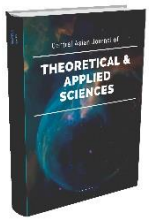

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Public Health Expenditure and Economic Growth Nexus in South Asia

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Abstract: *This study aims to analyze the nexus between public health expenditure and economic growth. For this purpose, the panel data has been utilized over the period from 1995 to 2018 for seven South Asian countries. Public health expenditures have been used as independent variables, economic growth (GDP per capita) as dependent variable, and HDI, labor force, life expectancy and infant mortality as control variables. Granger causality test was applied for prediction, and the analysis was conducted panel cointegration test and panel cointegration regression FMOLS technique. Panel cointegration regression FMOLS estimator investigated the study existence of statistically significant long run relationship between economic growth and public health expenditure. The results of the panel cointegration regression FMOLS analysed that long-term economic growth is positively and significantly affected by public health expenditure, HDI, labor force, life expectancy, and infant mortality. Close values of long-run coefficients for all estimations confirm the robustness of the estimated results. The study investigated public health expenditure is positively and significantly impact on economic growth. The study provides specific evidence to policymakers that increased public health expenditure contributes to increased countries economic growth.*

Keywords: *Public Health Expenditure; Economic Growth; Panel Cointegration Regression FMOLS; South Asian Countries.*

1. Introduction

Health is an important indicator to see the standards of living in a country. The productivity of labor depends on health and educational conditions of workers. Therefore, health expenditures which is made by the government is an important factor to accumulate human capital. Health has been considered as one of the remarkable elements that results in the increase in Gross Domestic Product (GDP) for a country. Thus, there have been some studies related to the relationship between health and economic growth (Erçelik 2018). The South Asian region is facing some of the world largest worst socio-economic inequities, but these compound broad gaps throughout access to healthcare. While there is a wide range of research on the inequalities that lead to health inequality and their effect on health outcomes, less is understood about the response among policymakers in South Asia (Zaidi, et al. 2017).

Sustainable economic growth (SEG) is a vital part of the human capital. The growth potential theories demonstrate the significance of human capital (HC) as an important agent for economic growth. The definition of human capital has been broadly defined in economic literature, such as education, health, training, migration, and other investment opportunities that improve the productivity of the employee (Akram et al, 2008). Enriched human capital has been an important factor in any country having achieved required long-term economic growth. In the long-term, human capital growth has a positive effect on per capita income in aspects of education and health, going to follow the neoclassical growth model (Bloom, et al. 2004). According to Newhouse, J. P. (1977) analysis of the relationship between GDP and PHCE in developing countries revealed that around 92% of PHCE changes can be influenced by differences in economic growth and that GDP per capita growth is the best indicator of how much money a country could even afford to spend on the healthcare sector.

Financial access is indirectly measured by out-of-pocket expenditure and accounts for 56% of total health expenditure in Pakistan, 62% in India, 64% in Afghanistan and 67% in Bangladesh 15% etc. The insufficient health facilities influence on individuals to depend on the private sector, and study regularly should buy drugs when government hospitals are out of stock. South Asia social and private health insurance ranges from 0% of overall health expenditure in Afghanistan to 7.7% in India (Zaidi, et al. 2017).

There is a bidirectional relationship between the situation of public health expenditure and economic development. Health and other forms of human and physical capital increase GDP per capita by increasing the productivity of existing resources coupled with resource accumulation and technological change. Additionally, some of this increased revenue is spent on investment in human resources, leading to more per capita growth (Gerdtham & Jönsson 2000). According to Fogel (1994), around one-third of Britain GDP between 1790 and 1980 was the result of changes in health, especially in nutrition, public health and healthcare facilities, and these improved healthcare facilities should be viewed as technological change that improves labor.

But at the other hand, economic growth contributes to improved nutrition, better sanitation, innovations in medical technology all this increasing life expectancy as well as decreases child mortality rates. The World Development Report (2007) portrays the situation by suggesting that the average birth-life expectancy in less than 40 years has increased from 51 years to 65 years. Similarly, the average life expectancy in developing countries was just 40 years in 1950 but had risen to 63 years by 1990 (World Bank, 1993). Preston (1976) examined various determinants of life expectancy and stressed that economic growth is the most significant factor.

