



**LONG RUN RELATIONSHIP BETWEEN PUBLIC DEBT AND ECONOMIC GROWTH:  
EMPIRICAL EVIDENCE FROM ODISHA**

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**Abstract:** - This paper examines the relationship between public debt and economic growth between the periods of 1950 to 2014. Using the JJ approach, the paper traces a long run relation between them and through VECM model we find an approximately 5 percent adjustment between public debt and economic growth. Further, the paper finds bidirectional causality and the variation is shown through variance decomposition method. It is recommended to implement a suitable debt management policy in the case of Odisha.

**Keywords:** Public Debt; Economic Growth and Bidirectional Causality

**Introduction:** The relation between debt and economic growth is an important issue for any government. It is commonly known that the government needs debt because of non-availability of adequate revenue to finance expenditure needs. If the borrowed fund is used for financing revenue deficit mostly for establishment cost, it is likely to have less impact or negative impact on economic growth due to lower multiplier effect. Whereas, use of borrowed fund for capital investment may lead

to higher positive impact on economy. So, we examine the relation between debt and economic growth in the case of Odisha. The motivation to choose Odisha is due to its poor performance in terms of qualitative growth as compared to the states like Maharashtra, Gujrat, Tamil Nadu, and undivided Andhra Pradesh. It is observed from fiscal indicators of Odisha that the deterioration of revenue deficit occurs due to high expenditures in the area of salary, pension and interest payment. The revenue deficit is financed through borrowing from different sources such as market loans, special securities issued by RBI, borrowing from Provident Fund and issuing of bonds. Although there is a revenue surplus since last decade, but its sustainability is a matter of concern in the subsequent years. It is also observed that the fiscal deficit from 1950-

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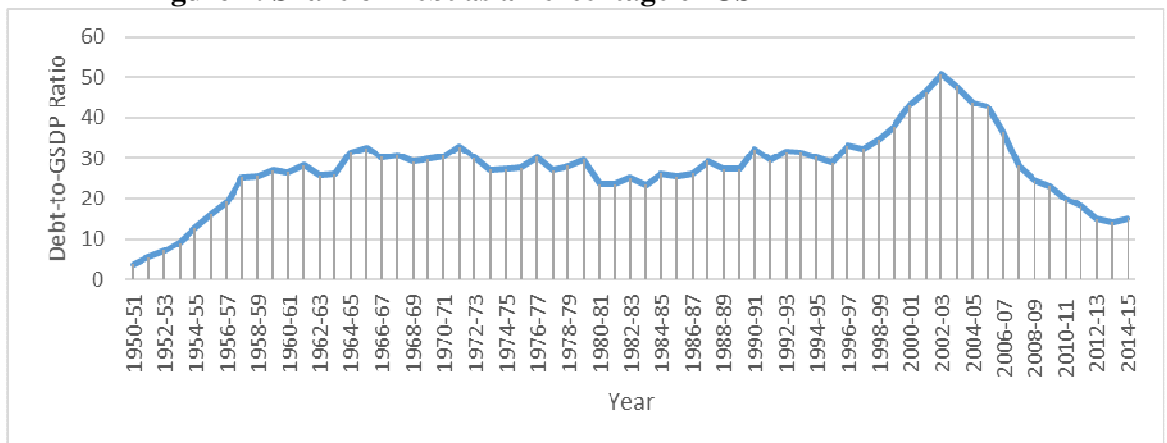
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51 to 2014-15 of the state is following a cyclical trend. The average fiscal deficit is around 4 percentage of gross state domestic product (GSDP) which is higher than the targeted amount stated by fiscal responsibility budget management act (FRBM Act, 2005). The higher level of fiscal deficit would raise the net borrowing and this is likely to crowd out the private domestic investment through the channel of interest rates (De Leeuw and Holloway (1983), Bahmani and Payesteh (1994), Evans (1985, 1987), Barro (1987), Deravi, Hegji and Moberly (1990), Seater (1993) and Gulley (1994)). Therefore, this study examines the long run relationship between debt and economic growth in the case of Odisha.

