

Vat Revenue and State Investment Spending in Nigeria, 1994-2010.

Joseph Ayowole Adesina^{1*} Matthew Abiodun Dada²

1. Department of Accounting, Ekiti State University, Ado-Ekiti, Nigeria
2. PGS Department of Economics, Faculty of Social Sciences Obafemi Awolowo University, Ile-Ife Nigeria

* E-mail of the corresponding author: jaadesina@yahoo.com

Abstract

This study attempted to determine the long-run equilibrium relationship and direction of causality between VAT revenue and state investment spending in Nigeria between 1994 and 2010. This was with a view to examining the link between VAT revenue and state investment spending in Nigeria. Time series data on variables (state investment expenditure and VAT revenue) covering the period (1994-2010) were used. The data were sourced from CBN Statistical Bulletin 2010 edition and CBN Annual Reports (various years). The unit root property of each of the variables was investigated using ADF and PP unit root tests. The study also employed Johansen cointegration technique to find out if group of I(1) variables converge to a long-run equilibrium, Vector Error Correction Mechanism (VECM) was used to find out the causal link between the two variables. The result showed that both variables were I(1) process. Also, the two I(1) variables were found to converge to a long-run equilibrium. Also, the VECM results indicate that long-run bidirectional causality existed between VAT revenue and state investment spending. The result also revealed short-run causal evidence between VAT revenue and state investment spending. This implies that VAT revenue influenced state investment spending and state investment spending also influenced VAT revenue. The study concluded that both short-run and long-run bidirectional causality existed between VAT revenue and state investment spending in Nigeria during the period under investigation.

Keywords: causality, cointegration, converge, bidirectional, short-run relation, long-run relation

1. Introduction

The term VAT is an acronym for value added tax, hence VAT revenue is any revenue accrued to value added tax. The revenue generated from value added tax is called VAT revenue. There has been a growing recognition among developing and emerging economies of the vital role of VAT revenue in stimulating economic development. VAT revenues are increasingly accounting for significant proportion of government revenue to finance the required level of expenditure at the three tiers of government viz; federal, state and local government. VAT came into the Nigeria fiscal system in 1994 to replace sales tax which was formerly in existence. Since then, it has been growing as an important element of state finances in Nigeria. Many countries across the globe have embraced VAT as a consumption tax because it is relatively easy to administer and difficult to evade. VAT was said to have been invented by a French Economist in the year 1954 as *taxe sur la valeur* (TVA in French language). He envisioned a sales tax on goods that did not affect the cost of manufacture or distribution but was collected on the final price charged on the consumer. VAT revenue forms an inexorable source of finance in France. It accounts for approximately 45% of state revenues. Immediately after the formation of Common Market in Europe now known as the European Union, it was decided that the imposition of one form of VAT is one of the requirements for joining the union. According to (BBC Edited Guide Entry, 2005), United Kingdom joined the European Union and replaced existing sales tax with VAT in 1973. VAT since inception in Nigeria has replaced the sales tax formerly in existence. VAT is imposed on all goods that were manufactured in Nigeria as well as goods that were made outside Nigeria and were brought for sales in Nigeria. According to the VAT Decree No. 102 of 1993, certain goods and services were exempted from the purview of VAT, such goods include exported goods, medical and pharmaceutical products, children products, basic food items, commercial vehicles and their spare parts, books and other educational materials, fertilizer, farm machines, agricultural output, farm transportation equipment, veterinary medicines, magazines and newspapers. The Nigeria Federal Government enacted the VAT Amendment Act in the year 2007. VAT is a tax on consumption, the more you consume the more tax you pay. It is also a neutral tax to businesses in that it does not represent a real cost to anyone but to the final consumer. Every citizen pays tax to the Government whenever he/she buys goods and services. This Tax is collected for the government by the supplier of those goods and services. VAT revenue has become a significant source of revenue to the government in Nigeria. It is not clear whether this important element of state finances induces state investment spending. It is also important to ask if state investment spending on the other way round influences VAT revenue in Nigeria. Consequent on these important questions, this study is set to examine the link between VAT revenue and state investment spending in Nigeria between

1994 and 2010. The rest of this paper is organized as follows: The next section presents the literature review. Section 3 describes the data and methods used in the analysis. Section 4 reports the empirical findings while section 5 draws the conclusion.

