Does health expenditure affect health outcomes? A cointegration based approach to the Indian healthcare system

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Abstract: The main purpose of this paper is to see whether the health expenditure (LHE) is going to have any influence on life expectancy (LLE) and on under-five mortality rates (LUM) in case of India. The data for these variables were taken for a period 1980–2018. To see the relationship among these variables we have used Johansen method of co-integration and VECM for knowing the direction of causality. To check the strength of causality, VDA and IMFs were used. A long-run causal relationship between health expenditure and health outcomes were observed showing both these variables got influenced by the health expenditure. This relationship was also found in the short run but is unidirectional. This relationship supports that better health expenditure leads to better health outcomes. Therefore, we suggest that if more health expenditure leads to better health outcomes, why shouldn't then health expenditure be enhanced to have better health outcomes?

Keywords: health expenditure; health outcome; cointegration; causality; unidirectional.

Reference to this paper should be made as follows: Lone, T.A., Sheereen, Z., Dar, J.A. and Lone, P.A. (2021) 'Does health expenditure affect health outcomes? A cointegration based approach to the Indian healthcare system', *Int. J. Behavioural and Healthcare Research*, Vol. 7, No. 3, pp.227–240.

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1 Introduction

Do countries with better health outcomes like low mortality rates, low fertility rates, low undernourishment rates, higher life expectancy rates etc spend more or less to accomplish these results? The usual input-output production theory implies a negative relationship between more spending and better health outcomes i.e., spending more yields higher life expectancy rates, lower mortality and morbidity rates, fertility rates, undernourishment rates and vice versa (Rubin et al., 2016). If this is really the case, then fiscal cutbacks could cause worse health outcomes. Same is the case with India; due to austerity measures introduced in late 1980s the health expenditure both by Centre and State governments have not increased significantly which has badly affected the health outcomes (Jain, 2014). The public healthcare system in India is erratic, with underfunded and congested hospitals and insufficient rural coverage. The funding reduction by the government has been ascribed as historic failures on the part of the Ministry of Health and Family Welfare (MHFW) to spend its allocated budget fully. This is regardless of increasing demand, because of growing incidence of age and lifestyle-related chronic diseases, sedentary lifestyles, changing diets, rising obesity levels, and widespread availability of tobacco products (IHS Global, 2014). Besides, India has one of the world's highest numbers of diabetic victims at more than 65 million people. The infant, maternal and child mortality and malnutrition rates are still one of the highest in India. As its hunger scenario is concerned it is one of the worst in the world. It still trails behind many neighbouring countries like Nepal, Bangladesh and Pakistan in Global Hunger index (Global Hunger Report, 2019).

Looking other side of the coin India is among the low public health spending economies in the world (Sanghera, 2018). This low spending on the part of government places much burden both on patients as well as on their families, as is evident by the country's out-of-pocket (OOP) spending rates. These spending rates are also one of the highest in the world. Just 33% of Indian healthcare expenditure comes from government sources and out of the remaining private spending around 86% comes from out-of-pocket expenses (WHO, 2015). No doubt, some initiatives have been taken to augment the public spending on healthcare, but these initiatives have met with little or limited success. The National Rural Health Mission (NRHM) 2005 and the Rashtriya Swastya Bima Yojana (RSBY) 2008 are the two major initiatives taken to address the rural health issues. Recently launched Ayushman Bharat in this connection is a good move as it aims to provide free health coverage to 40% of its poor and vulnerable people. Besides, several State governments have also came up with their own insurance schemes but in spite of these efforts the actual public spending on health has not shown much increase and is currently stagnated at 4.1% of GDP. Though this expenditure level is not bad at all but the main problem is that major portion of it comes from out-of-pocket expenses. Many developing countries like Brazil and Thailand are very close to universal health coverage. Both these nations have almost the same level of total health expenditure as that of India but its proportion of public health expenditure is 77.7% of total health expenditure (which is 3.2% of the GDP) and this is spent through a form of tactical purchasing in which about 95% is purchased from public healthcare services, this is what gave it such a high level of efficiency.

