The Impact of Budget Deficit on the Nigerian Economic Growth, 1983 – 2014

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Abstract
This study is on the impact of Budget Deficit on the Nigerian economic growth, 1983 – 2014. It was carried out to determine the long-run effect of deficit budgeting and the inflationary pressure in Nigeria using times series data. Two null hypotheses to determine whether there is a significant relationship between inflation and deficit budget; inflation and money supply were stated. The researcher used the method of OLS regression analysis to analyse the data. Further, ADF was used to test for the stationarity of the variables while cointegration test was conducted to determine the long-run relationship among the variables. The found that there is a significant relationship between the deficit budget and inflation as well as money supply and inflation. Finally, the researcher recommended, among others, that the Nigerian government should display a high sense of transparency in fiscal operations to bring about realistic fiscal deficit and the need to strengthen monetary policies to act as checks and balances used to complement fiscal policies.
Keywords: Deficit Budget, Inflationary Pressure, Money Supply

1. Introduction

No issue in economic policy has generated more debate over the past decade than the effects of government budget deficits. Economies of different nations have experienced extraordinary fiscal inequities. Such fiscal inequities have also affected the magnitude of challenges and gave rise to new developments in the global economy concerning fiscal actions of various nations. Shojai (1999) postulated that the controversial nature of budget deficits have puzzled many economic planners. Such apprehensions about budget deficits have triggered disruptive disproportions or movements in all sectors of the economy.

Budgeting is a political process that may be influenced by economic considerations; budgeting decisions involved two phases namely: expenditure and revenue side; the revenue side take care of what resources the government should take from the individual or private sector in the form of taxation. While expenditure side take care of how government should allocate her resources among its public sector. Budget deficits occurred where public expenditure is greater than public revenue. On the other hand budget surplus occurred when public revenue is greater than public expenditure. Budget deficits; arise as a result of deliberate gap between public revenue and public expenditure and such gaps can be financed by borrowing. Deliberate gap existed with intension of promoting economic activity in Nigeria. Politicians of various ideologies argue that deficit reduction is critical to the future of the Nigerian and other major economies. Although the economics profession is more divided over the issue, many economists share the view that deficits are harmful, and perhaps even disastrous. When economists and policymakers decry deficits, they cite diverse reasons. Thus, despite almost unanimous concern over deficits, there is considerable controversy about what effects budget deficits have on the economy.

1.2 Statement of the Problem

Available evidence shows that over the years Nigeria budget deficits trend has been on the increase. It recorded forty years of deficits since 1970, deficits are meant to accelerate economic activities during depressions through induced variables or aggregates. Despite the fact that Nigerian economy has been operating deficits for these periods and also operated in a situation of less than full employment, it has been in distress which runs contrary to the essence of deficits. There is an obvious reduction in the standard of living of the citizens; there is a decline in growth of the economy; poverty is in the land; there is persistent unfavorable balance of payment, increased public debt, continuous depletion of foreign reserve, little or no savings, and decline in exports, increased inflationary pressure and continuous dependence on external economies.

Budget deficit's impact on these macroeconomic variables has been unfavorable. One would then ask if budget deficit no longer stimulate economic growth. Do we then accept the Keynesian economists that budget deficit crowds-in private investment through its impact on macroeconomic variable or do we accept the neoclassical economists that budget deficit crowds-out private investment through its impact on interest rate and other variables or do we accept the Ricardian economists that budgets does not have positive or negative impact on aggregate demand. Since there is no consensus in the literature yet about the net impact of deficit financing in developing economies, we need to undertake further studies by extending the period to 2014.

1.3 Objectives of the Study

The aim of this research is to find the long-run relationship between budget deficit and inflationary pressure. The specific objectives were;
1. to examine the relationship between budget deficits and inflation rate in Nigeria; and
2. to examine the relationship between money supply and inflation rate in Nigeria.

1.4 Research Hypotheses

H_{01}: Budget Deficit does not have any significant relationship with the inflationary trend in Nigeria

H_{02}: Money supply does not have any significant relationship with the inflationary trend in Nigeria

1.5 Scope of the Study

This work is mainly interested in the budget deficits as it relates to the macroeconomic performance of selected variables in Nigeria such as inflation (INF), money supply (MS), Government Deficit (GDEF) a proxy for government revenue minus government expenditure. The study spanned through 35years for the above variables (i.e. 1980 — 2014) period, and the choice of the period is based on the availability of data.

