Unequal Wealth, Unequal Health: The Health Cost of Income Gaps in South Asian Countries

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Abstract

The study aims to assess the long-run influence of income inequality, GDP growth, and public health expenditures on people's health status in the selected South Asian countries. Before estimating the coefficients, the analysis thoroughly examined the stationarity of the series and the presence of long-term cointegration among the selected model variables. Finally, the analysis employed Fully Modified Ordinary Least Squares (FMOLS) to panel data covering the period 2000 to 2023. Empirical findings show that income inequality deteriorates people's health. More specifically, an increase in income inequality by one per cent deteriorates an individual's health by approximately 1.42 per cent. On the contrary, individuals' economic well-being and the public's spending on health improve people's health by about 0.511 and 0.321, respectively. The analysis recommends a public policy that uplifts the poor and reduces the economic gap between the poor and the rich.

Keywords: Absolute Income Hypothesis, Relative Income Hypothesis, Population's Health Status, Health Expenditure, Cointegration.

Introduction

Income inequality directly or indirectly affects the welfare of a society. Therefore, this phenomenon remained a topic of great significance for researchers and policymakers. Many studies have shown that income inequality negatively affects individuals' health, educational attainment, and economic progress (Elsevier, 1996; Góngora-Salazar et al., 2022a, 2022b; Knack & Keefer, 1997). In this regard, the "Income Inequality Hypothesis" asserts that the health status of individuals depends on one's personal income as well as inequality in the entire region, which also matters (Angus Deaton, 2003; Asghar et al., 2011; Góngora-Salazar et al., 2022a; Jørgensen et al., 2024). Although many studies support the positive association between income inequality and poor health, others have found that income inequality does not directly influence an individual's health (Kawachi, 2000; Lynch et al., 2004; Subramanian & Kawachi, 2004; Wagstaff & Van Doorslaer, 2000).

Researchers have sparked crucial debates about income inequality and its impact on individuals' health. The advocates of the 'Absolute Income Hypothesis' (AIH) argue that an individual's health

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depends on his personal income rather than relative income (Grossman, 2017). An increase in an individual's disposable income improves his/her living standard by spending more on various goods and services, including healthcare (Veenstra, 2003). Along these lines, Wilkinson (1990) and Wilkinson & Pickett (2006, 2007) demonstrate that when an individual's income reaches a certain threshold, relative income matters for health. The inverse relationship between the Relative Income Hypothesis (RIH) and population health is most evident in countries with exceptionally skewed income distributions between the rich and the poor. For example, Franzini et al. (2001) and Franzini & Fernandez-Esquer (2004, 2006) argue that population health is poor in large geographic regions with relatively unfair income distribution. Wilkinson & Pickett (2006) also argue that population health is poor in large geographic regions with relatively unfair income distribution.

In the second stage, this study explores whether high economic growth improves health outcomes. Literature gives mixed and inconclusive evidence. Some studies have found bidirectional causality between economic growth and population health. For instance, Gerdtham and Jönsson (2000) found that health improves GDP growth by increasing the productivity of the factors of production. In the next stage, high earnings are, in turn, spent on human capital and labour's health care. Similarly, Fogel (1994) explains that about one-third of GDP during the period 1790 to 1980 was due to improvements in nutrition and healthcare facilities provided by the British government.

However, few others have found a unidirectional relationship between economic growth and population health. For instance, (Cayssials et al., 2024; Dhrifi et al., 2021; Dunn et al., 2024; Erdogan & Erdogan, 2024; Kausar et al., 2024; Li et al., 2024; Rahim & Muzaffar, 2024; Rahman et al., 2022; Wilkinson & Pickett, 2009; Younsi et al., 2024) attempt to find whether important variables like education and health expenditure lead to higher economic growth. The result indicated a unidirectional relationship between GDP growth and people's health.

Although few researchers have also analysed the link between income inequality and people's health in developing economies. For example, (Kabir, 2008; Kabir & Ahmed, 2019; Sede & Ohemeng, 2015; Shahbaz et al., 2016) demonstrate that income inequality influences an individual's health outcomes. However, these studies yield inconclusive and ambiguous results, owing to differences in their models and methodologies. In addition, these studies suffered from econometric problems, including endogeneity and serial correlation. Therefore, this paper examines the association between income inequality and people's health across selected South Asian countries.

