Impact of Health Status on Economic Growth: A Study of Different Income Group Countries

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Abstract

Health plays a very important role in the economic growth of a country. Improved health brings about broader benefits including enhanced economic development. Health is vital to human capital which is one of the main inputs for economic development. When we have a healthy population, economic benefits will follow. The present study attempts to examine the status of health among four income group countries viz; high income, upper middle income, lower middle income and low income group countries. The study also attempts to analyse the factors influencing the health status of the countries. To examine the health status, a composite Health Index is computed by using Life expectancy at Birth and Adult Survival Ratio as indicators. The study examines that health status of high income group countries is better than all other three income group countries followed by lower middle income group countries. However, there is high variation in terms of health index in upper middle income group countries and also their mean value of health index is comparatively lower than the lower middle income group countries. The study reveals that economic growth and educational attainment of a country have positive impact on the health status of the same country.

Introduction: Health plays a very important role in the economic growth of a country. The wealth of any nation can be measured by the health status of its citizens. Health performance and economic performance are interlinked. Health improvements impinge on education, labour productivity, savings and investments and demography in ways that can possibly boost up the Gross National Income (GNP) of developing countries. Improved health brings about broader benefits including enhanced economic development. This corroborates the popular saying "Health is Wealth". Wealthier countries have healthier populations. National income has a direct effect on the development of health systems. Poverty, mainly through infant malnourishment and mortality, adversely affects life expectancy. Health is the heart of the Millennium Development Goals (MDGs). Better health can make workers more productive. Healthier individuals will often have the ability and incentive to save more, and this accumulation of capital will stimulate growth through investment. Similarly, companies may be more likely to invest when workforces are healthier or

better educated. Improved disease environments may also support the development of sectors such as tourism.

Peykarjou et al (2011) has rightly pointed out that health can affect production level of a country through various channels. For instance, health improvement in the human force will be followed by motivation to continue education and obtain more skills by enhancement of learning capability leading to a rise in the productivity level. Similarly, enhancement of health and health indexes in the society will encourage individuals towards more saving through reduction of mortality and increasing of life expectancy. Following increased saving in the society physical capital is enhanced and this issue will be effective indirectly on labour force productivity and economic growth (Weil,2005). Everyone knows importance of health as a basic right for life.

Improvement in health may be as important as improvement in income when thinking about development and human welfare. Empirically, high levels of population health go hand in hand with high levels of national income. This is not unexpected. However, health may not only be a consequence but also a cause of high income. This can work through a number of mechanisms (Bloom and Canning, 2000). The first is the role of health in labor productivity. Healthy workers lose less time from work due to ill health and are more productive when working. The second is the effect of health on education. Childhood health can have a direct effect on cognitive development and the ability to learn as well as school attendance. In addition, as adult mortality and morbidity (sickness) can lower the prospective returns to investments in schooling, improving adult health can raise the incentives to invest in education. The third is the effect of health on savings. A longer prospective lifespan can increase the incentive to save for retirement, generating higher levels of saving and wealth, and a healthy workforce can increase the incentives for business investment. In addition, health care costs can force families to sell productive assets, forcing them into long-term poverty. The fourth is the effect of population health on population numbers and age structure. Weil's (2001) conclusion is based on calibration that health plays a big role in explaining cross-country differences in the level of income per worker, a role as important as education.

Dixon et al (2001) and Bloom et al (2004) from their study have found a positive relationship between life expectancy and economic growth which confirms that health has a high and significant impact in productivity and economic growth. Bhargava et al (2001) inserted Adult Survival Ratio (ASR) as the representative variable of health status in their growth function in the time period 1965-90 for 92 countries. The obtained result showed the positive relationship between health and economic growth. Investment in health is not only a desirable, but also an essential priority for most societies. Heshmati (2001) studied the relation between health expenditures and gross domestic product in a research through generalized Solow model and concluded that health expenditures have a positive and significant impact on gross domestic product growth and existence of health expenditures makes impact of human capital on the economic growth insignificant.

