Business Project

Impacts of Health Indicators on Economic Growth of Pakistan

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Supervised by: Dr Adeel Ahmed
Submitted by: Raazia Bibi

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Executive Summary

We acknowledged Pakistan's health-care issues and their effect on the economy. The model incorporates the factors known by economists as key health and economic components. The key implications suggest that safety metrics have a strong relationship with the indices of economic growth. The economic effect of both deaths and health expenditure dissolves, although the country's GDP has been affected by FDI and fertility rates. The research indicates that nations, those desire strong economic growths prefer to spend to boost the environment in public wellbeing.

Abstract

This study purposed to observe the problems faced by Pakistan from health sector and the vital relationship among health indicators and economic growth. In this research, ARDL model is applied on Pakistan’s time series data ranging from 1990 to 2019. In the study results shows that, significant relationship between GDP, foreign direct investment, fertility rate and life expectancy in short run, whereas mortality rate is negative but have significant effect on economic growth whereas Health expenditure is insignificant and have negative impact on economic growth. In long run foreign direct investment, fertility rate significantly influenced the GDP. The study accomplishes that, nations that want high level of economic growth they can achieve it by increasing the wellbeing of human capital.

Introduction

Health is one of the major reason for a man to gain productivity or profitability, as a healthy person can get best in his life whether it is the matter of money or fame, he can acquire each and every thing in his life which he desires. As indicated by World Health Organization (WHO), health is denoted as the state of getting prosperity and social well being.it is not just because of the absence of sickness or illness. A Productive PERSON plays a very important role in the progress of any country, as they are more profitable or money-making than non-productive people. Profitability of an individual or a productive person can be estimated through his profit. A healthy individual attains more money and fame as compared to less healthy individual. Nations with healthy employees can get success in every matter of life (Henna Ahsan, 2014).

The effect of any kind on health does effect the profitability of a labor in certain ways because health directly effects a person economically as well as socially .in short health plays

an important role for any body's success. Healthy laborers don't waste their time during their work because of their good health so they are more profitable and productive in their work.

Healthiness also give us financial outcomes, as Abad health leads us towards poverty and good health towards prosperity (World Health Organization, 1999). Grossman (1972) had clarified the requirement between health as utilization and a capital decent. The utilization side of health implies that individuals appreciate more and more when they are sound while health can likewise be considered as great capital i.e. individuals don't spend more days in bed as being sick since that need to have more days to work to perform distinctive market and non-Market exercises. For the economic growth of Pakistan, health sector must be improved which can ultimately bring prosperity. There are many factors that affect the economic growth like, health, social, cultural and environmental factors, genetic endowments, living standards, working conditions etc. health can spur economic growth, through enhancing efficiency of labor, enhancing labor supply, enhancing the skills due to training or higher education.

Physically and mentally healthy workers can handle modern technology much efficiently and hence contribute to the economy. A labor can get wage score which does relate with the productivity of a labor and this productivity increases by better health conditions. In any country, the level of productivity can only be increased by increasing the level of education for people. It is keenly noticed that the people who are healthy, have more possibilities to get education bitterly as compare to unhealthy people. (Muhammad Omer Chaudhry, 2013)

Enhancing the health and life span of the poor is an end in it-self, a crucial objective of economic development. Be that as it may, it is additionally a way to accomplish the other advancement objectives identifying with deprivation. The relationship of health with deprivation decline and to long term economic growth is strong, significantly higher. The issue of disorders in some low-pay areas, particularly sub-Saharan Africa, remains clear limitation to economic development and in this manner must be tended to directly and centrally in any thorough improvement technique (Sachs, 2001). Health is a necessary part of human capital. It can continue laborers efficiency by expanding their physical limits, for example, quality and continuance, and also their psychological limits, for example, subjective working and thinking capacity. The nation's supreme authority is Government. The responsibility of education, social development and health of the people depends on its Government. Any state who is taking care of their people is getting success and high GDP growth rate. The country which is sincere for the growth of its people, works on development and health care of the nation's people (Ali, 2016).