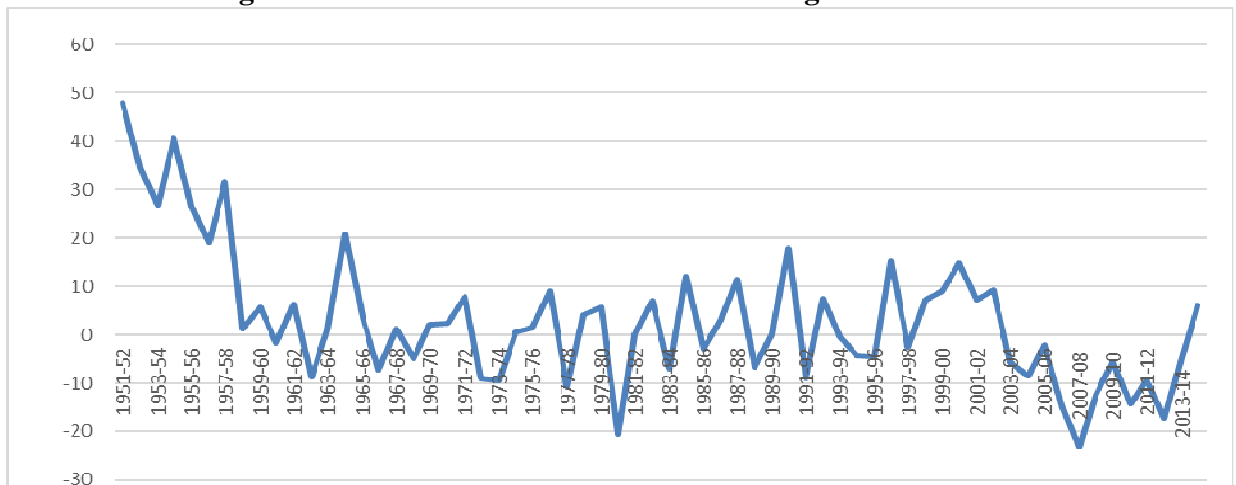
The trend of total debt stock of Odisha is shown in Figure 1. From this figure it is seen that debt to GSDP ratio has significantly increased from approximately 4 percent to around 51 percentage of GSDP in the year 1950-51 to 2002-03 respectively. The debt trend shows the downward slope from approximately 48 percentages to around 16 percentage of GSDP in the period 2003-04 to 2014-15 respectively. This decreasing level of debt stock as a percentage of GSDP is basically due to heavily cutting down of the both revenue and capital expenditure of the government. While it is also observed that the growth rate of debt stock as a percentage of GSDP is shown highly volatile and it is presented in Figure 2.

**Figure 1: Share of Debt as a Percentage of GSDP**



Sources: Department of Finance, Govt. of Odisha

**Figure 2: Growth Rate of Debt as a Percentage of GSDP**



Sources: Department of Finance, Govt. of Odisha

From the figure 2, the interesting point is to notice that the growth rate of debt to GSDP ratio is zigzag with sudden falls and rises. This kind of high volatile nature of the growth rate of debt to GSDP ratio is not good sign for any stable fiscal policy makers. Hence, the study examines the existence of long-run relationship through Johansen and Juselius (1990) cointegration approach. The results derived from this approach concluded that both debt and economic growth has long-run relationship among them. The remainder of this paper is organized as follows: Section 2 explains the review of literatures. The detailed methodology in terms of analytical framework and data sources is presented in section 3. The section 4 shows the results; and section 5 discusses the conclusion and policy implications.

**Review of Literature:** The relationship between public debt and economic growth has been ambiguous from the previous theoretical and empirical literatures. The classical economists such as Smith (1777) and Mill (1845) pointed out that the public debt negatively affects the economic growth. According to Smith (1777) “a certain portion of the annual produce turned away from serving in the function of a capital to serve in that of a revenue; from maintaining productive laborers to maintaining unproductive ones, and to be spent and wasted, generally in the course of the year, without even the hope of any future reproduction.” Subsequently, Say (1844) said that “There is this grand distinction between an individual borrower and a borrowing Government that, in general, the latter borrows capital for the purpose of barren consumption and expenditure.” He believed that public debt is burden for the future generation. However, the Ricardian Equivalence theory points out that public debt are neutral with respect to consumption and, as a result, with respect to economic growth (Ricardo, 1817). The Ricardian Equivalence theory argues that repayment of debt will take place through future taxation, which means individuals will increase