The health sector faces a number of problems, but the most serious problems faced health facilities are undermined by equality and quality in healthcare delivery. South Asian countries healthcare sector facing political influence and the funds are not properly distributed and that are not provide better hospitals, better medicines. The Government hospitals services and facilities are not up to the mark and increase patient infection. Most physicians prefer to practice independently instead of operating in government hospitals (Adeel, et al. 2016).

There is a bilateral causality and relationship between economic growth and public health expenditure. This study aims to examine at the long-term relationship between public health expenditure and economic growth. The contribution of public health expenditure to economic growth is from the health lead growth hypothesis, by using cointegration. long-term analysis of public health expenditure and economic growth would be helpful in determining the possible magnitudes of fully accumulated effects of economic growth on health.

The study is significant in the context, that it investigates the relationship between expenditure on public health and economic growth. In addition, it will be the contribution of public health expenditure to economic growth reducing from health driven growth theory. And empirical evidence is that the previous studies discussed the relationship between health expenditure and economic growth in many countries such as the Mediterranean countries of the North and South Bank, the OIC nations, Algeria, Nigeria, the United States and Turkey, but the study dealing with the case of South Asia and the period between 1995 and 2018 were scarce. However, most studies and economists focused on the development of public health expenditure as a fundamental component of human capital in supporting economic growth but did not consider the health effects on economic growth and human capital production and accumulation.

2. Literature Review

As noted in the introduction, numerous studies have been conducted regarding the relationship between human capital production and economic growth. Such studies primarily suggest that the relationship between human capital and economic development has been positive. There has been a flurry of research in the last decade studying the relationship of health-to-economic growth. There is a substantial and rich literature on what defines the amount of money a nation dedicates to the medical needs of its population, and the discussion keeps on growing. This section of the study looks at some literature.

Gyimah et al, (2004) stated that investment in health capital (health expenditure) and stock (child mortality rates) has a positive and important connection to per capita income growth. However, the relation is quadratic. The study concludes that health investment in LDCs will boost short-term economic growth and increase long-term income because health investment becomes part of human capital stock. Using different measures of adult nutrition and wellbeing in household surveys, Schultz, T. P. (2005) explore the effect wellbeing has on overall factor productivity. Study shows that improved human health capital has an important, beneficial impact on the worker income and productivity. Study states that developing countries still lack the resources to invest in health; on the other hand, poor health status is slowing economic growth. Developing countries seem to be in a vicious cycle that results in continued underdevelopment.

Lorentzen et al, (2005) analysed the impact of adult mortality rates on economic development. The study finds that high mortality rates limit economic growth by curtailing the time horizon. As a result, people act which delivers short-term gains at long-term costs. Fertility, investment in physical and human resources are also the channels that influence economic growth. While evaluating the contribution of health by calculating it by the rate of male survival in economic growth between the ages of 15 years and 60 years, Jamison et al, (2005) founds that improved health represented about 11% of growth. The study concludes that investment in physical capital, education and health plays an important role in stimulating economic growth. Sachs and Warner (1997) suggested an equations relationship between the human health resources and economic growth rates, using life expectancy as a health measure. The study concludes that balanced human capital is pushing down economic growth.

Anderson, G. F., & Frogner, B. K. (2008) Investigate the United States has spent $6,401 per capita on health care more than twice the OECD mean nation per capita income. Between 1970 and 2005, in the percentage of gross domestic product (GDP) devoted to health care, the United States had the largest increase (8.3%) among all OECD countries. While it had the third largest amount of public expenditure, health insurance reached just 26.2% of the U.S. population in 2005. The United States was similarly likely to be in the upper and lower half of the 17 normative indicators implemented by the OECD.

Health system resources are calculated using multiple metrics including health expenditure (total health expenditure per household, health expenditure as a percentage of GDP, proportion of public expenditure in total healthcare expenditure), number of doctors, number of hospital beds, number of computed

tomography scanners (Mohan, R., & Mirmirani, S. 2007, Baltagi, B. H., & Moscone, F. 2010). In this study the indicator for calculating health inputs is overall health expenditure per capita.

