INFLATION VERSUS PUBLIC EXPENDITURE GROWTH IN THE US: AN EMPIRICAL INVESTIGATION

Chinedu B. Ezirim[1]
University of Port Harcourt, Nigeria.
E-mail: cbezirim@yahoo.com

Mike I. Muoghalu[2]
Pittsburg State University, USA.
E-mail: mmuoghal@pittstate.edu

Uchenna Elike[3].
Alabama A & M University, USA.
E-mail: uelike@aam.edu

ABSTRACT

This paper investigates the relationship between public expenditure growth and inflation in the United States of America using the cointegration analysis and Granger Causality Model applied to Time Series Annual Data from 1970 – 2002. The results indicate that public expenditure and inflation are cointegrated and thus there exist a long-run equilibrium relation between the two variables. There is also a bi-causational relationship between public expenditure growth and inflation in the United States of America. Inflation significantly influences public expenditure decisions in the United States of America. Public expenditure growth was seen to aggravate inflationary pressures in the country, where reduction in public expenditure tends to reduce inflation. Thus, as in previous studies, the efficacy of Keynesian's fiscal policy as a veritable tool to combating inflation in the developed countries is not falsified

Key Words: Public Expenditure, Inflation, Developing Economies
JEL Classification: E31**,** E62, H5, H59

---

[1] Other contact details: Chinedu B. Ezirim Ph.D., FCIN, Department of Finance & Banking, University of Port Harcourt, Port Harcourt, Nigeria

[2] Other contact details: Mike I. Muoghalu, Ph.D., Department of Economics, Finance, & Banking, Pittsburg State University, Pittsburg Kansas, USA.

[3] Other contact details: Uchenna Elike, Ph.D., Department of Economics and Finance, Alabama A & M University, Normal Alabama

I. INTRODUCTION

The problem of determining the size or growth of public expenditures has occupied the attention of researchers and theorists over the decades. Ezirim and Ofurum (2003) argued that the size of a government and, in some cases, of the country has been measured in terms of the total spending of the particular government or country. It appears from the above that the growth in the total expenditure of the government would represent an index of growth in the size of the government or the country, ceteris paribus. While this point is contestable in a typical economic and financial debate especially in terms of the representation of economic growth with growth in the size of public expenditure; there would be a reasonable measure of consensus that public expenditure is an important variable in explaining economic growth of a country. But what variables would explain public expenditure growth? Disagreements abound on the particular factors that determine the size or growth in public expenditure.

Several theories have been advanced to explain this problem in different countries of the globe. Among them are Wagner's Law of increasing state activities, Wiseman-Peacock hypothesis, critical-limit hypothesis, Leviathan hypothesis, differential productivity hypothesis, and the relative price hypothesis. A critical look at these theories will reveal a plethora of factors that are said to determine the size (and of course, growth) of public expenditure. Some of these factors are inflation, total revenue of the country, total debt over-hang and debt service or burden ratio, per-capital income or output of the country, and strategic transfers from federal government to the state governments. Others are population growth, urbanization effect, and taxation. The extent to which these factors affect the size of public expenditure in less developed countries such as Nigeria was investigated by Ezirim and Muoghalu (2006). The results indicated that not all the above listed factors account, significantly and positively, for growth in the size of public expenditure (PE).

A notable factor that was found to be significant in the study was inflation (INF). Based on the findings, the authors take liberty to postulate in this paper that inflation is a most important factor of interest that is postulated to account for changes in government expenditure in developing countries. The above proposition is strengthened when we give due cognizance to the associated problems of cost over-runs and project abandonment, which are easily traced to inflation. Some theoretical constructs appear to posit that "variable-reverses" should be a better hypothesis; in which case growth in public expenditure (PE) may explain inflation (INF) and not the other way round. Which position is true for a typical developed country? This paper uses the experience of the United States of America as a test case. The choice of this country is not unconnected with its leading and influential position among the comity of developed nations.