their savings by buying bonds issued by the Government, and hence, public debt has neutral effect on economic growth. The Keynesian theory supports that the government should go for higher public debt to achieve higher economic growth in the short run. The modern theory of public debt was scientifically provided by Keynes through his book ‘General Theory of Employment, Interest and Money’ that was written in 1936. According to him, “The absolute size of the national debt does not matter at all, and that, however large the interest payments that have to be made, these do not constitute any burden upon society as a whole.” Keynes explained that the increase in level of public debt can help to solve the problem of inflation of the nation through curbing present consumption and encouraging savings. Further, the debt overhang theory suggested that if future debt will be larger than the country’s repayment ability, the expected debt–service costs will discourage further domestic and foreign investment, and thus is harmful for growth (Reinhart et al. (2010). Elmendorf and Mankiw, (1998) explained the long run relation between public debt and economic growth in a macroeconomic framework.

The empirical literatures such as Schclarek (2004) explored the relation between external debt and economic growth for 59 developing and 29 industrial countries. This study was undertaken from the period between 1970 and 2002. He concluded that external debt is inversely related to economic growth for developing countries, and insignificant relationship is observed in the case of industrial countries. Similarly, the literatures such as Pattillo et al. (2004), Kameda and Naketa (2005), Modeste (2005), Blavy (2006), Kumar and Woo (2010), Zdzienick (2011), and Checherita and Rother (2012) shows the relationship between debt and economic growth for both developing and developed countries. Baum et al. (2013) investigated the relation between public debt and economic growth of 12

nations of euro area from 1990 to 2010. They used a dynamic threshold panel method in order to capture the non-linear impact of public debt on economic growth. The empirical results concluded that debt is positively affecting the economic growth in the short-run and behaves negatively beyond 67 percent of debt-to-GDP ratio. It also showed that there is significant negative effect of debt beyond 95 percent of debt-to-GDP ratio. The paper further captured a positive relation between interest rate and public debt when the debt-to GDP ratio reached to 70 percent. Antonakakis (2014) examined the relationship between sovereign debt and economic growth for 12 European countries from 1970 to 2013. Using both dynamic and non-dynamic panel data method, the study found that debt is sustainable at 90 percent threshold level in the short run, whereas in the long run both non-sustainable and sustainable debt ratios are above 90 percent over the threshold level as well as non-sustainable debt ratios below the 60 percent. Beyond this threshold level, it effects negatively.

Some literatures also show the relation between debt and economic growth in the case of India. In this context, Singh (1999) stated that an increase in government debt is capable of finding the consumer wealthier, and this leads to higher spending in the short run. This increase in aggregate demand of goods and services, in view of sticky prices in short run will raise the output and employment. High marginal propensity to consume than the marginal propensity to save leads to decrease in private saving which is less than the government dissaving. This leads to increase in the real interest rate in the economy which encourages capital inflow from abroad in the short run. However, this rising level of real interest rate would discourage investment, and thus, crowding out the private investment in the long

run. Low domestic savings mean a small capital stock. The capital inflow from abroad would lead to high foreign debt. The high aggregate demand results in a high price level which adjusts over time, and the economy returns to a neutral rate of output. Low investment would eventually lead to a poor steady state capital stock and low level of output. Therefore, the overall impact when considering the long period would be smaller than the total output and eventually reduces consumption and welfare. Similarly, Rangarajan and Srivastava (2005), Kannan and Singh (2007), Gulati (1993), Jha and Shrama (2004), Goyal (2013), Ghosh (1988), Bal and Rath (2014), Sreekantaradhya (1972), Ghuge (1977), Rao (1992), and Seshan (1987) show the relationship between public debt and economic growth.