Objectives of the Study:

The study aims to achieve the following objectives

- To examine the status of health among different income group countries.
- To analyse the factors influencing the health status of the countries.

Hypotheses of the study:

Based on the above mentioned objectives, the following hypotheses are framed

- Health status does not vary across different income group countries.
- Economic growth, educational level and expenditure on health have no impact on health status.

Data Source, Variables and Analytical Tool: The study is based on secondary data collected from various issues of United Nations Development Programme (UNDP) Reports. To measure the health status of different income group countries and to examine the determinants of health status, various indicators related to health are collected for different countries of the world for the year 2011. As per World Bank classification, countries of the world are divided into four income groups viz; high income, upper middle income, lower middle income and low income groups. From these four income group countries, 133 countries in total are selected as sample of the study.

In the study, to examine the status of health for different income group countries of the world, Life expectancy at Birth and Adult Survival Ratio are taken as indicators.

Life expectancy at birth (LE): Life expectancy at birth is defined as number of years a newborn infant could expect to live if prevailing patterns of age-specific mortality rates at the time of birth stay the same throughout the infant's life (UNDP Report-2014). Dixon et al (2001) and Bloom et al (2004) from their study have found a positive relationship between life expectancy and economic growth which confirms that health has a high and significant impact in productivity and economic growth.

Adult survival ratio (ASR): Adult Survival Ratio denotes the probability that a 15-year-old will survive up to age 60, expressed per 1,000 people. Bhargava et al (2001) in his study includes ASR as an important indicator of health. He argues that the effects of ASR are likely to diminish at a relatively low GDP levels and also a broader view of health necessitates focusing on human development, including the formation of human capital.

Health Index (HI) is then measured by composite dimension index by assigning equal weights to life expectancy at birth index (LEI) and adult survival ratio index (ASI). LEI and ASI are constructed by applying the following formula

$$Dimension\ Index = \frac{Actual\ Value - Minimum\ Value}{Maximum\ Value - Minimum\ Value} \qquad .... (1)$$

Status of health among different income group countries is compared by using paired *t* test, where mean differences of health status indicators of different income group countries are tested.

Now, to determine the factors influencing the health status of a nation, the following three variables are taken in the study:

Health expenditure (HE): Health expenditure (HE) implies the current and capital spending on health from government (central and local) budgets, external borrowing and grants, including donations from international agencies and non-governmental organizations and social (or compulsory) health insurance funds measured in terms of PPP UD$. Heshmati (2001) inserted health expenditures as the variable representative of health status in the growth function. Then he concluded that health expenditures have a positive and significant impact on gross domestic product growth.

Educational attainment (EA): Educational attainment (EA) is measured by mean years of schooling, which is defined as average number of years of education received by people ages 25 and older, converted from educational attainment levels using official durations of each level. Eide and Showalter (2011) have found a positive impact of education on health.

Gross Domestic Product per capita (GDPPC): GDPPC is defined as the total money value of all final goods and services produced in an economy during a particular accounting year within the domestic territory of the nation divided by the total population of the nation. It is considered as one of the determinant of health because it is expected that higher incomes promote better health through improved nutrition, better access to safe water and sanitation, and increased ability to purchase more and better-quality health care (Bloom and Canning 2008).

In the study economic growth is measured by Gross Domestic Product per capita (GDPPC) purchasing power parity (PPP) US$.

To examine the determinants of health status the following model is applied

$$HI_i = \alpha + \beta_1 LNGDPPC_i + \beta_2 MYS_i + \beta_3 LNEH_i + u_i \qquad \text{........................ (3)}$$

where, i=1,2,3,..........100, HI is the health index, LNGDPPC is the natural logarithmic value of GDP per capita measured in terms of PPP US$, LNEA is the natural log of educational attainment, LNEH is the natural log of total expenditure on health, α and β's are the coefficients and u_i is the stochastic error which follows normal distribution with mean μ and variance σ^2. Here GDP is considered as one of the determinant of health because it is expected that higher incomes promote better health through improved nutrition, better access to safe water and sanitation, and increased ability to purchase more and better-quality health care (Bloom and Canning 2008).