In the light of above, the study aims to expatiate the health expenditure through brief literature and empirically investigate the relationship between health expenditure and health outcomes. Health expenditure has a great connotation for the economy as a whole but so far it has not been empirically deemed well. Same is the case of India. Therefore, we take an opportunity to understand the likely effect of health expenditure on Indian economy by relating it with life expectancy and under five mortality rates. Although there are other factors as well such as changing life styles, deteriorated climatic conditions, use of tobacco, drug addiction etc that also effect the public health (Rizzuto and Fratiglioni, 2014). However, this study is restricted only to three-variable system i.e., health expenditure, life expectancy and under five mortality rates because many organisation's such as World Health Organization advocate that healthcare spending is one of the important determinants of health status for the nation as a whole (WHO, 2015).

Although there has been a lack of support in terms of empirical works looking the relation between health expenditure and health outcomes. However, a few studies have been done on various issues of health expenditure. Most of the studies we have gone through have investigated the relationship between national income, healthcare expenditure, determinants and income elasticity of health expenditure both in developed and developing countries. However, the reported findings of these studies are mixed. One of the key findings of earlier studies is that the ratio of healthcare expenditure to GDP increased as country developed economically and industrially. One such finding is that GDP is an important determinant of health expenditure after adjusting for certain variables like inflation, exchange rates and population (Abel, 1967). Similarly, Shiu and Chiu (2008) studied population ageing and life expectancy as variables to explain the variation in healthcare expenditure. They found that healthcare expenditure, income growth, ageing and life expectancy had a significant and long-run economic relationship. All variables have shown positive impact on healthcare expenditure. Toor and Butt (2005) analysed the relationship between health expenditure and socio-economic factors in Pakistan using conventional log-linear and cointegrating method. The results indicate that socio-economic factors such as GDP per capita, urbanisation, literacy rate, crude birth rate, and foreign aid play a significant role in determining healthcare expenditure. Murthya and Okunade (2000) by applying a battery of cointegration tests empirically confirms the existence of a long-run economic relationship between the US healthcare expenditure and real GDP, demographics, physicians per bed and budget deficits. Rivera and Currais (2010) examined both direct and reverse causation between economic growth and healthcare through the use of Hausman test confirms the existence of a feedback effect between healthcare and income. Odubunmi et al. (2012) employed the multivariate cointegration technique of Johansen and discovered the presence of at least one cointegrating vector depicting a long run relationship among economic growth, foreign aid, health expenditure, saving and population. Akram et al. (2009) used the cointegration coupled with Error Correction technique illustrates that age dependency, population per bed, secondary school enrolment, life expectancy, mortality rates are affecting per capita GDP but shows that health expenditure does not show any relationship with per capita GDP.

After discussing the various studies related to different aspects of health expenditure and its relation with GDP, there are quite a few studies that examine the direct relation between health expenditure and health outcomes. Although few studies like Newhouse (1977) show that there is no relationship between health spending and health outcomes. However, we quote quite a few studies against such study. World Bank (1993) explicitly reveals three factors such as human behaviour, the range of diseases present, the amount and effectiveness of expenditure in the health system that determine the health status of population. Wagsta and Doorslaer (1993) explores the equity and fairness in the delivery of healthcare in ten OECD countries reveals that except USA, countries spending relatively a large share of per capita GDP on healthcare have a relatively low degree of disparity in morbidity. Cremieux et al. (1999) finds similar results in Canada showing that low health spending is associated with higher infant mortality and lower life expectancy rates. Hall et al. (2012) applied generalised cointegration method to check the relation between health expenditure and health outcomes. They found that life expectancy goes on increasing as health expenditure increases with elasticity around 0.29 which although is low but is quite stable. Same results were observed between health expenditure and health outcomes by Bokhari (2007) and Albala et al. (2002). Amponsah (2019) studied the impact health expenditure on health outcomes in Sub-Saharan Africa showing that health expenditure imposes a significant influence on less than 5 mortality and maternal mortality rates and on life expectancy. Bein et al. (2017) finds a positive relation between health expenditure, life expectancy, under five death rates, neonatal and infant mortality rates in eight East African countries through the technique of panel regression. Similar results were seen between health expenditure and health outcomes by Chukmaitova (2003), Notzon et al. (1998), Hitiris and Posnet (1992) in their respective studies. Under this scenario, the present study is designed to analyse if any convincing relationship exists between health expenditure and health outcomes in particular with life expectancy and under five mortality rates.

