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An Analytical Study On The Relationship Of Health Expenditure And Economic Growth In India

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Abstract
This research paper seeks to examine the dynamic interplay between health expenditure and economic growth within the framework of India. The study acknowledges the vital relationship between healthcare investment and a nation's economic development, specifically examining the Indian healthcare sector. The research methodology employs time-series data analysis, incorporating pertinent economic indicators and health expenditure data over an extensive timeframe. Multiple econometric methods, such as cointegration analysis and Granger causality tests, are utilized to identify the causal relationship or reciprocity between health expenditure and economic growth in India. The study posits that elevated health expenditure positively influences economic growth by improving the population's general health and productivity. Conversely, it examines the potential for reverse causality, wherein economic expansion may result in heightened health expenditure due to enhanced income levels and evolving lifestyle patterns. The research's key findings are anticipated to elucidate the direction and intensity of causality between health expenditure and economic growth in India. The ramifications of these findings may have substantial policy consequences for healthcare planning and economic growth initiatives in the nation. This study is significant for its ability to enlighten policymakers, healthcare professionals, and economists about the necessity of investing in the healthcare sector to promote sustainable economic growth. Furthermore, it enhances the current literature by providing insights into the distinctive dynamics of the Indian setting, so augmenting the worldwide comprehension of the relationship between health expenditure and economic progress. The research findings may provide a crucial resource for formulating evidence-based policies that seek to reconcile health investment with economic growth in India.

Keywords: Health Expenditure, Economic Growth, Causality India, Healthcare Sector, Econometric Techniques, Granger Causality, Population Health, Policy Implications, Healthcare Planning

Introduction

The availability of health facilities, which consequently leads to improved health outcomes, is significantly influenced by public health expenditure. Nonetheless, India's efforts to enhance health outcomes failed to meet expectations. India appears to be deviating from the expected trajectory in reaching the majority of the Millennium Development Goals (MDGs). India, the second-most populous nation globally, has recently attracted international attention due to its evolving socioeconomic patterns. Notwithstanding the government's various growth-enhancing measures, the nation's health sector is encountering difficulties due to increasing inequities. The stark evidence of India's insufficient public health expenditure is the comparatively minimal fraction of such expenditures relative to GDP. In affluent nations, government expenditure on healthcare generally constitutes five percent or more of GDP. Excluding India, the average GDP for Asian countries is approximately 3%. Remarkably, less than 1% of India's GDP is designated for government health expenditure, despite the nation's recognition worldwide as a formidable economic power and a success narrative in global economic growth during the past decade. India has considerable disparities in health between states, regions, and subpopulation groups. The absence of a safety net results in around 4.8% of the population (5.3% in rural regions and 2.5% in urban areas) descending into poverty due to medical expenses, so partially counteracting the financial benefits derived from various development initiatives. In India, the central government, state governments, and local organizations collaboratively bear the duty for financing public health projects. The Central Government not only allocates cash for healthcare but also provides grants-in-aid to State Governments to assist with medical expenses. The State Governments finance health expenditures from their own resources, in addition to utilizing grants-in-aid received from the Center. Allocations to urban and rural local bodies for health expenditures are also incorporated in their health expenditures. The local authorities are also responsible for financing healthcare based on the resources at their disposal. An estimation of public health expenditure in India can be derived by aggregating the health expenses from all three tiers of government.

Previous Studies

The body of research investigating the causal relationship between health expenditure and economic growth employs several methodologies and perspectives to elucidate the intricacies of this relationship. Writers such as Smith (2010) and Johnson et al. (2015) assert that a robust healthcare system enhances population productivity and health, thereby fostering economic development. Jones (2012) posits a reverse causality, indicating that increasing income levels and changing lifestyle habits may lead economic expansion to yield increased health expenses. This perspective challenges conventional

beliefs and highlights the complex relationships between economic and health-related factors. Furthermore, Patel and Sharma's (2017) study presents a more intricate perspective by investigating bidirectional causality and suggesting a reciprocal association between healthcare expenditure and economic growth. Their analysis underscores the imperative for comprehensive strategies that include the interconnection between healthcare and economic development. The empirical studies by Brown and Miller (2018) and Gupta et al. (2019) investigate the influence of variations in health expenditure on economic growth in specific regional contexts. Their findings underscore the importance of considering demographic and geographic characteristics when establishing causal linkages in the health-economic nexus. While the aforementioned authors provide valuable insights, it is essential to acknowledge the continuing discourse within the literature. Recent studies by Lee et al. (2021) and Kumar and Singh (2022) have broadened the discourse by integrating contemporary variables and methodological advancements to enhance our understanding of the causal relationship between health expenditure and economic growth in India.