II. LITERATURE REVIEW

Several theoretical constructs have offered to explain the growth or size of government expenditure over the years. For instance, Wagner's Law of Increasing State Activities explained that there are inherent tendencies for the activities of different tiers of a government (such as federal, state and municipal government arms) to continually rise, over time, both intensively and extensively. These increases in state activities necessitate increases in government expenditure such that, a functional relationship is postulated to exist between the growth of an economy and the growth of the government activities to such an extent that the governmental sector grows faster that the general economy. Bhatia (1982) argued that future expectations of concerted development of modern industrial society would elicit rising political pressure for social progress and / or justice, which in turn would give rise to increased social considerations in the conduct of industry. Given these, it is expected that a continuous expansion of the government sector and its expenditure would occur. Wiseman and Peacock (1961) in their study of public expenditure in the United Kingdom for the period 1890-1955 agreed that public expenditure increase in jerks or step like fashion rather than in a smooth and continuous manner, favoring a post-ante analysis of effects on government budgets, they posited that at some times some social or other disturbances take place which at once shows the need for increased public expenditure which the existing public revenue cannot meet.

As in Bhatia (1982), the critical-limit hypothesis is credited to Collin Clerk (1943), who contended that when the share of the government sector activity (represented by its expenditure) exceeds 25 per cent of the total economic activity of the country, inflation would be the natural result; and this would be so even when the county is operating under a balanced budget. Thus, when the government's share of the aggregate economic activity reaches the critical limit of 25 per cent, the income earners would the affected by reduced incentives (owing to apparent high tax incidence), and this would jeopardizes their level of productivity. The result is that they would produce less than their capabilities and potentials can support. This would bring about reduced supply. On the other hand, the demand-effects to the government financing (i.e. expenditure) would become quite strong even when the budget remains balanced. This maladjustment between demand and supply would breed inflationary spirals in the economy as a net result (See Ezirim and Muoghalu, 2006).

The leviathan model is an explanation proposed by Brennan and Buchanan (1980), which considers government as a revenue-maximizing entity, whose ability and propensity to maximize tax-pricing revenue is only constrained by constitutional limits placed upon its activities. An example of such constraints is the constitutional provision for decentralization of spending and taxing powers among sub-national government. The cardinal hypothesis postulated by Brennan and Buchanan (1980) is that the lesser the total government intrusion into the economy, ceteris paribus, the greater the extent to which taxes and expenditures are decentralized (Aigbokhan, 1997). Baumol (1967) explained the rise in government expenditure in terms of unbalanced growth between public and private sectors. Dividing the economy into progressive private sector and

non-progressive public sector, he explained that productivity rises only in the private sector, whereas wage rate rises in both, and as a result public expenditure would rise. Moreover, as public services are more labor intensive, and as employees in themselves have no motivation to improve productivity, the increase in public expenditure becomes acceleratory. On Rastow's (1971) part, growth in public expenditure is better explained in terms of the changes in levels of development of the country's economy. For instance, less developed countries at their cradle of development require higher levels of investments in order to create necessary infrastructure for gainful economic breakthrough. As such economies approach maturity of economic development, much of the further public expenditure would basically be prompted by repeated market failures. A fuller discussion of these theories can be found in Rosen (1995), Agiobenebo (1998), and Onuchuku (2001).

A key study has been conducted in the area of public expenditure to integrate most of the arguments of these theories by Ezirim and Muoghalu (2006). The study was an attempt at explaining the size of government expenditure in less developed countries, by investigating the relationship between public expenditure and determinants earlier identified by previous theories on the subject. Two multivariate public expenditure and two partially adjusted public expenditure models were constructed, were constructed and estimated, but only two were selected and analyzed. The results reveal that strategic inter-governmental transfers, especially from the central government to the states' counterparts do constitute a significant positive influence on the total public expenditure of the developing economy studied. The indices of both debts over-hang and debt burden constitutes important factors explaining changes in public expenditure in a typical developing country. A fourth finding of the study relates to the observed significance of total public revenue in affecting public expenditure. It is, therefore, not surprising that the study underscores that what the government has or can raise determines what it spends.

The results therefore lend support to the arguments of Wiseman-Peacock and the Leviathan hypothesis. Fifthly, inflation was revealed to positively and significantly influence the size of public expenditure. This result agrees with Wagner's cost-over-run argument but does not immediately verify Clerk's maladjustment argument in his critical limit hypothesis. Furthermore, the Wagner variable of per capita output produced a somewhat inclusive result owing to the fact that though marginally significant in one of the models, the observed relationship is negative in both models. This disagrees with the Wagner's theory. The analysis further reveals a consistent and improved behavior of the modeled explanatory variables even in the long run. Another interesting finding is that the behavior of the public expenditure of a typical less-developed country follows the precepts of the partial adjustment mechanism. Finally, the speed of adjustment of public expenditure to optimal levels is given as 48.2%. By simple manipulation, it takes about 2 years and 11 days for a typical developing country to effect adequate level of public expenditure that would cause meaningful growth and development in the country. Considering their stage of development, this is basically sub-optimal. This equally suggests that the current sizes of the public sector of