2. Literature

(a) Theoretical Review

The Keynesian Theory

According to Salen (2003) as stated by Wosowie (2013), this group of economists proposed a positive relationship between budget deficit and macroeconomic aggregates. They maintained that budget deficits results to an increase in the domestic production, increases aggregate demand, increases savings and private investment at any given level of interest rate. The main argument against the Keynesian theory suggests that an increase in the budget deficits would induce domestic captivation and thus, import expansion, causing current account deficit. In the mundell-Fleming framework, an increase in the budget deficit would induce an upward pressure on interest rate, causing capital inflows and an appreciation of the exchange rate. That will increase the current account balance.

The Keynesian school of thought differs from the standard neoclassical paradigm in two ways; first, the Keynesian school permits that the possibility that some economic resources are unemployed, secondly, they presuppose that existence of large number of liquidity constrained individuals. This assumption guarantees that aggregate consumption is very sensitive to changes in disposable income. Many traditional Keynesians maintained that deficits need not crowd-out private investment. Eisner (1989) reported in Wosowei (2013) argued that increased aggregate demand enhances profitability of private investments and leads to higher level of investment at any given rate of interest. Therefore, deficits may stimulate aggregate savings and investment despite the fact that they raise interest rates. He concludes that evidence abounds that deficits have not crowded-out investment; instead there is a crowd-in.

The Neoclassical Theory

Bluatia (2010) Argued that neoclassical group of economists proposed an adverse relationship between budget deficits and macroeconomic aggregates. They maintained that budget deficits lead to higher interest rates discourages the issue of private bonds, private investment, private spending and increases inflation level and creates a similar increase in current account deficits and slows the growth rate of the economy through resources crowding-out.

This school of thought considers individuals planning their consumption over their entire cycle by shifting taxes to the future generations. Budget deficits increase current consumption by assuring full employment of resources. The neoclassical maintains that increased consumption means a decrease in savings. Interest rate must rise as to bring about equilibrium in the capital market.

Higher interest rates in turn bring about a decrease in private investment, domestic production and an increase in the aggregate price level. Yellen (1989) argued that in standard neoclassical macroeconomic models, if resources are fully employed so that output is fixed, higher current consumption means an equal and offsetting reduction in other forms of spending. Therefore, investment or net exports must be "fully crowded-out."

It is important at this point to differentiate between "financial" crowding out and "resources" crowding out which occurs when the government competes with the private sector on purchasing certain resources such as skilled labour, raw materials etc. when the government sector expands, the private sector will contract because of the increase in prices of these resources due to an excess demand by the government. This will lead to a fall in investment and consumption by the private sector. Therefore, the government sector's expansion crowds out the private sector; the resources crowding out are an important issue to take into account especially in a developing country like Nigeria where resources are scarce even sometimes to the private sector. Any excess demand for these resources by the government will severely impinge on private sector productivity.

Their Cardian Theory

There is another model or approach as advanced by Barro (1989) called Ricardian Equivalence Hypothesis (REH). This model suggests that government budget deficits do not affect the total level of demand in an economy. This model was initially proposed by the 19th century economist such as David Ricardo. This theory simply denotes that government may either finance their spending by taxing current taxpayers, or they may borrow money. If funds are borrowed, government must eventually repay this fund by raising taxes above what they would otherwise have been in the future; the choice therefore is between "tax now" and "tax later".

David Ricardo argued that although taxpayers would have more money or fund now, they would realize that they would pay higher tax in future and save the extra money in order to pay the future tax. The extra savings by consumers would offset the extra spending by government; therefore overall demand would remain unchanged.

Recently economists such as Barro (1990) have developed sophisticated variations on this idea by using the theory of rational expectations. Ricardian equivalence suggests that government's attempt to influence demand by using fiscal policy will prove fruitless. He maintained that an increase in budget deficits as a result of an increase in government spending must be paid for either now or later, with total present value of receipts fixed by the total present value of spending. Which suggests that on cut in today's taxes must be matched by an increase in future taxes leaving real interest rates and thus private investment and the current account balance, exchange rate and domestic production unchanged. Therefore budget deficits do not crowd-in nor crowd out macroeconomic variables, that is no positive or negative relationship exists.