Jaba et al., (2014) analyzing the relation between input dynamics and healthcare Systems outputs. Input from the health care system is expressed through health care expenditure per capita (current US$), and output from the health care system is expressed through life expectancy at birth (years). The data were gathered for 175 world countries over 16 years (1995-2010), grouped by geographic location and level of income. The study uses a data analysis panel to estimate the life expectancy by a feature of health expenditure. The findings obtained suggest a significant correlation between public expenditure and life expectancy. State effects are important and suggest that there are major variations between the countries. Health systems success is measured either by longevity measures such as life expectancy (life expectancy at birth, life expectancy at 65 years, stable life expectancy) for the total population and/or gender, or by mortality measures (mortality rate, infant mortality rate, life expectancy lost). Such metrics are considered effective proxies for assessing the health status of a population (Shaw et al, 2005; Cutler et al., 2006; Poças, A., & Soukiazis, E. 2010).

Various studies have analyzed the impact of health on economic growth. There is extensive body of literature on the disparities that contribute to health inequity and their effect on health outcomes, less known about the response from policy makers in South Asian countries. (See, for example, Zaidi et al, 2017). The result confirms that health variable plays a very significant role in determining the long run economic growth. As all the health indicators have a significant impact on the long run economic growth. (See, for example, Akram, et al. 2008; Bhargava, et al. 2001). The main difference between these studies and the present study is that the previous study ignored the cointegration between public health expenditure and economic growth whereas the present study empirically analyzed cointegration and granger causality. Previous studies have worked on impact of health on economic growth but did not discuss the public health expenditure and economic growth in South Asian countries.

3. Data And Methodology

Panel data was used over the period 1995 to 2018 to statistically explore the connection between the specified variables. Annual data for 7 South Asian countries is used with 168 observations suitable for panel data regression analysis. The analytical information comes from secondary sources, with three main sources: "world development indicators" (WDI), UNDP and Our World In Data. WDI collect data on GDP per capita (proxy for economic growth), labor force, life expectancy, and infant mortality while data public health expenditure are acquired from Our World In Data, while Human Development Index are collect from UNDP. GDP per capita (proxy for economic growth) has been used as the dependent variable for the present analysis, while public health expenditure, human development index (HDI), life expectancy, labor force, and infant mortality independent variables. All suggested independent variables are expected to have a significant connection to GDP per capita (proxy for economic growth). The model is overall functional shape is given below:

Equation 1 is a non-linear equation used to measure the change in expenditure on public health by finding its derivative in respect of economic growth. This means that a change in percentage of expenditure on public health will change economic growth by β_1.

Equation 1

$$GDP_{it} = \beta_0 + \beta_1 PHE_{it} + \beta_2 HDI_{it} + \beta_3 LF_{it} + \beta_4 LE_{it} + \beta_5 IM_{it} + \varepsilon_{it} \quad (1)$$

Where:

GDP_{it} = GDP Per Capita (proxy for economic growth)

PHE_{it} = Public Health Expenditure

HDI_{it} = Human Development Index

LF_{it} = Labor Force

LE_{it} = Life Expectancy

IM_{it} = Infant Mortality

ε_{it} = Error term

Panel datasets consist of several observations on various individuals (which ranges from I = one…n) which are observed over a time at equal intervals. t refers to time, n = number of cross-sections when data is observed, t = Years (1995, 1996, 1997… 2018), $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, and\ \beta_7 = Partial\ slope\ coefficients$.

The model above uses the OLS regression model to calculate the linear correlation of the independent and dependent variables. The study would concentrate on the impact of PHE on GDP per capita regulation for effects from other factors (Mathew 2007).

3.1. Panel Unit Root Testing

Before applying Panel cointegration test, the study had tested the stationarity of variables to avoid a spurious regression problem. According to Canning and Pedroni (2008), "Panel Data shows the essence of time series if each cross-section contains data of more than 10 years, whereas time series data usually initiate non-stationary. hence to avoid spurious regression. (Maddala & Wu, 1999; Levin et al., 2002; Pesaran et al., 2004; Pesaran, 2007). The study used the Levin-Lin-Chu (LLC) Unit Root Test. According to Choi, I. (2001), "The LLC unit root test takes into consideration the heterogeneity of cross sections, serial correlation, but LLC will have low power in the small sample. "To fix the weakness of the LLC unit root test, IPS tests have been used that consider this same heterogeneity of multiple cross-sections, serial correlation and perform well in small sample size. The null hypothesis (H_0) of Levin-Lin-Chu (LLC), and the unit root tests of Im-Pesaran-Shin (IPS) indicate the existence of unit root (i.e., non-stationary variables), the alternative hypothesis (H_1) is (i.e., the variables are stationary).