2. Theoretical and Empirical Literature Review

Value Added Tax otherwise known as Goods and Services Tax (GST) is levied on the value added that results from each exchange. It is an indirect tax collected from someone other than the person who actually bears the cost of the tax Ochei, (2010). It was invented by a French Economist, Maurice Laure in 1954 and was first introduced in France on April 10, 1954. Feldstein and Krugman (1990) were the first set of researchers to research on the international trade effects of Value Added Taxation. Their research was based on the widespread belief that VAT, because it is levied on imports and rebated on exports, acts as a combination of protection and export subsidy, giving the traded goods sectors of countries with VAT an advantage over the corresponding sectors of countries that rely on income taxation. The research used a simple model to show that this view is almost completely wrong. A VAT is not a protectionist measure; indeed, the allegedly pro competitive device of export rebates is necessary if the VAT is not to act as an export tax, which in turn is actually a protectionist measure that would reduce both imports and exports. It was also established that in practice, VAT would almost surely fall more heavily on traded rather than non-traded goods, which would constitute a bias against both exports and imports. According to Desai, Foley and Hines (2004), governments have at their disposal many tax instruments that can be used singularly or jointly to finance their activities. These tax alternatives include personal and corporate income taxes, sales taxes, value added taxes, capital gains taxes and numerous others. In choosing what tax instruments to use and what rates to impose, governments are typically influenced by their expectations of the effects of taxation on investment and economic activities, including Foreign Direct Investments (FDI). The researchers have observed that there are extensive empirical studies that high corporate income tax rates are associated with low levels of FDI.

Owolabi and Okwu, (2011), asserted that VAT rate in Nigeria has been determined in a way that minimizes disincentive efforts on economic activities. What is being emphasized here is that it has been done in a way that never discourages investment activities in the country. Musa (2009) opined that economic and social development laws and policies provide the basis for effective state action that lifts society from underdevelopment, improves the standard of living and facilities for the realization of the millennium development goals.

Some of the recent empirical works on VAT were reviewed as follows:

Toder and Rosenberg (2010) worked on the effects of imposing a value added tax to replace payroll taxes or corporate taxes (in the US). The research work was conducted against the background that the United States is the only country in the developed world that does not impose a broad-based consumption tax. The typical form of broad-based consumption tax used worldwide is a credit-invoice Value Added Tax (VAT). The credit-invoice VAT, a subtraction –method of VAT or Business Transfer Tax (BTT), and a Retail Sales Tax (RST) are all intended to tax the final consumption once at the retail level, but the collection mechanisms differ among the three taxes. The researchers found out that VAT has administrative advantages over both BTT and RST. Both VAT and BTT are easier to enforce than RST because under a tax collected at different stages of production, evasion by the final seller still leaves much of the tax in place. Compared with BTT, VAT makes it easier to exempt sales of categories of consumption goods, including export sales, but more difficult to grant preferences to selected industries. On the distributional burden of VAT, it was found that, it is roughly proportional at the bottom of income distribution but regressive at the top.

