

An Empirical Study between Government Sectoral Expenditure and Indian Economic Growth

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ABSTRACT

The purpose of the present study is to examine the effect of government expenditure on economic growth in India over a period from 1991 to 2010, with a particular focus on sectoral expenditures. Five key sectors were preferred: (security, health, education, transportation, and communication, and agriculture.). The variables were tested for stationarity and co-integration analysis using the Johansen co-integration technique. Error-correction test was also performed. The results shows that in the short run, expenditure on agriculture was found to be negatively related to economic growth. The impact of education, though, also negative, was not significant. The impact of expenditure on health was found to be positively related to economic growth. Expenditures on national security and transportation and communication were also positively related to economic growth, though the impacts were not statistically significant. It is possible that in the long run, expenditure on education could be positive if brain drain could be checked.

Key Words: Government expenditure; economic growth; error correction; co-integration; India.

INTRODUCTION

The relationship between government expenditure and economic growth has continued to generate a series of controversies among scholars in economic literature. The nature of the impact is inconclusive. While some authors believe that the impact of government expenditure on economic growth is negative or non significant, (Akpan 2005, Laudau 1983) Akpan and others believed that the impact is positive and significant [Korman and Brahmasrene (2007) and Donaid and Shuaglin (1993)].

The main objective of this study is to investigate the effects of public expenditure sector-wise in India on economic growth. R. J. Barro (1990) trusted that expenditure on investment and productive activities is expected to contribute positively to economic growth, while government consumption spending is expected to be growth retarding. Government controls the economy through the use of public expenditure. This instrument of government control promotes economic growth in the sense that public investment contributes to capital accumulation. The other importance of government expenditure includes the provision of those facilities that are not

covered by the market economy, such as health care, public utilities, education, and social security, among others.

Human capital has a key role to play in promoting economic growth. Human capital promotes high benefit associated with economic growth, but the financial source for public expenditure, which is the taxation, reduces the benefits of the taxpayers, and as such, reduces the benefits associated with economic growth. The relevance of public expenditure in promoting economic growth lies with the way it is being spent. In empirical literature, while some authors believe that there is no impact of public expenditures on economic growth (Gupta et al 2002), others believe that the impact is negative [Folster and Henrekson (1999)], while some consider that the relationship is insignificant.

Economic growth is an essential ingredient for sustainable development. Economic growth brings about a better standard of living of the people, and this is brought about by improvement in infrastructure, health, housing, education, and improvement in agricultural productivity. Sustainable development is enhanced by economic growth, and economic growth is enhanced by the expansion of infrastructure, improvement of education and health services, the powerful security strategy, and food security (Agriculture). These sectors are very important in stimulating the economy by addressing the nation's foremost needs, and, thereby, bringing about sustainable development. The objective of the study is to investigate the impact of government expenditures on some selected sectors of the economy, such as

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transport and communication and the effect of this on economic growth. The justification for focusing on these five sectors is that there are some components of government expenditures that are productive while some are unproductive. Government expenditures on health and education raise the productivity of labour and increase the growth of national output. Education is one of the important factors and considered to be an independent factor of production that is indispensable to achieve high and sustainable economic growth rates. (Hartshorne, 1985). Government expenditure on health could lead to economic growth in the sense that human capital is essential to growth. A healthy population is the wealth of a nation. Healthy labour force enhances productivity and promotes economic growth.

Expenditures on infrastructure such as transportation and communication will bring about reduction in production costs, which will surely increase private sector investment and profitability of firms, thereby fostering economic growth. Good health promotes hard work and productivity. Capital in the form of national defense is a necessity for safeguarding and protecting the nation from outside aggression, while agriculture in the form of food production is a necessity for human existence.

The paper is divided into six sections. Following the introductory section above, a review of literature on public expenditure and economic performance in India is given in section 2. Section 3, presents the model used by Ram (1986). Section 4, presents the methodology adopted for the study. The empirical analysis and findings are discussed in section 5, while the conclusion is given in section 6. The study focused on five sectors of the economy, i.e., education, health, national security, transportation, and communication, and agriculture.

Review of Literatures

The relationship between government expenditure and economic growth has continued to generate a series of controversies among scholars in economic literature. Laudau (1983) studied the effect of government (consumption) expenditure on economic growth using a sample of 96 nations. His conclusion was that there is a negative effect of government expenditure on growth of real output.

Kormain and Brahasrene (2007) studied the economy of Thailand. They made use of the Granger causality tests. Their finding was that government expenditures, and economic growth are not co-integrated but indicate a unidimensional relationship. This is because causality runs from government expenditure to growth. They also detected a significant positive effect of government spending on economic

growth.