Results and Findings: The study reveals variation in health status among different nations. The mean ASR of the selected countries is observed to be 813 which imply that 81 per cent of the adult population have the probability to survive upto age 60 years, and it ranges from 949 to 438. Life expectancy at birth is highest in Japan (83.4) and lowest in Sierra Lione (47.8) with mean 69. The mean HI is 0.66 and it lies between 0.01 to 0.99. Japan has the highest HI while Lesotho has the lowest HI.

**Table 1: Descriptive Statistics of Health Status Indicators and Its determinants**

Variable	Mean	Median	Standard Deviation	Minimum	Maximum
ASR	813	839	106.19	438	949
LE	69	72.4	9.60	47.8	83.4
HI	0.66	0.73	0.24	0.01	0.99

Source: Various issues of Human Development Report.

Figures 1, 2 and 3 present the descriptive statistics of adult survival ratio, life expectancy and Health Index respectively among the four income groups. It is seen from Figure 1 that the mean, median, maximum and minimum adult survival ratio are highest in the high income countries while the standard deviation is lowest in these countries. The mean, median and maximum ASR are lowest in low income countries.

Figure 1: Adult Survival Ratio

Figure 2 : Life Expectancy
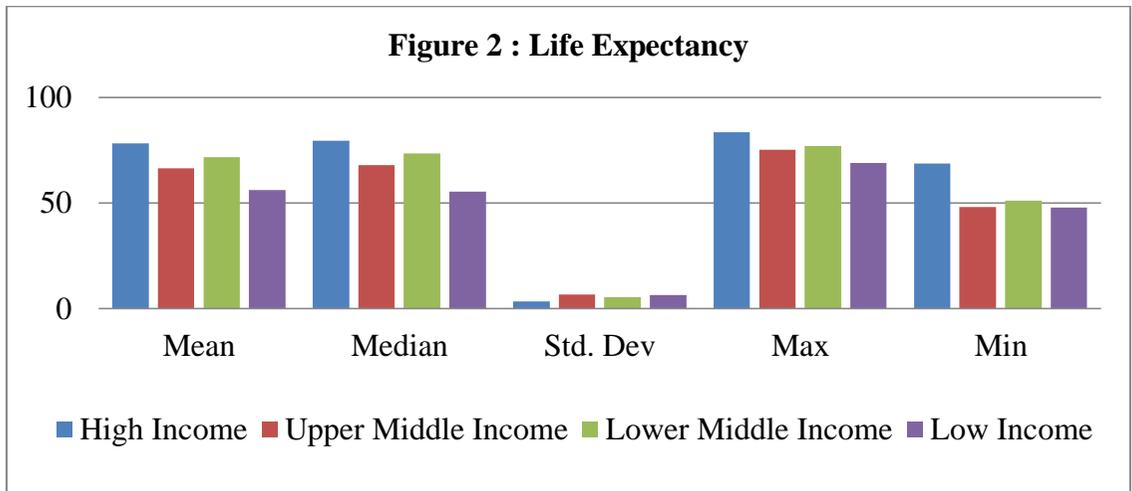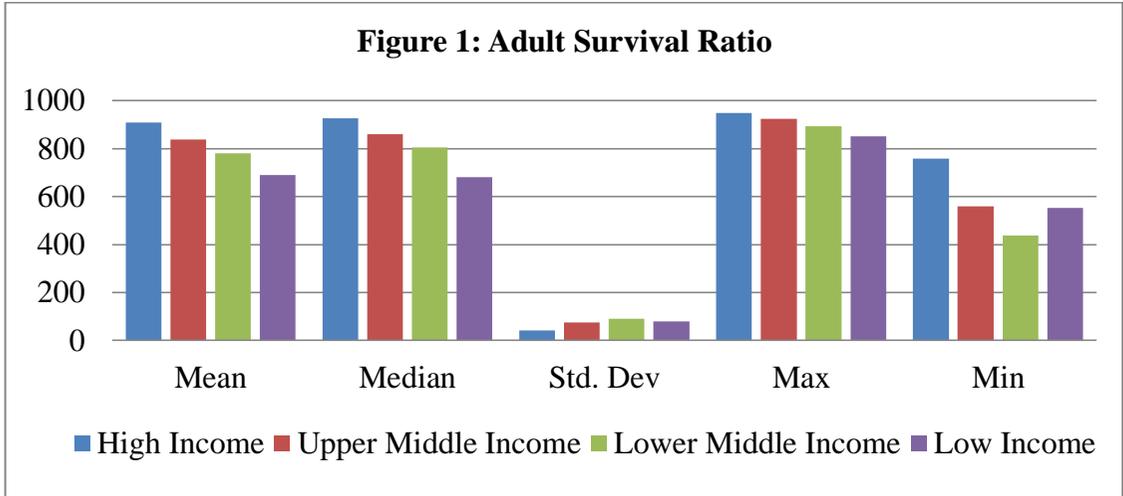
From figure 2, it is observed that the mean, median, maximum and minimum life expectancy are highest in the high income group countries, followed by lower middle income group, upper middle income group and lower income group countries. The standard deviation is lowest in high income group countries. The same findings are observed for Health Index among the four income groups (Figure 3).