Ajakaiye (2000) worked on the impact of VAT on key sectors and macroeconomic aggregates, using a Computable General Equilibrium (CGE) model considered suitable for Nigeria. The study developed three scenarios. In order to approximate the presumed Nigerian situation, the study assumed that government pursued an active fiscal policy involving the re-injection of the VAT via increases in government final consumption expenditure in combination with a presumed non-cascading treatment of the VAT. Two other simulations considered an active fiscal policy combined with a cascading treatment of VAT and a passive fiscal policy combined with a non-cascading treatment. As it turned out, the scenario of a cascading treatment of VAT with an active fiscal policy not only had the most deleterious effects on the economy, it was also the one that most closely approximated the situation in Nigeria. VAT revenues under this scenario are more than 3% lower than the first scenario, the general price index increases by 12%, and wage and profit incomes fall by 8.54% and 12.27% respectively. Overall, the GDP declines by 11.34%. Such a situation, as observed by the researcher, poses a great threat to the sustainability of VAT. United Nations (2000) expert group stated that VAT revenue contributes substantially to development. The stark reality in most developing countries is that while there are several budgetary pressures as a result of ever increasing demand for government expenditure, there is a limited scope for raising extra VAT revenues.

Eltony (2002) used time-series and cross-sectional country data for the period 1994-2000 for 16 Arab countries to examine the determinants of tax effort. The results showed that the main determinants of tax revenue share in GDP were per capita income, agricultural output-GDP ratio and mining-GDP ratio. The share of exports, imports and outstanding foreign debts were among other variables found to be important. Also, country-specific factors such as the political system, attitudes toward government, the quality of tax administration and other institutions of government appeared to be important determinants of tax-GDP ratio.

Teera (2003) attempted an assessment of Uganda's tax performance relative to 18 other Sub-Saharan countries aimed at evaluating the feasibility of raising tax revenues in Uganda. The study used pooled data to construct an index of tax effort for these countries, and also applied the model to individual tax shares to pinpoint the source of high and low effort. By extension, the model must have incorporated value added tax. The result showed that Uganda's tax effort index for total taxes on income were less than unity, while the indices for international trade taxes and taxes on goods and services exceeded unity. One may be tempted to consider this as defining a place for value added tax.

In their study, Bird, Vazquez and Torgler (2007) concentrated on the relevance of demand factors such as corruption and accountability. They opined that not only supply factors matter, but that demand factors matter quite significantly in the determination of tax effort. They concluded that a more legitimate and responsive state is likely to be essential preconditions for a more adequate level of tax effort in developing countries.

Owolabi and Okwu (2011), employed an OLS-Based simple regression analytical technique to evaluate the impact of value-added tax on development expenditure in Lagos State between 2001 and 2005. The state economy was disaggregated into seven strategic economic sectors in the development process and a model constructed for each sector, the result showed that VAT revenue contributed positively to development process in Lagos state. However, this study does not elucidate the channels or transmission mechanism upon which this linkage is based and little or no evidence was given on the appropriateness of OLS-Based simple regression model. If VAT Revenue induces state investment and state investment induces VAT Revenue growth, then the demand and the supply sides of the economy would have been affected positively, hence a positive impact on the national output. On this note, this study attempted to address the issue of long-run relationship and causality between VAT Revenue and state investment spending in Nigeria over the study period.

3. Data and Methodology

The study begins by specifying a model showing a functional relationship between VAT Revenue and state investment spending. This is expressed as

$$STATECAPEXP = f(VATRev) \dots \dots \dots (1)$$

This model captures the effect of changes in VAT Revenue on state investment spending. The dependent variable in this model is STATECAPEXP used to proxy state investment spending while VATRev which was used to proxy VAT revenue is the explanatory variable.

We also specify a model showing a functional relationship between state investment spending (STATECAPEXP) and VATRev (VAT Revenue)

$$VATRev = f(STATECAPEXP) \dots \dots \dots (2)$$

This model captures the effect of changes in state investment spending on VAT Revenue. The dependent variable in this model is VAT Revenue (VATRev) while the explanatory variable is state investment spending (STATECAPEXP).