The LLC and IPS reviews are equated as follows: while

$$\Delta x_{it} = a_i + \beta_i x_{i,t-1} + \sum_{j=1}^{pi} \beta_{ij} \Delta x_{i,t-j} + \mu_{it}$$

Whereas i, t, xi, t, pi and μit Indicates cross sections (country), optimal lags and residuals over time series of countries. LLC and IPS test Null hypothesize: H_0: β=0. LLC check integrates null hypothesis H_0: β = 0 as contrasting to H_1: β<0. On the other hand, IPS tests are implemented based on equation 1, but hold β. Because of the heterogeneity among β coefficients for all units in panel, LLC is not as good as IPS. IPS 'null hypothesis has H_0: β_1=0 as contrasting to alternative H_1: β_1<0.

Testing for the identity of Penal unit roots in variables is the first step in the cointegration analysis. The Dickey and Fuller fishers augmented study involves a regression of the series' first differences against the once lagged series, X_{t-1}, and lagged variable terms. It could include a normal distribution α and the following trend term γ_t:

$$\Delta X_t = \alpha\ \beta X_{t-1} + \sum_{1=1}^{m} \gamma_i\ \Delta X_{t-1}\ +\ \varepsilon_t \quad \textbf{(2)}$$

Where: Δ would be a first-difference operator, m is the optimal level lagged length, γ_t is the time trend and ε_t is the random stationary error

To determine whether a stationary variable pattern or discrepancy is stationary, the study used the panel unit root test. A panel data containing unit roots is stationary, with an average μ of 0 and a variance of 1. If the study denies null hypothesis that there is a unit root in the time series, then the series is in trend stationary. If there is insufficient evidence to contradict the null hypothesis then the sequence is stationary

3.2. Panel Cointegration Tests

Cointegration tests as certain whether the dependent variable and its regressions have a stable long-run relation. This measure means that there needs to be an adjustment mechanism to avoid the long-run relative relationship variations from getting bigger and bigger.

All existing variables are stationary at first difference, after which the study test cointegration. The study has applied three cointegration tests to verify the cointegration: Analyze health human capital's short-run and long-run effects on economic development. Cointegration coupled with Error Correction techniques was used to achieve that goal. The results show that age dependence, openness, population per bed, enrolment in secondary school, life expectancy and mortality rate affect GDP per capita but health expenditure has no relationship with GDP per capita (Akram 2008).

3.3. Cointegration Theory

Consider a VAR6 of order p

$$\boldsymbol{Y_t} = \mathbf{A1}\, \boldsymbol{Y_{t-1}} + \boldsymbol{APY_{t-p}} + \boldsymbol{BX_t} + \boldsymbol{\varepsilon_t} \quad \textbf{(3)}$$

Where Y_t is a -vector of non-stationary I (1) variables, X_t is a d-vector of deterministic variables and ε_t is an innovation vector. This VAR can be rewritten as

$$\Delta \mathbf{Y_t} = \mathbf{\Pi Y_{t-1}} + \sum_{n=1}^{P-1} \Gamma_i \, \Delta \mathbf{Y_{t-i}} + \mathbf{B X_t} + \varepsilon_t \quad \textbf{(4)}$$

Where.

$$\mathbf{\Pi} = \sum_{i=1}^{P} \mathbf{A_{i-1}}, \; \Gamma_i = -\sum_{j=i=1}^{P} \mathbf{A_j},$$

Granger theorem of representation asserts that if the matrix coefficient has reduced rank r < k then there is k x r matrices α and β with rank r each such that = αβ 'and β'Y_t is I (0). r is the number of Cointegrating Relations (Cointegrating Rank) and the Cointegrating Vector for each column of β. α elements are known in the VAR model as the adjustment parameters. The method used by Johansen is to estimate the matrix from an unrestricted VAR and to test whether the study reject the restrictions implied by the reduced range of variables (Hansen, P. R. 2005).