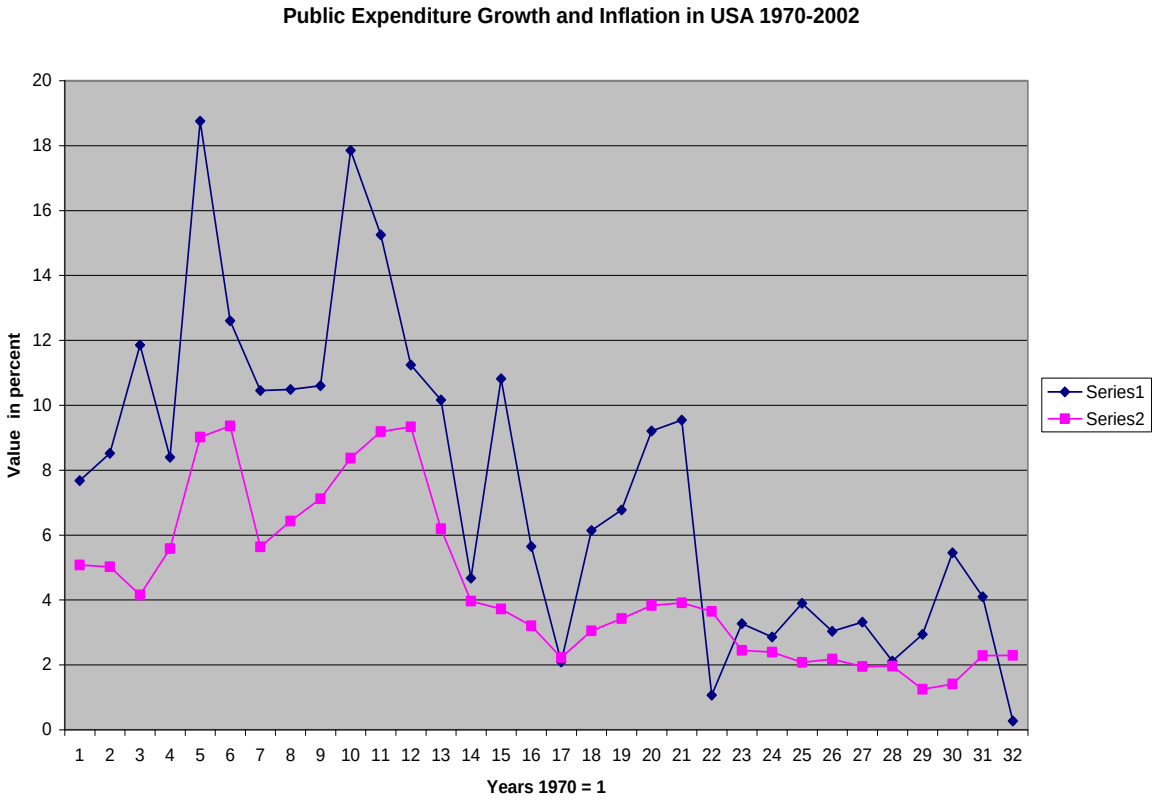
developing economies are too small for the government to play expected roles effectively.

Important as the inflation phenomenon, only a few studies like that of Ezirim and Muoghalu (2003), have attempted to investigate the relationship between public expenditure and inflation. To the best of the authors' knowledge, none of these studies addressed the causality question as many devoted their attention to ordinary relational effects. The present paper aims at investigating the causal relationship existing between public expenditure growth and inflation in the United States of America.

III. METHODOLOGY

A. Data

The data for the estimation related to World Bank Statistics for the country under study. Time Series Annual data was employed ranging from 1970 – 2002. The data are described in Figures 1. As shown in the Figure, Series 1 represented public expenditure growth, while Series 2 represented inflation.



From Figure 1, it can easily be seen that, for United States of America, even when public expenditure appeared to have fluctuated more violently than inflation, it never crossed the 20% range. Inflation particularly, never exceeded 10% at any given time during the period under study. Except in earlier years, it never reached the 4% mark

(See Figure 1). A crucial observation made in another study (Ezirim and Ofurum, 2003) was that inflation was generally higher among the developing countries than their developed counterparts on the average.

