

Detecting Causal Nexus in Economic Growth and Expenditure on Education among Indian States

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Since the time of Adam Smith and Ricardo, education has been regarded as one of the leading determinant of economic growth (Sen, A. 1999). The concept of aggregate production function relating to input of labour hours, services of land and capital to national output failed to account for modern economic growth in U.S.A. (Kuznets, 1952). The seminal works by Solow (1960), Shultz (1960, 62), Becker (1962) and Lewis (1962) have presented a formal model dealing with role of education in economic growth. Scholars like Griliches (1973, 1977), Nelson and Phelps (1966) and Hayami and Ruttan (1971) have Successfully attempted to establish the link in between wealth accumulation through research and development.

The debate got momentum through contributions of Romer (1986, 1989) and Lucas (1988, 1990) in form of endogenous growth theory. The salient feature of their contribution was the idea that in the long run, output per unit of input could increase, even when inputs were exhaustively accounted for. Synergies between highly skilled workers or particular forms of capital investment were credited with producing these increasing returns, and technically advanced human capital and the growing knowledge base appear to be part of this well spring of growth. An important implication of Lucas' hypothesis was that human capital should be factored back into aggregate production functions, an empirical practice that was not fully accepted in the literature of growth theory of 1960s. Countries with low income in per capita terms would tend to converge to high income in per capita terms, or catch-up [Barro (1992), Barro & Sala-i-Martin (1992), Barro, Mankiw and Martin (1992), Mankiw, Romer & Weil (1992)]. India is a federal country with 29 states. These states are heterogeneous in terms of various socio-economic indicators, especially in terms of State Domestic Product (SDP). Major concern before policy makers is as how to accelerate SDP of economically poor states as U.P., Bihar, M.P., Rajasthan and Orissa and hill states like J & K, H.P., Assam, Nagaland, Manipur etc. These states are also lagging behind other states in terms of human development indicators like education, health etc. Thus, vital issue arises whether there are interlinkages in state expenditure on education and SDP? Scholars and academicians like Ansari, MI and Singh, S.K. (1997), Gounden, A.M. (1967), Pradhan, RP (2009), Chandra, Abhijeet (2010), Chatterjee, Monojit (2008), Pravesh Tamang (2011), Lingraj Mallick & D.P. Dash (2015) etc. have attempted to examine nexus in expenditure on education and economic growth with econometric devices as Granger Causality, VECM, IRF, but these studies have been done at the national level, not at state level.

In the light of aforesaid, the present study has been undertaken to examine the existence of causal nexus, if any, in between state expenditure on education and SDP. Long-run/Short-run causal linkages in these variables have been examined with help of Granger causality (Granger, CWJ, 1969, 1986) and ECM (Engle, Granger- 1987) techniques. In addition, unit root test with structural breaks, if any, have been done through ADF (Dickey & Fuller, 1979), Phillip-Perron (Phillips-Perron, 1988) and Clemente-Montanes- Reyes Structural break test (Double mean shift-A O Model) (Clemente, Montanes, Reyes- 1988). The present paper attempts to evaluate empirically nexus between state education expenditure and economic growth for 17 states of Indian federation over the period 1980-81 to 2011-12. The paper is based on the hypothesis for testing the causality and co-integration between State Domestic Product (SDP) and State expenditure on education as to whether there is bi-directional causality between SDP growth and State expenditure on education, or whether there is Uni-directional causality between two variables or whether there is no causality between SDP and State expenditure on education for 17 Indian States. For testing the unit roots and structural breaks, if any, in time series data for two variables, ADF, Phillip-Perron (PP) as well as clemente-Montanes- Reyes tests have been applied. ADF and PP tests for Ln form of data for two variables reveal that both variables are co-integratable of order one i.e. I(1). Clemente-Montanes- Reyes (Double mean shift-AO model) for structural breaks in two variables reveal that, by and large, 1996 and 2006 have emerged as break years for SDP while 1998 and 2007 as break years for state expenditure on education. Residuals of co-integrating regression between two variables is found stationary revealing existence of long-run relationship between these two variables. Granger Causality test finally confirms unidirectional causality (education expenditure  SDP) for eleven states (AP, Gujarat, M.P., Maharashtra, Manipur, Nagaland, Punjab, Tamilnadu, Tripura, U.P.) While bi-directional Causality (education expenditure  SDP) for three states (Bihar, J & K and Assam). The error correction estimates (ECM) indicate speed of convergence, roughly in the range 2% to 4% towards attaining equilibrium position in case of any long run disequilibrium.

Key words : SDP, State education expenditure, ADF/PP Unit Root test ,Clemente-Montanes-Reyes Unit-Root and Structural Break test, Granger Causality, ECM.