purpose, we conducted the test using an Augmented Dickey Fuller (ADF) method based on the structure of the equation below:

$$\Delta x_t = d_0 + \rho x_{t-1} + a_1 t + \sum_{i=1}^n \Delta x_{t-i} + \epsilon_t$$

Where x is the variable under consideration, Δ is the first difference operator, t captures time trend, ϵ_t is a random error and n is the maximum lag length. If we cannot reject the null hypothesis $H = 0$, then we conclude that the series have a unit root, and are non-stationary. A series is stationary if integrated at order $I(d)$ for instance, if a series is integrated at order zero, $I(0)$ it implies stationarity at levels. At order one, $I(1)$, it means stationarity after first differencing.

The regression results of the unit root test for all the variables are presented in Appendix III. Based on the Augmented Dickey-Fuller (ADF) test, the results as presented in the table, show that four variables – inflation rate (INF), average tax rate (ATR), MSG (money supply growth rate) and openness of the economy (OPN) are stationary at levels, while the remaining two variables – exchange rate (EXCH) and unemployment rate (UN) are stationary at first difference. At the first difference, therefore, all the variables are stationary. This is because the ADF statistics for all the variables are all greater (in absolute terms) than their respective critical values at 5%

level of significance. This implies a rejection of null hypothesis of non-stationarity at 5% level of significance. The obvious conclusion from these results is that the OLS regression may not produce “spurious” results since all the variables are difference stationary. The next stage of our analysis is to determine if the variables have long-run relationships through the process of cointegration.

4.1.2 Cointegration Test Analysis

As shown by the unit root test results, four variables were non-stationary at levels and this suggests that cointegration tests be carried out to confirm the existence and otherwise of long-run linear relationship among the variables of the model. The cointegration test for this study was based on Johansen Maximum Likelihood Method. The Johansen method uses two tests to determine the number of cointegration vectors namely the “Trace Test (TT)” and the “Maximum-Eigenvalue Test (ME)”. The Likelihood Trace statistics can be expressed as:

$$T = \sum_{i=1}^n \ln(1 - \lambda_i)$$

The null hypothesis in this case is that the number of cointegration vectors is less than or equal to r , where r is 0, 1 or 2, etc. In each case, the null hypothesis is tested against the general hypothesis. That is, full rank $r = n$.

The maximum eigenvalue test, on the other hand, is expressed as:

$$ME = T/n(1 - \lambda_r)$$

In this case, the null hypothesis of the existence of r cointegration vector is tested against the alternative of $r + 1$ cointegrating vectors. If there is any divergence of results between the trace and the maximum eigenvalue test, it is advisable to rely on the evidence from the latter (Gujarati, 2005).

This was carried out with lag length of one. The cointegration result based on lag length one indicate many cointegrating equations. The decision to determine the optimal lag length to be used was based on the fact that the test is very sensitive to appropriate lag length. The result from the adoption of this lag length shows that both trace and eigen value statistic indicate some cointegrating equations for each of them. Thus, indicating that the variables are cointegrated and by extension proving that there exist a long-run linear relationship among the variables. The cointegration results based on Johansen maximum likelihood are presented in Appendix IV(a) and (b).

Once this is established (there are cointegrating equations), it implies that although some of the variables exhibit random walk, there is a stable long—run relationship amongst them and that they will not wonder away from themselves. This implies that our regression results depict a long-run relationship among the variables although there might be some deviations in the short run.

4.1.3 Discussion of Regression Results

Having established the long-run relationship among variables in the models, through cointegration test, the estimation results are presented and analysed below. The \check{R}^2 , R^2 as well as the F-statistic and Durbin Watson (D.W) statistics are clearly shown. The F-statistic helps in determining whether any combination of a set of coefficients is different from zero. In other words, F-statistic test the overall significant of coefficients in the model. The t-statistic values, help in determining the degree of confidence and the validity of the estimates. The R^2 is the coefficient of multiple determinations. It shows the percentage of the total variation of the dependent variable explained by the explanatory variables. Usually, the value of R^2 lies between 0 and 1, and the higher the value, the better the goodness of fit. The \check{R}^2 is the corrected coefficient of determination adjusted for the degree of freedom. It is a better measure of goodness of fit than R^2 . The Durbin-Watson (D.W.) statistic tests for serial correlation or autocorrelation. The data used for estimation of inflation and unemployment equations during the period under review (1970 – 2008), were presented in Appendix 1. The estimated results are presented in Appendix V(a) and (b).