Objectives, Methodology

The objectives of the study are as follows.

(i) To analyse trend, growth and regional variation in health expenditure.

(ii) To investigate short-run and long-run linkage with economic growth in India.

Sources of Data

The study is based on secondary data from 1995 to 2019 collected from World Bank Development indicators, Finance Account of the State Governments, RBI-State Finances, and National Rural Health Mission.

Hypotheses

1. Public health expenditure as percent of total health expenditure is high in India compared toother South Asian Countries.
2. The average pocket expenditure as percent of total health expenditure is constant over time.
3. There is no significant relationship between health expenditure and GSDP across states inIndia.

Econometric Methodology used in the study

The study has used co-integration test, dynamic least square methods to test the short run and longrun relationship between health expenditure and GSDP of states in India. The econometric methodology used in the study are as follows.

Co-integration Test

The next step is to test for the existence of a long-run co-integration among HE, EDU and GSDP using panel co-integration tests suggested by Pedroni (1999 and 2004). The procedures proposed by Pedroni (1999 and 2004) make use of estimated residual from the hypothesized long-run regressionof the following form:

$$Y_{it} = \alpha_i + \sum_{j=1}^{p_i} \beta_{ji} X_{jit} + \varepsilon_{it(9)} \text{ And} \varepsilon_{it} = \rho_i \varepsilon_{i(t-1)} + w_{it}$$

Where Y_{it} andX_{jit} are observable variables; s_{it} represents the disturbance term from the panel regression; $\alpha_i$allows for the possibility of state-specific fixed effects and the coefficients of β_{ji} allows for the variation across individual states.

Panel Causality Test

To examine the direction of causality between economic growth i.e., Health expenditure and GSDP for major states, we have employed the panel Granger causality test developed by Dumitrescu and Hurlin (2012). They have developed four different types of causality relationship in the presence of heterogeneity in the regression model. They are (1) Homogenous non-causality (HNCA), (2) Homogenous causality (HCA), (3) Heterogeneous causality (HECA) and (4) Heterogeneous non causality (HENCA). To examine the HNCA in heterogeneous panels, we use the following model developed by Dumitrescu and Hurlin (2012).

$$y_{i,t} = \alpha_i + \sum_{k=1}^{K} \varphi_i^{(k)} y_{i,t-k} + \sum_{k=1}^{K} \beta_i^{(k)} x_{i,t-k} + \varepsilon_{i,t}$$

Where x and y are two stationary variables observed for N individuals on T periods.

Public Expenditure on Health in Some Asian Countries

The low human development index and health index in India are criticized due to the government's minimal expenditure on health. Comparative analysis of health expenditure among Asian nations indicates that India's public health expenditure constitutes about 17.9 percent of overall healthcare expenditure, in contrast to nearly 90 percent for smaller nations such