Empirical Literature.

Khieu (2014) examined budget deficit, money growth and inflation: empirical evidence from Vietnam. The study empirically examines the nexus among budget deficit, money supply and inflation by using a monthly data set from January 1995 to December 2012 and a SVAR model with five endogenous variables, inflation, money growth, budget deficit growth, real GDP growth and interest rate. Since real GDP and budget deficit are unavailable on the monthly basis, he interpolated those series using Chow and Lin's (1971) annualized approach from their annual series. Overall, he discovered that money growth has positive effects on inflation while budget deficit growth has no impact on money growth and therefore inflation. In addition, budget deficit is autonomous from shocks to other variables. The estimation results also reveal that the State Bank of Vietnam implemented tightening monetary policy in response to positive shocks to inflation by reducing money growth but the response was relatively slow because it took three months for the monetary authority to fully react to such shocks. Finally, interest rate was not an effective instrument for fighting inflation but it was significantly and positively influenced by inflation.

Bakare, Adesanya and Bolarinwa (2014) conducted a study on empirical investigation between budget deficit, inflation and money supply in Nigeria. The paper critically investigates the long term relationship between budget deficit, money supply and inflation in Nigeria between 1975 and 2012. The paper employed quantitative methodological framework and specifically draws on econometric technique to find the relationship between inflation rate, growth rate of money supply, growth of budget deficit/GDP and growth of external debt/GDP. Stationarity test conducted using Augmented Dickey-Fuller (ADF) reveals that the variables used are stationary at levels. The Johansen co-integration test suggests that there are at least three co-integrating vectors among these variables. The estimated coefficient of the ECM reveals that about 132% of the errors in the short run are corrected in the long run. The overall result between inflation rate and growth of money supply, growth of BD/GDP and growth of ED/GDP indicates that the specified model is statistically significant at 5% level. By implication, the model is of goodness of fit i.e. reliable for policy making. However, the paper recommends that the Nigerian government should demonstrate a high sense of transparency in its monetary and fiscal operations in order to curb high prevalence of money supply and external debt, money supply in order to reduce the incidence of inflation in Nigeria.

Ezeabasili, Tsegba and Wilson (2012) studied economic growth and fiscal deficits: empirical evidence from Nigeria. They pointed out that there has been considerable debate about the relationship between fiscal deficits and economic growth. Although macroeconomic theory postulates that fiscal deficits stimulate economic growth, empirical research has been less conclusive about this relationship. This paper examines this controversial relationship within the Nigerian context, using data over the period, 1970 — 2006. The study adopted a modeling technique that incorporates cointegration and structural analysis. The results indicate that (1) fiscal deficit affects economic growth negatively, with an adjustment lag in the system; (ii) a one percent increase in fiscal deficit is capable of diminishing economic growth by about 0.023 percent; and (iii) there is a strong negative association between government consumption expenditure and economic growth.

Awogbemi, Adeyeye, Taiwo and Kola (2012) in their work examined the causes and effects of inflation in Nigeria between 1969 and 2009 and what could be done to ameliorate the negative effects on the economy. The time series variables properties on some selected variables were examined using Augmented Dickey Fuller (ADF) Unit root test and co-integration analysis. The result revealed that the explanatory variables

(money supply, growth rates, gross domestic product growth rates and expenditure revenue ratio) are not spurious but exchange rate of dollar to naira was nonstationary. The study also revealed that the gross domestic product growth rate is counter inflationary as against inflationary factors.

Odawara (2011) studied the relationship between government expenditure and economic performance. The first essay investigates a nonlinear relationship between government spending and macroeconomic performance by estimating a threshold model that relates real GDP growth to three measures of government spending: government consumption, government investment, and total government expenditure as share to GDP. Using quarterly data for five OECD countries from 1970 through 2008, Hansen's (1996,1999, and 2000) method is applied to test for the presence of threshold effects and to estimate the threshold values. The main findings suggest that there is strong evidence of a nonlinear relationship between government spending and macroeconomic performance for all three measures of government spending in five OECD countries. The results also indicate the importance of compositional effects when examining government spending. The impact on government investment on macroeconomic performance is quite different from that for government consumption.