From the regression results, the statistical characteristics of the three equations are not quite good. The R^2 of the inflation equation was too low (0.28 or 28 percent), the \check{R}^2 was 0.16 or 16%.

A close examination of the major arguments in the inflation equation reveals that while some conform to the apriori expectation, others do not. Starting with our variable of interest, which is Average Tax Rate (ATR), it is heartening to note that the coefficients of this variable maintain negative sign in the linear equation {equation (3.1)}, in line with our apriori expectation. This shows that tax policy has a negative effect on inflation rates in Nigeria. A further interpretation of ATR Coefficient in equation 3.1 shows that an increase in tax rate will reduce inflation rate in the economy, other things being equal. In the linear equation (3.1), exchange rate (EXCH and lag inflation (INF₋₁) are positively related to inflation (INF). However, Money supply growth rate (MSG) and Openness of the economy (OPN) are negatively related to inflation, contrary to our a priori expectations.

In Appendix V(a), the hypothesis that tax policy affects inflation is tested. Only about 28% of the systematic variation in inflation rate of the economy is explained by the model on the average. But the equation 3.1 has not

passed the t-test of significance even at 10% level. Also, the Durbin-Watson statistic test showed that the equation was free from auto correlation problem. But in the equation, the F-statistic is significant at 6% level of significance.

In Appendix V(b), we tested the hypothesis that tax policy has no significant influence on unemployment rate in the economy. The equation used to investigate this hypothesis did not perform quite good.

In equation 3.2, unemployment equation, the regression results show that tax policy measured by the ratio of total tax revenue to GDP, and unemployment rate (UN) in the economy were negatively related. This is not in line with the apriori expectation. In the equation, the implication is that an increase in tax rate will reduce unemployment rate in the economy. Theoretical reasoning holds that a decrease in tax rate will increase consumption and investment thereby stimulating demand and create more jobs to reduce unemployment rate in the economy.

Exchange rate (EXCH) is positively related to unemployment rate (UN), implying that increase in exchange rate lead to increase in unemployment rate. Inflation rate is negatively related to unemployment rate in equation 3.2, this is also in line with the existing theory. However, MSG and openness of the economy (OPN) have negative coefficients, implying that to reduce the rate of unemployment, the degree of openness of an economy must be higher and MSG must go up. It is observed that the t-test confirms that ATR co-efficient in this equation is not significant even at 5 percent level of significance. In the equation, F-statistic test of significance for overall significant of all the coefficients is significant at even less than 1%.

But both the R-square (R^2) and adjusted R-square (\check{R}^2) show a good fit of 82% and 79% respectively in the linear equation. This suggests the problem of multicollinearity. We used the correlation analysis to locate these explanatory variables that has strong correlation among them (see Appendix VI). From appendix VI, it was observed that three explanatory variables – Openness, Exchange rate and MSG, are strongly correlated.

One of the simplest things to do is to drop one or all of these collinear variables. But according to Gujarati (2005), in dropping variable(s) from the model we may be committing a specification bias or specification error. It is clear in the theory that these variables be included in the model, dropping one or all of them from the model to alleviate the problem of multicollinearity may lead to the specification bias. Hence, the remedy may be worse than the disease in this situation because, whereas multicollinearity may prevent precise estimation of the parameters (coefficients) of the model, omitting variable(s) will seriously mislead us as to the values of the coefficients.

Based on these reasons, we had decided to use the method of transformation of variables. This is the first difference form since we ran the regression, not on the original variables, but on the differences of successive values of the variables. The first difference regression model often reduces the severity of multicollinearity because, although the levels of variables may be highly correlated, there is no apriori reason to believe that their differences will also be highly correlated. The regression results of the first difference form are presented in Appendix V(c).