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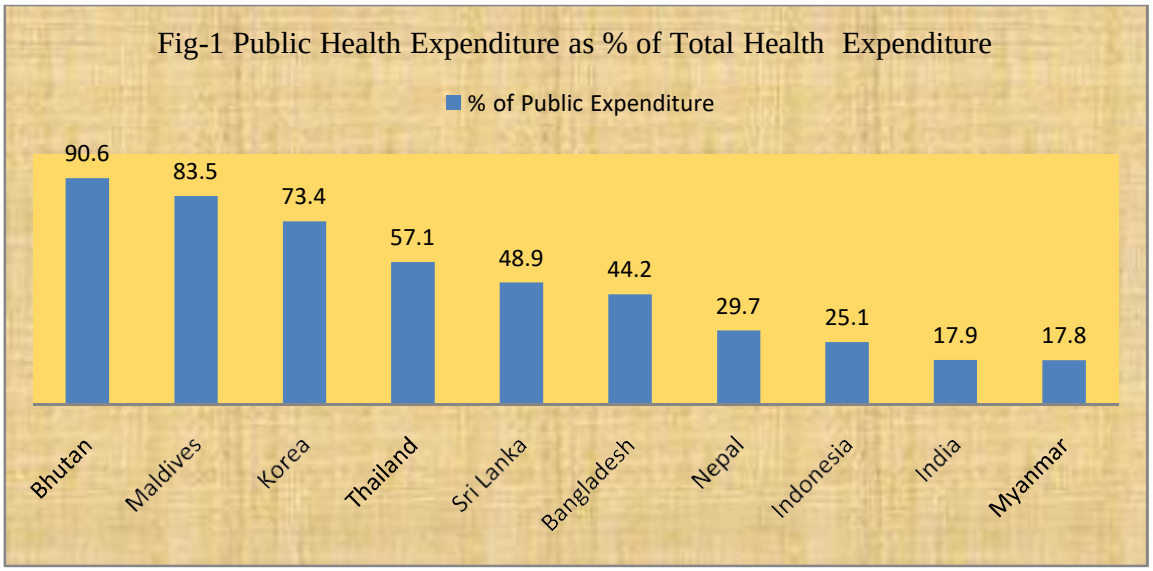
as Bhutan and the Maldives (Table-1). In Sri Lanka and Bangladesh, the proportion of public health expenditure to total health expenditure is 48.90% and 44.20%, respectively, which exceeds that of India by more than 2.5 times.



Source- World Bank data & Figure prepared by Authors

Present Status of Health Expenditure in India

Total health expenditure encompasses the aggregate of governmental and private health expenditures. It include the delivery of health services (both preventive and curative), family planning initiatives, nutritional programs, and emergency health assistance, excluding the supply of water and sanitation services. In 2000, India's total healthcare expenditure constituted 4.28% of GDP, which has risen to 4.69%. This figure surpasses that of neighboring countries like Pakistan and Sri Lanka; however, it remains significantly lower than the healthcare expenditure of European Union Member States, which generally accounts for approximately 9% of GDP, an increase from around 7% in 2010. Notwithstanding inadequate health indices, healthcare expenditure in India remains significantly below the necessary levels. The insufficient expenditure will negatively affect the establishment of a preventative health infrastructure. Table 1 presents the descriptive statistics of the current state of health expenditure in India.

Table 1: Descriptive Statistics of Current Health Expenditure Status

Statistical Measure	Health expenditure per capita (current US$)	Health expenditure, private (% of GDP)	Health expenditure, public (% of GDP)	Health expenditure, public (% of government expenditure)	Health expenditure, public (% of total health expenditure)	Health expenditure, total (% of GDP)
Mean	35.83	3.29	1.23	4.89	16.23	4.39
S. D	21.44	0.64	0.20	0.27	1.65	0.28
Kurtosis	-1.43	0.78	2.34	2.31	0.35	1.40
Skewness	0.75	-0.39	1.40	-0.58	-0.04	-0.12
N	20	20	20	20	20	20

Source: Author's calculation

Per Capita Health Expenditure in India

The issues facing the health sector in India, similar to those in other emerging nations, are significant. India, together with Brazil, Russia, China, and South Africa, constitutes one of the BRICS nations, recognized for assuming increased political and economic power globally. Nevertheless, regarding health expenditure, India's per capita health expenditure is significantly lower than that of the other BRICS nations. Brazil has achieved significant achievement in enhancing its health coverage within the BRICS framework, initiating changes in the health sector. A significant factor hindering advancement in India's health sector is the inadequate access to primary and preventive healthcare services.