Akinbobo1a (2011) study of budget deficit and inflation in Nigeria for tI period .1970-2005 revealed that budget deficits affect inflation directly and indirectly through fluctuations in exchange rate the Nigeria economy.

According to Omoke and Oruka (2010), who employed Pair Wise Grander causality Test in an attempt to offer evident on the causal long term relationship between budget deficit, growth and inflation in Nigeria, considering the broadest definition of money supply, money supple causes budget deficit which means that the level of money supply in the Nigerian economy will determine whether there has been or there will be budget deficits. Inflation and budget deficit revealed a bilateral or feedback causality proving that the changes that occur in inflation could be explain by its own lag and also the lag values of budget deficit and in the same vein, changes that occur in budget deficits are explained by its lagged values and the lagged values of inflation. The implication of their findings is that both budget deficit and inflation could be caused by money, supply meaning that they are both monetary phenomena and also, inflation is also caused and found to be dependent on the performance of the budget.

3. 0 RESEARCH METHODOLOGY

Research Design
Research design employed is quasi-experimental design. The main analytical tool proposed is the ordinary least square (OLS) and the co integration/error correction mechanism if the need arises. The OLS will be employed because of its desirable properties of best linear unbiased and estimator. The co integration technique shall be employed to establish the long run relationship between the variables in the model while the ecm will be used to correct the short-run analysis.

Model Specification
Our model is specify as follow

$INF = F (BD, MS)$

We first assume a linearity relationship and hypothesize that:

$INF = \alpha_0 + \alpha_1 BD + \alpha_2 MS + \mu_1$

Where the a priori expectations were:

$\alpha_1, \alpha_2 > 0.$

F = Functional notation

BD = Budget deficit defined as federal government retained revenue minus total expenditure.

MS = Money supply

INF = Inflation Rate

μ = Stochastic/Disturbance/Random/ error term

α_1, α_2 = Parameters for multiple regression

The study also shall try non-linear specifications. Specifically the Cobb-Douglas variety will be specified, estimated and compared with the linear version.

The Cobb-Douglas variety

$INF = B(BD_t)^{\Phi} (MS_t)^z e^{U1t}$

To make the model amenable to OLS we linearized by taking the natural log of both sides of (3.3), as follows: *In INF = lnA + αlnBD, + βIn MS$_t$ + U$_{1t}$*

Method of Data Analysis
As earlier stated, we shall use co-integration and error correction model as an econometric technique in this study. We will also make use of the Econometric View (E-view 7.0) software in running world. Some other tests that we intend to run in this study include the following.

Unit Root Test
It is now a common practice to examine the time series properties of economic data as a guide to a subsequent

multivariate modeling and inference. If we discover that the variables are integrated of order greater than or equal to one, then it could be the case that these variables are co-integrated. We will employ the Augmented Dickey-fuller test (ADF) to test for the stationarity of our data at level and at difference. The model is stated below:

$Y_t = \mu + P_{yt} - 1 + \varepsilon_t$

Where μ and P are parameters and ε_t is assumed to be white noise, y is a stationary series.

If $-1 < P < I$. If $P = I$, y is a non-stationary series.

If the process is started at some point, the variance of y increases steadily with time and goes to infinity. If the absolute value of P is greater than one, the series is explosive. Therefore, the hypothesis of a stationarity series can be evaluated by testing whether the absolute value of P is strictly less than one. The simple unit root test described above is valid because the series is an AR (I) process. If the series is correlated at higher order lags, the assumption of white noise disturbances is violated.

The Augmented Dickey fuller (ADF) tests take the unit root as the null hypothesis Ho: P = I. since explosive series do not make much economic sense, this null hypothesis is tested against the one-sided alternative H1: P<1. The null hypothesis of a unit root is rejected against the one sided alternative if the t-statistic is less than the critical value.

Cointegration

This study shall use the co-integration test to investigate the existence of a long-term relationship between budget deficit and macroeconomic variables. We shall explore existence of a long-term relationship among the variables in our model. If the variables that we are using in this research work are found to be co-integrated, it will provide statistical evidence for the existence of a long-term relationship. We will employ the maximum. Likelihood test procedure as established by Johansen (1991) and Juselus (1990).

