# Impact of Health Capital on Economic Growth in Pakistan

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## Abstract

Health is necessary for the well-being of individuals because healthy individuals can be more productive and efficient as compared to people who are unwell physically or emotionally. Healthy people tend to be more active, eager, excited and enthusiastic in their workplace and become more productive in their respective disciplines. Thus, healthy and productive workforce is important for both industrial and agricultural growth of the economy. Expenditure on health produces healthy populations which can lead to long and productive lives, less infant mortality, healthy mothers, healthy children and healthy population which engenders the high number of workforce to boost the economy of the country. Therefore, current research comprised to examine the impact of health capital on the economic growth in Pakistan. Keeping in view all the facts, importance and significance of health capital, it becomes crucial to empirically investigate what factors determine the impact of health capital on economic growth. For this purpose, data ranging from 1973 to 2020 was used to analyze the important relationships between the variables. The other variables included in the model are domestic investment, education and trade openness. Autoregressive distributed lag model and error correction model was used to estimate the long run and short run results respectively. The results showed that there exist long run as well as short run relationship between health capital and economic growth in Pakistan. Health capital expenditure has a long run convergence towards the equilibrium. Thus it is concluded that to boost the economy, the expenditures on human health are imperative and crucial. Education and openness of trade are also important for the economy.

*Keywords*: Health Capital, Domestic Investment, Economic Growth, Education, Trade Openness

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## Introduction

Health is necessary for the well-being even though it is not the only parameter to measure the well-being of individuals or population. However, healthy individuals can be more productive and efficient compared to people who are unwell physically or emotionally. Healthy people can work more hours and can be helpful for their countries (Akram, Padda, & Khan, 2008; Arrow, Dasgupta, Goulder, Mumford, & Oleson, 2012). Healthy people can live longer and work for more years than unhealthy people. Therefore, health can be considered an asset or capital.

Health has various dimensions and concepts such as mental health, illness, severity of illness, risk of disease, lack of pain or excessive pain, and nutritional problems for individual fitness (Brooks et al., 2022). It can be measured through live expectancy, infant mortality rate, presence of diseases preventable and availability of the services and healthcare units for the population. Similarly, the concept of treating health as a capital is contested as it is not an input into the production function as many economists would like to define the capital (Arrow et al., 2012; Barro, 1996; Bloom, Canning, & Sevilla, 2004). Regardless, good health can improve the productivity of goods and services. Healthy population can help the economy of a country as it affects the productivity, efficiency, and enjoyment of the populations (Chen and Wang, 2022). If the governments spent on the health of their population certain amount, the healthy population can return the expenditure in the form of skillful workers. As healthy people have high rates of school attendance, high rates of university attendance and high rates of employment attainments thus, creating a herd of highly professional and skillful worker for the companies which boost the economy of the country (Akram et al., 2008; Bloom, Canning, & Sevilla, 2001; Szreter & Woolcock, 2004).

Certain factors define the availability of good health for the population. For instance, availability of the healthcare units, doctors, specialists, healthcare service providers, hospitals and updated technology and availability and ease of access to healthcare services can define the healthiness of the population. The availability of healthcare can determine whether people have access or not. The availability of the healthcare units is necessary for the people to avail it. People cannot avail an opportunity that is not available for them (Barro, 1996). Similarly, the health facilities should be accessible to all. For instance, expensive treatment facilities might not help people who do not have the resources to buy the facilities. Another important factor is the expertise of the doctors and physicians at the hospitals, because without good physicians, specialists and doctors the healthcare units might not be able to help the population which suffers from diseases. Proper doctors and physicians who are willing to help the people is one of the most important factors in determining the impact of an illness on the populations (Akram et al., 2008; Barro, 1996; Szreter & Woolcock, 2004). Lastly, updated technology can help the doctors and healthcare providers to disseminate proper healthcare system to its population. Without updated technology the healthcare providers might not be able to convert their abilities into actions (Uohara et al., 2020). Hence, all of the above mention factors are essential for providing good health facilities to the population.

