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The Triangulation Dynamics between Education, Health and Economic Growth in India

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Abstract

The fact that India's spending growth on education and heath outpaced its GDP growth, but the outlay on these sectors is still lags behind that of other BRIC nations as observed in the past seven years, motivated us to perform a research study in order to understand the triangular dynamics between expenditure on education and health, and real economic growth in the country. India may be achieving less-than-desired growth in infrastructure, but the growth in social infrastructure such as education, and health has outstripped GDP growth between 2003-04 and 2010-11 as observed by rating agency CRISIL. Thus, the primary objective of this paper is to relate health and education indicators of human capital, and to identify how they can contribute to enhance economic growth of India. It is in this context we have employed Toda-Yamamoto causality test procedure on relevant data sets over the period spanning from 1985-86 to 2014-15, and found that health spending and real economic growth cause each other. But expenditure on education has only unidirectional relationship with real economic growth. Further, it has been found that expenditure on education causes expansion in health-care spending, but not the other way around. Such a finding is significant for planners, policy makers, researchers and academician as well.

Key words: Social Sector, Human Capital, Education Expenditure, Health Expenditure, Real Economic Growth, India

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Introduction

At the global level, there is a growing realization that social sector is an inseparable element of any economy. Social sector comprising of sub-sectors like education, health and medical care, housing, sanitation, and water supply is very essential for the economic development of any country. Social development paves the way for economic development (Samba and Rao, 2014). The social sector enhances other sectors of an economy like agriculture, industry and service sectors. Since the ultimate objective of any planned economy is to ensure well-being through sustained development of quality of life of the people, the social sector is given priority. Increasing attention to social sector contributes significantly and effectively to economic growth by providing healthy, educated and skilled workforce (MSDE, 2004).

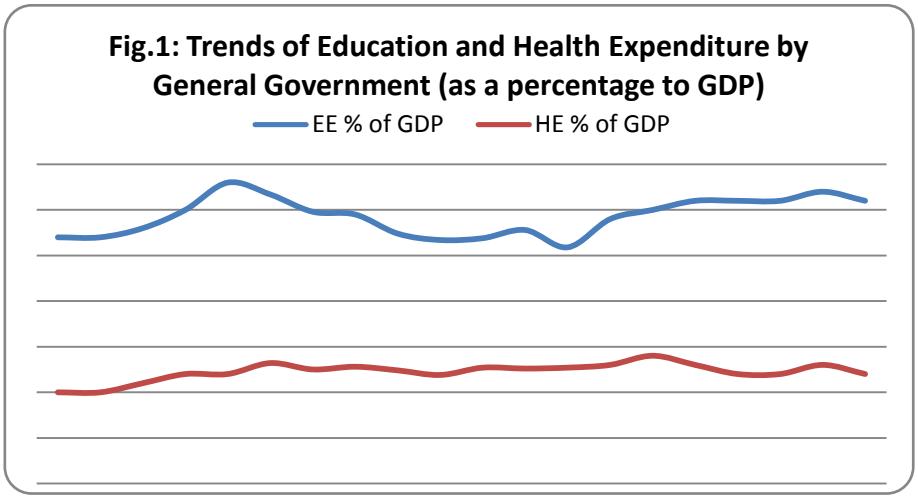
High level of education opens up the mind of people, increases tolerance and acceptability, removes prejudice and discrimination, and also increases larger participation in developmental activities. Moreover, a higher level of education increases marginal productivity of physical capital and labor force, and therefore promotes national income of a country (Kwon, 2009). Similarly, good physical and mental health standards increase the life expectancy, increase infant survival rate, and encourage people to perform their socio-economic responsibilities efficiently (Novick, 2001). Thus, high levels of education and health sector achievements directly, and through their multiplier effects positively contribute to sustained inclusive economic growth and development. Obviously, the willingness and ability to work, save, and invest of people increases in the economy which results in enlarged domestic market opportunities, enhanced international trade, larger infrastructure available for both domestic and foreign users, and many more. So, these three factors are very important for the fate of the people of a nation. If the government of the country seriously focuses on these three factors today, the results will be in front of the world tomorrow.