In the year 1990's the life expectancy (at birth) in Pakistan was 60.1years and now in 2016 the life expectancy is raised from 60.1 years to 66.5 years, in the matter mortality rate (per 1,000 live births) from year 1990-2015,also decreased from 106.2 to 65.7 respectively (World Bank). The death rate of infant children got decreased by vaccination in their most early stages of lives, due to which life expectancy rate is increasing day by day. It is also a good sign for a state that people of the state are healthy and escaping their lives from different kind of diseases, by defending themselves against diseases, so economic growth increases.

This study investigated the impact of health indicators on the economic growth of Pakistan, using the annual time series from 1990 to 2019 by considering GDP per capita taken as dependent variable economic growth and selected health indicators used i.e. Life expectancy, health expenditure, Infant mortality rate, Fertility rate and foreign direct investment are the independent variables.

LITERATURE REVIEW

Bhargava et al. (1990) explored the impacts of wellbeing markers on monetary development. Future, youngster ethical quality, grown-up survival rates, was utilized as free factors to watch their effect on GDP development. Panel information arrangement were utilized for examination. In this examination paper on GDP arrangement in light of obtaining power modifications and a GDP arrangement in light of authority trade rates and utilized a few econometric philosophies. It was imperative to utilized two options GDP arrangement as a result of obtaining power correlations.

Mincer (1996) clarify that human capital isn't just aim of financial development but at the same time is an impact. It is clarified that higher financial development through increment in family wage, urbanization, statistic change and expanded female work constrain investment human capital supply increment and then again because of higher physical capital collection and innovative advance interest for talented work increments. The cooperation of free market activity of human capital outcomes in expanded interest in training. It is proposed that this equal relationship is basic for maintained monetary development.

Musila and Walid (2004) researched the relationship of human capital venture and monetary development in Uganda utilizing yearly information on GDP and open use on training for the time of 1965 to 1999. Estimation of error correction model and co integration test affirmed the presence of short run and long run connection amongst GDP and human capital venture.

The probability proportion test likewise affirmed that training uses are pitifully exogenous, so they instruction consumption contribute altogether to expand GDP of the nation.

Abbas (2000) in a near report researched the impact of human capital on monetary development in Pakistan and India. He utilized a development bookkeeping system to think about the influence utilizing OLS technique on the macroeconomic information of the period from 1970 to 1994. In this examination enrolment rates at essential, auxiliary and higher optional levels were taken as an intermediary for human capital. For various intermediaries of human capital the outcomes were unique. Auxiliary tutoring was observed to be decidedly related and noteworthy in both the nations however essential instruction was observed to be emphatically related in the event of India at 1% level of hugeness and higher optional training was discovered decidedly related in the event of Pakistan at 10% level of criticalness.

Khan (2005) inspected the elements that add to financial development. He took the example of 72 nations of low and center pay gathering. The day and age was from 1980-2002. He made cross-segment examinations by taking the normal of the factors over the period 1980-2002. OLS evaluations of the relapse uncover that human capital is huge factor in deciding development. Also, for Pakistan to enter in the high-minded cycle interest in medicinal services and training ought to be given the need.

Abbas and peck (2008) examine the link between human capital and economic growth in Pakistan with aggregate time series data. Evaluated with the Johansen (1991) approach, the fitted model was determine a critical part for human cash-flow to upgrade the economy's ability to pull in world innovative advance.

Ahsan et al. (2014) researcher investigate effect of human efficiency, estimated through profit at both individual level and region level of Pakistan. For person’s health investigation is estimated by different sustenance consumption what's more, for area examination health is estimated by nourishment and also through local health organizations (number of beds per workers and fundamental wellbeing units per workers). Researcher obtain the data from Household Integrated economic survey 2010-2011 and also from numerous Provisional Development of Statistics. The results are that health is too important to increase the efficiency level. The unequal circulation of nourishment admission and health organizations influence the profit disparity, to limit this winning imbalance there is a requirement for reasonable dissemination of nourishment admission and health organizations.