Literature Review

Past studies have empirically analysed the association between income disparity and an individual's health status. These studies' Empirical findings examine the effects of income inequality on various health indicators, including mortality rates, life expectancy, mental health, and access to health care. For example, Dunn et al. (2024) examined the impact of the income gap on mortality rates from 1989 to 2019. The findings indicated that income inequality and mortality are strongly correlated. More specifically, the result revealed that a 0.01 increase in the Gini coefficient is associated with a higher death rate, including 9.6/100,000 for adult females and 29.1/100,000 for adult males of working age. Similarly, Wilkinson & Pickett (2009) conclude that individuals are healthier in societies with relatively fair income distributions. By the same line of reasoning, many countries lengthen pension durations to minimise the challenges posed by an ageing population. However, working for a longer period of time actually reduces life expectancy by giving rise to chronic diseases like hypertension, diabetes and cardiovascular disease. In this

regard, Li et al. (2024) conducted a longitudinal study to estimate healthy working life expectancy (HWLE). The result finds that hypertension and stiffness were common in individuals working unhealthily.

Moreover, the association between income distribution and health status has been examined in developing economies such as Pakistan. For instance, Rahim and Muzaffar (2024) examined the influence of the government's health expenditures and financial innovations on people's health in Pakistan. Employing the estimation method, Autoregressive Distributed Lag (ARDL), on the time series data on variables included in the model. The results found a significant influence of both the government's expenditure on individuals' health and financial strength on individuals' health. The co-integration analysis revealed a stable, enduring relationship between people's health and the associated determinants. Through Error Correction Mechanism (ECM) analysis, the analysis further observed that life expectancy, infant mortality, and child mortality under age 5 years exhibit significant inverse relationships with health spending. These results revealed that these variables adjust more swiftly toward equilibrium over the long term.

Kashif Raza (2024) empirically analysed the nexus between population health and an individual's well-being in Pakistan. Using Ordinary Least Squares (OLS) and Granger Causality techniques, the analysis assessed time-series data covering the period 1980 to 2012. The study focused on key health metrics, including health expenditures, fertility rate, life expectancy, and infant mortality rate. The analysis revealed significant correlations among the model's life expectancy, potency rate, health sector investment, and per capita GDP variables. Government expenditure on health was insignificant but positively associated with GDP growth. Conversely, factors such as infant mortality rate and population per bed showed a negative relationship with economic growth.

(Kousar et al., 2022) examined the socioeconomic factors of child mortality in the South Asian region. The analysis examined the influence of health and education expenditures, social protection, population growth, foreign direct investment (FDI), and human capital on the mortality rate. Utilising data from 1990 to 2020 and employing the ARDL estimation method, the study aims to find determinants of health outcomes. Findings revealed a significant positive association of health and education expenditures, FDI, and social protection with life expectancy. On the other hand, health and education expenditures, as well as social protection programmes, reduce child mortality. Interestingly, population growth shows a significant, negative association with educational levels.

Furthermore, Wasim et al. (2023) examined the causal association among real GDP per capita, health, and educational expenditures in Pakistan. The analysis uses the Ng-Perron test to assess stationarity, the ARDL bounds testing approach to identify long-term relationships, and the Granger Causality test to analyse short-term, long-term, and combined causal links among the variables using time series data from 1972 to 2009. Findings reveal a sustained relationship among real GDP per capita, per capita education expenditures, and per capita health expenditures in Pakistan. In the short term, per capita real GDP and per capita education expenditures exhibit mutual influence, whereas per capita health expenditures and real GDP per capita do not. However, in the long term, bidirectional causality is observed among all three variables. Additionally, the study confirms joint causality among these variables in both the short- and long-term, indicating their interconnectedness in shaping Pakistan's economic and social landscape.

Chaudhry, M. O. et al. (2023) focused on the linkage between health and GDP growth, particularly in underdeveloped countries where low economic growth persists alongside dismal health conditions. Using secondary data from 1975 to 2010, the analysis employed the ARDL estimation method for the model variables. The estimation process involved Government health expenses, the

number of dispensaries, beds and medical doctors. Except for the real exchange rate, all other independent variables show a positive association with the GDP growth.