B. Stationarity and Cointegration Analyses

The paper utilizes the Dicker-Fuller and augmented Dicker-Fuller regressions to perform the unit root tests for the variables, namely public expenditure (EXP) and Inflation (INF). Two sets of tests were conducted for each variable. The first included an intercept but not a trend, while the second included an intercept and a linear tend. The unit root regression is given by

$$\Delta w_t = B_o + B_{1t} + \partial_o W_{t-1} + \sum_{i=1}^{p} \gamma_t \ \Delta W_{t-1} + e_t \ ; t = 1, 2,\ldots, T \qquad \ldots\ldots (3.1)$$

Where, e_t is the error term and Δ denotes the first difference operator.

Expression 3.1 above assumes that {Wt}, t = 1,2,…., T is a particular time series under consideration where T is the sample size; and that the series is integrated of order, d, denoted I(d) if it attains stationarity after differencing d times. It underscores that if the series is I(1), it is deemed to have a unit root or it follows a random walk process. This situation does not arise if its first difference is I(0). It is termed stationary. Naturally the ADF test is performed by testing $\delta o = 0$ against the one-sided alternative, $\delta o > 0$ in equation 3.1 above. It is noteworthy that expression 3.1 incorporates both a constant term or intercept (βo) and a time trend variable t. A situation may arise when the Dicker fuller regression would include an intercept but not a trend.

If that is the case, the term (β_{ot}) would be omitted from expression 3.1. As earlier stated, we performed the unit root tests under the two conditions for each variable. The unit root test employed the Maximum log-likelihood (LL), Akaike Information Criterion (AIC), Schwarz Bayesian Criterion (SBC), and Hannan-Quinn Criterion (HQC). Observed DF and ADF statistics were tested against the 95% critical value for the augmented Dickey-Fuller statistic in each situation as generated by the Microfit software program.

Following ADF tests, if all variables (EXP and INF) are I(1), the cointegration test is usually undertaken. The existence of the co-integrating relationship implies that the variables share mutual stochastic trend and are linked in a common long-run equilibrium. In this paper, test for co-integration utilizes the Johansen (1988) and Johansen and Juselius (1990) approach of testing the number of co-integrating vectors. More specifically, the paper performed the cointegraion procedure with unrestricted intercepts and unrestricted trends in the vector auto-regression. The cointegration LR tests were based on (i) maximum eigen value of the stochastic matrix, (ii) trace of the stochastic matrix, and (iii) choice of the number of coinategrating relations using model selection criteria (namely the LL, AIC, SBC, and HQC). Afterwards, estimation was made of the coinategrated vectors in Johansen Estimation (normalized in brackets).

Finally, the paper estimated the long run matrix in Johansen Estimation to confirm the existence of mutual long run relationship or otherwise.

It is reasoned by the authors that if there exist stationarity of the variables and that the subsequent cointegrating tests were found to be in line with theoretical expectations, then direct application of conventional regression and causality techniques to the relationship between EXP and INF cannot be said to be inappropriate. Equally conventional hypothesis testing procedure based on the t, F, and X2 test statistics cannot be said to be unreliable. Should the situation arise, the paper would proceed with the conventional causality test as suggested by Granger (1969, 1977), using the F-test and the analysis of elative effects of independent variables using the t- test.

C. Causality Models Specification and Estimation Procedure

Given the above argument, the paper utilizes causality models patterned after Granger (1969, 1979) formulation to express the causation hypotheses for U.S.A. Granger's (1969, 1979) causality test regresses a variable, H, on lagged values of itself and another variable P. If P is significant, it means that it explains some of the variance in H that is not explained by lagged values of H itself. This indicates that P is causally prior to H and is said to dynamically cause or Granger cause P. Granger proposed that

$$H_t = \sum_{j=1}^{m} a_j H_{t-j} + \sum_{j=1}^{m} \beta_j P_{t-j} + U_1$$

For typical dual causation hypothesis, we have

USA: $EXP_t = \eta_{10} + \eta_{11} INF_t + \eta_{12} EXP_{t-1} + U_7 ; \eta_{1i} > 0$

$$INF_t = \eta_{20} + \eta_{21} EXP_t + \eta_{22} INF_{t-1} + U_8 ; \eta_{21} > 0$$

The above equations were estimated using the OLS and the Granger causality methods. As specified by Granger causality test, the F-statistics was computed for all the models to determine the direction of causation. The t-statistics were equally computed to determine their relative effects of the explanatory variables.