Health facilities can lead to seemingly obvious results which can help to measure the economy of a country hence creating grounds for health to be considered a capital (Yin et al., 2018). Expenditure on the health produces healthy populations which can lead to long lives, less infant mortality, healthy mothers, healthy children and healthy population which engenders the high number of workforce to boost the economy of the country. The healthy workers do not need sick leaves which increase productivity of the companies (Arrow et al., 2012). Similarly, healthy children and people are more likely to attend schools and remaining in schools means comparatively large number of skilled population. Therefore, health capital directly affects human well-being which is why the health capital affects the economy of the country directly as it provides future assets in the form of hospitals and doctors and healthy population to boost the economy of the country (Arrow et al., 2012; Barro, 1996; Bloom et al., 2004).

Pakistan and its Neighboring Countries Health Expenditures
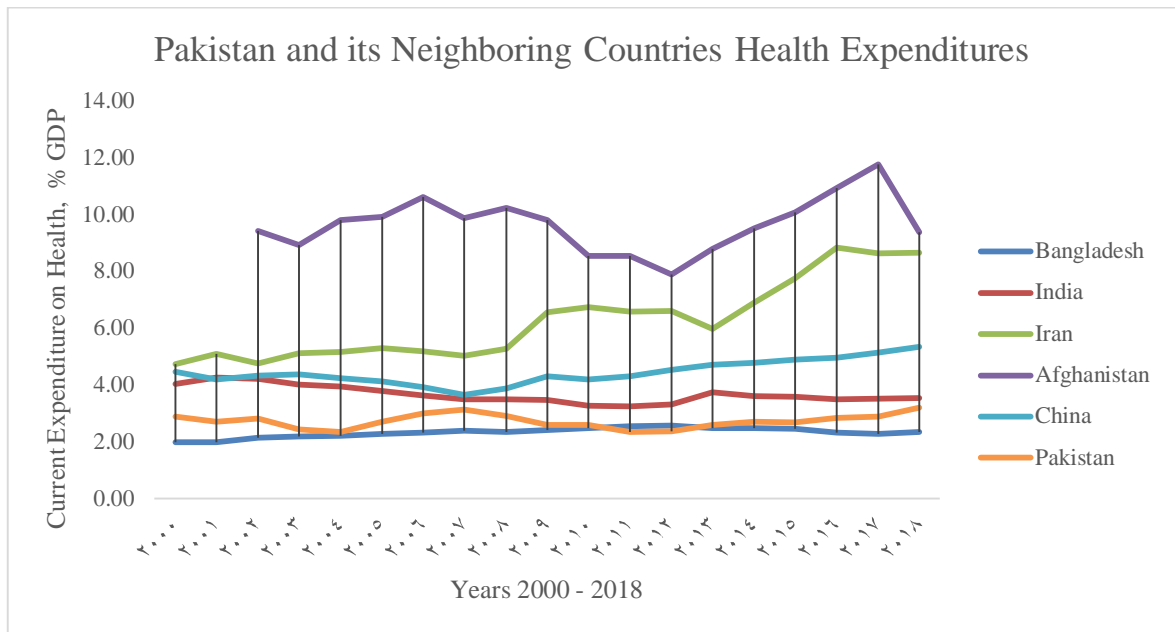
Therefore, current research is comprised to examine the impact of health capital on the economic growth in Pakistan. Keeping in view all the facts, importance and significance of health capital, it becomes crucial to empirically investigate what factors determine the impact of health capital on economic growth in Pakistan. Therefore, the overall aim of this study is to analyze the impact of health capital on economic growth in Pakistan as well as to find the long run and short run relationship between health capital and economic growth.