In addition, Khan and Khattak (2022) examined the relationship between health outcomes and economic progress (GDP Growth) across the selected South Asian economies. The study analysed the impact of individuals on economic progress. In addition to the explanatory variable 'health expenditure', the analysis has used a few control variables, including life expectancy, labour force and infant mortality. Further, the analysis employed FMOLS to estimate the coefficients of the regressors. The results show that health expenditure, HDI, and life expectancy significantly and positively affect economic growth. The analysis recommends that increasing health expenditures encourage economic growth.

Similarly, Muneer & Islam (2018) investigated the linkage between human health and economic progress from the perspectives of Bangladesh and Pakistan. To examine how health and educational expenditures are associated with economic progress, the analysis employed OLS estimation. The study's results show that, compared to Pakistan, Bangladesh is spending a greater proportion of its budget on health. In the case of education, both countries' spending is stable; however, it is less than 3% of total GDP. Further, the analysis concluded that Bangladesh has improved women's fertility and life expectancy at birth.

Akram (2022) examined the effects of various individuals' health on GDP growth in Pakistan. Using long-term cointegration and an ECM, the study analysed time-series data spanning 1972 to 2021. Empirical results revealed that an individual's health and GDP Growth are positively associated in the long run. This result suggested that long-term improvements in the health sector are imperative to boost GDP growth. However, during the short term, this relationship is not significant.

Data and Methodology

Data

This study utilised data on seven (7) countries of South Asia, including India, Pakistan, Bangladesh, Sri Lanka, Bhutan, Nepal, and the Maldives, covering the period 2000 to 2023. These South Asian economies were selected for the empirical analysis based on data availability for each model variable. The study downloaded data from World Development Indicators (WDI). Moreover, the study used EViews software for data analysis.

Model

The impact of income disparity, GDP growth, and government expenditure on individuals' health in the South Asian economies is estimated using the model given below:

Where 'HS' represents Health Status, 'IN' represents Income Inequality, 'EG' represents Economic Growth, and 'HE' represents Health Expenditure, are the coefficients of the independent variables, respectively.

Variables Description

- People's Health Status: The Number of Beds per 1000 people is used as a proxy for health status.
- Income Disparity: Income variation is proxied by the WDI Gini Index.
- Economic Growth: For Economic Growth, the study used Gross Domestic Product measured in US dollars at constant 2015 prices.

- Health Expenditure: To capture the impact of health expenditure, the study used current per capita health expenditure in US dollars.

The study aims to find the association among income inequality, economic well-being, and the population's health expenditure. However, it is not easy to suggest an appropriate method for estimating variable coefficients. Hence, the study first conducted some tests before estimation. Those tests are conducted to identify problems in the data, so the study uses an estimation method that accounts for them. Hence, the study first used descriptive statistics to identify outliers and other abnormalities in the data. Then, the study checked for multicollinearity using a correlation matrix and variance-inflating factor (VIF). After checking for multicollinearity, the study examined cross-sectional dependence using the Breusch-Pagan test (Breusch & Pagan, A. R., 1979), the LM test of Pesaran (Pesaran, 2004), and the CD test of Pesaran (Pesaran, 2004). The study aims to analyse the long-run relationship among variables using the cointegration test. However, before the co-integration test, the analysis checks the stationarity of all the series. Hence, the study examined the stationarity of the data using the Levin-Lin-Chu test, the Im-Pesaran-Shin test, the Fisher-ADF test, and the Fisher-PP panel unit root test. After examining the series for stationarity, the analysis employed the Pedroni (1999) Cointegration test. The result of the Pedroni (1999) co-integration test confirmed the existence of a long-run association among the model's variables. Finally, to empirically estimate the coefficients of the independent variables, the analysis employed the Fully Modified Ordinary Least Squares (FMOLS) method (Pedroni 2001). However, since the FMOLS method lacks information about causality, the study used (Dumitrescu & Hurlin, 2012) to precisely determine causality among the included variables.