#### **Methodology and Data Sources**

##### ***Johansen and Juselius cointegration Approach***

This paper used Johansen method Johansen and Juselius (1990) cointegration method in order to show the existence of a long-run relationship between debt and economic growth over the period of 1950-51 to 2014-15. The Gross State Domestic Product (GSDP) is defined as the value of an economy at current prices and the debt stock at current price is defined as the total debt of the government. So, both the variables are in nominal terms. We transfer both the variables into logarithm term. The reasons for applying the logarithm conversion were mainly to seasonally adjust all the variables and for the magnitude change of the variables (Bal and Rath, 2014). The secondary data of both the variables has been collected from Odisha Finance Account, published by Government of Odisha. The approach of Johansen and Juselius (1990) model is stated that, if  $Y_t$  is a vector of  $n$  stochastic variable, then there exists a  $p$ -lag vector auto regression with Gaussian error of the following form:

$$\Delta Y_t = k + \Gamma_1 \Delta Y_{t-1} + \dots + \Gamma_{p-1} \Delta Y_{t-p+1} + \Pi Y_{t-1} + z_t \quad (1)$$

Where  $\Gamma_1$ ,  $\Gamma_{p-1}$  and  $\Pi$  are coefficient matrices,  $z_t$  is a vector of white noise process and  $k$  contains all deterministic elements.

Johansen proposed two type of test i.e. Trace statistics and Maximum Eigen values for rank r. the null hypothesis under trace statistics stated that the cointegrating rank is equal to r against the alternative that existence of k cointegrating rank. Similarly, the null hypothesis under Maximum Eigen values stated that the cointegrating rank is equal to r against the alternative that the r+1 cointegrating rank.

### 3.2. Vector Error Correction Model (VECM)

$$\Delta z_t = \mu + \alpha t + \lambda z_{t-1} + \sum_{i=1}^{p-i} \gamma_i \Delta y_{t-i} + \sum_{i=1}^{p-1} \gamma_i \Delta x_{t-i} + \varepsilon_t \quad (2)$$

Where,  $\Delta$  is the first-difference operator. The long-run multiplier matrix  $\lambda$  is defined as:

$$\lambda = \begin{bmatrix} \lambda_{YY} & \lambda_{YX} \\ \lambda_{XY} & \lambda_{XX} \end{bmatrix}$$

The diagonal elements of the matrix are unrestricted, so the selected series can be either I(0) or I(1). If  $\lambda_{YY} = 0$ , then Y is I(1). In contrast, if  $\lambda_{YY} < 0$ , then Y is I(0). The VECM procedures described above are imperative in the testing of

Once the study finds existence of long run relationship between public debt and economic growth, the next step is to investigate causality, since the variables are cointegrated: there is causality in at least one direction (Engel and Granger, 1987). This study will proceed to determine the speed of adjustment coefficient by using Vector Error Correction Model (VECM). Vector error correction model (VECM) is given in the following as form.

at most one cointegrating vector between dependent variable  $y_t$  and a set of regressors  $x_t$ .

#### Results:

This paper presented a summary of descriptive statistics of the debt and economic growth in Table 1. In the next step, this study shows the stationarity in order to avoid any kind of spurious relationship among them. So, the ADF test are used and the results are presented in Table 2. The results derived from ADF test in Table 2 clearly shows that both the variables are stationary at first order difference.

**Table 1: Descriptive Statistics**

Variables	Mean	Max.	Min.	S.D.	Sk.	Ku.	J.B
LOD	7.56	10.76	3.01	2.21	-0.10	1.90	3.33
LY	8.90	12.64	5.96	2.06	0.19	1.79	4.30

Note: LOD = Debt; LY = Economic Growth

**Table 2: Results of Unit Root test**

Variables	Level	1 <sup>st</sup> order difference	Inference on Integration
LOD	-2.41 (0.37)	-3.54 (0.00)	I(1)
LY	-2.84 (0.18)	-9.54 (0.00)	I(1)

Note: Figure in Parentheses are P-Value.

Once the stationarity of the variables is determined, this study used the Johansen and Juselius (1990) Cointegration technique to trace the existence of long-run relationship between them. The results are presented in Table 3. Before conducting the Johansen and Juselius

(1990) test, this study choose the optimal lag 2 through VAR model by following AIC, SC and HQ criteria. It is observed from the Table 3 that there is at most 2 cointegrating vector exist between debt and economic growth.