In spite of such importance of social sector, it has been argued that due attention has not been paid adequately to the development of social sector like basic education and health care etc. in India. India's public spending on health as a proportion of GDP is just above 1 per cent and is amongst the lowest in the world. While Sri Lanka spends 1.8 per cent of GDP, figures in China and Thailand are 2.3 per cent and 3.3 per cent respectively. The corresponding figure for the U.S is in excess of 7 per cent while European nations like the U.K, Spain, Germany, and Italy spend 6.5 to 8 per cent of their GDP on healthcare. In terms of international per head spending comparison, while India spends $43 per head, counterparts in Sri Lanka invest $87,

China spends $155 and Thailand over six times at $261. Similarly from the education point of view the position of India is not good. According to UNDP report, the government spending on education in India is about 4.1 per cent of GDP which is lower than the global weighted average of 4.9 per cent. The developed countries like U.S and U.K have an education sector spending of 5.5 per cent of their GDP.

On the one hand, India's new economic policy has been quite successful in creating favourable environment of rapid economic growth such that economic growth of the country jumped from the so called Hindu growth rate of 3½ % to 8-9% per annum. But, on the other hand, India lags far behind the other BRIC nations in social sector achievements due to low spending on education and health, according to a study by the Associated Chambers of Commerce and Industry of India.

No doubt, public expenditure on education and health is an important policy instrument for realizing, not only social sector development but also overall socio-economic growth of the country via multiplier effects in the long-run. Realizing this Government of India (GoI) has initiated various policies and programmes in this direction since independence, but the progress of human capital in India shows a sluggish trend as continuously stated in HDR by UNDP. For instance, GoI has accepted the concept of investment in education in its 1968 policy and fixed a target of 6 per cent of GDP to be invested on education by 1986. Even after three decades of such resolution, the general government[1] expenditure on education hovers around 3 per cent per annum which is about 10 per cent of total expenditure and 49 per cent of expenditure on social services (see fig.1, fig.2 and fig.3).

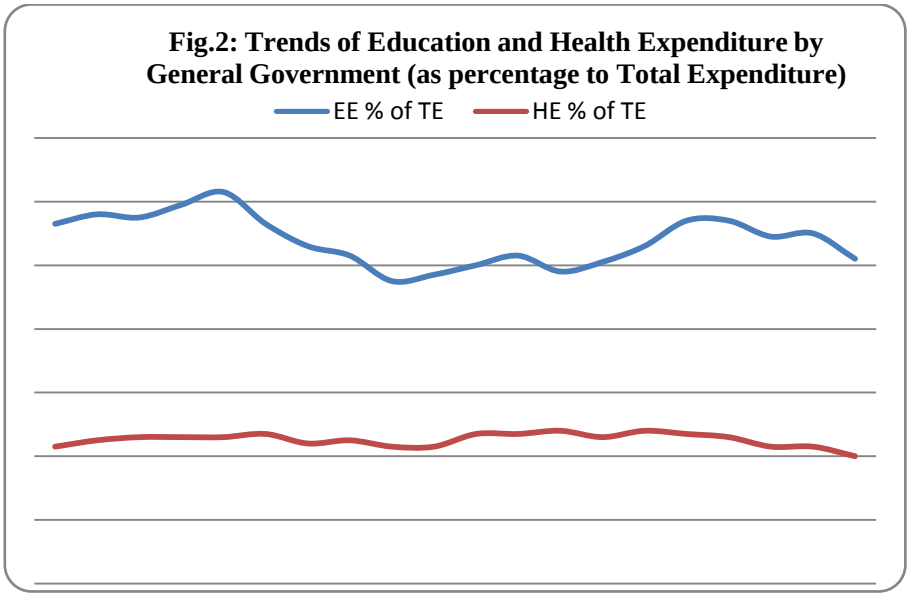


Source: Author's Own Plot

[1]*General Government refers to the combination of Central and State Governments.*

Similar trend is for health-care expenditure in India. India's public health expenditure as a percentage of GDP is just above 1 per cent since a long time which is about 4 per cent of total government expenditure and 21 per cent of expenditure on social services (see fig.1, fig.2 and fig.3). In fact, the expenditure on human development is inconsistent and severely inadequate in India economy even after 67 years of independence.