From Appendix V(c), it is observed that the regression results of the first difference form are not better. About 59% of the systematic variation in unemployment rate is explained by the model on the average. The coefficient of ATR is not only negative contrary to the apriori expectation, but also insignificant even at 10 percent level of significance. Same is observed in the case of inflation. The best performing variables turns out to be exchange rate (EXCH) which the coefficient has a positive sign in line with the apriori expectation and also significant at less than 1 percent. The Durbin-Watson statistic test showed that the equation was free from auto correlation problem. It has also been noted, therefore, that the regression results of the first difference form is not better than the regression result of the linear form. The F-test for the overall significance is quite good in all forms – linear and first difference.

5. Major Findings and Conclusions

From the empirical analysis, we observed that:

- (i) periods of lower taxes recorded lower inflation rates in some years and higher inflation rates in some years. It was also found that government in some years, lowered taxes amidst high inflation rates in the economy.
- (ii) the tax system in Nigeria has performed poorly in terms of controlling the working of the economy. The trends in inflation rate and unemployment rate have not moved in any direction with that of tax policy between the period 1970 and 2008. These variables have not responded significantly to changes in tax policy during that period.
- (iii) the regression results concerning inflation show a negative relationship between tax policy and inflation rate, which is in line with the theory, but with insignificant coefficient. Only about 28% of the systematic variation in inflation rate of the economy is explained by the model on the average. The F-statistic test for the overall significant of coefficients in the model is significant at 5%.

- (iv) in the case of unemployment, the coefficient is negative and it is not only insignificant but also not in line with the a priori expectation. Here, about 82% of the systematic variation in the unemployment rate of the economy is explained by the model on the average. In other words, it shows a good fit. The F-statistics test for the overall significant of coefficients in the model is significant even at less than 1%.
- (v) However, an overall evaluation of the tax system in Nigeria reveals a dismal performance of the tax policy in Nigeria. This could probably be attributed to the upsurge in oil prices, which led to periodical increase in revenue.

The implications are that, tax policy failed to redress the problems of inflation and unemployment in Nigeria during the 39 – year period studied.

Realizing the important roles taxes could play in the management of our economy, we proffered some recommendations for policy and for further studies, aimed at improving the effectiveness of tax policy in economic management.

5.1 Recommendations

Based on our investigation and major findings, we offer the following recommendations:

1. There is a need for government and our tax authorities to adopt a sound tax policy framework and a more promising implementation strategy.
2. Tax policy should be linked to economic conditions in the country. That is, if there is an inflationary pressure on the economy, to dampen the pressure, the policy prescription is to raise taxes to discourage spending. In the face of recession, policy prescription is to lower taxes to encourage production leading to the creation of more jobs to reduce unemployment rate.
3. However, a more effective policy might be to reform the tax system, realign expenditure to citizen demands. The application of benefits principle should be rigorously pursued.
4. The government should set targets and actively pursue same. This could strengthen the assessment, collection and enforcement of taxes. This should help improve tax administration and the effective use of tax in the management of the economy.

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APPENDIX 1
Trend Analysis of Major Economic Management Variables in Nigeria

