

Rising Government Expenditures and Standard of Living in Nigeria: An Ardl Bound Test Approach

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Keywords: Standard of living, Capital Expenditure, Recurrent expenditure, Economic Services, Transfer Payment

Posted Date: June 16th, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-34424/v1>

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Abstract

This study investigated the nexus between standard of living proxy by per capital income (PCI) and the rising four components of capital and recurrent expenditure namely: Administration (ADM), Economic Services (ECS), Social and Community Services (SCS), and Transfer Payments (TRP). The study used data from the Central Bank of Nigeria Statistical Bulletin, 2018 and World Development Indicator, 2018 for the period 1981–2018, using Autoregressive Distributed Lagged (ARDL) Bound Test Approach. The study found that rising government expenditures on these four components of both capital and recurrent spending were negatively and insignificantly related to PCI, those that were positively related were also insignificant, indicating low standard of living of Nigerians during the period of study. We concluded that government expenditure did not improve the standard of living of Nigerians significantly. The study recommended that political officers should always ensure integrity and accountability in handling public funds.

JEL CLASSIFICATION: F31, C01, C13, C32, C51

1.0 Introduction

1.0 INTRODUCTION

In a closed economy popularly known as autarky, there is no government intervention to regulate economic activities. Such an economy is a simple one made up of the household and the business firms. They engage only in consumption and investment and their gross domestic product (GDP) is represented by $C + I$. Autarky or closed economy is not an ideal economy hence the need for the inclusion of the third component called government (G). The GDP of a perfect economy is, therefore, made up of $C + I + G$. The rationale for the intervention of government in an economy is multi-faceted and multi-dimensional. These include provision of essential infrastructural facilities like right roads and bridges, clean portable water, electricity supply, transport and communication system, primary, secondary and tertiary education, health care facilities, maintenance of law and order, maintenance of international relations with other nations, national security and so on.

Effective provision of these essential functions by the government requires huge monetary investment which is partitioned into capital and recurrent expenditures. While capital expenditures are expenditures of government on durable capital goods to provide these governmental functions, recurrent costs are to pay wages and salaries of government workers for the services rendered. Government expenditures include all government consumption, investment and transfer payments. It refers to expenses that government incurs for maintenance in the economy as a whole. Government spending on public services has been on an upward spiral while economic growth has been on a downward spiral in the recent past. For instance, the trend of available data on the growth rate of government expenditure and PCI between 1981 and 2018 are as shown in the appendix

The whole essence of rising government expenditure is to improve the standard of living of the people, to enable the governed realise their full potential through quality education, food, shelter, nutrition, transport, security and so on. Standard of living refers to the level of wealth, comfort, material goods necessities made available to any social-economic class in a geographical area, usually, a country. According to Morris (1987), the determinants of the standard of living include factors like school and hospital, roads and bridges, water supply, electricity, wages and salaries and all other capital projects and recurrent expenditure of the government. The benefit that individual derives from all the expenditure is measured by per capita income (PCI), which, captures the standard of living. Per capita income is the ratio of real gross domestic product to the total population of the country concerned. Other determinants of the standard of living include revenue, unemployment, inflation rate, interest rate, exchange rate, investment, community and so on. Standard of living is closely related to the quality of life of individuals in a given setting. The problem that triggered off this study is, therefore, the inverse relationship that seems to exist between the standard of living proxy by PCI and rising government expenditure in Nigeria. The expense world-wide is that increasing government expenditure should lead to a rising standard of living, but the reverse is the case in Nigeria, why? To get to the root of this problem, it is, therefore, the objective of this study to investigate the relationship between public expenditure and standard of living in Nigeria. The association is derived by estimating the public expenditure pass-through effects to the standard of living. It will be achieved by calculating econometrically, the elasticity coefficients of the various components of recurrent and capital expenditures. These elasticity coefficients will help us to determine the degree of responsiveness of (PCI) standard of living to changes in the various components of public spending. We can as well compare the degree of responsiveness of standard of living to recurrent spending with that of capital expenditure to enable us to make an appropriate policy recommendation.