4. Results And Discussion

The study analysed selected data of seven South Asia countries Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. The study descriptive statistics for showing data summary; and correlation test to verify how strongly pairs of variables are related; and then perform Granger Causality for the predictive notion of causality. The present study applied Panel Unit Root Test for model or technique selection on the base of Prob 0.05. The estimation model of the Panel Cointegration Model for data analysis is applied, because all variables are stationary at the first difference I(1). The study based on the set of standard Panel Cointegration Tools, such as Pedroni Cointegration tests and the regression Fully

Modified Ordinary Least Squares (FMOLS), Penal Least Squares, and Dynamic Ordinary Least Squares (DOLS) estimators.

4.1. Descriptive Statistics of South Asians Countries

Table 1 Present the number of observations (N) and the summary statistics (Mean, Median, Maximum, Minimum, and Standard Deviation) for all variables that will be used in empirical analysis. This data set includes 168 observations for all the variables. Seven South Asia countries annually data was collected and time period from 1995 to 2018.

Table 1: Descriptive Statistics

Variables	Mean	Median	Maximum	Minimum	Std. Dev	Obs
GDP Per Capita	1746.56	982.02	10224	203.98	2021.3	168
PHE	2.39585	1.5677	10.8	0.2657	2.1361	168
HDI	0.56573	0.557	0.78	0.3963	0.0974	168
Labor force	61.6939	57.625	86.265	49.22	10.863	168
Life Expectancy	67.9768	67.628	78.627	56.636	5.0215	168
Infant Mortality	43.0738	40.95	97.4	6.4	24.025	168

The study descriptive statistics are presented the dependent variable GDP per capita is measured as GDP per capita (current US$), the mean value of GDP per capita was 1746.56 with standard deviation of 2021.3. The independent variable public health expenditure (PHE) measured as government health expenditure as percentage of GDP and its mean value 2.39585 with standard deviation 2.1361. While rests of the variables indicate HDI, Total labour, life expectancy, and infant mortality were taken as independent variables and the variable HDI human development index mean value 0.56573 with standard deviation of 0.0974. The mean value of total labor 61.6939 with the standard deviation of 10.863, the mean value of life expectancy is 67.9768 with standard deviation of 5.0215 and the means value of infant mortality is 43.0738 with standard deviation of 24.025.

4.2. Granger causality test

The purpose of this test, to verify the direction of causality between the study variables. The null hypothesis of this test states that between the variables there is no Granger Causality. while the alternative states that causality occurs, and it also shows that the causality is unidirectional or bidirectional. Results are showing in appendix no 1, the table below displays the results of the Pairwise Granger Causality Check for countries of South Asia and the sample is 2 lags and 154 observations from 1995 to 2018. There is a unilateral causality that runs from GDP per capita to public health expenditure, and that public health expenditure does not cause GDP per capita to granger. Since there is bidirectional causality between per capita GDP and expenditure on public health. This means the multiplier impact of expenditure on public health is rising as GDP per capita.

The study results also show one-sided relationship between labor force and GDP per capita, labor force granger causes GDP per capita but GDP per capita does not cause labor force to granger. The results of granger causality check also shows that HDI is caused by granger public health expenditure, but HDI does not cause Granger public health expenditure. There is a unilateral relationship running from labor force to GDP per capita while in South Asian countries there is a bidirectional relationship between GDP per capita and labour force.

4.3. Panel Unit Root Test

The panel unit root test findings are outlined in table 3 below. The findings show that the variables considered in this analysis are a combination of stationary I(0) regressors and non-stationary I(1)

regressors. After their first distinction the dependent variable GDP per capita and all independent variables were stable, i.e. I(1), with and without terms to the pattern. To obtain accurate results, Panel Data's stationarity is important to avoid spurious Regression Analysis as it is difficult to make forecasts if the data is non-stationary. The table below shows the effects of the E-views in the Levin-Lin-Chu (LLC) unit root test on all variables. Results provided at level and at the first difference, without trend and intercept. Inclusion of trend alternative means this model contains a linear time trend.