**Table 3: Results of Johansen and Juselius Cointegration Tests**

Dependent Variable LY			
Null	Alternative	Trace Statistics	95% Critical Value
Trace Statistics			
r = 0	r = 1	52.01	20.26
r = 1	r = 2	9.31	9.16
Maximum Eigenvalue			
r = 0	r ≥ 1	42.70	15.89
r = 1	r ≥ 2	9.31	9.16
ECM <sub>t-1</sub>		-0.05** (0.02)	

**Note:** Figure in Parentheses is P-Value and \*\* indicates significant at 5 percent Level.

It shows that the calculated trace statistics and maximum eigenvalue is higher than the critical value at 5 percent significance level. Hence, the null of no cointegrating vector is rejected at 5 percent level. This implies that debt and economic growth has long-run relationship among them (Checherita and Rother, 2012; Bal and Rath, 2014; Singh, 1999; Kumar and Woo, 2010 and Pattillo et al. 2004). In this context, the conventional theory on public debt needs to analyse to know the relationship between debt and economic growth in the long-run. This theory stated that, as public debt rises which leads to raise the private savings but it is less than the fall of public savings. As a result the total savings of the economy falls. This decline level of total savings do have possibility of fall in total investment over a period of time which results in smaller capital stock availability in an economy. Therefore, this lower capital stock leads to raise the marginal productivity of capital and that leads to higher the interest rate. This higher level of interest rate affects the

private investment and thereby possibility of crowding out of the private domestic investment and finally the total investment as well as the gross domestic product of the economy decline. Similarly, Elmendorf and Mankiw, (1998) explained the long-run impact of public debt on economic growth in a macroeconomic framework.

Further, in order to trace the speed of adjustment in terms of the relation between debt and economic growth, this study conducted vector auto regressive model (VECM). The error correction term of the one period lag (ECM<sub>t-1</sub>) shows the speed of adjustment between debt and economic growth. The result is presented in the Table 3. The ECM<sub>t-1</sub> term is negative and significant. This implies that both the variables i.e. debt and economic growth are adjusting around 5 percent every year. Once it confirmed the existence of long-run relation between debt and economic growth, this study tested the direction of the variables. So, Granger causality test and the results are presented in Table 4.

**Table 4: Granger Causality test**

Null Hypothesis	F-Statistics	P- Value
LOD does not Granger Cause LY*	2.61	0.08
LY does not Granger Cause LOD*	2.89	0.06

Note: LOD = Debt; LY = Economic Growth; \* indicates the significant at 10 percent level.

The Granger causality test from the Table 4 shows that there is bi directional causality between debt and economic growth. This implies that both debt and economic growth depends on each other. Therefore, the result of this study also support the issue of the existence of endogeneity problem between debt and

economic growth (Checherita and Rother, 2012; and Pattillo et al. 2004; Cordella et al., 2005; Presbitero, 2010). In the next step, this paper conducted Wald test and variance decomposition and the results are presented in Table 5 and Table 6 respectively. The main aim of this test is to check the robustness of the



results. The derived results from Table 5 and Table 6 clearly shows the existence of long-run

relation between debt and economic growth in the case of Odisha.

**Table 5: Results of Wald Test**

Test Statistics	Value	df	P-Value
t-statistics	-1.90*	59	0.06
F-statistics	3.63*	(1, 59)	0.06
Chi-Square	3.63**	1	0.05

Note: \* and \*\* indicates significant at 10 and 5 % level respectively.

The derived results from Table 5 shows that the null hypothesis of no long-run relation between debt and economic growth has been rejected at 5 percent level from t-statistics, F-statistics and Chi-square value. Therefore, it is confirmed that there is long-run relationship between debt and economic growth. Similarly, the results from Table 6 shows the decomposition of forecast error variance and the standard error shows the significance level of the variables. The result indicate that about 91 percent variation in debt is

explained by its own shock, whereas only 0.10 percent variation is explained by economic growth at first step ahead. Around 0.13, 0.80, 2.34 and 4.76 percent variation on public debt is explained by economic growth during third, fifth, seventh and tenth period horizon respectively. Similarly, this study finds about 0.87, 0.79, 0.77 and 2.26 percent variation on public debt is explained by economic growth in the period of third, fifth, seventh and tenth period horizon respectively.