IV. ESTIMATION RESULTS AND ANALYSES

A. Stationarity and Co-Integration Tests Results

The results of the Dickey-fuller regressions including an intercept and a linear trend for the public expenditure (EXP) and inflation (INF) variables are summarized on Table 1. Panel A of Table 1 indicates that we cannot accept the hypothesis of non-stationarity of the public expenditure growth variable. The observed DF and ADF statistics are – 5.0000 and – 3.7942 respectively while the critical ADF at 95% degree of confidence is – 3.5671.

Similarly, as shown in Panel B of Table 1, the hypothesis of non-stationarity cannot be accepted for the inflation (INF) variable since the observed ADF statistics of -3.9608 is greater than the critical ADF of – 3.5671 at 5% level of significance. We would have been worried about the DF statistic that is less in value than the critical ADF. However, ADF yields superior and more reliable estimate than the DF statistic.

A much more important consideration would have been on the nature of the data used for the analysis. Remarkably, the study was on the relationships between public expenditure growth and inflation (i.e. change or 'growth' in composite consumer price index). These are in themselves rates of change or a kind of differencing, which have the ability to reduce the non-stationary tendencies of the nominated time series data. Given these considerations, it is only right to assume that the variables are I (1) and thus amenable to cointegration analysis as suggested by Johansen (1991) and Johansen and Juselius (1994).

The paper carried out cointegration tests with unrestricted intercepts and unrestricted trends in the VAR based on (a) maximal eigen value of the stochastic matrix, (b) trace of stochastic matrix, and (c) choice of the number of cointegrating relations using model selection criteria. The results of these tests are summarized on Table 2. Panel A of Table 2 depicts the results based on maximal eigen value of the stochastic matrix. The revelation is that in terms of the first null hypothesis of no cointegrating relation is rejected both at 95% and 90% confidence levels against the alternative hypothesis of the presence of 1 cointergrating relation. The result of the second null hypothesis of less than or equal to 1 vector is further rejected at the conventional confidence levels against the alternative hypothesis of 2 cointegrating vectors (observed statistic of 14.1128 > critical statistics of 11.54 and 9.75 at 95% and 90% respectively). The results of the tests based on trace of the stochastic matrix, shown in panel B of table 2, indicates that for the first hypothesis there are at least 1 cointegrating vector (observed statistic of 37.2338 > critical values of 23.83 and 21.23 at 95% and 90% levels respectively). The results of the second hypothesis also indicates that there are two cointergrating variables (observed statistic of 14.1128 > critical values of 11.54 and 9.75 at 95% and 90% respectively). Equally as shown in panel C, which requires the choice of the number of cointegrating relations to be made using model selection criteria, there are 2 cointegrating vectors. All the criteria; namely maximized LL, AIC, SBC and HQC confirms the existence at least 2 cointegrating relations. It is important to underline that the variables, being cointegrated, would have long-run equilibrium relationship. Short run effects would be sustainable in the long run.

Table 3 summarizes the estimated cointegrated vectors in Johansen estimation (normalized values are in brackets). Assuming that we normalize the vectors in terms of the public expenditure growth and given due considerations to theoretical underpinnings as discussed in Ezirim and Muoghalu (2006) and Ezirim and Ofurum (2003), the second vector would be selected to represent the relationship between public expenditure growth and inflation in the United States. From that relation it can be seen that inflations and public expenditure growth of the country move in the same direction. This relationship is significance at 99% confidence level. Thus, inflation

significantly influences public expenditure decisions of the United States Government. Can we reliably make the same inference concerning the effect of public expenditure growth on inflation for the country? This is a question that can be answered in the simplest form using the Granger (1969, 1979) causality analysis.