Figure 3: Health Index
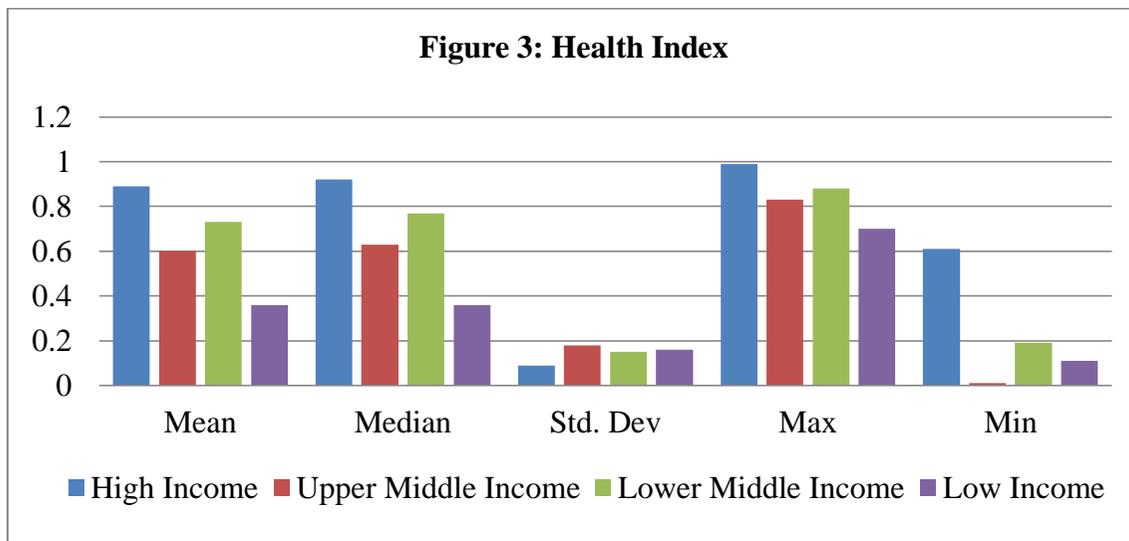
Health status measured in terms of composite health index for high income group countries is better than all other three income group countries followed by lower middle income group countries. However, there is high variation in terms of health index in upper middle income group countries and also their mean value of health index is comparatively lower than lower middle income group countries.

In order to check the mean differences of health indicators among the four income group countries, independent sample t test has been done, the result of which is shown in Table2 and it reveals that the mean differences of adult survival index between different income groups are all significant which implies that the mean values varies significantly between different pair of income group countries. The highest mean difference of adult survival index is between high income group and low income group countries. Similarly, the mean differences of life expectancy index and health index also vary significantly between all the paired income group countries.