Raza et al. (2013) examined the impact of health indicators on the economic growth of Pakistan. For finding the relationship they use OLS (ordinary least square method) Granger Causality technique. For this purpose they use Pakistan’s time series data from 1980-

2012.Therefor they use some of these indicators (health expenditures, fertility rate, life expectancy, and infant mortality rate).GDP (per capita) expressively effected by life expectancy, fertility rate, investment on health sectors. Health expenditure also effect positively related with GDP but irrelevant to economic growth. There's negative link of infant mortality rate, per bed people on economic growth. The strategy of the paper was when there is increment of investment on wellbeing services it improves the economic growth too.

Bhargava et al. (2001) researcher study wellbeing pointers as ASR (adult survival rates) on Gross Domestic Product (GDP) growing charges in numerous countries for 5 year intermission (1965-1990). The data analyzed was panel data on GDP sequence in light of acquiring power modifications and on trade rates. Initially, they built up a system for demonstrating the between connections between GDP development rates and informative factors by rethinking the life expectancy– wage relationship. Second, models for development rates were assessed considering the collaboration amongst ASR and slacked GDP level; issues of endogeneity and turn around causality were tended to. In conclusion, they processed confidence interims forward impact of ASR on development rate and connected a test for parameter solidness. The outcomes indicated beneficial outcomes of ASR on GDP development rates in low-pay nations.

DATA AND METHODOLOGY

SELECTION OF DATA AND VERIABLES

Data used in the study is time series data form the time period of 1990 to 2019. Data is collected from World development Indicators (WDI). In this study we use the GDP as Dependent Variable, whereas fertility rate, infant mortality rate, health expenditure, life expectancy and foreign direct investment are used as independent variables. The details of the data is below:

Description of Data				
S.NO.	**Variables**	**Time Period**	**Data Type**	**Source of Data**
1.	GDP	1990-2019	Time Series	WDI
2.	FERTILITY RATE	1990-2019	Time Series	WDI
3.	HEALTH EXPENDITURE	1990-2019	Time Series	WDI
4.	INFANT MORTALITY	1990-2019	Time Series	WDI

	RATE			
5.	FOREIGN DIRECT INVESTMENT	1990-2019	Time Series	WDI
6.	LIFE EXPECTANCY	1990-2019	Time Series	WDI

METHODOLOGY

The purpose of this study is to find the impact of health indicators on economic growth on Pakistan. For estimating the relationship ARDL method is used. For ARDL firstly check the data is stationary or non-stationary.

Table 1

UNITROOT RESULTS:

Variables	At Level	1st Difference	Decision
GDP	0.4643 0.9812	-2.1487*** 0.0328	I(1)
Mortality rate, infant	-3.9809* 0.0057	-	I(0)
Fertility rate	-1.9098 0.3216	-5.0887* 0.0004	I(1)
Life expectancy	-4.8011* 0.0011	-	I(0)
Health expenditure	-2.1987 0.2114	-4.013032* 0.0049	1(1)
Foreign direct investment	-2.7447 0.0803	-3.364001** 0.0220	1(1)

*shows intercept,**shows trend and intercept,*** shows none

The calculated ADF statistics of the variables are given in the above table with their p-values. As the table shows that Mortality rate and Life expectancy are stationary at level whereas GDP, Foreign direct investment, Fertility rate and Health expenditure are stationary at first

difference I(1) thus rejecting the null hypothesis of unit root respectively. All the variables are stationary at level or at first difference.

Empirical Results

The data of the present study was fed into the E-views 9 for the mathematical calculation. All the data is gathered from world development indicators for the past 29 years (1990 to 2019). Initially the data is converted into logically acceptable format in order to understand the working position affectively. Table 1 describes the statistical analysis of the variables giving a framework of mean, maximum, minimum and standard deviation of the data.