$Y_t = A1_{yt} - 1 + \ldots\ldots + A_{pyt} - p + \beta xt + \varepsilon_t$ (3.6)

Where y_t is a K – vector of non-statitionary I (I) variables, $_{xt}$ is a d-vector of deterministic variables, and ε_t is a vector of innocations.

Granger's representation theorem asserts that if the coefficient matrix $_\pi$ has reduced rank r

$H * I (r)$: $_{\pi yt-1} + \beta_{xt} = \alpha(\beta 1_{yt-1} + Po)$ (3.7)

Error Correction Model

The error correction result shows the speed of the adjustment of the variables to their long-term equilibrium. The error correction model coefficient is meant to tie the short-term disequilibrium of the error term to its long term value. The relationship is estimated using the model as shown below:

$\Delta GDP_t = \beta_{ot} \Sigma\beta_{1i} \Delta BD_t - 1 + \Sigma\beta_{2i} \Delta INF_t - 1 + \Sigma\beta_{3i} \Delta UNEMP_t - 1 + \Delta ECM - 1 + \varepsilon_t$

Where $\alpha1\ldots\ldots\alpha3$ are parameters of the independent variables. Δ is the error correction coefficient, μ and ε are the random disturbance term and Δ is the first difference operator. Equation (VII) is a dynamic error correction model (ECM) of the short-term behaviour of budget deficit, while nk (k = 1 to 3) measures the response of budget deficit to changes in the independent variables.

4. Analysis Technique

INF = F (BD, MS)

$INF = b_0 + b_1 BD + b_2 MS + U_i$

INF = 22.76669+ 1.38E-05BD+1.77E-09MS

t-value = (6.323427) (0.860833) (3.004287)

f-value = 3.113550

$R^2 = 0.825068$

Durbin-Watson (d) = 2.872938

Confidence Interval = 5% (We are confident that 95% of our result is correct based on the data used).

Evaluation of Regression Results

The result shows that $R^2 = 0.83$ which indicates that 83% of the changes in the dependent variable (INF) are explained by the changes in the independent variables. Further, the f-value of 3.113550 shows that the variables are significant when taken together at 5% level of significance using the rule of thumb (2) while the Durbin-Watson (d) statistics, unfortunately, show the presence of serial autocorrelation of the first order at 2. Over all, the result shows that the regression is spurious thereby necessitating the need for the second order test.

Augmented Dickey Fuller Tests

The ADF tests shows whether the mean and variance of the variable are stationary or not over the period. Therefore, ADF helps to determine the stationarity of the variable which is a prerequisite for cointegration analysis.

The ADF results, as shown in the appendix, reveals that all the variables are not stationary at 5% level at levels. Money Supply does not have a unit root at first differencing while others do.

Cointegration Test

The Cointergation test tests the long-run relationship between two or more non stationary variables. The precondition for cointegration is that one of the variables must have a unit root.

However, the cointegration result shows that there are no two cointegrating equations even though, these variables have unit roots. Two or more cointegrating equations are a prerequisite for Error Correction Mechanism (ECM).

Tests of Hypotheses

H_{01}: Starting with the effect of Deficit Budget to the inflation, the regression result shows that part of the major causes of inflationary pressure in Nigeria has been the abuse of budget deficit. Even in the period of high inflation, the government still adopted budget deficit which, in turn, fuelled the inflation.

The regression result shows that Deficit Budget has a positive impact on INF which is expected a priori. This impact is both visible in the short and long-terms. The result reveals that a unit increase DB increases INF by 1.38E-05 percent which is not significant at 5% level of significance using the t-test value of 0.860833 on a 2-tailed test. We therefore, reject the alternative hypothesis and conclude that there is no significant relationship between INF and Budget Deficit.

H_{02}: Again, there is significant relationship between INF and MS as shown by the t-value of (3.004287) at 5% confidence level. More so, the relationship is positive as a unit increase in money supply (M2) increases INF by 1.77E-09 per cent and vice versa. The sign conforms to the expected a priori sign.

The regression analysis shows that we will reject the null hypothesis and conclude that there is a significant relationship between money supply and inflation rate in Nigeria over the period under study.

5. Conclusion and Recommendations

Conclusion

Empirical evidence from this research work has shown that there is a positive relationship between budget deficits and inflation in the Nigerian economy. Thus, whenever there is a change in budget deficit, the rate of inflation is adversely affected in line with the empirical finding of the research work.