2 Data and variable

The study consists of annual time series data of health expenditure, life expectancy and under five mortality rates for a period 1980–2018. Health Expenditure as a percentage of GDP has been taken as a variable to look at the total government expenditure on health. Life expectancy is measured in terms of life expectancy at birth in total years and under five mortality rates in terms of prevalence of mortality rates among population aging less than five year. The data of life expectancy and under five mortality rates were taken from World Development Indicators of World Bank. However, data of health expenditure was taken from different sources such as World Development Indicators, RBI Monthly Bulletin and National Health Accounts, and WHO.

3 Methodology

3.1 Empirical model

The empirical model illustrating the relationship between health expenditure and health outcomes is written as

$$\text{LHE} = f(\text{LLE, LUM}) \tag{1}$$

where LHE is the natural log of health expenditure, LLE is the natural log of life expectancy and LUM is the natural log of under-five mortality rates.

We have applied the Johansen cointergration testing approach developed by Johansen and Juselius (1990) for testing cointegration and VECM (Vector Error Correction Model) for testing the causality among variables. To apply the said econometric techniques, we have to first go through the unit root testing in order to check the data for stationarity.

3.2 Unit root and stationarity test

The unit root testing requires the use of either Augmented Dickey Fuller or Phillips and Perron tests. We employed Augmented Dickey Fuller test for unit root testing. The Augmented Dickey Fuller test makes use of a regression of the first differences of the series against the series lagged once, Y_{t-1}, and lagged difference terms. It may include a constant term α and trend term δ_t as follows:

$$\Delta LY_t = \alpha + \delta_t + \beta LY_{t-1} + \sum\nolimits_{i=1}^{m} \gamma \Delta LY_{t-i} + \varepsilon_t \tag{2}$$

where Δ is the first difference operator and ε_t is a stationary random error. The lag length (m) is determined automatically by SIC information criteria. The test for a unit root has a null hypothesis that $\beta = 0$. If the coefficient is statistically different from 0, the hypothesis that Y_t contains a unit root stands rejected.

3.3 Tests of cointegration

The Johansen method and the Engle-Granger test are the two main approaches that can be used to check the existence of cointegrating relationship among variables. Both these methods are used for checking the presence of a unit root and for determining the order of integration. However, we have restricted our study to Johansen's procedure because it relies on the relationship between rank of a matrix and its characteristic roots and measures the long-run relationship between non stationary variables using a maximum likelihood procedure. This method depends on direct exploration of cointegration in the vector autoregressive (VAR) mode. The cointegration method of Johansen and Juselius (1990) has the following form:

$$\Delta Y_t = \Gamma \Delta Y_{t-1} + \ldots + \Gamma_{k-1} + \Delta Y_{t-k+1} + \Pi Y_{t-1} + \gamma + \varepsilon \tag{3}$$

The null hypothesis for r cointegrating vectors is: H_0: n has a reduced rank, $r < k$.

Where Y_t is a $k \times l$ vector of $I(1)$ variables of $\Gamma \ldots \Gamma_{k-1}.\varepsilon_t$ is an $(k \times 1)$ vector of residuals and Π is $k \times k$ matrices of unknown parameters Π, coefficient matrix contains information about long-run relationship. The reduced rank condition implies that the process ΔY_t is stationary and Y_t is non stationary. Three cases are possible for Π. Firstly, if Π is of full rank, all elements of Y are stationary, and none of the series has a unit root. Secondly, if a rank of $\Pi = 0$ implies an absence of stationary combinations and no cointegrating vectors. Finally, if the rank of Π, is between r and k, the Y variables are cointegrated and there exist r cointegrating vectors.

The presence of different cointegrating vectors can be obtained by determining the significance of the characteristic roots of Π. As such we have used both the Trace test and the Maximum Eigenvalue test to determine the significance of the number of characteristic roots that are not different from unity. The equations for these two tests are expressed in the form as:

$$\lambda_{trace}\left(r\right) = -T\sum\nolimits_{i=r+1}^{g} \ln\left(1-\hat{\lambda}_i\right) \tag{4}$$

$$\lambda_{\max}\left(r, r+1\right) = -T\ln\left(1-\hat{\lambda}_{r+1}\right) \tag{5}$$

where λ_i is the estimated value for the i-th ordered eigenvalue from the estimated Π matrix, r is the number of cointegrating vectors under null hypothesis, and T is the number of observations.