Table 2

Descriptive Results				
Variables	Mean	Maximum	Minimum	ST. Deviation
GDP	939.650	1178.789	741.801	137.338
HE	2.745	3.401	2.503	0.260
FR	8.946	66.33	3.550	16.225
LE	63.514	106.20	64.20	1.987
MR	83.575	106.20	64.20	12.980
FDI	1.136	3.668	0.382	0.854

The above table shows the descriptive statistics about the variables, variables are GDP, mortality rate, life expectancy, foreign direct investment, health expenditure and fertility rate. The mean value of GDP is 939.650, maximum value is 1178.789, minimum value is 741.801 and the value of standard deviation is 137.338. The mean value of HE is 2.745, maximum value is 3.401, minimum value is 2.503 and the value of standard deviation is 0.260. The value of standard deviation is 137.338. The mean value of FR is 8.946, maximum value is 66.33, minimum value is 3.550 and the value of standard deviation is 16.225. The mean value of LE is 63.514, maximum value is 106.20, minimum value is 64.20 and the value of standard deviation is 1.987. The mean value of MR is 83.575, maximum value is 106.20, minimum value is 64.20 and the value of standard deviation is 12.980. The mean value of FDI is 1.136, maximum value is 3.668, minimum value is 0.382 and the value of standard deviation is 0.854.

Model 1

$$GDP\tau = \beta 0 + \beta 1(FDI)\tau + \beta 2(MR)\tau + \beta 3(LE)\tau + \beta 4(HE)\tau + \beta 5(FR)\tau + \varepsilon \ldots\ldots \quad (1)$$

GDP= Gross Domestic Product

FDI=Foreign Direct Investment

MR= Mortality rate

LE= Life Expectancy

HE= Health Expenditure

FR= Fertility Rate

The model we developed in that GDP is dependent variable where as foreign direct investment, mortality rate, life expectancy, health expenditure and fertility rate is independent variables. We apply the estimation on the above equation after checking the stationary of the variables.

Empirical Techniques

For evaluating the impact of health expenditures on the economic growth of Pakistan, firstly we check for the variables whether they are stationary or not. For this purpose we use the Augmented Dicky Fuller test. Presence of unit root mean that the variables are not stationary and if there is not unit root then the variables are stationary. Life expectancy and mortality rate are stationary at level I(0) whereas all other variables are stationary at first difference I(1). So we apply ARDL technique on the model to estimate the results.

ARDL (Autoregressive Distributed lag)

The model ARDL was introduced by Pesaran and Shin in 1999 and reviewed by Persaran el al. in 2001. ARDL approach has the benefit that it does not need all the variables to be at first difference I(1). Conversely ARDL tends to the issue of collinearity by permitting the dependent variable's lag in the model with other variables which are independent or with their lags.

Rules for ARDL

The most important obligation of ARDL was that auto correlation does not exist.

Normal distribution of the data.

Heteroscedasticity should not arise in the data.

Data should be stationary either on first difference I(0) or I(1) or on both. Furthermore if some of the variables are stationary at second difference I(2) then ARDL should not be applied.

ARDL simple equation:

$$Y_t = \beta_0 + \beta_1 y_{t-1} + ...+ \beta p y_{t-m} + \alpha_0 x_t + \alpha_1 x_{t-1} + \alpha_2 x_{t-2} + ... + \alpha_q x_{t-n} + \varepsilon_t$$

Where,

The number for the lag term's are m and n,

Disturbance term is ε_t

Coefficients for short run are β_i

Coefficients for long run relationship are αi

Serial and hetro

Correlation

Table 3

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.064703	Prob. F(2,15)	0.9376
Obs*R-squared	0.222384	Prob. Chi-Square(2)	0.8948

The value of Obs*R-squared 0.222384 chi-Square is insignificant (0.8948). So there is no correlation between dependent and independent variables.