Gregorious (2007) made use of the heterogeneous panel data to study the impact of government expenditure on economic growth. The result was that countries with large government expenditure tend to experience higher growth.

Donaid and Shuanglin (1993) studied the differential effects of different forms of expenditure on economic growth for 58 sampled countries. They came up with the result that government expenditure on education and defense has positive impact on economic growth and that of welfare was insignificant and negative.

Akpan (2005) made use of disaggregated approach in order to determine the components of government expenditure that enhance growth. He concluded that there was no significant relationship between most components of government expenditure and economic growth in Nigeria. SKneller and Gemmell (1999) pointed out that composition of government expenditure might exert more influence as compared to the level of government expenditure on economic growth.

Devarajan et al (1993), using a sample of 140 ECD countries, found that expenditure on health, transport and communication had positive impacts on economic growth. Spending on education and defense did not have a positive impact on economic growth. The nature, size and direction of government spending would surely determine its impact on the economy, which will, directly or indirectly, affect the size and the output of the economy. Government spending and economic growth are directly related. It has been established in literature by some authors that there is a link between economic growth and government spending. For example, Niky et al (2003), believe that there is a nexus between government spending and economic growth. While we have expenditure that is productive, according R. J. Barro and Sala-i-Matin (1992), there are others that are not productive. Government spending has direct impact on the rate of economic advancement.

Infrastructure is a key to economic growth. A good infrastructural development will enhance productivity and bring about a low unit cost of production, which will, in turn, increase competitiveness and effective participation in the international market. Wadal et al (2009), Tomori and Adebisi (2002), Fosu (2001), and Adebisi (2003) confirmed a negative correlation between economic growth and spending on health and education. In as much as Wadal et al confirmed a short-run negative correlation between education and economic

growth, they went further to analyse the long-run relationship and confirmed that there exists a long-run positive relationship between educational spending and economic growth. The relationship between spending on defense and health on economic growth is not conclusive. Regarding government spending on defense, Wadad et al reported a insignificant relationship / no impact on economic growth. The findings on defense by some authors is negative and significant (Deger and Smith (1982), Knight et al (1996). Those that reported a positive and significant association include Benoit 1978, and Frederiksen and Looney (1982).

Biswas and Ram (1986) reported an insignificant effect of expenditure on defense as regards economic growth in Nigeria. Other authors that reported a negative effect of government spending on economic growth include, Grier and Tullock (1989), Barro (1991), Easterly and Rebelo (1993) and Tanninem (1999). Romer (1990) emphasized that the totality of government spending impacted negatively on economic growth. The same result was arrived at by Alexander (1990), Folster and Henrekson (1999). But Devarajan et al research shows that, by categorizing the government spending into sectors, a positive relationship was established between health, transport and communication sectors and economic growth.

Theoretical Framework

Some Marxist theorists viewed the rise of state expenditure as inherent to the politico-economic system. In the Marxist model, the private sector tends to overproduce, so the capitalist-controlled government must expand expenditures to absorb the production. Typically, this is accomplished by augmenting military spending. At the same time, the state must attempt to decrease worker discontent by increasing spending for social services. Eventually, rising expenditures outpace tax revenue capacity and the government collapses. Public expenditure theory is supported by increasing public expenditure which could be divided into either recurrent or capital expenditure. The very important theories in economic literature that have wide acceptability are the Wiseman and Peacock theory and that of Wagner's law of increasing state activities. This study is premised on the Wiseman and Peacock hypothesis which says that public expenditure does not increase in a smooth and continuous manner, but in a step-like fashion. There is an occasional shock in the system that will bring about an additional increase in public expenditure. This increase might distort the existing expenditure, thereby creating imbalance in the revenue, which may now be termed as displacement effect.

the needed public expenditure will bring about an inspection effect. The solution to this problem is agreed jointly by the government and the people through some level of tax tolerance. By doing so, the expenditure and the revenue of government will be stable until another shock enters into the situation. In any shock, the government bears the larger burden of total national activity. This is what Wiseman and Peacock called the concentration effect, which causes the economic activity of the central government to increase faster than other arms of government, such as state, local government etc.

MATERIALS AND METHODS

The main objective of the study is to analyze the impact of government spending on economic growth which can bring about sustainable growth in economic development. The focus is on how some of the components of government expenditures affect economic growth in India. The application of the endogenous growth theory has only emerged properly, not too long ago from the work of Moosa (2002) Devarajan (1996), although one of the pioneering works with original contribution work of Barro (1990) and, later, Futagam et al (1993). Barro made use of the endogenous growth model to find a linkage between public spending and economic growth.