2.0 Review Of Related Literature

Conceptually, total government expenditure is one of the basic components of aggregate demand which directly constitutes government purchases of goods and services meant to improve the standard of living of the people concerned. According to Frank and Bernanke (2001), government expenditures are government purchases by the federal, states and local governments of final goods and services. Government purchases exclude items like transfer payments, which are payments made by the government for which no current products and services are received in return, it also excludes interest paid on the government debts. In the same vein, Samuelsson and Nordhaus (2005) consider government expenditures as government purchases of goods and services like tanks, road-building equipment as well as the services of Judges and public school teachers. This third component of aggregate demand is determined directly by the government's spending decisions such that when the government buys a new fighter aircraft, this output instantly adds to the GDP. Theoretically, the following four theories of public expenditures are relevant to this study: Wagner's theory, Peacock and Wiseman theory, the classical theory and the Keynesian theory.

The classical economists, notably Adam Smith, did not believe in any form of government intervention in the economy. He advocated the principle of laissez-faire, where the economy is at a state of equilibrium. He argued further that any disequilibrium is self-adjusting due to the presence of the in-built stabiliser in the system. Therefore, there is no justification for government intervention in the economy with its associated public expenditures.

Adolph Wagner (1835–1917) in his early study of the relationship between rising public expenditure and economic growth, stated his law of increasing state activity. Specifically, he emphasized that the growth of government expenditure (TGEXP) is a function of increased industrialisation and economic development (GDP). Functionally stated: $TGEXP = f(GDP)$, implying that GDP granger causes TGEXP. Wagner said further that during the industrialisation process, as the real income per capita (RIPC) of a nation increases, the share of public expenditure (PUBEX) of total spending (TGEXP) increases. In functional notation: $PUBEX = f(RIPC)$, implying again that RIPC granger causes PUBEX. The bottom line here is that as far as Wagner is concerned, it is increasing in GDP or per capita GDP that brings about rising public expenditure in any economy.

The great depression of 1929–1933 led Keynes (1936) to consider the reversal of Wagner's theory as the way out of such economic disturbances in the future. Keynes argued in favour of increasing state activities and rising taxation as a means of improving economic growth and hence, the standard of living. If the government increases public expenditure on different public services, the multiplier effects will trickle down to producers, consumers, contractors, workers and everybody as more employment opportunities will be created to reduce poverty level and enhance people's standard of living. The bottom line is that increase public expenditure will granger cause increase economic growth such that $PCI = f(TGEXP)$. This argument is opposed to Wagner's.

Finally, still disgruntled with Wagner's theory, Peacock and Wiseman (1967) studied the relationship between rising government expenditure and economic growth in England and discovered the exact opposite of Wagner's result. They found that government activities are diverse and some of them constitute large scale disturbances in the economy, for which increases in taxation are inevitable. Political disturbances like major wars call for increases in taxation to raise enough revenue to fight the war to ensure the safety of the people and hence improve their standard of living. Peacock and Wiseman discovered that the Government likes to increase taxation to raise revenue to maintain people standard of living, while people dislike increases in taxation. Their argument summarises that it is the increase in government activities that necessitates increases in public expenditures (TGEXP) to improve the people's standard of living (PCI). Functionally stated: $PCI = f(TGEXP)$. This argument is also opposed to Adolph Wagner's theory.

Empirically, hundreds of writers have written their views on these theories of public expenditure about the economic growth of their countries. Some argued in favour of Wagner's theory while some others argued against him but in support of Peacock and Wiseman's approach. While the implication of Peacock and Wiseman and (or) Keynesian assertion is that rising public expenditure leads to increasing economic

growth (a positive relationship), Wagner's theory implies a negative correlation. Other studies found both positive and negative relationship among some components of government expenditure and economic growth. Among the recent studies that have seen a positive and significant relationship between public expenditure and economic growth are Al Bataineh (2012), Baro (1990), Jiranyakul (2007), Olorunfemi (2008), Yasin (2000), Onakoya and Somoye (2013), Rahman et al. (2015), Agbonkase (2014), Chude and Chude (2013), Njoku et al. (2014) and so on. All the studies have pitched their camp with Peacock and Wiseman as well as with Keynes's assertion. On the negative side of the divide are studies like Olupade (2014), Stefan (2001), Alexander (1990), Awomuse (2013), Egbetunde (2013), Maku (2009), Mutiu (2013) whose studies found favour with Wagner's theory. But other studies like Devarajan et al. (1990), found a positive relationship between recurrent expenditure and economic growth but a negative association between capital expenditure and economic growth in their study of some combination of poor and rich countries. But when the research was conducted on the rich-countries sub-sample of the main sample, the result was not the same. This made them conclude that the result of the earlier study was a signal to the high level of corruption in poor countries of the world. Nwadibu and Onuka (2015) also found a positive relationship between all components of public expenditures with the exception of spending on education which exhibited negative relationship with economic growth in Nigeria and concluded that public expenditure on education did not improve the standard of living in Nigeria for the period of study.