| YEAR | GDP (₦'M) | TR (₦'M) | EXCH (%) | INF (%) | ED (₦'M) | ATR |
|------|--------------|-------------|-------------|------------|-------------|----------|
| 1970 | 4219.00 | 513.5 | 0.7143 | 2.69 | 178.5 | 0.121711 |
| 1971 | 4715.50 | 941.6 | 0.6955 | 2.97 | 265.6 | 0.199682 |
| 1972 | 4892.80 | 1102 | 0.6579 | 18.55 | 276.9 | 0.225229 |
| 1973 | 5310.30 | 1366.2 | 0.6579 | 9.52 | 322.4 | 0.257274 |
| 1974 | 15919.70 | 800.2 | 0.6299 | 43.48 | 349.9 | 0.050265 |
| 1975 | 27172.00 | 3730.1 | 0.6159 | 12.12 | 374.6 | 0.137277 |
| 1976 | 29146.50 | 4729.8 | 0.6265 | 31.27 | 365.1 | 0.162277 |
| 1977 | 31520.30 | 1622.5 | 0.6466 | 6.18 | 1252.1 | 0.051475 |
| 1978 | 29212.40 | 5641.3 | 0.606 | 8.31 | 1611.5 | 0.193113 |
| 1979 | 29948.00 | 6883.1 | 0.5957 | 16.11 | 1866.8 | 0.229835 |
| 1980 | 31546.80 | 10957 | 0.5464 | 17.4 | 2331.2 | 0.347325 |
| 1981 | 205222.10 | 9054.6 | 0.61 | 6.94 | 8819.4 | 0.044121 |
| 1982 | 199685.30 | 7732.4 | 0.6729 | 38.77 | 10577.7 | 0.038723 |
| 1983 | 185598.10 | 6292.5 | 0.7241 | 22.63 | 14808.7 | 0.033904 |
| 1984 | 183563.00 | 7164.6 | 0.7649 | 39.6 | 17300.6 | 0.039031 |
| 1985 | 201036.30 | 9898.8 | 0.8938 | 13.67 | 41452.4 | 0.049239 |
| 1986 | 205971.40 | 7641.7 | 2.0206 | 9.69 | 100789.1 | 0.037101 |
| 1987 | 204806.50 | 17280 | 4.0179 | 61.21 | 133956.3 | 0.084372 |
| 1988 | 219875.60 | 14037.2 | 4.5367 | 44.67 | 240393.7 | 0.063842 |
| 1989 | 236729.60 | 18327.9 | 7.3916 | 3.61 | 298614.4 | 0.077421 |
| 1990 | 267550.00 | 38547.2 | 8.0378 | 22.96 | 328453.8 | 0.144075 |
| 1991 | 265379.10 | 53900.7 | 9.9095 | 48.8 | 544264.1 | 0.203108 |
| 1992 | 271365.50 | 72948.7 | 17.2984 | 61.26 | 633144.4 | 0.268821 |
| 1993 | 274833.30 | 84248.7 | 22.0511 | 76.76 | 648813 | 0.306545 |
| 1994 | 275450.60 | 80632.9 | 21.8861 | 51.59 | 716865.6 | 0.292731 |
| 1995 | 281407.40 | 122861.2 | 21.8861 | 14.31 | 617320 | 0.436595 |
| 1996 | 293745.40 | 184667 | 21.8861 | 10.21 | 595931.9 | 0.628663 |
| 1997 | 302022.50 | 121574.1 | 21.8861 | 11.91 | 633017 | 0.402533 |
| 1998 | 310890.10 | 301900 | 21.8861 | 10.3 | 2577374 | 0.971083 |
| 1999 | 312183.50 | 359900 | 92.6934 | 14.53 | 3097384 | 1.152848 |
| 2000 | 329178.70 | 769200 | 102.1052 | 16.49 | 3176291 | 2.336725 |
| 2001 | 356994.30 | 1016700 | 111.9433 | 12.14 | 3932885 | 2.847945 |
| 2002 | 433203.50 | 781600 | 120.9702 | 23.84 | 4478329 | 1.804233 |
| 2003 | 477533.00 | 1130200 | 129.3565 | 10.01 | 4890270 | 2.366747 |
| 2004 | 527576.00 | 1571500 | 133.5004 | 11.57 | 2695072 | 2.978718 |
| 2005 | 561931.40 | 2456100 | 131.6619 | 8.57 | 451461.7 | 4.370818 |
| 2006 | 595821.60 | 2682500 | 131.76 | 6.56 | 428058.7 | 4.502187 |
| 2007 | 634251.10 | 271672 | 129.25 | 15.1 | 452076.3 | 0.428335 |
| 2008 | 674889.00 | 273800 | 130.12 | 13.7 | 501345.9 | 0.405696 |