Tsoukis and Miller also built on the work of Barro. They thought that public services are part of the component of public capital and public expenditure flow. All their studies centred on endogenous growth theory. Barro theorized the relationship between public spending and economic growth. Barro concluded that the growth-maximizing ratio of public expenditure/GDP needs to be equal to the public service's elasticities in the aggregate production. In this present study, the model adopted for carrying out this study follows that of Tsoukas and Miller (2003) and Manh and Terukazu (2006). The determinant factor, as specified by Tsoukas, and Miller, are production, public capital expenditure, public current expenditure and Tax rate.

Manh and Terukazu in addition to the above also added technology as a determinant factor of economic growth, which can capture the impact of FDI on economic growth. To do this, it is assumed that total factors productivity level is a function of FDI. As a result, this is added to the model. Manh and Terukazu's equation is specified as follows:

1) They assumed that the government attempts to maximize the utility function that has a CES function. Thus:

$$U = \frac{S(C^{1-\theta} - 1)}{\theta(1-\theta)e^{-\rho t}} dt \dots \dots \dots (1)$$

Where:

C = Government consumption

θ = Intertemporal substitution elasticity θ > 0

P = Constant rate of time preference P > 0

2) The form of the production function assumed by Manh and Terukaza was:

$$Y = AK^{1-\theta} (P^\alpha H^{1-\alpha})^\theta$$

$$A = f(f)$$

$$0 < \alpha < 1 \dots \dots \dots (2)$$

Where:

Y = Total Final Output

K = Aggregate Stocks of Private Capital

P = Aggregate Stocks of Public Capital

H = Flow of non-capital public expenditure

f = Stock of FDI

A = Total Factor Productivity level which is a function of FDI

3) The transformation procedure was followed and they defined the long-term growth rate equation as:

$$\left[g = \frac{1}{\theta} (1-t)(1-\theta)(A)^{1/\theta} \left[\frac{x}{g} \right] \frac{\partial \theta}{\partial Y} \left[\frac{H}{Y} \right] \left[\frac{1-\alpha}{1-\theta} \right]^\theta - P \right] \dots \dots \dots (3)$$

Where:

t = Tax rate

h = Ratio of output to non-capital public expenditure

x = Ratio of output to capital-public expenditure

Overbars indicate steady-state values

4) They generalized the relationship between the factors as:

$$g = f(t, A, x, h) \dots \dots \dots (4)$$

This present study made use of annual time series data from 1980 - 2008. The expenditure is disaggregating into sectors in order to know exactly the government spending on sectors and which sector is having positive and significant impacts on economic growth. The study made use of time series

data on India from 1991 - 2010. In the empirical analysis, the investigation was carried out in a linear form, using the OLS method. The time series were tested for the order of integration of the individual series by conducting unit root tests for stationarity, Engle and Granger (1987). The study employed on each of the variables, the standard Dickey-Fuller test. A co-integration error-correction analysis was also performed using Johansen procedure. The essence of using this technique is to identify the relationship between government spending on the chosen sector and economic growth in India.

The variables under consideration are:

- GDP growth rate
- Education Spending
- Health Spending
- Agriculture

Transport and communication

OLS regression was used. Because OLS regression sometimes gives spurious results, especially when there is autocorrelation and multicollinearity among the variables, a way of guarding against this is to test for the presence of unit roots using the Dickey-Fuller a augmented approach, as stated in the equations below:

$$\Delta X_t = \alpha_0 + \alpha_1 X_{t-1} + \alpha_2 \Delta t^{-1} + \alpha_3 t + e_t$$

Where
 ΔX_t = First difference operators

The test on the coefficient of X_{t-1} in the regression equation is the test for unit root. The Mackinnon critical values give the critical values for the determination of the order of integration. The null-hypothesis of the existence of a unit root is given as:

$$X_0: X_{t-1}(1)$$

The value of the Mackinnon and the ADF test statistics are compared and decisions either to reject or accept are taken as follows:

If the Mackinnon critical value is less than the ADF test statistics, then we reject the null hypothesis that X_t contains a unit root. In this case, we accept the alternative hypothesis which says that X_t is stationary and vice versa. In a situation whereby some or all the variables are not stationary at their levels, they will be differenced d times until stationarity is achieved. The study also tested whether there is co-integration among the variables within the framework established by Johansen. The Johansen procedure establishes a VAR model which can be defined by the following error-correction model as stated below:

$$\Delta Y_t = r_0 + r_1 \Delta Y_{t-1} + r_2 \Delta Y_{t-2} + r_3 \Delta Y_{t-3} + r_k - 1 \dots \dots \dots (5)$$

(various issues)

Where:

- Δ = The difference operator
- Y_t = P x1 vector of non-stationary
- I_0 = The deterministic element of VAR model
- Z_t = Dummy variable to capture the political situation in a country that takes value (1) if there is peace and (0) otherwise.
- et = Vector of random errors that are normally distributed with zero mean and constant variance.
- Π = This encompasses the error correction terms (ECT). This coefficient provide information about the long-run properties of the VAR in the above model.