Table 4

Heteroscedasticity

Heteroscedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.420448	Prob. F(8,17)	0.8929
Obs*R-squared	4.294591	Prob. Chi-Square(8)	0.8296
Scaled explained SS	0.982078	Prob. Chi-Square(8)	0.9984

There is no Heteroscedasticity present if the probability value of Obs*R-squared is insignificant. In this paper, according to the Breusch Pagan Godfrey test, the probability of value of obs* R square is insignificant (0.8296) at the chi-square level so there is no hetro present in their model insignificant. In this paper, according to the Breusch pagan Godfrey test, the probability of value of obs* R square is insignificant (0.8296) at the chi-square level so there is no hetro present in their model.

ARDL:

Table 5

Short run				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(LNGDP(-1))	0.456186	0.255687	1.784160	0.0923
D(LNFR)	0.026368	0.020630	1.278159	0.2184
D(LNFDI)	0.025401	0.010903	2.329613	0.0324
D(LNHE)	-0.025135	0.060495	-0.415486	0.6830
D(LNLE)	37.437229	20.244171	1.849284	0.0819
D(LNMR)	-2.904496	1.008730	-2.879360	0.0104
CointEq(-1)	-0.800082	0.253951	-3.150534	0.0058

Selected model for ARDL (2, 0, 0, 0, 1, 0).As in the above table shown the short run relationship among dependent and independent Variables. The estimated variables of the short run affiliation are significant for GDP, FDI, LE and MR. Fertility rate, foreign direct investment and life expectancy has significantly positive impact on GDP. Health expenditure and mortality rate has negative impact whereas MR is significant having probability value 0.0010. As if there is increase of 1% in FR then there will be increase of 0.026 in GDP, if there is increase of 1% in FDI then there will be increase of 0.025 in GDP. If investment increases on health sector that means it will also rise the economic growth. Correspondingly if there is increase of 1% in life expectancy then it will increase GDP by 37.43. Respectively if there is increase of 1% in health expenditure then it will effect GDP negatively by -0.025. As in previous researches, using the co-integration method, it was also confirmed that there exist a negative relationship between health expenditure and economic growth. Arısoy et al. [18].Kar and Taban [16] used co-integration method to verify the relationship between health expenditure and economic growth in Turkey; they noticed a negative relationship between health expenditure and economic growth. Previous research also shows that there is negative relationship between Infant Mortality Rate, using OLS method. The results of the study shows that Infant Mortality rate has negative but has vital impact on per capita GDP (Raza Kashif et al).

Table 6

Bound test:

Test Statistic	Value	K
F-statistic	**9.309085**	**5**
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

Demonstrating results of F-statistics, if the critical value bound is less then F-stat value, it shows the long-run relationship among the variables. As the F-stat value is 9.309085 is grater then the critical value, which shows that there is co-integration between the variables, so reject the null hypothesis. The long run relationship exists among the variables

