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Does Health Accelerate Economic Growth in Pakistan?

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Abstract

This paper has been designed to investigate whether health accelerate economic growth in Pakistan. The study is using Growth Accounting Method, Ordinary Least Squares and Johansen Cointegration Test as analytical techniques. The Results show that Total Factor Productivity, Capital and health contributed 46.61%, 43.15% and 2.61% to growth rate of GDP per capita during 1971-2008. The Ordinary Least Squares results showed health, labour and Research and Development as the significant determinants of economic growth in Pakistan. The results further indicate that real GDP per capita, R&D, education and health institutions affect health in Pakistan. The Cointegration test results confirmed the existence of long run relationship between health and economic growth. Therefore, the study concludes that health accelerates economic growth in Pakistan and this relationship also exists in long run. The study suggests increase in public expenditure on health and R&D. It is also suggests further research on the determinants of Total Factor Productivity

Key words: Health, Economic Growth, Growth Accounting, Ordinary Least Squares, Pakistan

Introduction

The development of new growth theories opened new directions for empirical research in economics. The economists in developing countries are trying to explore the non-conventional factors which foster economic growth. Education is believed to be one of such most important non-traditional factors but not the end of this exploration¹. Knowles and Owen (1995) introduced health as human capital in the model of economic growth. Poor health leads to less human capital development and lowers productivity which affects economic growth². Nakamura (1981), Schultz (2003), Bloom et al 2004 and a number of other studies³ also emphasized the role of health in economic growth. Barro and Sala-i-Martin (1995) found that 1.4% increase in GDP per capita increases with 13 years

increase in life expectancy while Bloom et al (2004) found 4% increase in output due to one year increase in life expectancy. Edwards and Grossman (1979), and Shakotko *et al* (1980) argued that health affects cognitive development of children. Children with poor family background will have lower Intelligence Quotient (IQ) than those who belong to rich family. McDonald and Jennifer (2002), and Bhargava *et al* (2001) supported the view that life expectancy is meaningful in macroeconomic context. Wand and yudong (2003) recommended high priority to human capital accumulation and productivity growth to keep china on path of sustained economic growth.

Health differences across countries significantly explain growth differences in these countries. Therefore, Investment in health and higher level of mass awareness in third world countries can be recommended as macroeconomic tools to achieve sustainable economic growth (Rico *et al*, 2005). Interestingly, Hartwig (2009) found that health

¹ Mankiw et al (1992) extended the Solow (1956) model by introducing education as human capital.

² See Simons and Alexander (1978), Behram et al (1981) and Peri (1984) for details.

³ Schultz (1961), Arrow (1962), and Romer (1986) found health as another form of human capital.

expenditures or life expectancy does not affect economic growth in longrun.

Besides paramount significance of health for sustained economic growth, it failed to get mandatory consideration in Pakistan. Pakistan, still lies in group of countries which are low ranked on Human Development Index (HDI) scale⁴.

The provision of health facility is mainly the responsibility of government in Pakistan. The private sector is sharing this responsibility with the government and it is emerging as a major contributor of health facilities. Pakistan experienced fluctuations in health expenditure during its history. The health expenditure which was on average 0.492 % of GDP during the period 1961-65 increased to 0.762% of GDP during the period 1981-85. The health expenditure as a percentage of GDP remained higher during the period 1986-90 which was on average 1.054 % of GDP per annum (SBP, 2005). It again fell to 0.54% of GDP during the period 2006-08. The demographic indicators of Pakistan are improving with reasonable pace. The Total Fertility Rate fell from 7.0 in 1972 to 3.0 in 2008 (Economic Survey of Pakistan, 2008-09). Similarly birth rate and Infant Mortality Rate (IMR) also showed reasonable turn down.

The life expectancy at birth in Pakistan which was 49 years for both sexes, 50 years for male and 49 years for female in 1960 increased to 67 years for both sexes, 67 years for female and 66 for male in 2008. The rising life expectancy in Pakistan is an indicator of human development but, it is still gripped into a number of health problems like poor sanitation, lower life expectancy, malnutrition, high infant mortality rate and poor living conditions. The successive governments are continuously trying to cope with these problems but due lack of funding and non application of health policies the progress doesn't seem exemplary. Unfortunately, the importance of health in economic growth has been rarely addressed in Pakistan.