3.0 Methodology

We proceed systematically by defining the variables of the study to include per capital income (PCI), as a measure of standard of living and as the dependent variable of the study. The explanatory variables are the functional classification of the capital and recurrent expenditures. These include Administration (ADM), Economic Services (ECS), Social and Community Services (SCS), and Transfer Payments (TRP) respectively. The data are sourced from the Central Bank of Nigeria (2018) and from the World Development Indicator (2018)

The study covers the period of 1981–2018 (38 years), part of which covers the period of reconstruction after the Nigeria-Biafran civil war of 1967–1970. It also marks in part, period of transition from military to civilian rule and civilian to a civilian administration in the country during which series of elections have been conducted. It also covers the period in which many states and local government have been created in the country. All these constitute a period of rising government expenditures. It is also a period of increasing population figures coupled with an era of oil-boom from which government have sourced adequate revenue to finance her rising costs.

3.1 MODEL SPECIFICATION

The model is based on the Peacock and Wiseman theory as well as the Keynesian assertion. The model shows that increase in government expenditures that granger causes an increase in economic growth and per capita income. In a functional notation, economic theory assumes that: $PCI = f(TGEXP)$ (1) Since

total government expenditure (TGEXP) is made up of capital expenditure (CEXP) and recurrent expenditure (REXP), then:

PCI = f(CEXP, REXP) (2) To capture our objectives, we break down Eq. 2 for capital and recurrent expenditures as follows:

FOR CAPITAL EXPENDITURE

$$PCI_c = f(ADM, ECS, SCS, TRNSF) \quad (3)$$

Econometrically:

$$\Delta PCI_c = \alpha_0 + \sum \alpha_1 \Delta PCI_{c-1} + \sum \alpha_2 \Delta ADM_{c-1} + \sum \alpha_3 \Delta ECOS_{c-1} + \sum \alpha_4 \Delta SCSc_{c-1} + \sum \alpha_5 \Delta TRSF_{c-1} + \alpha_1 \ln PCI_{c-1} + \alpha_2 \ln ADM_{c-1} + \alpha_3 \ln ECSc_{c-1} + \alpha_4 \ln SCSc_{c-1} + \alpha_5 \ln TRSF_{c-1} + u_1 \quad (4)$$

Table 1
UNIT ROOT TEST RESULTS

Variable	At level form			Logarithm Transformed			Difference Transformed		
	t-stat	5% cv	Result	t-stat	5% cv	Result	t-stat	5% cv	Result
PCIc	-3.879	-2.948	S	-0.464	-3.052	NS	-9.992	-2.946	S
ADM	2.8323	-2.968	NS	-0.940	-2.943	NS	-3.574	-2.946	S
ECSc	-0.214	-2.943	NS	-0.718	-2.943	NS	-6.107	-2.946	S
SCSI	-0.455	-2.943	NS	-0.563	-2.946	NS	-6.114	-2.946	S
tr	-1.890	-2.943	NS	-1.053	-2.986	NS	-8.853	-2.946	S

The unit root results of the series analysed showed that only the PCI was stationary at level meaning it was I (0) or integrated at order zero while the ADM, ECS, SCS and TRSF were all I (1) or integrated of order one. But the combination of variables that were integrated of a different order could still be exhibit long-run relationship. It is on this basis that we run the Johansen co-integration test and found that both the trace test and maximum eigenvalue test results indicated 5 cointegrating equations each. The result is in the appendix.