Table 2: Panel Unit Root Test at the first difference (Levin-Lin-Chu)

Variable	Level		1st Difference		Decision
	Statistic	Prob	Statistic	Prob	
GDP Per Capita	6.89618	1.00000	-2.18967	0.01143	I(1)
PHE	1.16887	0.87880	-13.05560	0.00000	I(1)
HDI	5.35846	1.00000	-2.41380	0.00790	I(1)
Labor force	0.02282	0.50910	-4.82782	0.00000	I(1)
Life Expectancy	-1.29302	0.09800	-6.61844	0.00000	I(1)
Infant Mortality	-3.60315	0.18020	-7.19865	0.00000	I(1)

"The level of significance at 1%, 5%, and 10% respectively".

The study cross-sectional dependence unit root test null hypothesis rejected at level 1%, first difference 5% and second meaning difference 10%. The study implies cross-sectional interdependence on the data, to obtain objective results estimation, the study carried out a diagnostic test with the application of Panel Unit Root Tests in the presence of cross-sectional dependence on the residual estimates (Pesaran, 2007). The results of the panel unit root tests on the residual, as shown in the above table that the residual is stationary at first difference and the stationarity validates the estimates of the results of the Penal Cointegration.

The variables are not stationary at trend of level, and this means that the Panel data properties (mean, variance, autocorrelation) are not constant, so it is imperative to distinguish and test stationarity again. The results show that at first difference the properties of the Panel Data are now constant. The properties for the South Asia Countries Panel data which spend more on health than government expenditure is stationary after the first difference. The study suggested order one integrated and that finding illustrates the high probability of a long-run relationship between economic growth and public health expenditure, the probability of these variables being Cointegrated is strong.

4.4. Panel Cointegration Test

The cointegration test purpose to check Long-run relationship in the variables. The study explains the tools of E-views for estimating relationships with Cointegration using Panel Data. The study considers various forms of the residual based Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS) estimators (Pedroni, 2000, 2001) producing asymptotically unbiased, probability distribution estimates of the coefficient.

Table 3: Panel Cointegration Test

Pedroni Residual Cointegration Test		Statistic	Prob.	Statistic	Prob.
Within-dimension (panel)	Panel v-Statistic	1.15365	0.87570	2.91141	0.99820
	Panel rho-Statistic	1.450474	0.92650	1.701495	0.95560
	Panel PP-Statistic	8.40233	0.00000	9.59364	0.00000
	Panel ADF-	3.59048	0.00020	4.86020	0.00000

	Statistic				
Between-dimension (group)	Group rho-Statistic	2.767016	0.9972		
	Group PP-Statistic	12.0492	0.00000		
	Group ADF-Statistic	3.58533	0.00020		

"The level of significance at 1%, 5%, and 10% respectively".

Table 4 shows that the variables are cointegrated, panel cointegration test developed by pedroni (Pedroni, P. 1999) is used to test empirically whether there is cointegration. The results of the panel cointegration test for South Asia countries show that six are significant in terms of weighted statistics for the seven dimensional and three inter-dimensional tests with standard statistics, while two are important in terms of the five-dimensional tests. And from these test statistics the study concludes that there is cointegration between the variables. This means regression of the cointegration panel is required.

4.5. Penal Regression

This study utilizes three models of panel regression: fully modified OLS (FMOLS), panel OLS, and dynamic panel OLS (DOLS). The results show that all three models for South Asia countries have a very high explanatory capacity with more than 93 per cent of the dependent variable variance explained by the independent variables. This can be seen from R-squared and adjusted R-square. This study explains the methods used by e-views software to estimate and test the cointegration method for long run relation of a single equation. Three type regressions are described, including Fully Modified OLS (Phillips and Hansen 1992), Panel OLS, and Dynamic OLS (Saikkonen 1991, Stock and Watson 1993).

Table 4: Penal Regression FMOLS, Penal OLS, and DOLS

Variables	**FMOLS**	**Penal OLS**	**DOLS**
	Coefficient (Prob)	**Coefficient (Prob)**	**Coefficient (Prob)**
PHE	159.2327 (0.0000)	601.9155 (0.0000)	596.7034 (0.0008)
HDI	26098.33 (0.0000)	9476.988 (0.0001)	24656.96 (0.0098)
Labor force	182.3442 (0.0000)	17.27122 (0.0527)	587.4536 (0.0003)
Life Expectancy	186.5659 (0.0000)	337.3815 (0.0000)	-127.0763 (0.5562)
Infant Mortality	89.22237 (0.0000)	70.23118 (0.0000)	78.18974 (0.0410)
R-squared	0.936733	0.86745	0.99986
Adjusted R-squared	0.931603	0.86251	0.9974
Long-run variance	114346.4		212.572
Durbin-Watson stat		2.25037	

"The level of significance at 1%, 5%, and 10% respectively".