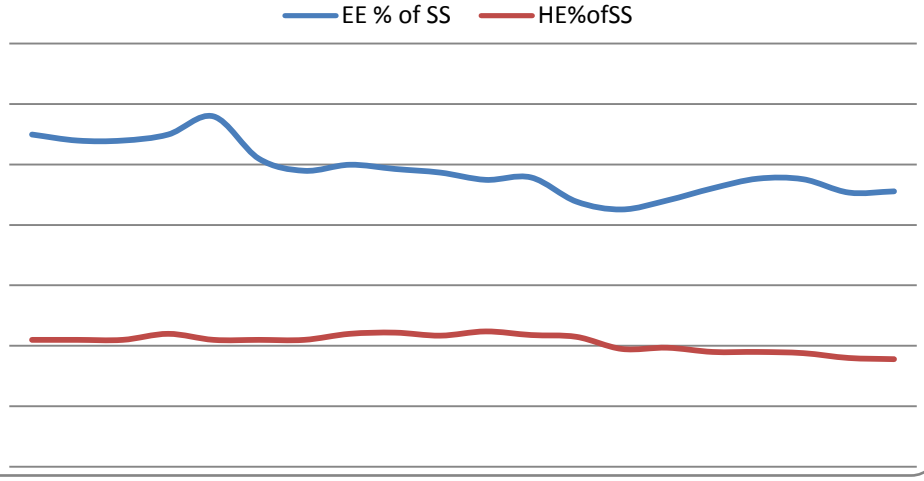
Fig.2: Trends of Education and Health Expenditure by General Government (as percentage to Total Expenditure)



Source: Author's Own Plot

In a recent observation CRISIL Ltd. pointed out that India's growth of expenditure on education and health outpaced its GDP growth. Between 2003-04 and 2010-11, India's spending on social infrastructure grew at an annual average pace of 18.7% faster than the average nominal GDP growth rate of 15.3%. Health has seen an annual average increase of 17.5%, education 19%, family welfare 22.3% and scientific services has witnessed growth of 16.8% over the years.

Fig.3: Trends of Education and Health Expenditure by General Government (as a percentage to Social Services Expenditure)



Source: Author's Own Plot

Now, the obvious question comes to the mind that if growth of social sector spending is more than the growth rate of GDP, is it true that better health and education leads to higher economic growth? or any other dynamics exists between education, health and real economic growth in India. The existing empirical literature provides the evidence that in USA, China, India, Pakistan, Nigeria, Brazil, and Mexico health and education have strong positive impact on real economic growth (Aka and Dumont, 2008; Li and Huang, 2009; Haldar and Mallik, 2010; Qadri and Waheed, 2011; Hassan and Kalim, 2012; Ebiringa and Charles, 2012; Sen et al, 2015). Some other studies conclude about expansionary impact of education on health (Guisan and Exposito, 2010; Bernard et al, 2006). There are studies provide empirical mixed evidence on the degree of association between health, education and real economic growth (Maitra and Mukhopadhyay, 2012; Eggoh, Houeninvo and Sossou, 2015). The conflicting findings of these empirical studies make the issue of triangular relationship between health, education and economic growth a moot point.

It is with this backdrop of mixed findings, this paper is an attempt to unfold the dynamics of the triangular relationship between government expenditure on education, government expenditure on health, and real economic growth in India. Such an empirical study shall help us clarifying whether rapid economic growth brings better health and education outcomes or the other way around. This study shall contribute to the existing literature by providing the possible logic of the impact of

public expenditure on health and education on real economic growth of India thereby justifying the significance of social sector in the long-run economic growth of the nation. Further, in developing nations, an issue is whether to focus health or education first. This study provides the evidence of complementarities of health and education, but giving a relative importance to education. In this context, the rest of the paper has been organized as follows: Section 2 reviews the extant literature and lines up the study; Section 3 discusses about the variables of the study, data sources and the methodology of analysis; Section 4 makes the empirical analysis; section 5 significantly discusses the statistical findings of the study; Section 6 comes out with policy implications and concludes.

Literature Review

Health and education are two important aspects of socio-economic development of a nation. As indicated in Schultz (1961), Arrow (1962), Mushkin (1962), and Romer (1986), another important aspect of human capital is health. Van Zon and Muysken (2003) argued that health is a principal determinant of economic growth. Health is the most important asset of human being. It permits us to fully develop our capabilities. If this asset erodes or it is not properly developed, it can cause physical and emotional weakening, causing obstacles in the lives of people. Thus, health is the backbone of human resource. The factors guiding health indicator of a nation are life expectancy, infant and maternal mortality rate, other important diseases etc. Improper development of health creates various problems in economic growth and development of a nation. The health factor is affected due to some reasons such as disparity in education, poverty, unemployment, low income, low standard of living etc. Health and other forms of human and physical capital increases the per capita GDP by increasing productivity of existing resources coupled with resource accumulation and technical change. Furthermore, some part of this increased income is spent on investment in human capital, which results in further per capita growth (Akram et al., 2008). Thus, enhancing health has positive impacts on economic growth and vice-versa. Since independence, India has developed a huge amount of health infrastructure in the form of primary, secondary and tertiary health care institutions like PHC, CHC, and Hospitals in private, public and voluntary sectors. Still it is not up to the desired level. Thus, more and more public spending is warranted in the health sector.