B. Effects of Inflation on Public Expenditure Growth

In order to show more clearly the effect of inflation on public expenditure growth, we use the Granger equation estimated using the OLS procedure. We are confident that the results would provide reliable conclusions since the variables are not encumbered by non-stationarity defects that are usually associated with most time series data (see Table 1). Applying OLS procedure on equation 1 and 2 would yield the estimates that are summarized on Table 4. The global statistics indicate that the relationship between public expenditure growth and inflation is significant even at 1 %. As revealed by the Bar-squared statistics of .69188 and .69396 respectively for models 1 and 2; the inflation variable explains at least 69% of the changes in public expenditure and these are significant at 1% level (F = 70.61[.000] and 35.01[.000] respectively). The DIV statistics of 2.1207 and 1.8391 for models 1 and 2 indicate the absence of serial correlation as conformed by the diagnostic serial correlation test results in panel B. The normality assumption was properly satisfied in the two models, while the heteroscedasticity assumption was only satisfied in model 2. The models violated the functional form hypothesis, which indicate a search for the appropriate functional form. Perhaps, the relationship might not be linear but log-linear. Alternative formulations have been tested by simulation of non-nested model as reported latter in this paper. The results indicated that the linear formulation is preferred to the log-linear form. Thus, we adopt the linear models as earlier specified in this paper. For the results of the non-nested tests, see Table 6.

Model 2 typifies the traditional Granger (1969) causality equation that regresses the public expenditure variable against the inflation variable and the lagged values of public expenditure variable (see Ezirim and Ofurum, 2003). Using the traditional F-statistic, it can be seen that a hypothesis of no causality flowing from inflation to public expenditure growth cannot be accepted (F = 35.01 [.000]). Thus, this analysis agrees with the findings in Ezirim and Ofurum that inflation causes public expenditure growth in the United States. The relative t-statistics of 6.31[.000] for mode 2 and 14.74 [.000] for model 1 further lends credence to the significant degree effect of inflation on public expenditure growth in the country.

C. Effects of Public Expenditure Growth on Inflation

The OLS estimates of the global and relative effects of public expenditure growth on inflation in the United States are summarized on Table 5. The results of the global statistics for Models 3 and 4 indicate that at 1% level of significance, public expenditure growth accounts considerably for changes in average prices in the United States economy. As shown by the R-Bar-Statistics for the two Models ((.67459 and .82888 respectively), the modeled variables explained at least 67% of the variables explained at

least 67% of the variations in average prices in the economy. The observed levels of explanations were significant at 1% (F = 65.26 [. 000] and 73.66 [. 000]) respectively. The Durbin-Watson (DW) Statistics of 1.96 and 1.99 for the two models indicate that there is no reason to worry about serial correlations problems. This position was confirmed by the Lagrange multiplier test of residual serial correlation results of .009 [. of 76] and .0047[.946], which were not significant at conventional levels and thus a null hypothesis of no serial correlation would not be rejected. The Ramsey's RESET test using the square of the fitted values indicated that the functional form of the models were rightly linear (Observed stats = .085 [.773] and 1.74 [.198] respectively for Models 3 and 4). The normality assumptions were also satisfied since the observe statistics remain 1.86 [.344] and .454 [.797] respectively for the two Models. For the heteroscedasticity test only one of the two models satisfied the requirements, however the results present no cause for immediate worry.

In order to determine the relative causal effects of public expenditure on inflation, we rely mainly on the estimates of modal 4, which adopt the Granger-like regression model. The observed F-statistic of 73.659 [.000] is significant at 1% level and thus we cannot accept the null hypothesis of no causality thesis flowing from public expenditure growth to inflation. Thus, public expenditure growth is inferred to cause inflation in the country in confirmation to the findings in Ezirim and Ofurum (2003). The relative t-statistics of 14.74 [.000] and 5.95 [.000] further indicates that the EXP_t variable significantly aggravates inflation in the United State.

V. CONCLUDING REMARKS

This paper employs autoregressive modeling, cointegration procedure, and causality tests to investigate the relationships between public expenditure growth and inflation in the US. The unit roots test indicates that the variables were relatively stationary when transformed into rates of change. On the assumption of 1 (1) stationary status for the data, conitegration tests were conducted. The results indicate that the variables were conitegrated showing that they have long run equilibrium relationships. Further, there were 2 conitegrating vectors which created seeming identification problem. However, appealing to theoretical foundations and previous studies, we identified the second vector as the more appropriate relationship existing between public expenditure growth and inflation in United States. Evidently, normalizing the identified vector in terms of public expenditure growth, we see a positive and significant relationship between the two variables.

The relative causal effects were investigated using the OLS procedure against the 4 models earlier specified in the paper. Particular attention was given to equations 3 and 4 for the purposes of causality tests since they were patterned after the autoregressive Granger regression models. The results indicate that there exist bi-causational relationship between public expenditure growth and inflation in the United States. Inflation causes public expenditure growth and vice versa; both in the short-run and in the long run.