The stochastic form of equation 1 and equation 2 thus becomes:

$$STATECAPEXP_t = \alpha_0 + \alpha_1 VATRev_t + u_{1t} \dots \dots \dots (3)$$

$$VATRev_t = \beta_0 + \beta_1 STATECAPEXP_t + u_{2t} \dots \dots \dots (4)$$

However, the VECM version of equations (3) and (4) is thus specified with the assumption of linear trends in the series and a constant in the cointegrating equations, so that it has the form

$$\Delta STATECAPEXP_t = \lambda_0 + \lambda_1 ecm^1_{t-1} + \lambda_2 \Delta VATRev_t + u_{3t} \dots \dots \dots (5)$$

$$\Delta VATRev_t = \varphi_0 + \varphi_1 ecm^2_{t-1} + \varphi_2 \Delta STATECAPEXP_t + u_{4t} \dots \dots \dots (6)$$

where Δ is the first difference operator, and ecm^1_{t-1} , ecm^2_{t-1} are error-correction terms lagged one period. In long-run equilibrium, the error correction term becomes zero. However, if state investment spending and VAT revenue deviated from long-run equilibrium last period, the error correction term is nonzero and each variable adjust partially to restore equilibrium relation. The coefficients λ_1 and φ_1 measure the speed of adjustment. Times series data on variables (state investment expenditure and VAT revenue) covering the period (1994-2010)

were used. The data were sourced from CBN Statistical Bulletin 2010 edition and CBN Annual Reports (various years).

Data were analyzed using descriptive and econometric techniques.

In order to test for the stationarity of the variables involved in the study, we embarked on testing formally for the presence of a unit root for each variable in the model, Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests of the type given by regression equations (7) and (8) were conducted. The ADF test was conducted using the regression equation of the form:

$$\Delta z_t = \vartheta_0 + \vartheta_{1t} + \rho z_{t-1} + \sum_{i=1}^k \phi_i \Delta z_{t-i} + u_{5t} \dots \dots \dots (7)$$

Where z_t is a vector of time series variables included in the models. Δz_t are the first differences of the series z_t , k represents the lag order and t stands for time. Equation (7) is specified with intercept term and time trend.

Phillips-Perron (PP) tests involve computing the following OLS regression:

$$z_t = \phi_0 + \phi_1 z_{t-1} + \phi_2 \left[t - \frac{T}{2} \right] + u_{6t} \dots \dots \dots (8)$$

where ϕ_0, ϕ_1, ϕ_2 are the conventional least-squares regression coefficients. Then hypotheses of unit-root to be tested are $H_0: \phi_1 = 1$ and $H_0: \phi_1 = 1, \phi_2 = 0$.

Akaike's Information Criterion (AIC) is used to determine the lag order of each variable under study. Mackinnon's (1991) tables provide the cumulative distribution of the ADF and PP test statistics.

4. Empirical results

The result of the ADF unit root test shown in Table 1(a) revealed that variables in their level form follow a I(1) process. They become stationary after first differencing. The study also employed Phillips-Perron unit root test. Phillips-Perron unit root test is adjudged in the literature to be more robust and can increase the power of a test especially when Time series data are involved. Hence when ADF and PP tests do not produce the same result, the result obtained from the PP test is adopted. However, both tests in this study produced the same result. The result of PP unit root test shown in Table 1b revealed that the two variables are nonstationary at level. They all become stationary after first differencing.

Table 1a: Result of Augmented Dickey Fuller (ADF) Unit Root Test

Variable	ADF Test-statistic at level	MacKinnon 5% Critical value	ADF Test-statistic at First Difference	MacKinnon 5% Critical value	Order of Integration
VATRev	0.825	-3.733	-3.833	-3.760	I(1)
STATECAPEXP	1.827	-3.791	-4.493	-3.791	I(1)

Source: computed by the author

Table 1b: Result of Phillips-Perron Unit Root Test

Variable	PP Test-statistic At Level	MacKinnon 5% Critical Value	PP Test-statistic At First Difference	MacKinnon 5% Critical Value	Order of Integration
VATRev	2.673	-3.733	-3.833	-3.760	I(1)
STATECAPEXP	-1.633	-3.733	-7.334	-3.760	I(1)

Source: computed by the author

After the issue of stationarity of the variables has been settled, next was to determine the number of cointegrating relationships, the maximum likelihood method of estimation proposed by Johansen and Juselius (1990) is employed. The results are presented in Table 2. Both the trace statistics and maximum eigenvalue suggest the existence of two cointegrating vectors indicating that variables converge to a long-run equilibrium. Also, as suggested by Engle and Granger (1987), if cointegration exists between two variables, there must be at least causality in one direction, the idea of no causality therefore becomes a myth.