Results and Discussion

This section presents all findings obtained from the specified methodologies. In the first stage, the analysis examined descriptive properties of the series and discussed its mean, median and deviation from the mean. Below, Table 1 briefly show and explain characteristic of the given data:

Table 1: Descriptive Statistics

Model's Variable	Obser.	Mean	Median	Maximum	Minimum	Standard Deviation
lnPH.STATUS	168	0.138	0.510	1.850	-1.772	0.999
lnIN.INEQ	168	3.540	3.536	3.780	3.350	0.103
lnE.GRO	168	7.553	7.373	9.353	6.304	0.812
lnH.EXP	168	4.090	3.885	6.946	2.079	1.170

Results show that people's health status mean value is 0.138, with the highest being 1.850 and the lowest being -1.772. Moreover, the mean value of inequality in South Asian countries is 3.540 with the lowest being 3.350 and the highest being 3.780. In this line, economic growth and health expenditure mean are equal to 7.553 and 4.090, and the highest and lowest values are 9.353 and 6.304 and 6.946 and 2.079 respectively. Since results show that there are no outliers in the data. Furthermore, the standard deviation of people's health status, income inequality, economic growth, and health expenditure is 0.999, 0.103, 0.812, and 1.170 respectively. Since the values of standard deviation are not larger, consequently, it indicates that all variables have not deviated from the mean value.

Secondly, the study conducted a correlation analysis of all the variables included in the model. Below, Table 2 show and discuss results of the correlation:

Table 2: Correlation Matrix Results

Variables	lnP.H.STATUS	lnIN.INEQ	lnE.GRO	lnH.EXP
lnP.H.STATUS	1	0.400	0.813	0.758
lnIN.INEQ	0.400	1	0.247	0.176
lnE.GRO	0.813	0.247	1	0.956
lnH.EXP	0.758	0.176	0.956	1

The findings of a correlation analysis between the variables chosen for the study are presented in Table 2. Examining the possible existence of multicollinearity among the variables in the recipient panel was the primary goal. A threshold level of greater than 0.85 was recommended for identifying multicollinearity among the variables following Elith et al. (2006). The result shows that the model does not suffer from multicollinearity problem as majority of the variables have obtained value less than 0.85.

In the third step, the analysis conducted cross-sectional dependency (CD) test. The results of the CD tests are given below in Table 3:

Table 3: Cross sectional Dependency Tests Results

Breusch-Pegan LM	Pesaran LM	Pesaran CD
151.990***	19.132***	5.137***

Since, the results of all tests are significant, thereby the analysis rejects the hypothesis that no cross-sectional dependency exist across the entities.

In the fourth step, the study checked for stationarity problem of the included series. Results of the variable's order of integration are given below in Table 4:

Table 4: Panel Unit-Root Tests Results

Variables	Levin-Lin-Chu		Im-Pesaran-Shin		Fisher-ADF		Fisher-PP	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
lnP.H.STAT	0.694	-1.837***	-0.655	-5.466***	15.922	54.444***	49.644	655.833***
lnIN.INEQ	2.289	0.031***	2.289	-1.533***	10.276	26.823***	0.871	32.528***
lnE.GRO	0.409	-4.773***	0.039	-3.971***	24.072	40.802***	30.284	170.978***
lnH.EXP	3.133	-4.557***	4.074	-4.874***	2.958	49.478***	1.388	143.110***

The results of the tests revealed that all variables are significant at first difference. However, none of the variables is a second difference.

After the panel unit root, in the fifth step, the study conducted cointegration tests of (Pedroni, 1999) and presented its results in Table 5.

Table 5: Pedroni Cointegration Test results

Within-Dimension		
Statistic Type	t-Statistic	Weighted Statistic
Panel υ	1.775**	0.756
Panel ρ	-0.322	-0.589
Panel PP	-1.722**	-2.285**
Panel ADF	-1.647**	-2.659***
Between-Dimension		
Group ρ	0.588	
Group PP	-1.786**	
Group ADF	-2.841***	

Results in Table 5 show that out of seven statistics four reject the null hypothesis of no cointegration. Since the majority reject the null hypothesis hence long-term relationship exists between people's health status and other variables.