Similarly, education as an investment in human resources plays an important role among the factors which contribute to real economic growth of a nation. Todaro (2000) estimated that in the developing countries, it is estimated that 40% of the people are illiterate; 25% of children of age between 6 to 12 years old are not able to

attend primary school and 80% of children between 12 to 18 years old do not enter the secondary school. Poor education results in unskilled labor and unemployment, and this may have serious impact on economic growth. As a result, many studies focus on education as the main form of human capital (e.g. Romer, 1990; Barro, 1991). Education is classified into elementary, secondary, higher secondary, vocational, higher education, technical and education, etc. Education is an important determinant factor of economic growth.

Prominent classical and neoclassical economists such as Adam Smith, Romer, Lucas and Solow emphasized the contribution of education in developing their economic growth theories and models. The main theoretical approaches of modeling the linkages between education and economic performance are the neoclassical growth models of Solow (1957) and the model of Romer (1990). Thus, education is recognized as an engine of social and economic development of a nation. Investment in education enhances labour productivity, income generation, poverty reduction, and human resource development etc. India at present is in the forefront among the developing nations and its major challenges are unemployment, inequality and poverty. All these obstacles are largely due to low level of public expenditure on education in India. These can be reduced with the help of providing better education facilities.

Needless to say, health and education are two critical factors of economic growth and development. However, the connections between education and health and their impacts on development have received relatively little attention [2]. Understanding the links between health and education is important for social policy as well as academic knowledge. An intervention that improves health will have some impact on human development, but one that improves health and education simultaneously may be a more effective use of resources. In contexts where trade-offs are inevitable, the knowledge that an intervention in one area is likely to spark improvement in other areas could have a major influence on policy. Ignoring these interactions in policy making is wasteful. It may also be damaging. If they are to succeed, policy interventions intended to spur development must adequately address the range of factors that can impede a country's progress. Funds invested in teacher training, for example, may be squandered if teachers receive no advice or assistance to maintain sound health. Ill health decimates the education workforce in a country triggering a vicious spiral whereby poor health in teachers hinders the education of children. This leaves children, through their lack of knowledge, more vulnerable to

[2] *One of the more useful and extensive studies to date is United Nations (2005).World Population Monitoring 2003: Population, Education and Development.*

health hazards themselves. Such an analogy gives reasons for a possible causal link between health, education and economic growth. Keeping in mind such linkages we review the extant empirical literature concerning the triangular relationship between health, education and economic growth.

Bloom *et al* (2004) by using 2SLS technique found that life expectancy and schooling have a positive and significant effect on GDP and thus, health, education and economic growth are linked. Khan (2005) analyzed the relationship between human capital and economic growth in 72 developing countries for the period 1980-2002, and concluded that countries which invested significantly in human capital have achieved higher returns in terms of economic growth. Bernard *et al.* (2006) examined the interactions between education, health and economic welfare in a holistic framework of economic development which provided the evidence of a powerful interdependency among them. Aka and Dumont (2008) examined the dynamic linkage between health, education and economic growth for the USA and found that the long-run dynamics of economic growth can be explained by past education level while a lesser part of these variations are related to health level. Economic growth accounts for more part in the explanations of education level. Li and Huang (2009) examined the relationship between health, education and economic growth in the framework of Chinese economy for a sample period of 1978-2005, and found that both health and education have positive significant effects on economic growth.

Alam, Sultana and Butt (2010)examined the long run relationship between social expenditures and economic growth in Asian developing countries and suggested the existence of long-run dynamic relationship among expenditures on education, health and social security welfare along with fiscal deficit/surplus on economic growth for all cases of sample countries. Haldar and Mallik (2010)investigated the cointegration between investments in physical capital, human capital (education and health) and output for India over the time span 1960 to 2006, and found neither short-run nor long-run effect of investment in physical capital on per capita GNP, but found significant long-run effect of investment in health and education on per capita GNP.

Guisan and Exposito (2010) examined the empirical relationship between expenditure on health and education and certain indicators of human well-being in the context of Africa and Asia, and found that increase in spending on education has an expansionary impact on spending on health-care. Qadri and Waheed (2011) investigated the impact of human capital (education and health) on Pakistan's economic growth during 1978-2007 and found that human capital is a highly