**Table 6: Forecast Error Variance (in percentage)**

Variables Explained	By Innovations in			
	Year	Standard Error	LY	LOD
LOD	1	0.07	0.10	99.90
	3	0.11	0.13	99.87
	5	0.13	0.80	99.19
	7	0.15	2.34	97.66
	10	0.17	4.76	95.24
LY	1	0.07	100	0.00
	3	0.11	99.13	0.87
	5	0.13	99.20	0.79
	7	0.15	99.23	0.77
	10	0.17	97.71	2.29

Note: LOD = Debt and LY = Economic Growth

**Conclusion:** This paper shows the long run relation between public debt and economic growth during the period of 1950-51 to 2014-15 in the case of Odisha. The economic theory suggest that there exist a negative relation between public debt and economic growth in the long run whereas positive effect may persist between them in the short-run. Although this paper does not perform the impact of public debt on economic growth but shows the existence of long run relation between them. The primary

motivation is to show the presence of endogeneity issue among them. The results derived from JJ approach concluded that there exist long run relation between public debt and economic growth. The VECM model shows the speed of adjustment and the result observed that there is around 6 percent for each year. Further, this paper examined the Granger (1988) causality which shows the short run relation among them and finds a bidirectional causality between public debt and economic growth. In

the final step, this paper shows the variations that explained by the independent variable. The results derived from variance decomposition methods that both public debt and economic growth have explained to each other. So, the paper is suggested to take care of the issue of endogeneity problem before showing the impact of public debt and economic growth. Further, as both public debt and economic growth does have long run relation and hence it is suggesting implementing a suitable debt management strategy in case of Odisha.

### References

- Antonakakis. N. (2014), "Sovereign Debt and Economic Growth Revisited: The Role of (Non-) Sustainable Debt Thresholds," Department of Economics Working Paper No. 187.
- Bahmani-Oskooee, M. and Payesteh, S. (1994), "Do Budget Deficits Cause Capital Inflows? Evidence from the United States", *The Quarterly Review of Economics and Finance*, Vol. 34(1), pp. 63-74.
- Bal, D. P. and Rath, B. N. (2014), "Public Debt and Economic Growth in India: a Reassessment", *Economic Analysis and Policy*, Vol. 44, pp. 292-300.
- Baum. A., Checherita-Westphal, C., Rother, P. (2013), "Debt and growth: new Evidence for the euro area", *Journal of International Money Finance*. Vol. 32, pp.809–821.
- Blavy . R. (2006), "Public Debt and Productivity: The Difficult Quest for Growth In Jamaica", IMF WP 06/235.
- Barro, R. J. (1987), "Government Spending, Interest Rates, Prices, and Budget Deficits in the United Kingdom, 1701-1918." *Journal of Monetary Economics*, Vol.20, pp. 221-247.
- Checherita C W. and Rother P. (2012), "The Impact of High Government Debt on Economic Growth and its Channels: An Empirical Investigation for the Euro Area". *European Economic Review*. Vol.56. pp.1392-1405.
- Cordella, T., Luca A. R. and Marta Ruiz-Arranz. (2005), "Debt Overhang or Debt Irrelevance?"
- Revisiting the Debt Growth Link", IMF Working Papers 05/223 International Monetary Fund.
- De Leeuw, F. and Holloway, T. M. (1983), "Measuring and Analyzing the Cyclically Adjusted
- Budget in the Economies of Large Government Deficits", Federal Reserve Bank of Boston Conference Series No. 27, pp. 1-42.
- Deravi, M. K., Hegji, C. E. and Moberly, H. D. (1990), "Government Debt and the Demand for Money: An Extreme Bound Analysis." *Economic Inquiry*, Vol. 28, pp. 390-401.
- Elmendorf, D. W. and Mankiw, N. G. (1998), "Government Debt", *Handbook of Macroeconomics*, Oxford Press.
- Engle, R. F. and C. W. J. Granger (1987). *Co-integration and Error Correction: Representation, Estimation and Testing*. *Econometrica*, 55 , 251–276.
- Evans, P. (1985), "Do Large Deficits Produce High Interest Rates?" *American Economic Review*, Vol. 75, pp. 68-67.
- Evans, P. (1987), "Do Budget Deficits Raise Nominal Interest Rates? Evidence from Six Countries", *Journal of Monetary Economics*, Vol. 20, pp. 281-300.
- Ghosh. A. (1988), "India's Public Debt: A Partial Analysis", *Economic and Political Weekly*, Oct. 29, P. 2253.
- Ghuge, V. B. (1977), "Burden and Benefits of India's National Debt". Himalaya Publishing House, Bombay.
- Goyal, A. (2013), "Sustainable Debt and Deficits in Emerging Market", *International Journal of Trade and Global Markets*", Vol.4 (2), pp. 113-136.
- Granger, C.W.J. (1988), "Causality, Cointegration, and Control," *Journal of*