Finally, after confirming the long-term relation among the dependent and independent variables, the study estimated the long-term coefficients of the variables using panel FMOLS and presented them in Table 6.

Table 6: Panel FMOLS results

Variables	Coefficients	Std. Error	t-Statistic	P-Value
lnIN.INEQ	-1.424	0.072	-19.657	0.000
lnE.GRO	0.511	0.051	9.876	0.000
lnH.EXP	0.321	0.035	9.067	0.000

Results in Table 6 show that income inequality is negative, while economic growth and health expenditure have a positive impact on people's health status. More precisely, a one percent increase in income inequality decreases people's health status by 1.424 percent, while a one percent increase in economic growth and health expenditure increases people's health status by 0.511 and 0.321 percent respectively.

Since Panel FMOLS do not tell anything about causality, hence the study conducted (Dumitrescu & Hurlin, 2012) causality test and presented its results in Table 7.

Table 7: Dumitrescu-Hurlin causality test results

Null Hypothesis	W-Statistic	Zbar-Statistic	Prob.
lnIN.INEQ does not homogenously cause lnP.H.STAT	2.740	2.517	0.012
lnP.H.STAT does not homogenously cause lnIN.INEQ	3.697	3.995	0.000
lnE.GRO does not homogenously cause lnP.H.STAT	5.503	6.786	0.000
lnP.H.STAT does not homogenously cause lnE.GRO	1.565	0.702	0.483
lnH.EXP does not homogenously cause lnP.H.STAT	6.973	9.057	0.000
lnP.H.STAT does not homogenously cause lnH.EXP	1.60168	0.75798	0.000
lnE.GRO does not homogenously cause lnIN.INEQ	4.563	5.333	0.4485
lnIN.INEQ does not homogenously cause lnE.GRO	1.530	0.647	0.518
lnHEXP does not homogenously cause lnIN.INEQ	4.716	5.569	0.000
lnIN.INEQ does not homogenously cause lnH.EXP	2.351	1.916	0.055
lnH.EXP does not homogenously cause lnE.GRO	3.243	3.295	0.0010
lnE.GRO does not homogenously cause lnH.EXP	1.436	0.503	0.615

Dumitrescu-Hurlin test results reveal that people's health status has a two-sided causality with economic while and health expenditure while with income inequality it has a one-sided causality. Moreover, health expenditure has a two-sided causality with income inequality while it has no causal relation with economic growth. Furthermore, economic growth has no causal relation with income inequality.

Conclusion and Recommendations

This study analyzed the long-run impact of income inequality and significant control variables of economic growth and health expenditure between 2000 and 2023. To achieve the objective, the study went through several steps. First, the study reviewed a large number of studies and found that the majority of studies either analyzed short-term impact or fixed effect and random effect. Hence, this study analyzed the long-run impact. Before estimating long-run coefficients, this study conducted various pre-estimation diagnostic tests. First of all, the study conducted descriptive statistics to check for outliers and other abnormalities in the data, results revealed that there is no abnormality. Second, the study checked for CD using Breusch-Pegan, Pesaran LM, and Pesaran CD tests, and the results did not show any traces of CD. Next, the study checked for stationarity using LLC, Im-Pesaran-Shin, ADF, and PP, their results found that all variables integration order is same, that is, first difference of variables converge back to long run equilibrium. Then, the study checked for the presence of long-run relation between variables by using the Pedroni test. The result of the test confirmed the presence of long-run relationship between variables. Finally, based on the results of diagnostic tests, this study employed the Panel FMOLS estimation technique to estimate the long-run coefficients of the variables. Outcomes show that income inequality has a negative while economic growth and health expenditures have a positive impact on people's health status in South Asian countries. More precisely, a one percent increase in income inequality decreases people's health by about 1.424 percent. Furthermore, a one percent (1%) increase in economic growth and health expenditures improve population health's outcome by about 0.511 and 0.321 percent, respectively.

Based on the results, this study suggests significant policy recommendations. First, governments of South Asian countries should adopt economic policies which could potentially uplift the marginalized and poor segment of the economy. This way, the income gap between and poor and rich people will be minimized. Second, to improve wellbeing of the people, the governments of South Asian countries should allocate more funds to health sector.

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