The public health expenditure has a significantly and positive effect on GPD per capita. Across all three models suggested that HDI has a significantly and positive effect on GPD per capita. In the two models FMOLS and Panel OLS, labor force has significantly and positive effect on GDP per capita. For the two

models FMOLS and Panel OLS for South Asia, life expectancy has a positive and significant effect on GDP per capita but negative and insignificant effect on GDP per capita in the Dynamic OLS model. Infant mortality has a significantly and positive effect on GPD per capita for all three models. Deriving conclusions from the FMOLS model is best adapted for Cointegrated Panel Regressions, one unit improvement in public health expenditure would suggest in a 159% increase in GDP per capita. These all-independent variables at positively and significantly relation with dependent variable GPD per capita. It can be seen for the countries of South Asia; an increase in units of the independent variables contributes to an increase in GDP per capita. The relationship is significant for the seven countries in South Asia.

5. Conclusion and Policy Implications

The study's main objective determines the nature of the relationship between public health expenditure and economic growth in south Asia countries from 1995 to 2018. The study's problem statement was testing the nature of the relationship between public health expenditure and economic growth. The research findings are compatible with previous literature. That rising public health expenditure can be a very important factor for increasing the quality of human resources and therefore economic growth. Additionally, this is not a direct mechanism in which the increase in public health expenditure translates into the economic growth, the required institutional framework must be efficient and free to overcome economic growth. The theoretical idea is that economic growth and health are components of a vicious circle or system, as income generates wealth and wealth generates income. This is partly since certain country-specific indicators are essential parameters for the sensitivity of the increased economic growth expenditure on health. Which describes the probability of one-sided causality from economic growth to public health expenditure. This illustrates the importance of labor to the growth of economies in South Asia, so productivity would be greatly improved if sufficient investment were made in health infrastructure and workers in this region.

The result of long-run Panel Cointegration shows that mostly variable is positively associated with economic growth (GDP per capita), which means that increase in public health expenditure, HDI, labor force, life expectancy, and infant mortality leads to increase in economic growth (GDP per capita). he following variables were used by Piabuo, S. M., & Tieguhong, J. C. (2017) presented the same result, i.e., GDP growth positively influence by economic growth. All the variables are significant at a 5% significance level."

The aim of this research is to examine the public health expenditure and economic growth nexus in South Asia. From the arguments and debate as well as from the background of the study it is revealed that the analysis of public health expenditure and economic growth nexus in South Asia, in the theoretical world is a relatively new concept. However, the findings of this relation analysis showed that there is positive and significant relation among public health expenditure and economic growth nexus in South Asia.

The present study recommends that it can be observed that public health expenditure is the major determinant of economic growth and have a positive and significant impact on GDP per capita in selected South Asia countries. The economic growth of selected South Asia countries strongly depends on public health expenditure that are badly affected by economic growth, and the government should make special policies to increase public health expenditure. The state should also make good policies to enhance public health expenditure that are considered backbone for the developed and developing economies and particularly for these selected South Asia countries. The state should find the root cause of these low expenditure and then it will be easy to recommend new policies, budget allocation, and resource management as well. So that region becomes a healthy and skillful labor force place for home and foreign investors and invest with full confidence and satisfaction.

Furthermore, under the light of the evidence of this research study recommendations that extended by looking at the individual component of the public health expenditure and its relationship with economic growth. The study also checks the nexus between public health expenditure, HDI, labor force, life expectancy, infant mortality, and economic growth in developing countries. Future analyses might help evaluate how well the public health expenditure performs in terms of economic activities development.

The study highlights that expenditure output depends on the country level of growth, its standard of institutional and governance, and macroeconomic policy, as well as political will to change. This study may be considered complementary, providing a broader picture of expenditure efficiency, but a thorough analysis of a country revenue system that considers the overall fiscal policy of the country, the needs of public expenditure and the overall level of growth in the Asian region is required for future research.

The study extended these investigations by integrating public health expenditure in implementing the empirical work and the theory can help us determine how public health expenditure progresses.

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