The present study is being designed to find the role of health in economic growth of Pakistan. It will investigate empirically whether health accelerates economic growth in a developing economy like Pakistan. The paper will also present sound suggestions for formulation of economic policies in Pakistan.

Materials and Methods

This paper is based on secondary data for the period 1971-2008. The data has been taken from Economic Survey of Pakistan (Different Issues), World Development Indicators (Different issues) and State Bank of Pakistan (2005). Before going to the empirical model for economic growth, it will be fruitful to explore the contribution of TFP to economic growth in presence of health as human capital. The present study is using the most widely used technique Growth Accounting Method (GAM)⁵ for this purpose. The technique starts with the standard production function as given below

$$Y = F(A, K, L) \quad (1)$$

The equation for Total Factor Productivity (TFP) has been derived from equation (1) by using Khan (2012) methodology as given below

$$TFP = y - S_1k - S_2l - (1 - c)h_e \quad (2)$$

Where

$$c = S_1 - S_2$$

Where 'y' stands for growth rate of GDP per Capita, 'l' growth rate of labour and 'h_e' growth rate of human capital in form of health. S₁ and S₂ are shares of capital and labour in output. Similarly 'k' is the growth rate of physical capital. The physical capital has been measured by Gross Fixed Capital (GFC) and labour by total labour force in the economy. Life expectancy has been used as a proxy for health in this paper.

After finding the contribution of health to GDP per capita, we are interested in finding the contribution of health through other econometric techniques. The empirical

⁴ HDI is Human Developed Index computed by United Nations Development Programme (UNDP)

⁵ Growth Accounting is a method which rapture the observed economic growth into elements associated with variation in factor inputs

model for the study has been derived from the seminal work of Weil (2005) with little addition.

$$Y = AK^\alpha(H)^{1-\alpha} \quad (3)$$

Where K shows the physical capital, H shows health and A stands for technological progress. By taking ln and simplification we get

$$Y = \beta_0 + \beta_1 \ln GFCF + \beta_2 \ln Health + \beta_3 \ln L + \beta_4 \ln RD + U_i \quad (4)$$

In order to find the macro determinants of health, we have used the following model

$$Y = \beta_0 + \beta_1 \ln GFCF + \beta_2 \ln Health + \beta_3 \ln L + \beta_4 \ln RD + U_i \quad (5)$$

The data has been analyzed by using the method of Ordinary Least Squares and Johansen Cointegration test. The results have been presented in form of tables.

Results and Discussion

The results obtained from Growth Accounting showed that Total Factor Productivity (TFR) is chief contributor to GDP per capita at the beginning of the study period (1971-75). It shared 68.85% of GDP per capita. The second major component was capital and it contributed 25.03% to GDP per capita while the share of health remained 1.56%. TFP, capital and health added 9.59%, 79.52%, and 2.22% respectively to economic growth during 1976-80. The share of health increased while that of capital declined during 1981-85. The fluctuations in shares of TFP, capital and health continued till end of the study period. The over shares of TFP, Capital and health remained 46.61%, 43.15% and 2.61% during 1971-2008. The results are displayed in Table I.

The regression results show that health, labour and Research and Development are the major factor among the set of explanatory variables which affect GDP Per Capita in Pakistan. The physical capital as expected showed positive relationship with economic growth, however the result is statistically insignificant. The results supported the view that health

positively affects economic growth and the result is significant at 1% level of significance. This is the support of the view that increase in life expectancy helps in achievement of sustained economic growth.

Table-I The contribution of TFP in presence of Health

Period	Contribution to GDP Per Capita (%)		
	TFP	Capital	Health
1971-75	68.85	25.03	1.56
1976-80	9.59	79.52	2.22
1981-85	46.28	43.02	3.03
1986-90	42.06	45.80	0.69
1991-95	57.64	38.11	1.91
1996-00	50.98	38.67	1.06
2001-05	58.73	29.15	0.57
2006-08	37.88	56.29	0.00
1971-2008	46.61	43.15	2.61

Source: Author’s Calculations from the data obtained from World Development Indicators (Various issues), Economic Survey of Pakistan (Various issues), Sate Bank of Pakistan(2005)

The importance of health for economic growth necessitates increasing investment in health. Labour force emerged as significant determinant of economic growth and its positive sign shows its positive contribution to economic growth in Pakistan. Expenditure in Research and Development also appeared as significant variable which affect economic growth in Pakistan. The values of R-Sq and Durban-Watson Statistic support the results of the present study. The DW Statistic is 1.81 which is closer to 2 rejecting the presence of autocorrelation in the model. The results are shown in Table II.