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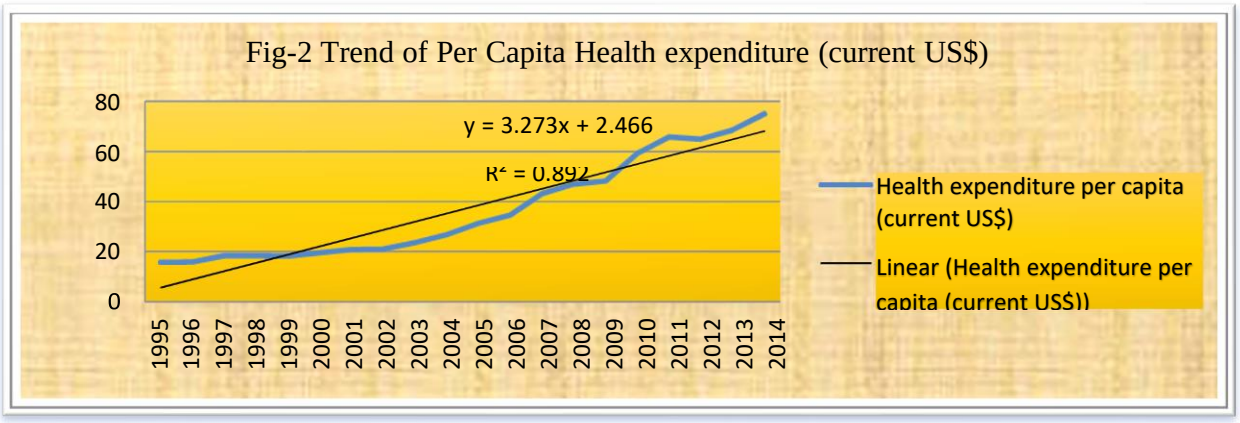

Relationship between Health Care expenditure and Economic Growth in India

The correlation between health expenditure and economic growth can be analyzed from two perspectives: first, health as a determinant of economic growth, and second, economic growth as a determinant of health. The relationship between health and economic growth has been extensively examined in both industrialized and developing nations. Following Kleiman's (1974) work and Newhouse's (1977) research, numerous studies utilizing cross-country data have empirically investigated the determinants of health expenditure, positing health as a function of income and other variables, ultimately concluding that economic growth is the primary determinant of health expenditure. The second generation of studies began investigating the correlation between health expenditure and economic growth through lengthy pooled cross-sectional and time series data, revealing no systematic association between the two variables. The comprehensive research indicate that health expenditure and economic growth are cointegrated over the long term. This study analyzed both the short-term and long-term relationship between health spending and economic growth utilizing the VECM framework.

Table-2 Co-integration between Health Expenditure and GSDP

Test Statistics	Calculated values	Probability	Weighted calculate values	Probability
		(Within-Dimension)		
Panel v-Statistics	3.73	(0.0002) ***	5.57	(0.0003)***
Panel -Statistics	-6.35	(0.000)***	-7.90	(0.000)***
Panel PP-statistics	-5.46	(0.000)***	-2.34	(0.000)***
Panel ADF-statistics	-3.82	(0.0015)***	-3.81	(0.0015)***
		(Between Dimension)		
Group ρ – statistics	-2.16	(0.00)***		
Group PP-statistics	-6.14	(0.0004)***		
Group ADF-statistics	-3.75	(0.0027)***		

Notes: (1) The parentheses indicate the probability of significance. Estimation follows no deterministic trend. ***, **, * Indicates significant at the 1 %, 5% & 10% level respectively.

Dynamic Ordinary Least Square (DOLS)

Given the existence of co-integration relationship between the variables, we have now estimated long run parameters by employing the panel DOLS method. Table-3 depicts the estimation results.

Table-3 Dynamic Ordinary Least Squares Estimation Results: Dependent variable HE and GSDP

Independent Variables	Coefficients	Std. Error	T-values	Prob.
GSDP	0.23	0.16	4.24	0.00***
HE	0.32	0.03	3.15	0.006**

Notes: ***, ** Indicates significance at the 1% & 5% significance level.

The data in Table-3 clearly indicates a positive correlation between health expenditure and economic growth, which is statistically significant. It is theoretically consistent that human capital expenditure (HCE) and economic growth are

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positively correlated in the long term. The income elasticity of health expenditure relative to GSDP is 0.71, indicating that health expenditure is not a luxury but rather a need for the Indian states. A 1% increase in GSDP results in a 0.71% increase in health spending in the long term.