Table 2: Result of Johansen Cointegration Test

Date: 02/20/13 Time: 17:41
 Sample (adjusted): 1996 2010
 Included observations: 15 after adjustments
 Trend assumption: Linear deterministic trend
 Series: VATRev STATECAPEXP
 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 *	0.835972	32.78062	15.49471	0.0001
At most 1 *	0.314536	5.664889	3.841466	0.0173

Trace 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

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.835972	27.11573	14.26460	0.0003
At most 1 *	0.314536	5.664889	3.841466	0.0173

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

After the confirmation of the existence of long-run equilibrium relationship between state investment spending and VAT revenue, the study proceeded by providing the estimates of the dynamics that characterized this unique relationship. The result of the VECM is reported in Table 3. The optimal lag length chosen in the two equations based on SIC is set at 2.

It was found in both equations that the lagged value of the residual is significant; this indicates long-run bidirectional causality between VAT revenue and state investment spending in Nigeria. Also, the coefficients in the DVATrev equation as well as DSTATECAPEXP equation are all significant; this implies that short-run bidirectional causality existed between VAT revenue and state investment spending in Nigeria. These results suggest that bidirectional causality existed between VAT revenue and state investment spending both in the short-run as well as in the long run.

Table 3: Result of VECM

	D(VATrev)	D(STATECAPEXP)
CONSTANT	76751.84 [4.33195]	654078.0 [2.55845]
D(VATrev(-1))	0.352033[1.02394]	13.01828 [2.62422]*
D(VATrev(-2))	-0.034528[-0.09443]	5.596735 [1.06077]
D(STATECAPEXP(-1))	-0.320492[-3.52402] *	-3.873862[-2.95201]
D(STATECAPEXP(-2))	-0.325318[-3.06295] *	-4.727273[-3.08458]
ecm^1_{t-1}	-1.586628[-3.93728] *	-
ecm^2_{t-1}	-	-14.23449[-2.44803]*
R-Squared	0.793996	0.588514
Adj. R-Squared	0.665244	0.331336
Akaike AIC	21.64331	26.98184
Schwarz SC	21.91719	27.25572
F-statistic	6.166842	2.288349
VECM DIAGNOSTIC TEST:		
LM-Stat 3.035[0.552] JB-Stat 4.884[0.299] White Heteroscedasticity Test 29.833[0.474]		

Note: [] = t-statistic, * = sig at 1%, ** = sig at 5%

5. Conclusion

This study attempted to investigate the long-run equilibrium relationship and direction of causality between VAT revenue and state investment spending in Nigeria between 1994 and 2010. These were with a view to examining the link between VAT revenue and state investment spending. Time series data on variables (state investment spending and VAT revenue) covering the period (1994-2010) were used. The data were sourced from CBN Statistical Bulletin 2010 edition and CBN Annual Reports (various years). The unit root property of each of the variables was investigated using ADF and PP unit root tests. The study also employed Johansen cointegration technique to find out if group of I(1) variables converge to a long-run equilibrium. Vector Error Correction Mechanism (VECM) was used to find out the causal relation between the two variables. The result showed that both variables were I(1) process. Also, the two I(1) variables were found to converge to a long-run equilibrium. Also, the VECM results indicate that long-run bidirectional causality existed between VAT revenue and state investment spending. The result also revealed short-run causal evidence between VAT revenue and state investment spending. This implies that VAT revenue influenced state investment spending and state investment spending also influenced VAT revenue. Any policy measure towards increasing VAT revenue will equally induce state investment spending. The reverse is also true in this case. The study concluded that both short-run and long-run bidirectional causality existed between VAT revenue and state investment spending during the period under investigation.