| YEAR | MSG (%) | OPN | IMP (₹'M) | EXP (₹'M) | UN (%) |
|------|------------|----------|--------------|--------------|-----------|
| 1970 | N/A | 0.389215 | 756.4 | 885.7 | 3.1 |
| 1971 | 6.501738 | 0.503086 | 1078.9 | 1293.4 | 4.9 |
| 1972 | 16.61547 | 0.495483 | 990.1 | 1434.2 | 2 |
| 1973 | 25.31896 | 0.659699 | 1224.8 | 2278.4 | 3.2 |
| 1974 | 54.50246 | 0.473162 | 1737.8 | 5794.8 | 6.2 |
| 1975 | 80.30013 | 0.318232 | 3721.5 | 4925.5 | 4.1 |
| 1976 | 39.23182 | 0.408269 | 5148.5 | 6751.1 | 4.3 |
| 1977 | 33.76234 | 0.46714 | 7093.7 | 7630.7 | 2.1 |
| 1978 | 1.096369 | 0.4887 | 8211.7 | 6064.4 | 1.6 |
| 1979 | 20.770 | 0.61137 | 7472.5 | 10836.8 | 2 |
| 1980 | 28.29163 | 0.738024 | 9095.6 | 14186.7 | 1.9 |
| 1981 | 47.39473 | 0.116278 | 12839.6 | 11023.3 | 4.1 |
| 1982 | 7.031126 | 0.095034 | 10770.5 | 8206.4 | 4.2 |
| 1983 | 11.95357 | 0.088396 | 8903.7 | 7502.5 | 5.3 |
| 1984 | 15.39495 | 0.088614 | 7178.3 | 9088 | 7.9 |
| 1985 | 11.93011 | 0.093433 | 7062.6 | 11720.8 | 6.1 |
| 1986 | 12.44159 | 0.072362 | 5983.6 | 8920.8 | 5.3 |
| 1987 | 4.232502 | 0.235453 | 17861.7 | 30360.6 | 7 |
| 1988 | 22.91948 | 0.239401 | 21445.7 | 31192.8 | 5.1 |
| 1989 | 34.98785 | 0.375244 | 30860.2 | 57971.2 | 4.1 |
| 1990 | 3.538415 | 0.581588 | 45717.9 | 109886.1 | 3.5 |
| 1991 | 45.91967 | 0.795178 | 89488.2 | 121535.4 | 3.1 |
| 1992 | 27.43463 | 1.285215 | 143151.2 | 205611.7 | 3.5 |
| 1993 | 47.52662 | 1.399244 | 165788.8 | 218770.1 | 3.4 |
| 1994 | 53.75794 | 1.339071 | 162788.8 | 206059.2 | 3.2 |
| 1995 | 34.49515 | 6.061636 | 755127.7 | 950661.4 | 1.9 |
| 1996 | 19.41172 | 6.373444 | 562626.6 | 1309543 | 2.8 |
| 1997 | 16.17814 | 6.911337 | 845716.6 | 1241663 | 3.4 |
| 1998 | 16.039 | 5.112017 | 837418.7 | 751856.7 | 3.5 |
| 1999 | 22.31778 | 6.571409 | 862515.7 | 1188970 | 17.5 |
| 2000 | 33.12089 | 8.903206 | 985022.4 | 1945723 | 18.1 |
| 2001 | 48.06769 | 9.036935 | 1358180 | 1867954 | 13.7 |
| 2002 | 27.00465 | 7.518113 | 1512695 | 1744178 | 12.2 |
| 2003 | 21.55423 | 10.82254 | 2080235 | 3087886 | 14.8 |
| 2004 | 24.11369 | 12.49076 | 1987045 | 4602782 | 11.8 |
| 2005 | 14.02364 | 17.8801 | 2800856 | 7246535 | 11.9 |
| 2006 | 24.35329 | 18.02025 | 3412177 | 7324681 | 13.4 |
| 2007 | 43.09492 | 19.71156 | 4381930 | 8120148 | 14.6 |
| 2008 | 44.23953 | 23.1 | 5921450 | 9774511 | 15.9 |

Note: Na = Not available; Minus (-) sign indicates decrease in reserve, plus (+) indicates increase.