Comparison of Expenditure on Health and GDP per Capita Growth in Pakistan
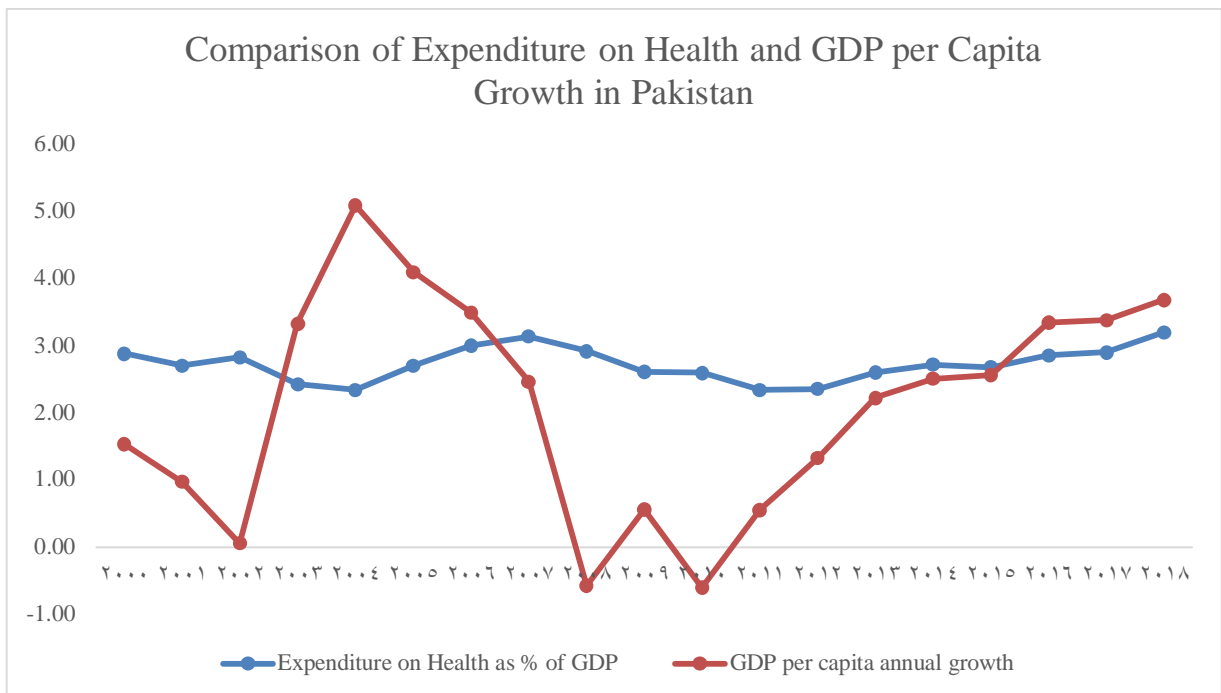
Based on these objectives, this study will help to identify the factors that are responsible for causing economic growth in Pakistan and along with that it will also help to get know whether health capital helps in the growth of economy in Pakistan, by analyzing the time series data from 1973 to 2020. Thus, the study of health capital and economic growth is quite important for policy maker to understand a broad spectrum of development.

## Literature Review

According to Cooray (2013) the impact of health capital disaggregated by gender on economic growth in a sample of 210 countries over the 1990-2008 Period. This study suggests that the influence of health capital across countries cannot be generalized. Results for the full sample indicate that health capital does not have a robust and significant effect on economic growth unless through their interactions with health expenditure and education. The results disaggregated by income group reveals that health capital has a positive robust influence on economic growth in high and upper middle income economies. In low and low middle income economies, health capital gains statistical significance only through their interaction with education and health expenditure.

Hartwig (2010) stated that a large body of both theoretical and empirical literature has affirmed a positive impact of human capital accumulation in the form of health on economic growth. Similar findings were indorsed by Bucci, Prettner & Prskawetz (2019); Gebrehiwat (2016) and Kanayo (2013). For rich countries, however, the existing empirical evidence is mixed. This paper revisits the question whether health capital formation stimulates GDP growth in rich countries applying a new empirical methodology; the panel Granger-causality framework. The results do not lend support to the view that health capital formation fosters long-term economic growth in the OECD area.