References

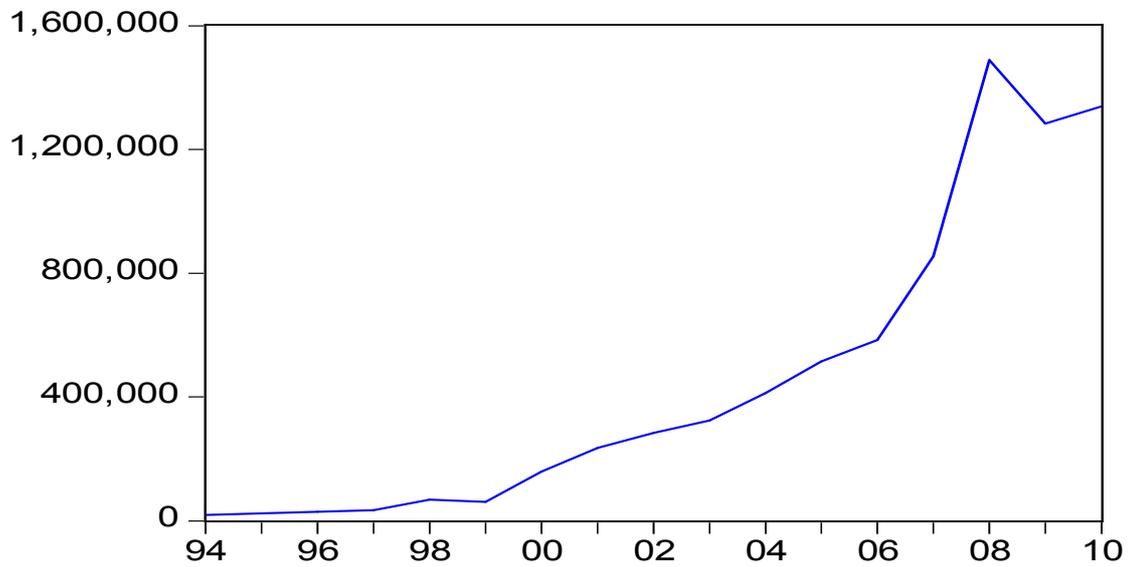
- Ajakaiye, D.O (2000). Macroeconomic Effects of VAT in Nigeria: A Computable General Equilibrium Analysis, assessed from www.citeseerx.ist.psu.edu/viewdoc/
- Adereti, S.A., Adesina, J.A. and Sanni, M.R., (2011). "Value Added Tax and Economic Growth of Nigeria." *European Journal of Humanities and Social Sciences*, 10(1) special issue.
- Desai, M.A; Foley, C.F and Hines, J.R (Jnr) (2004). Foreign Direct Investment in a World of Multiple Tax, *Journal of Public Economics*, 88: 2727-2744.
- Eltony, M.N. (2002). The determinants of tax effort in Arab countries. Working Paper Series from Arab Planning Institute – Kuwait.
- Golit, P. D. (2008): "Appraising Nigeria's Tax Effort: A Comparative Econometric Analysis". *Economic and Financial Review, Central Bank of Nigeria*. Vol. 46, No. 1. 69-103.
- Owolabi S.A and Okwu A.T (2011). "Empirical Evaluation of Contribution of Value Added Tax to Development of Lagos State Economy", *Middle Eastern Finance and Economics*, Issue(9), 1-11.
- Teera, J. M. (2003): "Could Do Better: An Appraisal of Uganda's Tax Performance Relative to Sub Saharan Africa". Department of Economics, University of Bath, BA2 7A. www.wikipedia.com.
- Toder, E and Rosenberg, J (2010). Effects of Imposing a Value Added Tax To Replace Payroll Taxes or Corporate Taxes, assessed from <http://www.taxpolicycentre.org/ur/cfn>
- Vazquez, J. M. and Torgler, B. (2007): "Tax Effort: The Impact of Corruption, Voice and Accountability". *Working Paper* No. 200713, CREMA Gellertstrasse, 18 CH-4052, Basel.