Table 2
ARDL Bound Test Results

Test Statistic	Value	K
F- statistic	8.815590	4
Critical Value Bounds		
Significance	10 Bound	11 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

As a better alternative to the Johansen co-integration test which in some cases, the trace and maximum eigenvalue tests may indicate different levels of co-integration, we conducted the more robust Autoregressive Distributed Lagged (ARDL) bound test for co-integration. We found the results in the table above. Since the F- statistic value of 8.815590 is higher than the 11 bound upper value of 5.06 at even the 1% critical value, we conclude that the series was cointegrated. This results corroborated the Johansen co-integration results in which each of the trace test and the maximum eigenvalue test indicated 5 cointegrating equations.

Having established co-integration among the series in this fashion, we proceeded to run the regression of the long-run relationship and obtained the following results:

Table 3
LONG-RUN RELATIONSHIP RESULTS

Variable	Coefficient	Standard error	T-statistic	Probability
dPCI _{t-1}	-1.490042	0.300209	-4.963341	0.0025
dLADM _{c-1}	-16.45566	7.833381	-2.100709	0.0804
dLECS _{c-1}	2.007812	4.568565	0.439484	0.6757
dLSCS _{c-1}	16.52218	9.327974	1.771250	0.1269
dLTRNSF _{c-1}	4.923294	4.076474	1.207734	0.2726
R ² = 0.970132	Adj. R ² = 0.865595	F = 9.280239	dw = 1.846721	Prob(F) = 0.005413

Since Per Capital Income is functionally related to government expenditure according to the Keynesian and Peacock & Wiseman theories of public expenditures, we considered the result of the first lagged in an ARDL model. The long-run results in the above table showed that two of the explanatory variables were

negatively signed and significant. In contrast, the remaining three variables were positively signed but not substantial. An increase in government spending in Nigeria reduced the standard of living of the people in areas of General administration which include defence and internal security. One can feel the reduction in the standard of living of Nigerians generally and particularly in states that were affected by the Boko-Haram insurgency, Kidnapping, herdsman menace and other anti-social vices. The result shows that 1 per cent increase in government expenditure on general administration led to 16.5 per cent decrease in the standard of living of Nigerians. The Economic services, Social Services and Transfer payment that were positively signed showed that an increase in government spending did not have any statistically significant pass-through effect on the standard of living of the people. The situation is right when we considered the poor performances of education, health, agriculture, construction and transport sectors as well as the rising public debt servicing, pension and other contingencies. The graph below shows per capita income (PCIt) in the blue line that is almost parallel to zero range. Government expenditures on all the four components were rising steadily, but PCI or the standard of living could not increase commensurately. Graphically, another problem noticed in the data for PCI is that Nigeria recorded negative values of PCI in 15 years and positive values in 23 years out of the 38 years of study despite the rising public expenditures. A situation in which government expenditure is rising continuously every year and the standard of living of the people remains positively low for some years, and negatively high for some other years, calls for questions. The question arises as to why the standard of living of the people remains low.

Table 4
Vector Error Correction Results

Dependent variable	Ecm Coefficient	Standard error	T-statistic	Findings
dPCIt	-0.061854	0.06274	-0.98583	Exogenous
dLADM _c	-1.082544	1.16420	-0.92986	Exogenous
dLSOC _{Sc}	-0.989472	0.97443	-1.01544	Exogenous
dLTRNSF _c	-0.491919	0.31074	-1.58305	Exogenous
dLECO _{Sc}	0.046775	0.13741	0.34040	Exogenous

The results of the short-run model are showed in the table above. The estimated coefficient for the ECM when PCI was dependent variable was - 0.061854, meaning that the deviation from the long-run equilibrium path was corrected by 6% over the following year. The coefficients for the ECM when each variable was made dependent and all other variables independent were recorded accordingly. Except ECS, which was positive all other variables have the correct signs, but they were all not statistically significant. The implication of this is that all the variables were exogenous meaning that they all provided explanations for the poor standard of living of the people in Nigeria. It shows that Government expenditures on Administration, Economic Services, Social and Community Services and Transfer

payment proxy by Per Capital Income did not improve the standard of living of Nigerians. This table also showed that all these variables the determinants of the poor standard of living in Nigeria. All of them jointly contributed 97% to the low standard of living in the country.