- Economic Dynamics and Control 12, 551-559.
- Gualati, I. S. (1993), "Tackling the Growing Burden of Public Debt", Economic and Political weekly, Vol. XXIX, pp. 1297-1298.
  - Gulley, O. D. (1994), "An Empirical Test of the Effects of Government Deficits on Money Demand", Applied Economics, Vol. 26(26), pp. 239-247.
  - Jha, R. and Sharma, A. (2004), "Structural Breaks, Unit Roots and Cointegration: A Further Test of the Sustainability of the India Fiscal Deficit", Public Finance Review, Vol. 32, pp.196- 219.
  - Johansen, S., and K. Juselius (1990). "Maximum Likelihood Estimation and Inference on Cointegration with Applications to the Demand for Money." Oxford Bulletin of Economics and Statistics 52(2): 169-210.
  - Kameda. K and Nakata, M. (2005), "Public Debt and the Macroeconomic Stability of Japan", Public Policy Review, Vol. 1, pp. 49-90.
  - Kannan R, Singh, B. (2007), "Debt-deficit dynamics in India and macroeconomic effects: a structural approach", Munich Personal Repec Arch. 16480. Available on the web: <http://mpra.ub.uni-muenchen.de/16480/>.
  - Kumar M. S. and Woo, J. (2010), "Public Debt and Growth". IMF Working Paper WP/10/174.
  - Modest. N. (2005), "The Impact of the Foreign Debt Burden on Exchange Market Pressure in
  - Guyana, 1968-2000: An Application of the Error Correction Methodology", Journal of Developing Areas, Vol. 38, pp. 25-39
  - Pattillo, C. H. and Poirson Ricci, R. (2004), "What are the Channels through which External
  - Debt affects Growth?", IMF Working Paper No. 04/15.
  - Rangarajan, C., Srivastava, D. K. (2005), "Fiscal Deficits and Government Debt: Implications
  - for Growth and Stabilization". Economic Political Weekly, Vol. 40, pp. 2919–2934.
  - Rao, N. R. (1992), "Union State Financial Resources in India", Karnataka University, Dharwad.
  - Reinhart, C. M., and Rogoff, K. S. (2010), "Growth in a Time of Debt", American Economic
  - Review Papers and Proceedings. Vol. 100 (2). Pp. 1-9.
  - Ricardo, D. (1951), "On the Principles of Political Economy and Taxation. In: Sraffa, P. (Ed.),
  - The Works and Correspondence of David Ricardo 1". Cambridge University Press, Cambridge, with the collaboration of M. Dobb.
  - Say, J. B. (1964), "A Treatise on Political Economy" (Augustus M Kelly, New York), P.477.
  - Schclarek, A. (2004), "Debt and Economic Growth in Developing and Industrial Countries",
  - Available on the web: [www.nek.lu.se/nekasc](http://www.nek.lu.se/nekasc).
  - Seater, J. (1993), "Ricardian Equivalence", Journal of Economic Literature, XXXI, March, pp.142-190.
  - Seshan, A., (1987), "The Burden of Domestic Public Debt in India", RBI Occasional Papers. Vol. 8 (1).
  - Singh, C. (1999), "Domestic Debt and Economic Growth in India". Economic Political Weekly, Vol. 34, pp. 1445–1453.
  - Smith, A. (1977), "In: Cannan, E. (Ed.), The Wealth of Nations", Random House, New Work.
  - Sreekantaradhya B. S. (1972), "Public Debt and Economic Development in India", Sterling Publishers, Delhi.