INV = Gross Private Investment, GDP = Real Gross Domestic Product, R = Total Tax Revenue
 EXCH = Current Exchange rate
 INF = Inflation Rate

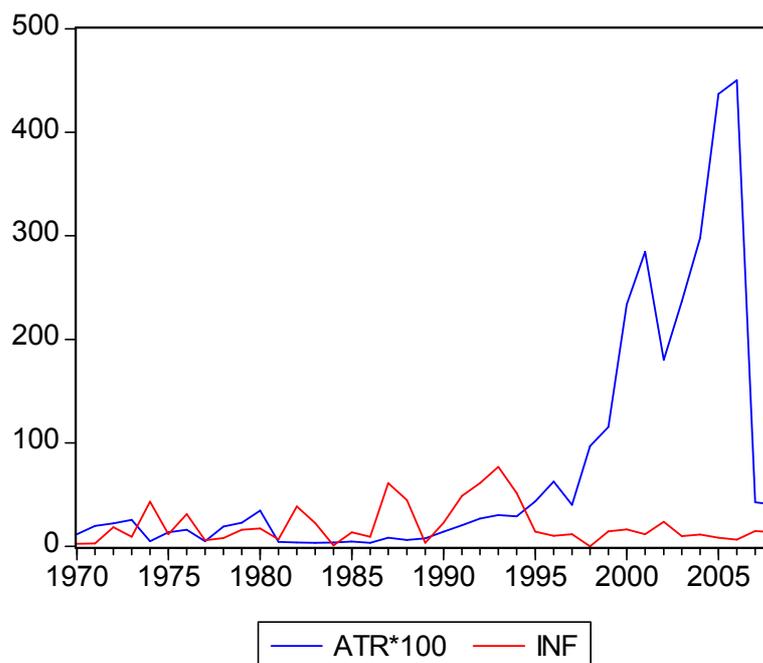
ED = External Debt
BOP = Balance of Payments
ATR = Average Tax Rate
MSG = Money Supply Growth Rate
NFO = Net Foreign Operation
OPN = Openness of the Economy
IMP = Imports
EXP = Exports
UN = Unemployment Rate
CEXP = House Consumption Expenditure

Sources:

- (1) National Bureau of Statistics, General household Survey Report 1995 – 2005
- (2) Federal Office of Statistics, annual Abstract of Statistics (various issues)
- (3) CBN Statistical Bulletin (various issues)
- (4) CBN Annual Reports and Statement of Accounts (various issues)
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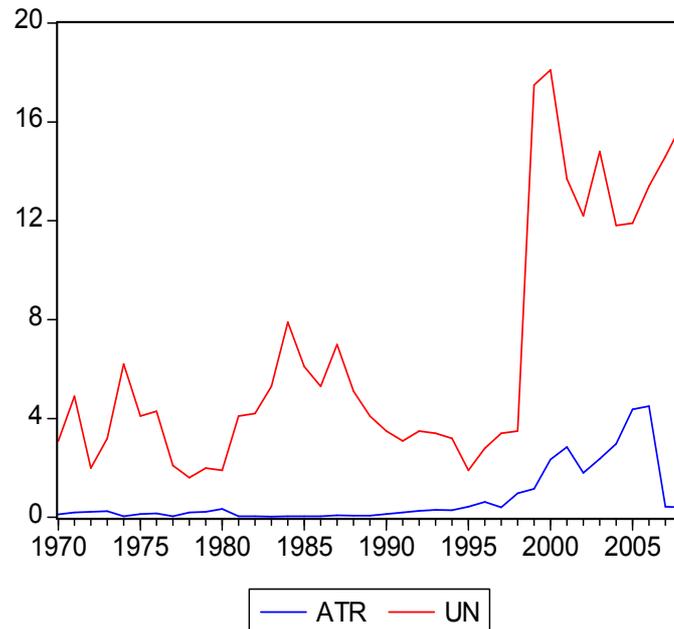
APPENDIX II

Figure (a): Trend Graph of Inflation and Average Tax Rates



Source: Captured by the researcher from Appendix 1

Figure (b): Trend graph of Unemployment and Average Tax Rate (ATR)