Narayan, Narayan and Mishra (2010) investigated the relation between health and economic growth through including investment, export, imports, and research and development (R&D), for five Asian countries using panel unit root, panel cointegration with structural breaks and panel long-run estimator for the period 1974-2007. This relationship within the production function framework, and unravel two important results. First, in all four variants of the growth model, variables share a long-run relationship; that is, they are cointegrated.

Chandra and Skinner (2012) stated that health care technology has contributed to rising survival rates, yet health care spending relative to GDP has also grown more rapidly in USA than any other country. Brown and Saltman (1985) stated that health capital policy is strategically important not only because of the long-term nature of capital commitments but also because capital requirements often drive institutional behavior far out of proportion to dollars expended. The authors offer a framework for analyzing U.S. health capital policy, much of which is indirect and not always understood to be health capital policy. They emphasize the complex interaction between capital policy and health system configuration and performance, and highlight the long-term effects of current capital policy. They conclude with a likely configuration of the future U.S. health care system and with a discussion of a strategic role of capital policy in creating that future.

## Model Specification and Data

Time series data from 1973 to 2020 was used to determine the effect of health capital on economic growth in Pakistan. The following specification was used in the empirical model to examine the impact of health capital on economic growth in Pakistan.

$$\ln Y_t = \alpha_0 + \alpha_1 \ln H_t + \alpha_2 \ln K_t + \alpha_3 \ln E_t + \alpha_4 \ln TO_t + \varepsilon_t$$

Y = Gross Domestic Product Per Capita
K = Domestic Investment (GFCF)
H = Health Capital (per capita expenditure on health)
E = Education Expenditure (per capita expenditure on education)
TO = Openness of Trade

In this econometric model, gross domestic product per capita is the dependent variable while the explanatory variables are domestic investment, health capital, education and trade openness. In the model above most of the variables are transformed into Log form in order to smooth out the data. Data for the variables included in the model were extracted from World Development Indicators (WDI).
Augmented Dickey Fuller test was employed for stationarity analysis and autoregressive distributed lag model and error correction model was used for long run and short run analysis respectively. Descriptive and correlational analysis was also performed to study the behavior of the individual variables as well as the association of variables under study.

## Results and Discussion
### Descriptive Statistics

To understand the basic information about variables and nature of data we have applied the descriptive statistics. Descriptive statistics is the basic analysis of the data for all the independent variables as well as for the dependent variable. It summarizes the data set and helps in order to get know the different features of the date set with the help of mean, maximum, minimum, standard deviation, Skewness, kurtosis and normality of variables. The values from the table 1 are clearly representing that all the variables are statistically normally distributed and can be used for regression analysis and forecasting.

Table 1: Descriptive Analysis

|            | GDP       | GFCF      | HEALTH    | EDUCATION | TRADE     |
| --- | --- | --- | --- | --- | --- |
| Mean       | 25.49935  | 15.90912  | 0.775364  | 2.165750  | 0.354208  |
| Maximum    | 25.90035  | 17.73199  | 1.291551  | 2.746230  | 0.431576  |
| Minimum    | 25.09883  | 14.20456  | 0.121615  | 1.767590  | 0.268515  |
| Std. Dev.  | 0.320064  | 1.208516  | 0.377487  | 0.375188  | 0.053542  |
| Skewness   | -0.069461 | 0.210714  | -0.367671 | 0.365491  | -0.224322 |
| Kurtosis   | 1.415226  | 1.858697  | 2.176822  | 1.495220  | 1.826657  |
| Jarque-Bera| 1.159953  | 0.678414  | 0.558410  | 1.282736  | 0.723257  |

## Correlation Analysis

The results of the correlation analysis are presented in table 2 below. Correlation analysis shown that expenditure on health, expenditure on education and openness of trade has a significant positive association with economic growth of the country.