Since cointegration results are responsive to lag length of VAR, the optimum lag length can be chosen through the use of different information criteria. As we have selected the annual data for the study, the maximum length is chosen therefore is three.

3.4 Vector error correction model

Once variables depict the long run relationship, it requires the use of an error correction mechanism which specifies the speed of adjustment towards long run equilibrium after taking place of a short run shock. In order to go for error correction, the following equations are estimated:

$$\begin{aligned}\Delta LHEC_t = {} & \alpha_1 + \sum\nolimits_{i=1}^{p} \Phi_1 \Delta LHEC_{t-i} + \sum\nolimits_{i=1}^{p} \Phi_2 \Delta LLE_{t-i} + \sum\nolimits_{i=1}^{p} \Phi_3 \Delta LUN_{t-i} \\ & + \alpha_2 ECT_{LHECt-1} + \varepsilon_{LHECt}\end{aligned} \tag{6}$$

$$\begin{aligned}\Delta LLE_t = {} & \beta_1 + \sum\nolimits_{i=1}^{q} \eta_1 \Delta LHEC_{t-i} + \sum\nolimits_{i=1}^{q} \eta_2 \Delta LLE_{t-i} + \sum\nolimits_{i=1}^{q} \eta_3 \Delta LUN_{t-i} \\ & + \beta_2 ECT_{LLEt-1} + \varepsilon_{LLEt}\end{aligned} \tag{7}$$

$$\begin{aligned}\Delta LUN_t = {} & \gamma_1 + \sum\nolimits_{i=1}^{r} \delta_1 \Delta LHEC_{t-i} + \sum\nolimits_{i=1}^{r} \delta_2 \Delta LLE_{t-i} + \sum\nolimits_{i=1}^{r} \delta_3 \Delta LUN_{t-i} \\ & + \gamma_2 ECT_{LUNt-1} + \varepsilon_{LUNt}\end{aligned} \tag{8}$$

where ECTs are the error correction terms derived from the cointegrating vector. Its negative and statistically significant parameters would indicate the long-run causality. Φs, ηs and δs are the short run parameters and $\mathcal{E}$s are the white noise error terms. The study makes use of Wald coefficient restriction test based on the Chi-Square values. The rejection of null hypotheses ($\Phi_2 = 0$ and $\Phi_3 = 0$) would show the short run causality direction from life expectancy and under five mortality rates to health expenditure, equation (6). The rejection of null hypotheses ($\eta_1 = 0$ and $\eta_3 = 0$) reveals the short run causality direction from health expenditure and under five mortality rates to life expectancy, equation (7). The rejection of null hypotheses ($\delta_1 = 0$ and $\delta_2 = 0$) proves the short run causality from health expenditure and life expectancy to under five mortality rates respectively, equation (8).

3.5 Variance decomposition analysis and impulse response functions

After looking for the direction of causality, the study makes the use of innovative accounting procedures to verify the strength of relationship by applying the VDA (Variance Decomposition Analysis) IRF's (Impulse Response Functions) procedures. VDA explicates variance of forecast error of variable due to its self-innovation and other variables under study. However, the Impulse response functions depict the effects of shock on adjustment track of a variable.

3.6 Residual diagnostic tests

We have applied varied residual diagnostic tests for the model validity check-up. To know the serial correlation of the residuals, we have applied Breusch-Godfrey Serial Correlation LM Test. To check the Heteroskedasticity, we have used Breusch-Pagan-Godfrey Test and to see whether residuals follow normal distribution, we have applied Jarque-Bera Test.

4 Results and discussion

As mentioned before, the initial step in cointegration analysis is to determine integration order of the variables. Therefore, ADF unit root test was conducted on both at levels and at first difference. The results of ADF are reported in Table 1. The lag length for the model is determined according to the Schwartz information criterion.