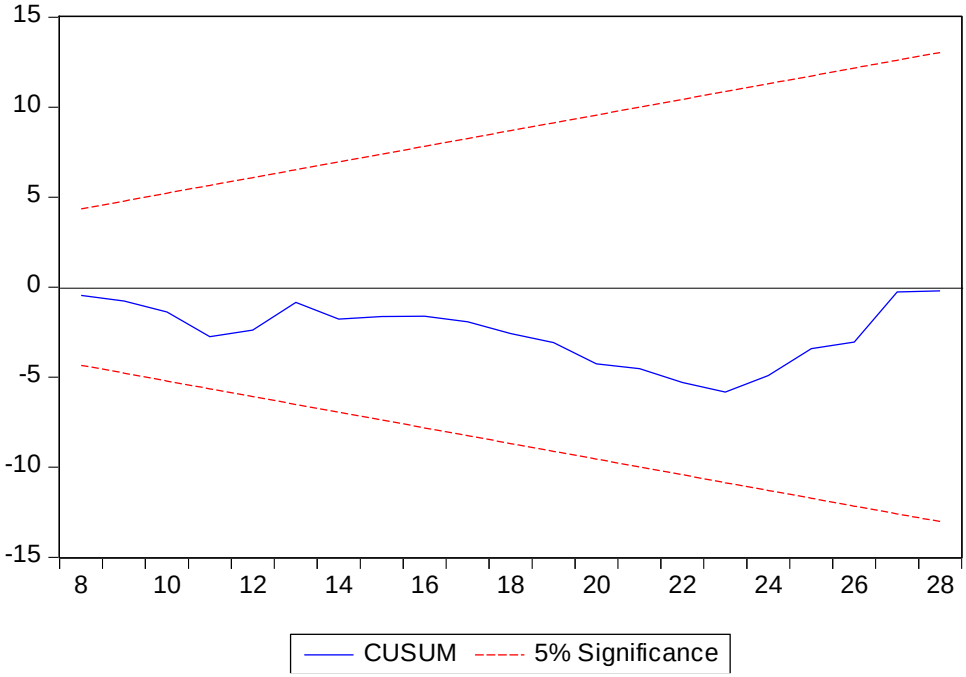
Table 7

Long Run Coefficients				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
LNFR	0.032957	0.017689	1.863142	0.0798
LNFDI	0.031748	0.010005	3.173058	0.0056
LNHE	-0.031415	0.074793	-0.420030	0.6797
LNLE	-12.510631	4.528335	-2.762744	0.0133
LNMR	-3.630249	0.916243	-3.962103	0.0010
C	74.544663	22.821211	3.266464	0.0045

Selected model for ARDL (2, 0, 0, 0, 1, 0).As in the long run table FR is significant with the probability value of 0.0798.FDI is significant with the probability value 0.0056. LE is negative with the significant probability value of 0.0133. As in the previous researches, using multiple regression analysis, there was negative impact of life expectancy on economic growth (Babatunde, 2014). MR is negative but significant with the probability value 0.0010. Whereas HE is negative and insignificant with the probability value of 0.6797. In the developing countries ‘income of people are low so they faces a lot of health problems but

unable to pay for their treatment, they cannot actively participate in economic growth activities.

Stability:



For checking the stability of the selected ARDL model by applying Recursive estimation, Brown et.al (1975).The above figure shows CUSUM plot. As in the above figure the blue line lies between the 5% significant level which shows that the model is fit at the significance level of the 5%.

Conclusion:

Health indicator is the measure which is designed to summarize information about a given prioritized topic in population health or health system performance. The data is collected for the country of Pakistan. The data is panel data which is collected from world development indicator form the time period of 1990 to 2019.This study involves descriptive statistics and co-integration technique as the prerequisite tests, unit root test is involved to check the stationarity of the data. The ARDL model is used in this study after checking the stationarity and the bound test. The result shows both long run and short run relationship. In long run relationship, mortality rate and health expenditure has the negative impact on the growth rate of the country and all the other variables have positive impact on the growth rate of Pakistan which means that the health indicator has overall positive impact on the growth rate of the country. In short run scenario, all the variables have significant values except health expenditure. Health expenditure, life expectancy and mortality rate has negative impact on

the growth rate of country, foreign direct investment and fertility rate have positive impact on the growth rate of Pakistan. Collectively, in short term, the growth rate is not much influenced by the health indicator but it has weak influence of variables on the growth rate of country. In long run, the variables are greatly stimulating the growth rate of the country. Lorentzen et al (2005) investigation the effects of mortality rate on economic development. Study finds that high death rate diminish the economic development by abridging the time skyline. Resultantly individuals take activities that yield here and now benefits at the long term cost. Concentrate likewise fertility that ripeness, interest in physical and human Capital, are the channels by adults death rate influences economic development.

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