The results of this study shown that, there was uni-directional causality between budget deficit and inflation in Nigeria. Although, the degree of causality from budget deficit to inflation was much higher and significant, however, the degree of causality from inflation to budget deficit was very low and insignificant. These results provide the basis to conclude that efforts targeted at inflationary control could be best achieved if it was aimed at fiscal deficit reduction. Therefore any efforts targeted at controlling inflation could be best achieved by formulating policies geared towards reducing fiscal (budget) deficit.

The direct causal relationship between budget deficit and inflation according to the results of this research work, indicate that an increase in budget deficit will also lead to a corresponding increase in the level of inflation. Hence, for the level of inflation to be reduced in Nigeria, government needs to cut down the current level of her expenditure, in form of reducing the level of her budget deficit, in order to reduce the rate of inflation.

Policy Recommendations

Based on the findings of this study which show that, there was causal relationship between budget deficit and inflation in Nigeria, government should display a high sense of transparency in the fiscal operations to bring about realistic fiscal deficits. Fiscal deficits, where recorded, should be channeled to productive investments like road construction, electricity provision and so on, that would serve as incentives to productivity through the attraction of foreign direct investments, in other to reduce the incidence of inflation in Nigeria.

Also, the implication of these findings was that both budget deficit and inflation could be caused by money supply meaning that they were both monetary phenomenon. Inflation was also found to be dependent on performance of the budget (deficit). The increase in money supply could as well help to cushion the extent of budget deficit in an economy, whereas, the same increase in money supply might still lead to an increase in the rate of inflation. Hence, adequate monetary policy should be geared towards balancing the role money supply performs to both budget deficit and inflation, noting that there was uni-directional relationship between budget deficit and inflation.

Based on the causal relationship that exists between budget deficit and inflation, relevant measures has to be put in-place in order to enhance policy coordination among various arms of government, especially monetary policy should be made to complement fiscal policy. According to the result of this research work, inflation has been established as monetary phenomenon in Nigeria. Then, for inflation to be curtailed, government should strongly adhered to fiscal discipline at all levels for budget deficit to be effective.

In the quest of Nigeria to achieve high and sustained long-run economic growth, monetary policy has to be strengthened to act as checks and balances, that is, monetary policy should be used to complement fiscal policy, in order to curtail inflation when budget deficit is used as fiscal policy instrument.

From the research study, it was impossible for aggregate demand side of the economy to be motivated

without causing inflation in an economy. Hence, government has to employ policy mix so as to put inflation under control if the gain that government intends to achieve through the promotion of economic growth is not to be eroded.

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Appendix
Regression Results for the Linear Model
Dependent Variable: INF
Method: Least Squares
Date: 10/18/15   Time: 11:11
Sample: 1980 2014
Included observations: 35

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	22.76669	3.600372	6.323427	0.0000
DB	1.38E-05	1.61E-05	0.860833	0.2157
MS	1.77E-09	4.13E-07	3.004287	0.0066

R-squared	0.825068	Mean dependent var		19.87429
Adjusted R-squared	0.716635	S.D. dependent var		17.84814
S.E. of regression	17.78883	Akaike info criterion		8.676835
Sum squared resid	10126.16	Schwarz criterion		8.810150
Log likelihood	-148.8446	Hannan-Quinn criter.		8.722855
F-statistic	3.113550	Durbin-Watson stat		2.872938
Prob(F-statistic)	0.340783			

ADF Unit Root Results
Null Hypothesis: DB has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.340977	0.5990
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DB)
Method: Least Squares
Date: 10/18/15   Time: 11:12
Sample (adjusted): 1981 2014
Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DB(-1)	-0.120595	0.089931	-1.340977	0.1894
C	-41591.96	34123.50	-1.218866	0.2318

R-squared	0.053205	Mean dependent var		-17671.18
Adjusted R-squared	0.023617	S.D. dependent var		171659.5
S.E. of regression	169620.3	Akaike info criterion		26.97753
Sum squared resid	9.21E+11	Schwarz criterion		27.06732
Log likelihood	-456.6181	Hannan-Quinn criter.		27.00815
F-statistic	1.798219	Durbin-Watson stat		1.470471
Prob(F-statistic)	0.189370			