Table 1 Results of augmented Dickey-Fuller unit root test

Variables	*At level*		*At first difference*	
	With intercept	*With intercept and trend*	*With intercept*	*With intercept and trend*
LHE	–1.794134(0)	–2.858996(0)	–7.105202(0)**	–7.017614(0)**
LLE	0.752079(4)	1.886071(8)	–14.34700(2)**	–15.07233(1)**
LUM	–0.733384(3)	–2.867767(1)	–4.528431(2)**	–4.449032(2)**

Note: ** indicates the significance at 5% level and the values in parenthesis shows the lag length.

In Table 1 null hypothesis of unit root against the alternative of stationarity is tested. The results reveal that all the variables are non-stationary at level so the null hypothesis of unit root at level cannot be rejected. However, taking the first difference, null hypothesis of unit root gets rejected for all the variables and become stationary at $I(1)$. As all the variables are of the order $I(1)$, the most suitable technique for analysis is therefore cointegration.

It can be seen from Table 1 that as all the variables are stationary of the order 1(1), we can apply the Johansen method of cointegration. The next step is the choice of optimal lag length. To determine the optimal lag length, we have used the VAR model. The lags selected on the basis of various criteria are presented in Table 2.

Table 2 Lag selection criterion

Criterion	*Lag length selected*
LR	3
FPE	3
AIC	3
SC	3
HQ	3

The next step after choosing the optimal lags is to determine the number of cointegrating vectors. In this study, we used both Trace statistic and Eigenvalue statistics. The results of both of these statistics are summarised in Table 3 and Table 4.

Table 3 Unrestricted cointegration rank test (trace)

Hypothesised no. of CE(s)	*Eigenvalue*	*Trace statistic*	*(0.05) Critical value*	*Prob.***
None	0.74068	69.2917	29.79707	0.0000
At most 1	0.44892	15.49471	27.4514	0.3215
At most 2	0.25148	3.841466	8.97921	0.1727

Table 4 Unrestricted cointegration rank test (maximum eigenvalue)

Hypothesised no. of CE(s)	*Eigenvalue*	*Max-eigen statistic*	*(0.05) Critical value*	*Prob.***
None *	0.740679	41.8403	21.13162	0.0000
At most 1	0.44892	14.2686	18.47215	0.1302
At most 2	0.251476	3.841466	8.979211	0.1527

Notes: Both trace and Max-eigen indicates 1 cointegrating eqn(s) at the 0.05 level.
*Denotes the rejection of the null hypothesis at 0.5 level.
**MacKinnon-Haug-Michelis (1999) p-values.

The results of both the Trace statistic and Max-Eigen value suggest that there exists at least one cointegrating vector. As only one value is statistically significant, we can categorically reject the null hypothesis at 5% level of significance.

The testimony for the existence of a cointegration equation tells us that there is long-term relationship between healthcare expenditure and the health outcomes. To check out this relationship and to examine the causality among variables we have applied VECM (Vector Error Correction Model). The results of VECM are presented in Table 5.

Table 5 Error correction model estimation

	Short run causality			*Long run causality*
Variable	*D(LHE$_{t-i}$)*	*D(LLE$_{t-i}$)*	*D(LUM$_{t-i}$)*	*ECT$_{t-1}$*
D(LHE$_t$)	–	18.34974*** (0.0004)	9.915702** (0.0193)	–1.140741*** (0.0008)
D(LLE$_t$)	3.437383 (0.3290)	–	0.183011 (0.9803)	0.000228* (0.1037)
D(LUM$_t$)	1.279246 (0.7341)	1.464589 (0.6893)	–	–0.024984 (0.7366)

Notes: *; ** and *** show the rejection of null hypothesis at the 10%, 5% and 1% significance level respectively and values in parenthesis ( ) show the p-values.

Table 5 shows the results of causality test. The estimation of significance of the coefficient of ECT represents the long-run causality. The value of ECT depicted in Table 5 is negative and significant indicating the long run causality running from under five mortality rates and life expectancy to health expenditure. This finding is inconformity with the results of Kabir (2008) who found that life expectancy in developing countries could be improved if attention is paid to increasing number of physicians per persons because it is very low in these countries. Estimation results have also shown the short run causality. Unidirectional causality was found between under-five mortality rates and health expenditure and between life expectancy and health expenditure with missing reverse feedback effect.