The study is based on secondary data from 1980 -2008, sourced from:

- i. The Central Bank of Nigeria annual report and statement of accounts (Various issues)
- ii. The Central Bank of Nigeria statistical bulletin

- iii. The Central Bank of Nigeria economic survey (various issues).

Empirical Results

The objective of this present study is to investigate the growth impact of government spending, sector-wise, for the Indian economy. The sectors of interest based on government spending on are Education (E), Health (H), National Security (SEC), Transport and communication (TC) and Agriculture (AG).

Thus, the growth equation model for the study is specified as:

$$g = \alpha_0 + \alpha_1 E + \alpha_2 H + \alpha_3 SEC + \alpha_4 AG + \alpha_5 TC + \mu \dots (5)$$

Table 1 shows the results of the unit root tests for all the variables used. After comparing the ADF value against the Mackinnon critical value at 5% level of significance, it was noticed that the variables attained

Table 1. Unit Root Test at First Difference

Variables	ADF Value	Mackinnon Critical Value at 5%	No. of Lags
LGDP	-4.8732	-2.9850	1
LSEC	-3.6756	-2.9798	1
LE	-4.8037	-2.9798	1
LH	-4.4514	-2.9798	1
LTC	-4.3079	-2.9798	1
LAG	-5.4159	-2.9798	1

Where:

- LGDP= log of real gross domestic product growth rate
- LSEC= log of government spending on internal security
- LE= log of government spending on education
- LH= log of government spending on health
- LTC= log of government spending on transport and communication
- LAG=log of government spending on agriculture

their stationarity after the first differencing. The test for Johansen co-integration was also performed. Existence of co-integration allows for analysis of the short-run dynamic model that allows for adjustment to the long-run equilibrium relationship. The co-integration test was performed to investigate whether there is any co-integrating vector. The result of this is

Looking at the likelihood ratios as compared to the critical values at 5%, the hypothesis of no - co-integration was rejected. The result shows that there is one co-integrating equation (vectors). This is presented in Table 3. The test revealed the existence of equilibrium condition that keeps the variables in proportion to each other in the long run. The

Table 2. Co-integration Test

Eigen Value	Likelihood Ratio	Critical Value at 5%	Critical Value at 1%	Hypothesized No. of CE (S)
0.8605	121.73	94.15	103.18	None **
0.6815	68.51	68.52	76.07	At most 1
0.5396	37.62	47.21	54.46	At most 2
0.3485	16.87	29.68	35.65	At most 3
0.1465	5.30	15.41	20.04	At most 4
0.0373	1.03	3.76	6.65	At most 5

* (**) denotes rejection of the hypothesis at 5% (1%) significance level.

L. R. test indicates 1 co-integrating equation(s) at 5% significance level.

Table 3. Unnormalized Co-integrating Coefficients

LGDP	LSEC	LE	LH	LTC
-0.2364	0.2599	-0.5478	0.0871	0.1886
-6.3364	0.5740	-0.6569	1.6445	-0.3362
-2.4760	-0.0241	-0.1833	0.5280	-0.3428
-1.2576	-0.3822	0.0899	0.2465	0.3111
-2.8718	0.8364	0.6351	-0.7757	-0.1886
-0.3646	0.4332	0.4231	-0.5710	-0.2568

Table 4. Error Correction Model

Variables	Coefficient	S.E.	t-statistics	Probability
C	-0.0023	0.0016	-1.4266	0.0842
D(LSEC, 1)	0.0467	0.0248	1.8855	0.0219
D(LE, 1)	-0.0038	0.0346	-0.1122	0.9117
D(LH, 1)	0.0954	0.0433	2.2008	0.0311
D(LTC)	0.0113	0.0145	0.7795	0.4444
D(LAG 1)	-0.0425	0.0181	-2.3469	0.0288
ECM (-1)	-0.8702	0.1507	-5.4883	0.0000
R-Squared	0.6455	Mean Dependent Variable		0.0157
Adjusted RSq.	0.5442	S.D. Dependent variable		0.0726
S. E. of Regression	0.0490	Akaike Inf. Criterion		-2.9980
Sum of Sq. Resid.	0.0505	Schwarz criterion		-3.0457
Log likelihood	48.7054	F-Statistic		7.1744
Durbin-Wat. Stat.	1.8805	Prob. (F-Statistic)		0.0006

Dependent Variable: D (LGDP: 1)

Included Observations: 20 after adjusting endpoint

Method: Least Squares

parsimonious error correction model (ECM) Table 4.