FOR RECURRENT EXPENDITURE

$$PCIr = f(ADM, ECS, SCS, TRSF) \quad (5)$$

$$\text{Econometrically: } \partial PCIr = \alpha_0 + \sum \alpha_1 \partial PCIr_{-1} + \sum \alpha_2 \partial ADMr_{-1} + \sum \alpha_3 \partial ECSr_{-1} + \sum \alpha_4 \partial SCSr_{-1} + \sum \alpha_5 \partial TRSFr_{-1} + \alpha_1 \ln PCIr_{-1} + \alpha_2 \ln ADMr_{-1} + \alpha_3 \ln ECSr_{-1} + \alpha_4 \ln SCSr_{-1} + \alpha_5 \ln TRSFr_{-1} + u_1 \quad (6)$$

Table 5
UNIT ROOT TEST RESULTS

Variable	At level form			Logarithm Transformed			Difference Transformed		
	t-stat	5% cv	Result	t-stat	5% cv	Result	t-stat	5% cv	Result
PCIr	-3.879	-2.948	S	-0.464	-3.052	NS			I (0)
ADMr	1.608	-2.943	NS	-2.306	-2.948	NS	-5.148	-2.946	I (1)
ECSr	-0.842	-2.943	NS	-1.203	-2.943	NS	-5.296	-2.946	I (1)
SCSr	1.308	-2.943	NS	-1.045	-2.946	NS	-6.175	-2.946	I (1)
TRSFr	5.716	-2.946	S	-1.071	-2.946	NS			I (0)

The results of the unit root test for variables of the recurrent expenditures revealed that PCI and TRSF payment were stationary at their level form. So they were integrated of order zero meaning that they did not have a unit root problem. But for the other variables such as ADM, ECS and SCS they were forced to become stationary at their first difference, meaning that they are of order one. A situation like this calls for co-integration test. The Johansen co-integration test was attached to the appendix. The trace test indicated 5 cointegrating equations, while the maximum eigenvalue test indicated one cointegrating equation. To confirm the actual status of the variable we conducted the more robust ARDL bound test, and the result was presented in the table below:

Table 6
ARDL Bound Test Results

Test Statistic	Value	k
F- statistic	19.61979	4
Critical Value Bounds		
Significance	10 Bound	11 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Since the F-statistic value of 19.61979 was higher than all the 11 bound values even at 1% critical level, we concluded that the series were cointegrated, long run relationship existed among them. This result corroborated the Johansen co-integration results.

Table 7
LONG-RUN RELATIONSHIP RESULTS

Variable	Coefficient	Standard error	T-statistic	Probability
dPCI _{t-1}	-1.431766	0.146699	-9.759919	0.0000
dLADM _{t-1}	4.355579	3.116519	1.397578	0.1750
dLECOS _{t-1}	-1.242568	1.899694	-0.654083	0.5193
dLSOCS _{t-1}	-0.488259	1.251038	-0.390283	0.6998
dLTRNSF _{t-1}	-3.614177	2.412334	-1.498208	0.1471
Constant	3.819649	5.755526	0.663649	0.5132
R ² = 0.838769	Adj. R ² = 0.7784	F = 13.87278	dw = 1.947527	Prob(F) = 0.0000

The results of the long-run relationship among the variables were presented in the table above. Apart from ADM that was positively related to PCI all other variables were negatively related, and they were all not statistically significant. This means increases in government expenditures on this variable led to a decrease in the standard of living of the people. This is against the Keynesian or the Peacock and Wiseman theory of public expenditure that rising government expenditure should improve the standard of living of the people.

The graph below also exhibited the same pattern as that of capital expenditures. While the PCI hovered around zero lines from the beginning to the end, the recurrent expenditure variables were rising steadily especially useful from 1992 to date. This is a clear indication that increasing government recurrent expenditure did not improve the standard of living of the people.