After knowing the direction of causality, we used the innovative accounting procedure to verify the strength of relationships by applying the VDA (Variance Decomposition Analysis). The results shown by the variance decomposition are presented in Tables 6, 7 and 8 respectively. The results divulge that the innovative shocks of life expectancy and under five mortality rates on health expenditure are 38.12% and 8.59% respectively and the remaining 53.29% effect in health expenditure is the result of its own innovative shocks. The innovative shocks of health expenditure and under five mortality rates on life expectancy are 68.66% and 5.53% respectively while 25.81% effect is the outcome of its own innovative shocks. This result reveals that health expenditure has a significant influence life expectancy. This result is similar to the results of Hall et al. (2012) who also find positive relationship between health expenditure and life expectancy. The innovative shocks of health expenditure and life expectancy on under five mortality rates are 2.38% and 30.86% respectively. The rest 68.66% is stemming from its own shock.

The impulse response functions (IRF's) presented in Appendix explains the responses of endogenous variables to an initial shock of one standard deviation in health expenditure, life expectancy and under five mortality rates. The results reveal that public expenditure has an immediate response to a one standard deviation shock in both life expectancy and under five mortality rates. On the same coupon, we find a stable and positive response of one standard deviation impulse in health expenditure and life expectancy over a period. The response of life expectancy to health expenditure is positive and is stable over the time. However, the response of under-five mortality rates to health expenditure is negative from the initial period until last.

Table 6 Variance decomposition of health expenditure

Period	*S.E.*	*LHE*	*LLE*	*LUM*
1	0.089682	100.0000	0.000000	0.000000
2	0.128548	67.22538	31.65571	1.118905
3	0.148415	65.18915	31.14004	3.670802
4	0.161665	65.14996	31.60598	3.244066
5	0.170323	61.51461	34.19963	4.285761
6	0.175149	61.81925	33.79972	4.381032
7	0.181023	59.72642	35.22184	5.051735
8	0.187128	57.94824	35.87218	6.179579
9	0.195529	55.91465	36.76826	7.317096
10	0.206574	53.29194	38.11692	8.591147

Table 7 Variance decomposition of life expectancy

Period	*S.E.*	*LHE*	*LLE*	*LUM*
1	4.17E-05	41.38343	58.61657	0.000000
2	0.000145	46.55344	53.34905	0.097508
3	0.000336	52.50645	47.11159	0.381962
4	0.000635	56.95835	42.24057	0.801088
5	0.001053	60.39826	38.26589	1.335853
6	0.001595	63.06035	34.93453	2.005116
7	0.001225	65.08813	32.11764	2.794232
8	0.003005	66.63467	29.68632	3.679032
9	0.003837	67.79556	27.59373	4.610748
10	0.004726	68.65839	25.81198	5.529639

Table 8 Variance decomposition of under-five mortality rates

Period	*S.E.*	*LHE*	*LLE*	*LUM*
1	0.022833	1.846074	22.29204	75.86189
2	0.046344	0.450635	19.88228	79.66709
3	0.075128	0.239159	22.52805	77.23279
4	0.100057	0.352546	24.20592	75.44154
5	0.118096	0.590342	25.8454	73.56426
6	0.129096	0.810814	27.34345	71.84574
7	0.134922	1.071915	28.46273	70.46535
8	0.138271	1.374651	29.36252	69.26283
9	0.141054	1.780932	30.11563	68.10343
10	0.144595	2.381514	30.85424	66.76424

To check the model fitness various types of tests were conducted. The results of these tests are presented in Table 9.

Table 9 Residual diagnostic test results

Test name	*Test statistic*	*Prob.*	*Decision rule*
Brush Godfrey LM Test of Autocorrelation	11.65109	0.2337	No Serial Correlation among Variables
Jarque-Bera Test of Normality	0.01696	0.9916	The Variables are Normally Distributed
Whites Test of Heteroskecadasticity	132.1281	0.2117	No Heteroskedasticity among Variables

The autocorrelation checked through Brush Godfrey LM Test shows no serial correlation among variables as the P value is insignificant. Jarque-Bera Test of Normality test was conducted to check the distribution of residuals which follow normal distribution. However, for Heteroskecadasticity, Whites Test of Heteroskecadasticity was conducted which also depict no heteroskecadasticity. Thus, our model is statistically fit for the estimation and the results we have drawn must be valid.