Source: Captured by researcher from Appendix 1

APPENDIX III

Unit Root Test: augmented dickey-fuller test result

| Variable | ADF Test Statistic | | 5% Critical Variables | | Decision |
|----------|--------------------|----------------------------|-----------------------|----------------------------|----------|
| | Level | 1 st Difference | Level | 1 st Difference | |
| INF | -3.747207 | - | -2.941145 | - | 1 (0)* |
| ATR | -3.678830 | - | -2.954021 | - | 1 (0)* |
| EXCH | 0.382891 | -2.941145 | -2.943427 | -5.298530 | 1 (1)** |
| MSG | 4.756677 | - | -2.954021 | - | 1 (0)* |
| OPN | 3.473765 | - | -2.960411 | - | 1 (0)* |
| UN | -1.3740776 | -2.94445 | -2.943427 | -6.179655 | 1 (1)** |

* = Stationary at levels
 ** = Stationary at first difference

Source: Researcher's computation (2011)

APPENDIX IV

Cointegration test results based on Johansen Maximum Likelihood Procedure

(a) Inflation Equation

Unrestricted Cointegration Rank Test (Trace)

| Hypothesized No. of CE(s) | Eigenvalue | Trace Statistic | 0.05 Critical Value | Prob.** |
|------------------------------|------------|--------------------|------------------------|---------|
| None * | 0.772402 | 115.9119 | 69.81889 | 0.0000 |
| At most 1 * | 0.551965 | 61.14543 | 47.85613 | 0.0018 |
| At most 2 * | 0.318984 | 31.43873 | 29.79707 | 0.0321 |
| At most 3 * | 0.218187 | 17.22446 | 15.49471 | 0.0272 |
| At most 4 * | 0.196989 | 8.117292 | 3.841466 | 0.0044 |

Trace test indicates 5 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

| Hypothesized No. of CE(s) | Eigenvalue | Max-Eigen Statistic | 0.05 Critical Value | Prob.** |
|------------------------------|------------|------------------------|------------------------|---------|
| None * | 0.772402 | 54.76649 | 33.87687 | 0.0001 |
| At most 1 * | 0.551965 | 29.70670 | 27.58434 | 0.0263 |
| At most 2 | 0.318984 | 14.21427 | 21.13162 | 0.3477 |
| At most 3 | 0.218187 | 9.107164 | 14.26460 | 0.2773 |
| At most 4 * | 0.196989 | 8.117292 | 3.841466 | 0.0044 |

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

(b) Unemployment Equation

Unrestricted Cointegration Rank Test (Trace)

| Hypothesized No. of CE(s) | Eigenvalue | Trace Statistic | 0.05 Critical Value | Prob.** |
|------------------------------|------------|--------------------|------------------------|---------|
| None * | 0.824525 | 153.7848 | 95.75366 | 0.0000 |
| At most 1 * | 0.636933 | 89.39527 | 69.81889 | 0.0006 |
| At most 2 * | 0.457286 | 51.90801 | 47.85613 | 0.0198 |
| At most 3 | 0.386447 | 29.29464 | 29.79707 | 0.0570 |
| At most 4 | 0.245897 | 11.22056 | 15.49471 | 0.1983 |
| At most 5 | 0.020812 | 0.778176 | 3.841466 | 0.3777 |

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

| Hypothesized No. of CE(s) | Eigenvalue | Max-Eigen Statistic | 0.05 Critical Value | Prob.** |
|------------------------------|------------|------------------------|------------------------|---------|
| None * | 0.824525 | 64.38954 | 40.07757 | 0.0000 |
| At most 1 * | 0.636933 | 37.48726 | 33.87687 | 0.0177 |
| At most 2 | 0.457286 | 22.61337 | 27.58434 | 0.1906 |
| At most 3 | 0.386447 | 18.07408 | 21.13162 | 0.1271 |
| At most 4 | 0.245897 | 10.44238 | 14.26460 | 0.1845 |
| At most 5 | 0.020812 | 0.778176 | 3.841466 | 0.3777 |