Table 7
Vector Error Correction Results

Dependent Variable	Ecm Coefficient	Standard Error	T-statistic	Findings
dLPClr	-0.462457	0.13354	-3.46316	Endogenous
dLADMr	-0.200153	1.26104	-0.15875	Exogenous
dLECSr	0.026880	0.12111	0.22194	Exogenous
dLSCSr	-2.017103	1.01297	-1.99128	Exogenous
dLTRSFr	0.134047	0.41080	0.32631	Exogenous

The ECM coefficients showed the speed of adjustment of PClr back to long-run equilibrium relationship. The deviation from long-run equilibrium path was corrected by 46% over the following year. The fact that all the variables were not statistically significant means that they were genuinely exogenous in the model and as such they were responsible for 84% of the fall in the standard of living of Nigerians as the government expenditure was rising.

Conclusion And Recommendations

The results of the model on capital expenditure and that of the recurrent spending appear to be pointing toward the same direction that rising government expenditure did not improve the standard of living of Nigerians tremendously. While the expenditure on administration was negative and statistically significant in the case of capital expenditure, it was positive and insignificant in the case of recurrent expenditure. This means the recurrent expenditure had a little improvement in the standard of living of the people since it involves salary earnings. But the capital expenditure aspect was negative because most of the funds were shared among government officials involved and the balance was expended on inflated contract to do shoddy jobs that could not improve the standard of living of the people.

On the other hand, the recurrent expenditures on Economic Services such as agriculture, construction, transport & communication; Social & Community Services such as health and education; Transfer Payment such as public debt servicing, pensions & gratuities, contingencies & subventions exhibited negative but not statistically significant relationship with Per Capital Income or standard of living. The workers salaries in this sector were not sufficient because of rising inflation in the country. Whereas the results of all these variables indicated positive and insignificant relationship with the PCI in the case of capital expenditures. Some of the structures were there either in dilapidated form or in short form. Most roads were death traps; power supply was erratic, the water supply was in poor condition, most hospitals

were mere consulting centres, school at all levels were not adequately funded and many more. Only the communication sector has improved tremendously. Hence the positive relationship was not statistically significant.

On this note, we concluded that the rising public expenditure in Nigeria has not translated to any significant and corresponding increase in the standard of living of Nigerians. From the two graphs above the curve for PCI, which is a proxy for standard of living did not rise above zero lines with the rising expenditures. This demonstrates that the standard of living of Nigerians is still at the low ebb while government expenditure is skyrocketing on an annual basis without any significant improvement to show for it. This is counter-intuitive and opposed to the Keynesian or Peacock & Wiseman theory of rising public expenditure.

We recommend that government at all levels should desist from corruptible practices. The government officials should not engage in the award of inflated contracts, demand for kick-backs and sharing of contract funds. Despite the high budget and substantial oil revenue, the standard of living is still low., an indication of mismanagement of resources. The government should decrease the current tide of corruption that has eaten deep into the fabric of all Nigerians at all levels. Public funds should be attached to specific projects. Political office holders should always account for how they spent the previous allocations before they can collect the next one; Nigeria political system should be demonetised, and stiffer (death) penalty should be recommended for looters of the treasury.

Declarations

DATA AVAILABILITY

The data that support the findings of this study are available from authors upon reasonable request.

COMPETING INTEREST

The authors declare that they have no competing interest.

FUNDING

The authors provided funds for the study. However, Covenant University, Nigeria intends to support the publication.

AUTHORS' CONTRIBUTION

Introduction and literature Review aspects were handled by DR BOWALE,E. K. whilst DRs AZUH,B and ILESANMI, A. handled the Methodology, Results and Conclusion.

ACKNOWLEDGMENT

We are grateful to the Management of Covenant University for agreeing to sponsor the publication.

Appendix

APPENDIX1: CAPITAL EXPENDITURE CO-INTEGRATION TEST

Date: 03/16/20 Time: 16:08				
Sample (adjusted): 1984 2019				
Included observations: 36 after adjustments				
Trend assumption: Linear deterministic trend				
Series: DPCIt DADMc DECSsc DSCSc DTRSFc				T
Lags interval (in first differences): 1 to 1				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized Trace 0.05				
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.708180	152.6658	69.81889	0.0000
At most 1 *	0.654468	108.3276	47.85613	0.0000
At most 2 *	0.598216	70.07143	29.79707	0.0000
At most 3 *	0.431654	37.24513	15.49471	0.0000
At most 4 *	0.374724	16.90424	3.841466	0.0000
Trace test indicates 5 cointegrating eqn(s) at the 0.05 level.				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized Max-Eigen 0.05				