The ECM coefficient carries the correct sign and

with the speed of convergence to equilibrium at 87% of the past years deviation from equilibrium. This adjustment is essential for maintaining long-run equilibrium in order to reduce the existence of disequilibrium over time.

The short-run relationship shows that there is a negative correlation between economic growth and spending on education, while that of health is a positive correlation and is also significant. Government expenditure on health could lead to economic growth in the sense that human capital is essential to growth. A healthy population is the wealth of a nation. Healthy labour force enhances productivity and promotes economic growth.

While the result of that of education is in line with the studies of many authors, such as Adebisi (2003), Tomori and Adebisi (2002), Fosu (2001), the negative relationship between education and economic growth might be due to the fact that there is brain drain. The educated ones want to go abroad for better pay package. Due to lack of jobs and poor pay, there is brain drain and a number of people prefer to work abroad after finishing their courses. Brain drain affects economic growth in the sense that what the graduates are supposed to produce for the economy is being produced for another economy. This will reduce the gross domestic in terms of output not produced. A reduction in GDP is a reduction in economic growth, simply because GDP is a measure of economic growth. Some of these graduates are sent abroad on government monies. This shows that government bears the cost of their education, and another country takes the benefits in a continued economic growth. If in one way or the other, these set of people are able to invest their gains from abroad in the domestic economy, then economic growth can take place. This will be in the long run. But in the short-run, the coefficient of education is negative and insignificant. This means that there is no significant impact of education spending on economic growth in the short run.

In India, spending on national security has a positive effect on economic growth but not statistically significant. This shows that spending on national security does not contribute meaningfully to economic growth in India. This same result was reported by Biswas and Ram, (1986). Transportation and communication's coefficient is also positive but not significant. Spending on agriculture has a significant but negative impact on economic growth in India. The result shows that agriculture, if properly funded, could bring about sustainable economic growth, but if not, it can retard growth.

negative impact on agriculture and positive impact on health. It is important to disaggregate government spending for policy purposes. Information on government spending by each sector of the economy and its contribution to economic growth is very essential. For there to be a meaningful impact of government spending sector-wise on economic growth in India, the proportion of government spending on each of the individual sectors of the economy must be very substantial.

SUGGESTIONS AND CONCLUSIONS

This paper investigates the relationship between government expenditure on economic growth in India from 1991-2010. A linear OLS regression analysis was done. The variables were tested for stationarity and co-integration analysis was also carried out using the Johansen co-integration technique. Also error-correction test was performed. The result shows that in the short run, expenditures on education and agriculture were found to be negatively related to economic growth; while the impact of education was not significant, that of agriculture was found to be significant.

Expenditure on health, national security, and transportation and communication was found to be positively related to economic growth. The results of that of health were significant while that of national security and transportation and communication were found to be insignificant. It is possible that in the long run, expenditure on education could be positive if brain drain is checked, i.e., if more universities are established and the salary structures are more attractive.

The objective of this study was to shed more light on the impacts of some of the components of government spending on economic growth in India, using a sample of time series data. Most of the results of the study are consistent with those of other researchers. While some researchers such as Adebisi (2003) Tomori and Adebisi (2002) found a negative correlation between spending on education and health, this present study found a positive and significant relationship between economic growth and health.

From the study, it can be concluded that in the short run, government spending on health has a positive and significant impact on economic growth. Spending on education has negative but insignificant impact on economic growth. However, spending on agriculture has a negative and significant impact. Spending on security, transportation and communication have non-significant positive impact.

Future Research

Extricating government spending into a disaggregated analysis is very essential for policy purposes. The results as to the impact of government spending on different sectors of the economy, and also their individual impacts on economic growth create awareness and provide information that is very valuable. Allocation of public funds can now be checked and attention needs to be given to crucial sectors such as education, health, and agriculture. The assumption is that these sectors can bring about economic growth in the long run. On the basis of the results obtained, the following recommendations will be necessary.

1. Allocation of government spending needs to be based on the level of need and the versatility of individual sectors.
2. In as much as government is trying its best to see that education is better funded to promote economic growth in India, the impact of this funding is not felt. One of the reasons could be due to the fact that the money spent on education is not translated to economic gains in the domestic economy. The gains are being transferred to other economies in the form of brain drain, which is a reduction in the level of GDP, and GDP is a measure of economic growth.

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