significant determinant of economic growth. Similarly, Asghar, Awan and Rehman (2012) examined the cointegration and causality between human capital and economic growth and found a significant impact of human capital on economic growth of Pakistan. Hassan and Kalim (2012) investigated the existence of long-run association and triangular causality among real GDP per capita, per capita education expenditure and per capita health expenditure in Pakistan over 1972-2009, and fond the evidence of presence of such relationship. Ebiringa and Charles (2012) found the evidence that government expenditure on education and health sector have positive impact on Nigeria's economic growth. Maitra and Mukhopadhyay (2012) examined the relationship between public expenditure on education, health care and economic growth in selected countries of Asia and the Pacific, and found mixed evidence of cointegrating and causal relationship between variables. Sen, Kaya and Alpaslan (2015) empirically analyzed the possible existence of Granger causality among education expenditure, health expenditure and economic growth for the selected developing countries – Argentina, Brazil, Chile, India, Indonesia, Mexico, South Africa, and Turkey – over the period 1995-2012 in a Bootstrap Panel Granger Causality framework. The result shows a positive and significant causality running from both education and health expenditures to economic growth only in Brazil and Mexico. Thus, no robust evidence has been noticed. Eggoh, Houeninvo and Sossou (2015) found interesting empirical evidence regarding the relationship between education, health and economic growth on the basis of a sample study on 49 African countries that public expenditures on education and health have negative impact on economic growth, whereas human capital stock indicators have a slight positive effect.

All of the above studies contributed in depicting various facets of the interdependencies existing between health, education, and economic growth/development. It is clear that the direction of causality between these variables has been a controversial and much disputed subject within the field. Furthermore, it is observed that a little work has been carried out in the context of Indian economy to analyze the dynamics of the triangular relationship between health, education and economic growth. But, India being at the frontier of the developing world, it is very essential that the said dynamics be investigated, to enable formulating a holistic policy approach to the problems of economic development in the country. It is in this way this study intends to contribute to the literature empirical evidence on the dynamics of the relationship between health, education and economic growth.

Data and Methodology

This research work is an endeavor to uncover the dynamics of linkages between government expenditure on health, government expenditure education and economic growth in the context of Indian economy. The period of the study spans from 1985-86 to 2014-15. On the basis of the aforesaid literature, it is hypothesized that there exist a positive relationship among the indicators of health, education and economic growth in case of India. In order to test this hypothesis, we have taken Real GDP per capita as proxy for economic growth of India, general government expenditure on education as an indicator of growth of education and general government expenditure on health as an indicator of growth of health care in the country.

Real GDP per capita is important because it ensures opportunities to the investors to expand volume of investments in the country which in turn raises employment opportunities and living standard of people. Therefore, more funds available to the people ultimately reveal their attention to focus on both health and educational facilities in the country.

Lucas (1988), Permani (2009), Chandra (2011) and Hussin*et al.* (2012) held the view that public spending on education promotes human capital which in turn may contribute to economic growth. Thus, public expenditure on education by GoI is taken as the proxy for growth of education in the country. It is hypothesized that if GoI raises its volume of development spending on education, the working class will become well equipped and sound in terms of latest techniques of production, and R&D. This will enhance their productivity skills which ultimately benefit the manufacturing class. The returns to business class will encourage further investments in the country leading to enhance rate of economic growth in the country.

Wang (2011) and Rajeshkumar and Nalraj (2014) found that health-care expenditure growth positively contributes to economic growth. Thus, expenditure on health-care by the government is considered as an important variable in this study. It is assumed that if government increases its spending on health, people will enjoy good health, and death rate will decline in the country. This will not only enhance the volume of labour force in the country, but also uplift the productivity of labour.

Given the above justifications for the inclusion of aforementioned three study variables, the required time series data have been collected from various sources – GDP per capita at 2004-05 prices (denoted by EG) from Central Statistical Organization (CSO), General Government Expenditure on Health (denoted by HE) and General Government Expenditure on Education (denoted by EE) from plan

documents and economic survey of India. All the variables have been used in their logarithmic form so as to obtain significant, consistent and reliable results (Cameron, 1994; Ehrlich, 1996).

In order to examine the triangular dynamism, Toda and Yamamoto (1995) approach of causality test is used. This method is relatively more efficient in small sample data sizes. Another advantage of this procedure is that it does not require the pre-testing of the time series for cointegration properties so long as the order of integration of the process does not exceed the true lag length of the model. Toda and Yamamoto methodology of Granger causality test by directly performing the test on the coefficients of the levels VAR, minimizes the risk associated with possibly wrongly identifying the orders of integration of the series and the presence of cointegration relationship (Galies, 1997; Mavrotas and Kelly, 2001).