No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.708180	44.33821	33.87687	0.0020
At most 1 *	0.654468	38.25613	27.58434	0.0015
At most 2 *	0.598216	32.82630	21.13162	0.0007
At most 3 *	0.431654	20.34089	14.26460	0.0049
At most 4 *	0.374724	16.90424	3.841466	0.0000
Max-eigenvalue test indicates 5 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegrating Coefficients (normalized by b'S11*b=l):				
DPCIT	DADMCT	DECOSCT	DSOCSCCT	DTRNSFCT
-0.104075	-0.040116	-0.002238	0.031285	-0.008990
-0.018864	-0.010710	0.021526	-0.068963	0.008065
0.054987	-0.026398	0.026605	-0.016165	-0.026042
0.429284	-0.006548	-0.006491	0.007718	0.010196
-0.028271	-0.063691	0.002522	0.114174	0.019785
Unrestricted Adjustment Coefficients (alpha):				

D(DPCIT)	0.633674	0.274936	-1.377518	-2.612216	1.335888
D(DADMCT)	82.64351	20.41526	-2.535650	10.49661	3.372485
D(DECOSCT)	140.6326	-2.664541	-38.21923	10.16049	-20.42245
D(DSOCST)	37.26227	22.54602	-9.584043	2.704656	-3.532042
D(DTRNSFCT)	59.66170	-29.14054	29.90405	-7.798476	-20.11909
1 Cointegrating Equation(s):		Log likelihood	-867.9558		
Normalized cointegrating coefficients (standard error in parentheses)					
DPCIT	DADMCT	DECOSCT	DSOCST	DTRNSFCT	
1.000000	0.385456	0.021509	-0.300601	0.086384	
	(0.09235)	(0.03988)	(0.15810)	(0.04080)	

APPENDIX 2: RECURRENT EXPENDITURE CO-INTEGRATION TEST

Date: 03/19/20 Time: 20:33

Sample (adjusted): 1984 2019

Included observations: 36 after adjustments

Trend assumption: Linear deterministic trend

Series: DPCIT DADMRT DECOSRT DSOCST DTRNSFRT

Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized	Trace	0.05		
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.779461	108.0848	69.81889	0.0000
At most 1 *	0.440746	53.66419	47.85613	0.0129
At most 2 *	0.306686	32.74271	29.79707	0.0222
At most 3 *	0.298190	19.55690	15.49471	0.0115
At most 4 *	0.172341	6.809561	3.841466	0.0091

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

* denotes rejection of the hypothesis at the 0.05 level

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

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized	Max-Eigen	0.05		
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No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.779461	54.42058	33.87687	0.0001
At most 1	0.440746	20.92148	27.58434	0.2810
At most 2	0.306686	13.18580	21.13162	0.4353
At most 3	0.298190	12.74734	14.26460	0.0856
At most 4 *	0.172341	6.809561	3.841466	0.0091

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 $b'S_{11}b=I$):

DPCIT	DADMRT	DECOSRT	DSOCSRT	DTRNSFRT
0.028603	-0.016455	0.011332	0.016872	0.002317
-0.451169	-0.009046	0.003075	0.003885	-0.003639
-0.103013	0.004910	-0.003076	0.003685	0.006160
-0.031423	0.010149	0.017559	-0.000953	-0.003098
0.058599	-0.001025	0.014179	-0.018532	0.009135

Unrestricted Adjustment Coefficients (alpha):

D(DPCIT)	-0.653467	2.737359	1.493649	0.361528	-0.118102
D(DADMRT)	-10.92078	77.33649	-137.9766	4.779328	35.56234
D(DECOSRT)	-31.63410	8.080971	-19.51729	-16.96290	8.890975
D(DSOCSRT)	-73.15842	44.49018	-88.36251	34.22918	26.69681
D(DTRNSFRT)	-122.0119	97.69001	-236.1099	52.22715	1.879636
1 Cointegrating Equation(s):		Log likelihood	-970.9998		
Normalized cointegrating coefficients (standard error in parentheses)					
DPCIT	DADMRT	DECOSRT	DSOCSRT	DTRNSFRT	
1.000000	-0.575278	0.396182	0.589857	0.080992	
	(0.07300)	(0.08843)	(0.08628)	(0.04032)	