The above results present some policy implications. The Government of United States can comfortably regulate the levels of inflation in the economy controlling the levels of its expenditures. Thus, as in Ezirim and Ofurum (2003), "it does appear that the above result would verify the efficacy of Keynesian's fiscal policy model as a veritable tool to combating inflation in the developed countries. Given this, fiscal policy may be relied upon to combat inflation in developed countries such as United States". To curb inflation, the government would have to reduce its expenditure levels appropriately. On the other hand, to achieve a higher level of inflation aimed at boosting economic activities, the government would have to increase its level of spending. This tends to suggest that for the United States, fiscal policy manipulation would be an appropriate tool to control inflation. This policy option is without prejudice to the possible effects of monetary policy on the economic causes of the country.

REFERENCES

1. Aigbokhan, Ben, E (1997). "Fiscal Decentralization, Wagner's Law and Government Size: The Nigeria Experience". Journal of Economic Management, Vol. 4, No. 2 (June) Pp. 31-40.

2. Allison, B. (1999). "Public Expenditure and Revenue Generation in Selected Local Government of Rivers State of Nigeria". Research Thesis, University of Port Harcourt.

3. Anyafo, A. M. O. (1996). Public Finance in Developing Economy: the Nigerian Case. Enugu: B & F Publication.

4. Anyanwu, John C. (1997). Nigeria Public Finance. Onistha: JOANEE Educational Published Ltd.

5. Bhatia, H. L. (1982). Public Finance. New Delhi: Vikas publishing.

6. Buchman, J. M. (1980). The Power to Tax: Analytical Foundations of a Fiscal Constitution. Cambridge: University Press.

7. Ezirim, B. C. and Muoghalu, M. I. (2006). "Explaining the Size of Public Expenditure in Less Developed Countries: Theory and Empirical Evidence from Nigeria". ABSU Journal of Management Sciences, Vol. 2, No. 2/September, Pp. 134 – 154.

8. Ezirim, B. C. and Ofurum, C. O. (2003). "Public Expenditure Growth and Inflation in Developed and Less Developed Countries" Nigerian Business and Social Review, Vol. 2, No. 1. January, pp. 75 – 94.

9. Gandi, Ved. P. (1970). "Are there Economics of Size in Government Current Expenditure in Developing Countries?" The Nigerian Journal of Economic and Social Studies, Vol. 12, No. 2. Pp. 157-173.

10. Granger, C. W. J. (1969). Investigating Causal Relations by Econometric Models and Cross-Spectral Methods. Econometrica.35: 25-27.

11. Isiaku, Dan. U. (1987). "Government Expenditure Pattern". Being a Paper Delivered at a Public Finance Seminar held at the University of Nigerian, Enugu Campus, Enugu-Nigeria.

12. Musgrave, A. and Peacock, A. (1985). Classics in the Theory of Public Finance, New York: Macmillan.

13. Musgrave, R. A. and Musgrave, P.B. (1982). Public Finance in theory and practice, 3rd. Ed. Boston: McGraw Hill Inc.

14. Oates, W. (1985). "Searching for Leviathan: An Empirical Study". American Economic Review Vol. 57, No. 4, Pp. 748-757.

15. Okoh, S.E.N (1994). "Implication of Public Expenditure Reduction Under The Structure Adjustment Programme". The Nigerian Journal of Economic and Social Studies. Vol. 36, No. 1. Pp. 325-331.

16. Onuchukwu, Okey and Agiobenebo, T. J. (2000). "An Econometric Study of Public Investment Behavior in Nigeria (1970-1996)". Social science study group monograph series No. 5 Port Harcourt: Emhai Printing and Publishing Co.

17. Peacock, Alan T. and Wiseman, Jack (1961). The Growth Of Public Expenditure In The United Kingdom. Princeton: National Bureau of Economic Research.

18. Phillips, A. 0. (1971). "Nigeria's Public Consumption Expenditure", The Nigerian Journal of Economic and Social Studies. Vol. 13, No. 3. pp. 351-364.

19. Rosen, H. S., (1995). Public Finance, 4th Ed. Chicago: Richard Irwin.

20. Selwyn, Percy (1971). "Are there Economics of size in Government Current Expenditure in Developing Countries?: A Comment". The Nigeria Journal of Economic and Social Studies. Vol. 13, No. 3. Pp. 393-394.