The basic idea in the Toda and Yamamoto procedure is artificially augmenting the correct VAR order, k with d extra lags, where d is the maximum likely order of integration of the time series in the empirical system. Thus, at the outset, it is required to determine the maximum order of integration of time series, say, $d_{\max}$. Then the optimal lag length of the VAR model is to be determined using In this study, the Sequential modified Likelihood Ratio(LR) test statistic, Schwarz Information Criterion (SIC) and Hannan-Quinn Information Criterion (HQIC) techniques, say, k . In the third step, the ($p = k + d_{\max}$)$^{\text{th}}$ order of VAR is to be estimated with Seemingly Unrelated Regression (SUR). At last, the null hypothesis of no-causality is to be tested using a standard Wald statistic, say, W . The implementation of the Toda and Yamamoto approach to Granger causality necessitates linking the three variables of the study in a trivariate system as follows:

$$Y_t = A_0 + A_1 Y_{t-1} + ... + A_k Y_{t-k} + \varepsilon_t \quad \text{..... (1)}$$

where $Y_t = \begin{bmatrix} Y_{1t} \\ Y_{2t} \\ Y_{3t} \end{bmatrix} = \begin{bmatrix} LEG_t \\ LHE_t \\ LEE_t \end{bmatrix}$ and $\varepsilon_t \sim i.i.d\ N(0, \mu)$; and A's are 3x3 matrices of coefficients. LEG stands for Log of Economic Growth variable, LHE is the Log of Health-care Expenditure variable, and LEE is the Log of Education Expenditure variable.

The following augmented levels $VAR(p = k + d)$ shall be estimated to test the null hypothesis of no-causality:

$$Y_t = \alpha + A_1 Y_{t-1} + ... + A_k Y_{t-k} + A_{k+1} Y_{t-k-1} + ... + A_p Y_{t-p} + \varepsilon_t$$

..... (2)

This augmented VAR system is to be estimated using the Seemingly Unrelated Regression (SUR) technique. The null hypotheses of the study are:

H_{01}: Y_{2t} does not cause Y_{1t}, i.e., $a_{12}^1 = a_{12}^2 = ... = a_{12}^p = 0$

H_{02}: Y_{3t} does not cause Y_{1t}, i.e., $a_{13}^1 = a_{13}^2 = ... = a_{13}^p = 0$

H_{03}: Y_{1t} does not cause Y_{2t}, i.e., $a_{21}^1 = a_{21}^2 = ... = a_{21}^p = 0$

H_{04}: Y_{1t} does not cause Y_{3t}, i.e., $a_{31}^1 = a_{31}^2 = ... = a_{31}^p = 0$

H_{05}: Y_{3t} does not cause Y_{2t}, i.e., $a_{23}^1 = a_{23}^2 = ... = a_{23}^p = 0$

H_{06}: Y_{2t} does not cause Y_{3t}, i.e., $a_{32}^1 = a_{32}^2 = ... = a_{32}^p = 0$

All the null hypotheses are to be tested by Wald test which can be formulated as follows. Let $e_1 = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$, $e_3 = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$ and $D = I_k \otimes e_3$ with I_k being the $k \times k$ identity matrix. Let $vec(A)$ be the column vector obtained by stacking the rows of the matrix A. Then the Wald Test statistic is given by: $W = T\left((e_1^{'} \otimes D^{'})vec(\hat{A})\right)\left((e_1^{'} \otimes D^{'})\hat{\Sigma}(e_1^{'} \otimes D^{'})^{'}\right)^{-1}(e_1^{'} \otimes D^{'})vec(\hat{A})$, Where $\hat{\Sigma}$ is a consistent estimator of the asymptotic variance matrix of $\sqrt{T}vec(\hat{A} - A)$.

The Wald test statistic (W) has an asymptotic χ^2 distribution with k degrees of freedom. The reason for ignoring the remaining $d_{\max}$ autoregressive parameters in testing for Granger causality is that it helps overcoming the problem of non-standard asymptotic properties associated with standard Wald test for integrated variables. In the literature, it has been shown that Wald test experience efficiency improvement when SUR models are used in the estimation (Rambaldi and Doran, 1996).

Empirical Analysis

In the first step of the Toda and Yamamoto causality analysis, the order of integration for each of the three variables used in the analysis is determined. The

Augmented Dickey-Fuller (ADF) unit root test has been used for this purpose. The results of ADF unit root test are reported in Table -1.