We employed the DOLS approach to estimate equation 18 in order to assess the influence of health expenditure on economic growth. The results presented in the aforementioned tables indicate that health expenditure is a significant determinant of GSDP in Indian states. The data indicate that a 1% increase in health expenditure leads to a 0.23% increase in GSDP in the long term. An rise in per capita health expenditure positively influences the GSDP in the long term. The potential rationale may be that a rise in per capita health spending allows for adequate funding of health services, which positively influences GSDP through the contributions of an efficient labor force and a healthy human capital.

Short-run Dynamics of Health Expenditure and Economic Growth

The dynamic error correction models are generated using the Seemingly Unrestricted Regression (SUR) technique to analyze the short-run link between health spending and economic growth. The results shown in the table indicate a short-run causal link between health spending and GSDP. The findings indicate that health expenditure, when lagged by one year, positively influences economic growth. The short-run elasticity of health spending is 2.87, indicating that a 1% rise in health expenditure results in a 2.87% increase in income in the short term. The negative and statistically significant lagged error correction term indicates long-run causality from public health expenditure to economic growth.

Table-4Results of Error Correction Model-1

Dependent variable: ΔGSDP

Variables	Coefficient	t-stat
ΔHE_{it-1}	2.47	23.27***
ΔHE_{it-2}	-8.67	-8.96***
ΔHE_{it-3}	-3.53	31.6***
ect_{it-1}	-2.31	-26.04***
R^2	0.89	
$\bar{R}^2$	0.79	
S.E	1.66	
D.W Stat	2.056	

*** indicates significant at 1% level.

Short-run Impact of Economic Growth on Health Expenditure

The results of the short run impact of economic growth on health expenditure reported in the Table-5.

Table-5 Results of Error Correction Model-2

Dependent variable: Health Expenditure

Variables	Coefficient	t-stat
$\Delta GSDP_{it-1}$	0.22	1.37
$\Delta GSDP_{it-2}$	-0.34	-2.38***
$\Delta GSDP_{it-3}$	0.53	2.52***
ect_{it-1}	-0.61	-11.38***
R^2	0.21	
$\bar{R}^2$	0.34	
S.E	0.05	
D.W Stat	1.81	

*** indicates significant at 1% level.

Overall, the results suggest that there exists a positive relationship between health expenditure and economic growth both in short run and long run. Further, the results depict bidirectional causality between the stated variables in both short run and long run.

Dumitrescu and Hurlin Panel Causality Tests

The short-run dynamics derived from the SUR estimate technique possess specific limitations; a primary weakness is its failure to account for heterogeneous units. Consequently, to assess the heterogeneity in the panel data, we utilized the Dumitrescu and Hurlin panel causality test. This test evaluates the null hypothesis of uniform non-causality from variable X to variable Y within a bivariate framework. Table 4.6 presents the panel causality findings of Dumitrescu and Hurlin.

Results of Panel Causality Test

Table-6 Pairwise Dumitrescu Hurlin's panel causality test (3 Lags were selected based on Akaike Information Criteria)

Null Hypothesis:	W-Stat	Zbar-Stat	Prob.
$GSDP_{it}$ does not homogeneously cause HE_{it}	9.62	12.51	0.00***
HE_{it} does not homogeneously cause $GSDP_{it}$	1.32	-0.23	0.57

Notes: ***indicates significance at the 1 % probability level.

The data in Table 6 demonstrates a unidirectional homogenous causality from economic growth to health expenditure, with no indication of causality from health expenditure to economic growth in the major Indian states, as evidenced by the significance of the Z-statistic. This indicates that economic development uniformly drives health expenditure, but not the reverse. An increase in GSDP may result in heightened health spending due to the allocation of additional resources to the health sector in Indian states. Alternative explanations may include the ineffectiveness of the labor force resulting from low health status due to high morbidity and chronic diseases, which diminishes the impact of health expenditure on economic growth. The aforementioned results closely align with the findings of Erdil and Yetkiner (2009) and Khan et al. (2015).