5 Conclusion and policy implications

The chief goal of this paper was to analyse the short run and long run dynamics of health expenditure on health outcomes. To accomplish that purpose Johansen Cointegration test was conducted. To use the Johansen technique, the data must be stationary at first difference. The Augmented Dickey Fuller (ADF) test was used for that purpose and the optimal lag length was selected through various lag selection criteria's. Finally, the Error Correction technique has been used to check the short run and long run causality among variables. Further, for checking the strength of causality the Variance Decomposition Analysis (VDA) and Impulse Response Functions (IRF's) were used.

Our findings have shown that health expenditure has a significant influence on life expectancy and under five mortality rates both in the short run as well as in the long run despite of being the relation unidirectional. The results of study are depicting that health expenditure has an important role in improving the health status of the population. This relationship is extremely an important on as it has certain policy implications. Firstly, the health expenditure should be increased to have better health status of the population. However, the cuts in health expenditure as a part of general fiscal consolidation will lead to reduction in health outcomes and therefore, inevitably more deaths. In India, the government is spending a meagre amount of GDP on health, which might be the reason of its worst health outcomes. Every year budget allocations made by the policy makers towards health sector have not shown much change over the years, which hovers around 2% to 3%. No doubt, various committees have recommended rising of health expenditure to around 6%. If the government would increase the health expenditure around 6% it would really have a positive impact on health status of the population. Therefore, policy makers need to comprehend this fact that if increased health expenditure leads to better health outcomes, then health expenditure should be increased to have better health outcomes. Secondly, efforts should be made to raise the per capita income levels of the population so as to ensure more spending on healthcare by public. Lastly, the allocations to the various health related welfare schemes should be enhanced to have better healthcare coverage of the public.

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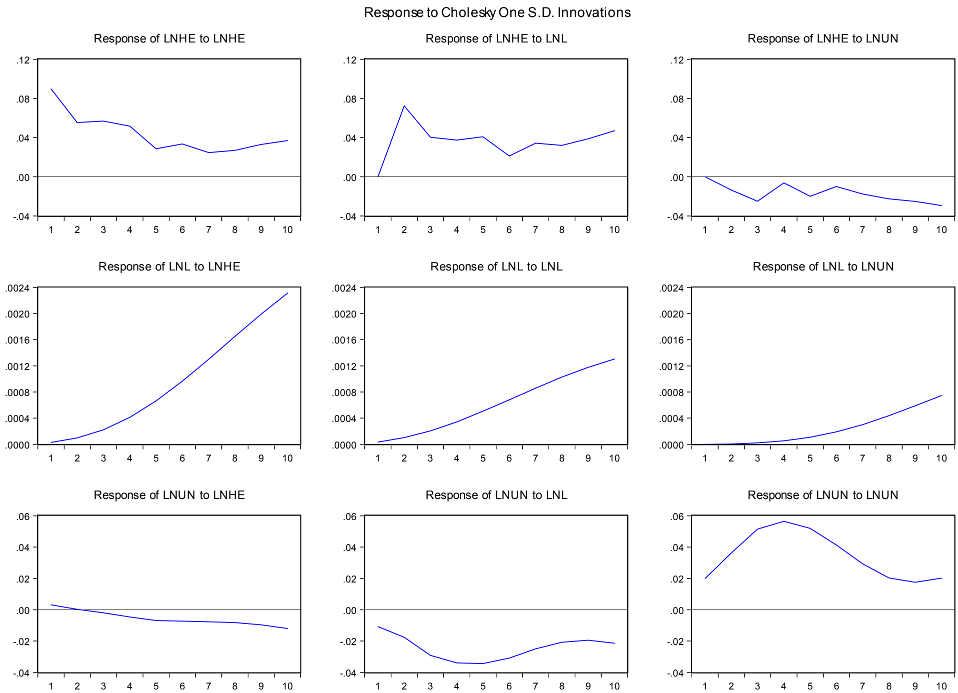
Appendix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