Table 1: Results of ADF Unit Root Test

Variables	Augmented Dickey-Fuller (ADF) Test Statistic				
	Level form with intercept		First Difference form with intercept		Order of Integration
LEG	0.750	1%: -3.68 5%: -2.97 10%: -2.62	-3.553	1%: -3.68 5%: -2.97 10%: -2.62	I(1)
LHE	-0.532	1%: -3.71 5%: -2.98 10%: -2.62	-4.761	1%: -3.71 5%: -2.98 10%: -2.62	I(1)
LEE	-0.777	1%: -3.68 5%: -2.97 10%: -2.62	-3.738	1%: -3.68 5%: -2.97 10%: -2.62	I(1)

Source: Author's Own Calculation

It is evident that the null hypothesis of no unit roots for LHE and LEE variables are rejected at their first differences since the ADF test statistic values are less than the critical values at 1% levels of significance. Thus, these two variables are stationary and integrated of same order, i.e., I(1). Similarly, the variable LEG is integrated of order one, i.e., I(1) as the ADF test statistic at the first difference form is less than the critical value at 5% level of significance.

The results obtained from the ADF test suggest that the maximum order of integration of the series under study is one, i.e., $d_{\max} = 1$. Thus, the Toda-Yamamoto test involves the addition of one extra lag of each of the variables to control for potential cointegration. Then it is required to select the appropriate lag length for the VAR in order to perform causality test. In this study, the Sequential modified Likelihood Ratio (LR) test statistic, Schwarz Information Criterion (SIC) and Hannan-Quinn Information Criterion (HQIC) techniques have been used to determine the optimal lag length. The results of such test are presented in Table-2. The optimal lag length, thus selected is $k = 1$.

Table 2: Selection of Lag Length

Lag	LR	SIC	HQIC
0	NA	2.023344	1.924243
1	223.8398*	-6.232250*	-6.628652*
2	14.65777	-5.859174	-6.552876

Source: *Author's Own Calculation*

**indicates lag order selected by the criterion at 5% level*

In the next step, the augmented VAR of order 2 ($p = k + d_{\max}$) is estimated with SUR and the Wald test is carried out using standard chi-square distribution. And, the results of Toda and Yamamoto Ganger non-causality test are reported in Table-3. Results of Wald test shows that the null hypotheses that 'Health Expenditure does not Granger Cause Economic Growth' and 'Economic Growth does not Granger Cause Health Expenditure' are rejected at 5% level of significance. In other words, health-care expenditure causes real economic growth and real economic growth also leads to expansion in health-care spending. Thus, both health expenditure and real economic growth cause each other, i.e., a bi-directional relationship exists between these two variables.

Table 3: Results of Toda and Yamamoto Granger Non-Causality Test

Null Hypothesis	Chi-Square Statistic (d.f)	p-value	Decision about Null Hypothesis
LHE does not Granger Cause LEG	14.267 (2)	0.0008	Reject
LEG does not Granger Cause LHE	5.078 (2)	0.0789	Reject
LEE does not Granger Cause LEG	9.389 (2)	0.0091	Reject
LEG does not Granger Cause LEE	4.034 (2)	0.1330	Accept
LEE does not Granger Cause LHE	7.145 (2)	0.0281	Reject
LHE does not Granger Cause LEE	1.595 (2)	0.4502	Accept

Source: Author's Own Calculation

Furthermore, the results of Toda-Yamamoto test reveals that the null hypothesis that 'Expenditure on Education does not Granger Cause Economic Growth' is rejected at 5% level of significance whereas the null hypothesis that 'Economic Growth does not Granger Cause Expenditure on Education' is accepted at 5% level of significance. In other words, education expenditure leads to real economic growth but not the other way around. It means a unidirectional causal relationship runs from education expenditure to real economic growth. And real economic growth, on the other hand, lacks impetus to boost up the development of education sector through government spending.

It is further revealed that the null hypothesis that 'Expenditure on Education does not Granger Cause Health Expenditure' is rejected at 5% level of significance. But the null hypothesis that 'Health Expenditure does not Granger Cause Expenditure

on Education' is accepted at 5% level of significance. It means a unidirectional causality runs from education spending to health-care spending. In other words, the expenditure on education contains certain stimulating power to influence positively the health sector. But there exists no causality running from health-care expenditure to education over the sample period. It means health-care spending lacks energy to accelerate the pace of growth of educational attainments in India through government spending in this sector.