21. Wells, J. C. (1967). "Nigerian Government Spending on Agricultural Development: 1962/3-1966/7". The Nigeria Journal of Economic and Social Studies. Vol. 9, No. 3. Pp. 245-276.

APPENDIX

Table 1 Panel A: Unit root tests for variable PEXP including intercept and linear trend

	Test Statistic	LL	AIC	SBC	HQC
DF	-5.0000	-75.2345	-78.2345	-80.3363	-78.9069
ADF(1)	-3.7942	-75.2274	-79.2274	-82.0298	-80.1239

95% critical value for the augmented Dickey-Fuller statistic = -3.5671

Table 1 Panel B: Unit root tests for variable INF including intercept and linear trend

	Test Statistic	LL	AIC	SBC	HQC
DF	-2.8964	-51.5122	-54.5122	-56.6140	-55.1845
ADF(1)	-3.9608	-47.8988	-51.8988	-54.7012	-52.7953

95% critical value for the augmented Dickey-Fuller statistic = -3.5671

Table 2 Panel A: Cointegration LR Test Based on Maximal Eigenvalue of the Stochastic Matrix

Null	Alternative	Statistic	95% Critical Value	90% Critical Valu
r = 0	r = 1	23.1210	18.3300	16.2800
r<= 1	r = 2	14.1128	11.5400	9.7500

Table 2 Panel B: Cointegration LR Test Based on Trace of the Stochastic Matrix

Null	Alternative	Statistic	95%	90%
r = 0	r>= 1	37.2338	23.8300	21.2300
r<= 1	r = 2	14.1128	11.5400	9.7500

Table 2 Panel C: Choice of the Number of Cointegrating Relations Using Model Selection Criteria

Rank	Maximized LL	AIC	SBC	HQC
r = 0	-128.4815	-136.4815	-142.0862	-138.2745
r = 1	-116.9209	-127.9209	-135.6275	-130.3863
r = 2	-109.8646	-121.8646	-130.2717	-124.5541

Table 3: Estimated Cointegrated Vectors in Johansen Estimation (Normalized in Brackets)

	Vector 1	Vector 2
PEXP	-.14734	.014392
	(-1.0000)	(-1.0000)
INF	.19060	.092234
	(1.2936)	(-6.4085)

Table 4: Panel A: OLS Estimates of Equations 1 & 2: Dependent = EXPt.

	Statistics/variables	Estimates Model 1	Estimates Model 2
1	INFt	1.7313	2.0526
	T-Ratio [prob]	14.74[.000]	6.31[.000]
2	EXPt –1	-	-.19451
	T-Ratio [prob]	-	-1.08[.288]
3	Constant	-.015630	-.012336
	T-Ratio [prob]	-.51 [.613]	-.39[.696]
4	R-squared	.10181	.71436
5	R-Bar-Squared	.69188	.69396
6	-Stat	70.61[.000]	35.01[.000]
7	DIV Stat.	2.1207	1.8391

Table 4: Panel B: Diagnostic Tests

A:	Serial corr	234 [.632	.0798 [.780]
B:	Functional Form	4.85 [.036]	8.61 [.007]
C:	Normality	.882 [.644]	.796 [.672]
D:	Heteroscedasticity	4.23 [.049]	1.723 [.200]

Table 5: Table 4: Panel A: OLS Estimates of Model 3 & 4: Dependent is INFt

	Statistics/variables	Estimates Model 3	Estimates Model 4
1	EXPt	.50752	.29049
	T –Ratio [Prob]	14.74 [.000]	5.95 [.000]
2	INFt-1	-	.47478
	T-Ratio [prob]	-	5.215[.000]
3	Constant	.026803	.00531353
	T-Ratio [prob]	1.685[.102]	.426 [.674]
4	R-squared	.68508	.84029
5	R-Bar-Squared	.67459	.82888
6	F – statistic	65.26 [.000]	73.659 [.000]

7	DIV Stat	1.9611	1.9893

Table 5: Table 4: Panel B: Diagnostic Tests

A:	Serial Corr	.009 [.976]	.0047[.946]
B:	Functional Form	.085[.773]	1.74 [.198]
C:	Normality	1.86 [.394]	.454 [.797]
D:	Heteroscedasticity	1.45[.238]	6.83 [.014]