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Figures

PCI

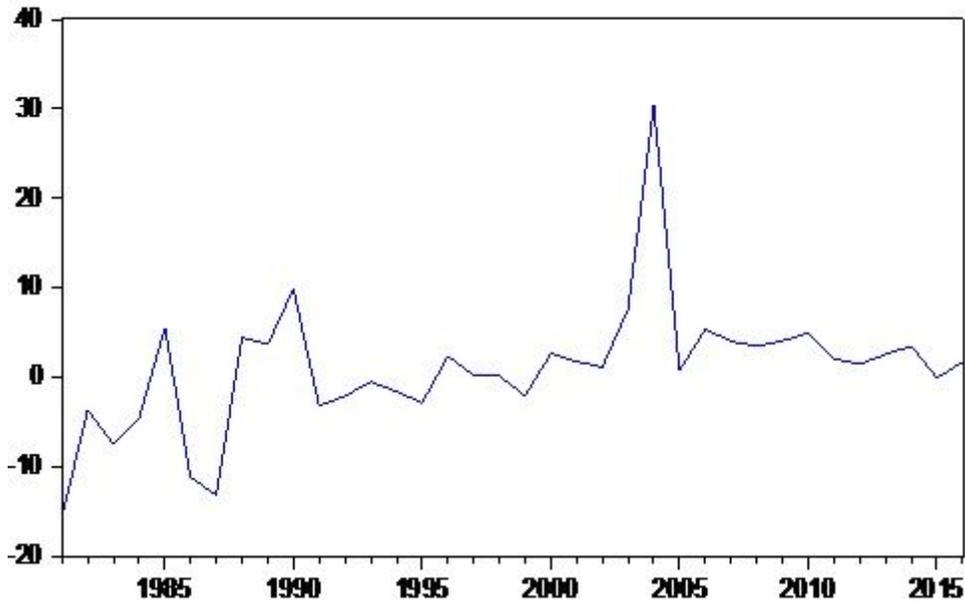


Figure 1

Trend in PCI

TOTAL

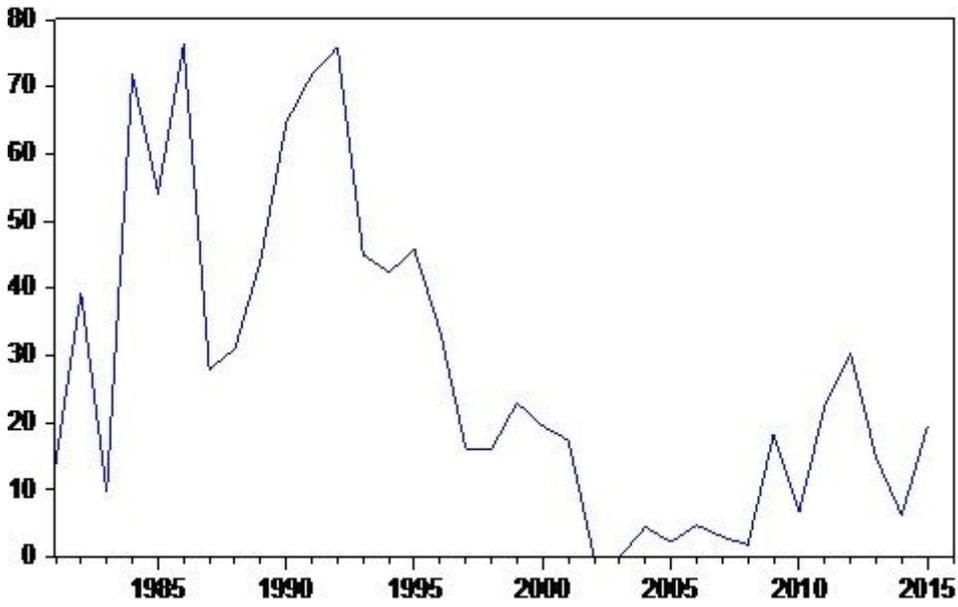


Figure 2

TOTAL CAPITAL EXPENDITURE