Discussion

The results of this study are very interesting. It is found that real economic growth (real per capita GDP) Granger causes health-care spending and health-care spending also Granger causes real economic growth. This confirms that there exists a bi-directional causality between real economic growth and expenditure on health-care in India over a long period of time. It is further revealed that expenditure on education causes real economic growth, but not the other way around. In addition, expenditure on education is found to cause health-care expenditure, but not the other way around. This indicates a unidirectional intra-sectoral causality running from general government spending on education to that of on health. This finding keeps much relevance to India. In India the average general government spending on education during 1995-96 to 2014-15 is about 49 per cent of total social service expenses whereas that of on health is only 21 per cent. So statistically spending on education likely to dominate and thus, influence the health-care spending. In terms of percentage of total expenditure and as a percentage of GDP, government expenditure on education remains ahead of government expenditure on health. However, such number wonder does not reveal the truth. Of course, higher educational attainments due to higher education spending have created certain forward linkage effects which contribute to health sector development in the country. It is quite evident from the increased demand for health-care facilities in India in at least last two decades. But what about the people at the bottom of the pyramid? There are large volumes of illiteracy and primary school drop-outs certainly due to various socio-economic marginalities. They are not aware of the benefits of better education and health. In fact, most of them have not the scope of thinking about health and education. Because of poor health, enrollment ratio is far below the satisfactory level, cognitive and learning response at school and higher education is also not satisfactory. Probably these are the explanations for no intra-sectoral causal relationship running from health-care spending to that of education.

Interestingly, our results support the unidirectional causal relationship running from expenditure on education to real economic growth. In a macro-

economic perspective, spending on education by creating educated, trained and productive human capital contributes effectively to higher real economic growth. In India this fact is evident from the development of huge educational infrastructure, increased labour productivity, and expansion in domestic market size, technological sophistication, and increased per capita national income. However, we did not find any evidence of causality running from economic growth to the development of education as a basic social service. The reasons may include: first, given the limited amount of resources, share of government spending on education in GDP is very low; second, it might be due to teaching and research quality, which has recently come to the forefront as an important social bottleneck; last but not the least, it also seems possible that this finding may be due to inefficient or corrupt bureaucratic practices which prevents the benefits of higher real economic growth to percolate in education.

The finding of the existence of feedback relationship between health-care spending and real economic growth in the context of Indian economy partially corroborates to the earlier empirical evidence provided by Rajeshkumar and Nalraj (2014) that examined the causal relationship between health care spending and economic growth on the four selected states of India for the period 1991-2010 and found the evidence of unidirectional causality from health expenditure to economic growth for all the states. Good health due to increased health care facilities as a result of efficient government spending on health sector eliminates production losses; raises a number of children enrolled to school and performing better in a cognitive and learning task; reduces mortality rate and increases life expectancy; creates an opportunity for individuals to use existing resources; puts higher disposable income in the hands of individuals with good health, and contribute to national income by boosting efficiency productivity of manpower. Similarly, the way economic growth leads to expenditure on health sector development may be explained in terms of productive utilization of money and other resources for health sector development, higher per capita income and better awareness make it possible to demand improved health-care facilities.

Concluding Remark

This research work was an attempt to investigate the triangular dynamics among real GDP per capita, expenditure on education and health in the context of Indian economy over the sample period spanning from 1985-86 to 2014-15. In relation to this objective, Toda-Yamamoto method of Granger Causality test was employed in a trivariate framework and it is found that real economic growth (real per capita GDP) Granger causes health-care spending and health-care spending also Granger causes real economic growth. This confirms that there exists a bi-directional

causality between real economic growth and expenditure on health-care in India over a long period of time. It is further revealed that expenditure on education causes real economic growth, but not the other way around. In addition, expenditure on education is found to cause health-care expenditure, but not the other way around.

Sen (2013) aptly said 'you need an educated, healthy workforce to sustain economic development'. Thus, the Govt. of India should emphasize on substantial development of health sector by bringing efficiency in spending and encouraging greater level of private sector participation in this sector. By enjoying healthy life, people will desire to derive benefits from quality of life. Thus, the demand for education will increase and hence, both public and private expenditure on education would go up leading to the development of education sector. Due to expansion in health and education larger volume of trained and skilled manpower shall be available for contributing effectively to real national income. Therefore, it may be concluded that social sector spending can positively affect the economic growth of a developing nation like India. Any fiscal adjustment that reduces unproductive expenses, generated economies of scale to reduce cost of production and increase returns to manufactures, and protects social sector spending can prove to be more sustainable and more likely to result in faster economic growth. In addition, a congenial socio-economic and legal environment should be created in the country that promotes foreign investment over and above to domestic investment in the social sectors like health and education. This will not only give a fillip to employment scenario of the nation, but also helps achieving warranted rate of growth. However, further empirical studies incorporating other dimensions of social sector are warranted to reveal the dynamics of sectoral linkages in India that may substantially contribute to the sustainable development of the country. This study has a limitation of not including in the discussion the cases of various states of India. In this direction, a cross-sectional study is also warranted to justify the merit of the importance of social sector in the macro-economic growth and development of India.

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