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

APPENDIX V

(a) Equation 3.1: Inflation Equation Result

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|-------------|-----------------------|-------------|----------|
| C | 15.60713 | 5.774232 | 2.702893 | 0.0109 |
| ATR | -4.397694 | 4.226856 | -1.040417 | 0.3059 |
| EXCH | 0.191264 | 0.163919 | 1.166817 | 0.2519 |
| MSG | -0.005661 | 0.191233 | -0.029603 | 0.9766 |
| OPN | -1.413920 | 1.073756 | -1.316798 | 0.1973 |
| INF(-1) | 0.395624 | 0.177996 | 2.222662 | 0.0334 |
| R-squared | 0.275893 | Mean dependent var | | 21.01737 |
| Adjusted R-squared | 0.162751 | S.D. dependent var | | 18.79753 |
| S.E. of regression | 17.19999 | Akaike info criterion | | 8.671634 |
| Sum squared resid | 9466.870 | Schwarz criterion | | 8.930200 |
| Log likelihood | -158.7610 | F-statistic | | 2.438467 |
| Durbin-Watson stat | 1.954215 | Prob(F-statistic) | | 0.055645 |

(b) Equation 3.2: Unemployment Equation

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|-------------|-----------------------|-------------|----------|
| C | 4.289731 | 0.845151 | 5.075700 | 0.0000 |
| ATR | -1.108544 | 0.568191 | -1.951007 | 0.0599 |
| EXCH | 0.137307 | 0.022079 | 6.219015 | 0.0000 |
| MSG | -0.006023 | 0.022359 | -0.269388 | 0.7894 |
| OPN | -0.297386 | 0.146331 | -2.032283 | 0.0505 |
| INF | -0.016918 | 0.021841 | -0.774592 | 0.4443 |
| R-squared | 0.819294 | Mean dependent var | | 6.673684 |
| Adjusted R-squared | 0.791058 | S.D. dependent var | | 4.995062 |
| S.E. of regression | 2.283250 | Akaike info criterion | | 4.633016 |
| Sum squared resid | 166.8233 | Schwarz criterion | | 4.891582 |
| Log likelihood | -82.02730 | F-statistic | | 29.01658 |
| Durbin-Watson stat | 1.041137 | Prob(F-statistic) | | 0.000000 |

(c) Regression results of the first difference form (unemployment equation)

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|-------------|-----------------------|-------------|----------|
| C | -0.456598 | 0.359094 | -1.271527 | 0.2130 |
| D(ATR) | -0.453087 | 0.423133 | -1.070791 | 0.2925 |
| D(EXCH) | 0.177802 | 0.028214 | 6.301959 | 0.0000 |
| D(MSG) | 0.004377 | 0.017335 | 0.252504 | 0.8023 |
| D(OPN) | 0.203886 | 0.225601 | 0.903750 | 0.3731 |
| D(INF) | 0.015947 | 0.017049 | 0.935403 | 0.3568 |
| R-squared | 0.597617 | Mean dependent var | | 0.297297 |
| Adjusted R-squared | 0.532717 | S.D. dependent var | | 2.849024 |
| S.E. of regression | 1.947540 | Akaike info criterion | | 4.318404 |
| Sum squared resid | 117.5802 | Schwarz criterion | | 4.579634 |
| Log likelihood | -73.89048 | F-statistic | | 9.208208 |
| Durbin-Watson stat | 1.779654 | Prob(F-statistic) | | 0.000019 |

Source: Researcher's computation (2011)

**APPENDIX VI
 Correlation results**

UNEMPLOYMENT EQUATION

| | UN | ATR | EXCH | M2GDP | OPN | INF |
|------|-----------|-----------|-----------|-----------|-----------|-----------|
| UN | 1.000000 | 0.655133 | 0.885981 | 0.758881 | 0.753973 | -0.175565 |
| ATR | 0.655133 | 1.000000 | 0.812374 | 0.580775 | 0.692739 | -0.244556 |
| EXCH | 0.885981 | 0.812374 | 1.000000 | 0.887940 | 0.907230 | -0.192228 |
| MGS | 0.758881 | 0.580775 | 0.887940 | 1.000000 | 0.969847 | -0.223479 |
| OPN | 0.753973 | 0.692739 | 0.907230 | 0.969847 | 1.000000 | -0.261547 |
| INF | -0.175565 | -0.244556 | -0.192228 | -0.223479 | -0.261547 | 1.000000 |

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