Null Hypothesis: INF has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.842708	0.0630
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(INF)

Method: Least Squares

Date: 10/18/15   Time: 11:13

Sample (adjusted): 1981 2014

Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF(-1)	-0.400954	0.141047	-2.842708	0.0077
C	8.134455	3.785574	2.148804	0.0393

R-squared	0.201616	Mean dependent var	0.082353
Adjusted R-squared	0.176667	S.D. dependent var	16.13882
S.E. of regression	14.64399	Akaike info criterion	8.262960
Sum squared resid	6862.289	Schwarz criterion	8.352746
Log likelihood	-138.4703	Hannan-Quinn criter.	8.293580
F-statistic	8.080988	Durbin-Watson stat	1.637969
Prob(F-statistic)	0.007727		

Null Hypothesis: MS has a unit root

Exogenous: Constant

Lag Length: 8 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.310523	0.1763
Test critical values:	1% level	-3.711457	
	5% level	-2.981038	
	10% level	-2.629906	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MS)
Method: Least Squares
Date: 10/18/15   Time: 11:14
Sample (adjusted): 1989 2014
Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MS(-1)	-24.07957	10.42169	-2.310523	0.0345
D(MS(-1))	22.17702	10.13131	2.188959	0.0438
D(MS(-2))	22.90957	10.86291	2.108973	0.0511
D(MS(-3))	20.86492	9.705258	2.149857	0.0472
D(MS(-4))	56.17448	20.70902	2.712561	0.0154
D(MS(-5))	21.86341	7.843907	2.787311	0.0132
D(MS(-6))	56.57440	24.06435	2.350963	0.0319
D(MS(-7))	-37.43865	13.33816	-2.806882	0.0127
D(MS(-8))	112.5619	32.27878	3.487179	0.0030
C	-615860.5	583689.0	-1.055117	0.3070

R-squared	0.976930	Mean dependent var		725007.9
Adjusted R-squared	0.963953	S.D. dependent var		10899359
S.E. of regression	2069363.	Akaike info criterion		32.20710
Sum squared resid	6.85E+13	Schwarz criterion		32.69099
Log likelihood	-408.6923	Hannan-Quinn criter.		32.34644
F-statistic	75.28168	Durbin-Watson stat		2.785150
Prob(F-statistic)	0.000000			

Cointegration Results
Date: 10/18/15   Time: 11:14
Sample (adjusted): 1982 2014
Included observations: 33 after adjustments
Trend assumption: Linear deterministic trend
Series: DB MS INF
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.769763	63.43623	29.79707	0.0000
At most 1	0.314791	14.97089	15.49471	0.0598
At most 2	0.072842	2.495849	3.841466	0.1141

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.769763	48.46534	21.13162	0.0000
At most 1	0.314791	12.47504	14.26460	0.0941
At most 2	0.072842	2.495849	3.841466	0.1141

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

DB	MS	INF
-7.40E-06	-2.02E-07	0.007130
5.09E-07	-2.77E-08	-0.064116
2.12E-06	-2.72E-08	0.010264

Unrestricted Adjustment Coefficients (alpha):

D(DB)	14248.78	-35491.73	-40304.60
D(MS)	7310661.	824614.5	704483.1
D(INF)	-0.562197	8.300805	-1.642806

1 Cointegrating Equation(s):	Log likelihood	-1130.703

Normalized cointegrating coefficients (standard error in parentheses)

DB	MS	INF
1.000000	0.027239	-963.3706
	(0.00127)	(904.953)

Adjustment coefficients (standard error in parentheses)

D(DB)	-0.105454
	(0.22709)
D(MS)	-54.10531
	(6.98745)
D(INF)	4.16E-06
	(2.2E-05)

2 Cointegrating Equation(s):	Log likelihood	-1124.465

Normalized cointegrating coefficients (standard error in parentheses)

DB	MS	INF
1.000000	0.000000	-42707.77
		(11438.9)
0.000000	1.000000	1532518.
		(419538.)

Adjustment coefficients (standard error in parentheses)

D(DB)	-0.123507	-0.001891
	(0.22212)	(0.00609)
D(MS)	-53.68586	-1.496589
	(6.90787)	(0.18948)
D(INF)	8.38E-06	-1.16E-07
	(1.9E-05)	(5.3E-07)