Appendix

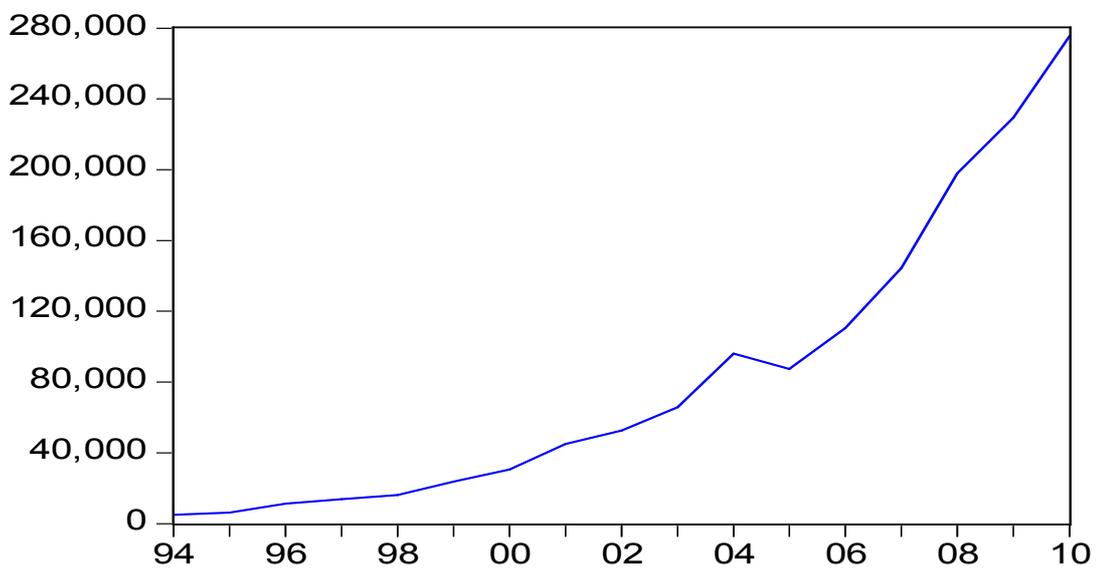
Graph of variables (single)