The results of model with health as dependent variable shows that real GDP per capita, R&D,

education and health institutions affect health in Pakistan. The results indicate that GDP per capita (real) is a significant determinant of health. The health status improves with increased GDP per capita which stimulates life expectancy. The Research and Development (R&D) also emerged as a significant determinant of health which means that R&D is also a helpful tool for improvement of health status of masses. Education is considered a pivotal factor for a large number of socio-economic indicators. Keeping in view the significance of education, it is introduced in health model. The results show that education positively affects public health. It may be due to the fact that educated people are more careful about their health, and are cautious in selection of food and other eatables. The health conditions also depend upon the access to health institutions. The results show that health institutions play a significant role in health status and life expectancy. The higher the number of institutions, the easier will be access to hospitals and other institutions and the better will be the health standard.

In order to investigate the longrun relationship between health and economic growth, Johansen Cointegration technique is followed in this study. The cointegration results show the existence of at most two cointegrating equations which reject the null hypothesis of no Cointegration. This further confirms that there is long run relationship between health and economic growth. In other words there exists long run relationship between health and economic growth. Eigen Value and Max-Eigen Statistic have been used for this purpose. The results are shown in Table IV.

The cointegration results for health equation shows the existence of at most two cointegrating equations which confirm the long run relationship of health and its determinants. The results are displayed in Table V.

Conclusion and Suggestions

This paper concentrated on the role of health in economic growth of Pakistan. Total factor productivity appeared as the largest contributor to GDP per Capita and physical capital as the second largest contributor. Health contributes 2.61% to GDP per Capita in Pakistan. The regression results showed that along with health, physical capital, labour force and R&D play a significant role in determination of GDP per capita. Moreover, an interesting finding is that education, GDP per capita, R&D and health institutions are significant determinants of health in Pakistan. The Cointegration test results confirmed the existence of health and economic growth in long run.

It is therefore concluded that health accelerate economic growth in Pakistan and this relationship also persists in long run. It is therefore, recommended to increase expenditure on health to provide easy access to health settlements and increasing the life expectancy. The contribution of TFP should be kept in mind while developing economic policies. The R&D sector is not given much attention in Pakistan and the pace of R&D needs to be accelerated to improve the health conditions in the country and gain sustained economic growth.

Table-II Results of Economic Growth Model

Variable	Coeffient	Std.Error	T-stat	Probability
LGFCF	0.102790	0.061380	1.674658	0.1035
LHEALTH	2.649692	0.850796	3.114367	0.0038*
LTLF	0.914044	0.274796	3.326263	0.0022*
LRD	0.123670	0.043913	2.816226	0.0081*
C	-18.91307	4.057598	-4.661150	0.0000*
R-squared	0.937462	DW Statistic		1.81
F-statistic	123.67	Prob (F-statistic)		0.0000

*Shows 1% level of significance

Table-III Regression Results with Health as Dependent Variable

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LRGDPPC	0.0643	0.0239	2.6817	0.0100*
LRD	0.0152	0.0066	2.2836	0.0290**
LENRHM	0.0458	0.0183	2.4996	0.0176**
LHEINS	0.0401	0.0175	2.2841	0.0289**
C	2.7454	0.0859	31.947	0.0000*
R-squared 0.965 DW Stat 1.92 F-statistic 232.61 Prob (F-stat) 0.0000				

Table-IV Results of Johanson Cointegration Test

Hypothesized No. of CE(s)	Eigen value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.6555	38.366	34.805	0.0180
At most 1 *	0.5832	31.510	28.588	0.0205
At most 2	0.3011	12.897	22.299	0.5667
At most 3	0.2285	9.3396	15.892	0.3982
At most 4	0.1778	7.0495	9.1645	0.1238

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table -V Cointegration Test Results the Model with Health as Dependent Variable

Hypothesize d No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.727789	45.54127	30.43961	0.0003

At most 1 *	0.568465	29.41426	24.15921	0.0088
At most 2	0.231871	9.232923	17.79730	0.5685
At most 3	0.201605	7.880313	11.22480	0.1822
At most 4	0.001308	0.045814	4.129906	0.8608

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

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