Table 2: Correlation Analysis

|  | GDP | GFCF | HEALTH | EDUCATION | TRADE |
|---|---|---|---|---|---|
| GDP | 1.000000 |  |  |  |  |
| GFCF | 0.336321 | 1.000000 |  |  |  |
| HEALTH | 0.768311** | 0.188034 | 1.000000 |  |  |
| EDUCATION | 0.888679** | 0.653388* | 0.690797* | 1.000000 |  |
| TRADE | 0.765688** | 0.492157 | 0.820715** | 0.708790* | 1.000000 |

## Stationarity Analysis

It is necessary to check the stationarity of the variables before applying regression analysis for forecasting. For this purpose we applied Augmented Dickey Fuller (ADF) test. The results of the ADF test are given in the table 3 below. ADF test revealed that all the variables were stationary at first difference and they can be used for further analysis.

Table 3: Stationarity Analysis using Augmented Dickey Fuller Test

| Variables | ADF Values at Level | ADF Values at First Difference | Decision |
|---|---|---|---|
| Economic Growth | 2.83 (-3.67) | -3.72** (-3.68) |  |
| Health Capital | -2.06 (-4.29) | -4.52** (-4.42) |  |
| Domestic Investment | -1.81 (-367) | -4.51** (-3.68) | Integrated at first difference |
| Education | -2.99 (-3.67) | -3.47* (-2.97) |  |
| Trade Openness | -2.14 (-3.67) | -6.34** (-3.68) |  |

The results obtained from ARDL revealed that there exist a long run relationship between the independent and dependent variable as the F-value was higher the upper bound value. The results ARDL bounds test are given below in table 4.

Table 4: ARDL Bounds test values

| Level of Significance | Lower Bound | Upper Bound |
|---|---|---|
| 10% | 2.52 | 3.56 |
| 5% | 3.05 | 4.22 |
| 1% | 4.28 | 5.84 |
| F-Statistic | 5.82 | |

Error correction mechanism (ECM) results predicted a short run relationship of the variables under study and confirmed a 64 percent convergence towards the equilibrium annually in the long run. It is evident from the results of the study that health capital plays a vital role in boosting the flow of economic growth in the country. Thus, it is concluded that economic growth of the country is dependent on health capital. If the citizens of a country are healthy and have enough immunity to protect their health from the diseases then they can work for a longer period of time and with full energy.

Table 5: Results of Error Correction Mechanism (ECM)

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| ECM term | -0.641462 | 0.076735 | -8.359440 | 0.0004 |
| R-squared | 0.710243 | Akaike info criterion | | -3.220748 |
| Adjusted R-squared | 0.710243 | Schwarz criterion | | -3.184576 |

Moreover, healthier and skilled workforce can bring a potential change in the flow of economy. In this connection the policy makers and government officials must pay attention in increasing the expenditure on health as well as on education. Also the openness of trade is depending upon the healthy and skilled labors thus, the policy makers must focus on the trade liberalization and promotion policies to uplift the economic and developmental progress of the country.

## Conclusion

Healthy individuals can be more productive and efficient as compared to people who are physically ill. Healthy people tend to be more active and energetic in their workplace and become more dynamic in their respective disciplines. Thus, healthy and productive workforce is vital for both industrial and agricultural growth of the economy. Expenditure on health produces healthy populations which can lead to long and productive lives, less infant mortality, healthy mothers, healthy children and healthy population which engenders the high number of workforce to boost the economy of the country. Therefore, current research comprised to examine the impact of health capital on the economic growth in Pakistan. Keeping in view all the facts, importance and significance of health capital, it becomes crucial to empirically investigate what factors determine the impact of health capital on economic growth. For this purpose, data ranging from 1973 to 2020 was used to analyze the important relationships between the variables. The other variables included in the model are domestic investment, education and trade openness. Autoregressive distributed lag model and error correction model was used to estimate the long run and short run results respectively. The results showed that there exist long run as well as short run relationship between health capital and economic growth in Pakistan. Health capital expenditure has a long run convergence towards the equilibrium. Thus, it is concluded that to boost the economy, the expenditures on human health are imperative and crucial. Education and openness of trade are two main pillars of the economy.

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