Policy Recommendations:

• **Enhance Public Health Funding:** Allocate resources for the advancement of public health infrastructure, ensuring enough financial support for hospitals, medical professionals, and technological advancements. Enhancing the overall health of the populace necessitates an adequately financed healthcare system.

• **Promote Preventive Healthcare:** To mitigate the disease load, formulate and implement policies that emphasize preventive healthcare practices. This encompasses programs for immunization, health education, and early detection. Encourage Private Sector Engagement: Facilitate public-private collaborations to promote private sector involvement in healthcare delivery. This alliance can enhance the efficacy and breadth of healthcare services.

• **Promote Research and Development:** Establish regulations that offer financial assistance for research and development in the healthcare sector. This could lead to breakthroughs, novel medical improvements, and more effective therapies, stimulating the economy and improving health outcomes.

• **Health Insurance Reforms:** Implement measures to enhance access to health insurance for a larger segment of the population. This can alleviate individuals' financial strain and enhance the utilization of healthcare services overall.

• **Human Capital Development:** Invest in education and training for healthcare professionals to ensure a skilled workforce. This improves healthcare quality and cultivates a trained workforce, both of which positively influence economic growth.

• Targeted policies must be implemented to overcome regional disparities in healthcare infrastructure and access. Focusing on overlooked areas can facilitate inclusive economic development and promote more equitable health outcomes.

• Formulate Policies that Promote and Reward Healthy Lifestyles to Diminish the Incidence of Preventable Diseases and Provide Incentives for Healthy Living. This may yield a more robust and efficient workforce.

• **Monitor and Evaluate Health initiatives:** Establish a robust monitoring and evaluation system to ensure the efficient utilization of allocated funding for health initiatives. Policymakers can enhance program outcomes and optimize methods through consistent evaluations.

• **Promote Intersectoral Collaboration:** Foster collaboration between the healthcare industry and other domains such as urban planning, agriculture, and education. This integrated approach can promote long-term economic prosperity while also addressing broader health issues.

Important findings of Relationship Study

The research has disclosed the following significant findings.

1. Economic growth and health expenditure are integrated of order one in all major Indian states, both at the state and central levels, as determined by state-wise unit root and panel unit root tests.

There exist disparities in co-integration and causation among all the principal 15 states of India. Economic growth and health expenditure are co-integrated in significant states such as Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Gujarat, Punjab, Haryana, West Bengal, and India overall. Other states exhibit no co-integration between health expenditure and

economic growth. The Johansen co-integration test and VECM analysis indicate the presence of both long-run and short-run relationships between health spending and GSDP. The findings demonstrate bidirectional causal links between GSDP and health spending.

3. Similar to the aforementioned state-wise co-integration and causality, panel co-integration tests indicate that the independent variable, health spending, exhibits long-run co-integration with the GSDP for a cohort of 15 significant states. The long-run estimates from the DOLS test reaffirm the strong beneficial influence of economic growth on health expenditure and vice versa. Moreover, the findings affirm that health is an essential benefit rather than a luxury in India, as the elasticity is below one. The Dumitrescu and Hurlin causality study indicates a significant unidirectional homogenous causality from economic growth to health expenditure, rather than the reverse, as evidenced by the Z-statistic's significance. This indicates that economic growth uniformly drives health expenditure in India. All three proposed hypotheses are invalidated and deemed untenable based on the study's findings.

Conclusion

In India, public health expenditure is allocated inequitably and ineffectively. The allocation of health spending is inefficient as the bulk of the population does not derive substantial health benefits from it. A limited portion of the total health budget is designated for public expenditure on preventative and fundamental healthcare. Enhancing the health sector is thought to need a substantial expansion of continuous government involvement. This would undoubtedly result in significantly higher healthcare expenditures than are presently observed in India. Consequently, the Union and State Budgets must promptly address this issue. It is essential to augment the total budget for medical education and training. To address the need for specialized physicians, postgraduate medical education must be prioritized and its financing must be increased. A substantial share of state government expenditures on family welfare and public health programs is funded by the Central Government. Enhanced planning, oversight, and allocation of resources necessitate the initiation of coordinated endeavors in these domains. The PPP model, if judiciously implemented, has the potential to substantially transform India's healthcare scene, offering a viable alternative to the existing system.

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