1. Graphical presentation showing the trends in the data series

STATECAPEXP

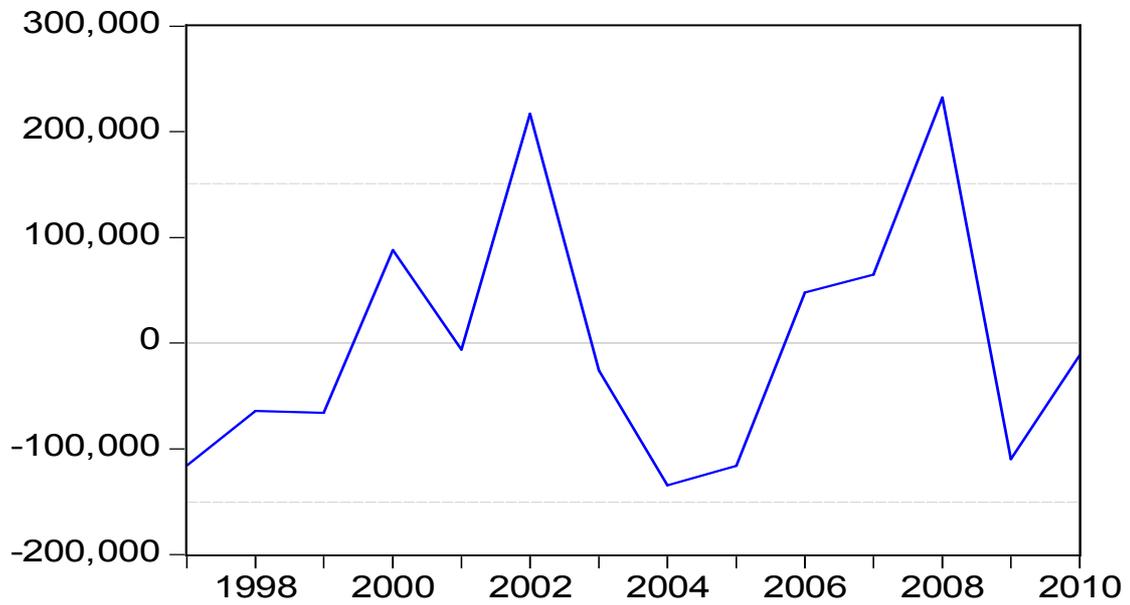


VAT

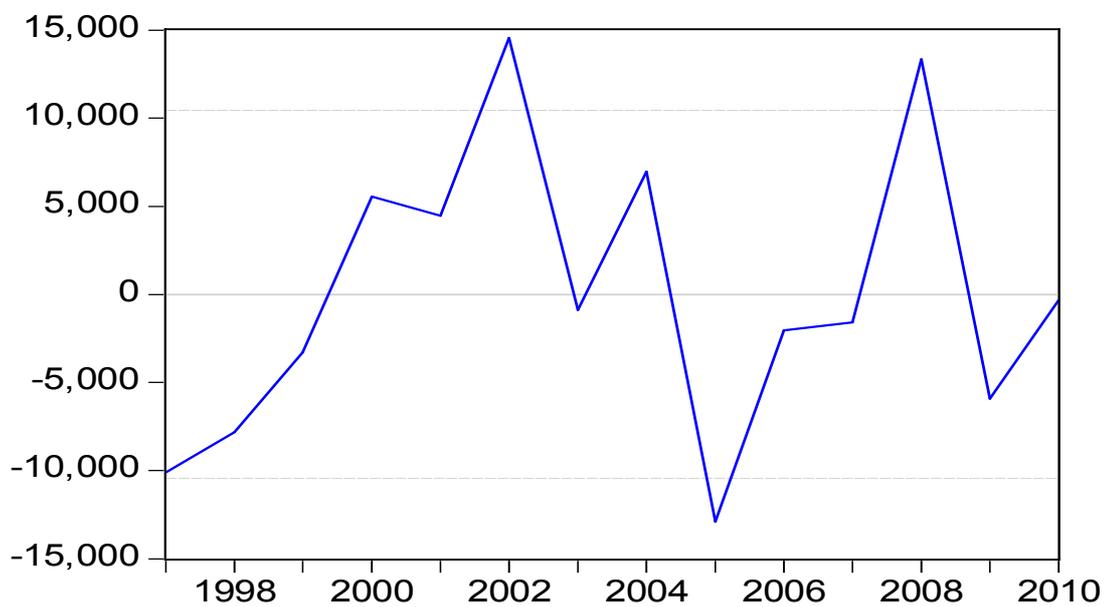


2. Graphs of residuals

STATECAPEXP Residuals



VAT Residuals



This academic article was published by The International Institute for Science, Technology and Education (IISTE). The IISTE is a pioneer in the Open Access Publishing service based in the U.S. and Europe. The aim of the institute is Accelerating Global Knowledge Sharing.

More information about the publisher can be found in the IISTE's homepage:

<http://www.iiste.org>

CALL FOR PAPERS

The IISTE is currently hosting more than 30 peer-reviewed academic journals and collaborating with academic institutions around the world. There's no deadline for submission. **Prospective authors of IISTE journals can find the submission instruction on the following page:** <http://www.iiste.org/Journals/>

The IISTE editorial team promises to review and publish all the qualified submissions in a **fast** manner. All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Printed version of the journals is also available upon request of readers and authors.

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digital Library, NewJour, Google Scholar