Table 2: Independent Samples Test for mean differences of health indicators among different income group countries

Paired Samples Test		Variances	Mean Difference	Std. Error Difference	t value	Sig. (2-tailed)
Pair 1	$SI_1 - SI_2$		0.137	0.028	4.983	0.000
Pair 2	$SI_1 - SI_3$		0.251	0.032	7.891	0.000
Pair 3	$SI_1 - SI_4$	Unequal	0.426	0.033	12.940	0.000
Pair 4	$SI_2 - SI_3$		0.114	0.038	3.014	0.004
Pair 5	$SI_2 - SI_4$		0.289	0.038	7.631	0.000
Pair 6	$SI_3 - SI_4$		0.175	0.044	4.109	0.000
Pair 7	$LEI_1 - LEI_2$		0.185	0.030	6.078	0.000
Pair 8	$LEI_1 - LEI_3$	Unequal	0.329	0.035	9.103	0.000
Pair 9	$LEI_1 - LEI_4$	Unequal	0.621	0.038	16.483	0.000
Pair 10	$LEI_2 - LEI_3$		0.144	0.041	3.481	0.001
Pair 11	$LEI_2 - LEI_4$		0.436	0.042	10.328	0.000

Pair 12	LEI$_3$ - LEI$_4$		0.292	0.047	6.152	0.000
Pair 13	HI$_1$ - LEI$_2$		0.115	0.037	3.072	0.003
Pair 14	HI$_1$ - HI$_3$		0.224	0.044	5.044	0.000
Pair 15	HI$_1$ - HI$_4$		0.462	0.045	10.327	0.000
Pair 16	HI$_2$ - HI$_3$		0.109	0.038	2.850	0.006
Pair 17	HI$_2$ - HI$_4$		0.348	0.037	9.427	0.000
Pair 18	HI$_3$ - HI$_4$		0.239	0.046	5.201	0.000

Source: Various issues of Human Development Report.

*Note: * and ** denotes parameter are significant at less than one and five percent respectively.SI, LEI and HI stand for survival index, Life Expectancy Index and Health Index respectively, and the subscripts 1,2,3 and 4 are for high, upper middle , lower middle and low income group countries respectively.*

The highest mean difference of adult survival index is between high income group and low income group countries. Similarly, the mean differences of life expectancy index and health index also vary significantly between all the paired income group countries.

The highest mean differences are between high income and low income group countries. All the three indices have lowest mean differences between lower middle income and upper middle income group countries.

Table 3: Macro-economic factors influencing Health Status

Variables	Co-efficient	t-values	Prob. value	ANOVA
Intercept	-0.543*	-5.714	0.000	
lnGDPPC	0.120*	8.892	0.000	R^2= 0.690
HE	0.000	0.018	0.986	
				Adj. R^2=0.683
MYS	0.017*	3.015	0.003	F Stat.=99.549 *

Source: Calculated on the basis of Statistical Handbook on Indian statistics 2012-13, Data For 2012-13 are provincial.

Note: denotes parameters are significant at less than one per cent.*

Table 3 presents the result of the regression analysis depicting the major economic factors influencing health status. The value of R^2 in the model is 0.69 which shows that 69 per cent of the variation in the dependent variable is explained by the independent variables of the model. The 31 per cent variation in the dependent variable remains unexplained by independent variables of the study. The adjusted R^2 shows that asymptotically the variables can explain approximately 68 per cent of total variation. The implication is that the model has goodness of fit. F-statistic tests the overall significance of the model under study. The value for the F-statistic is 99.549 and is significant. The result of regression analysis shows that GDP and mean year schooling have significant positive impact on health while health expenditure has no impact on health.

Conclusions: Health status and economic performance are intimately related to each other. Improved health status encroaches on education, labour productivity, savings and investments and

demography in ways that can possibly boost up the economic growth of nations. Hence health and economic development are interrelated. The study explains the relationship between health status and economic growth of different income group countries. The study reveals significant positive relationship between health status and economic growth while expenditure on health is found insignificant for health status. Hence we can say that higher economic status enhance healthy life. The study also examines the relationship between heath status and educational attainment and reveals that there is significant positive relationship between these two. This implies that higher educational attainment leads to awareness and improves better health conditions.

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