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Impact of Health on Labour Productivity: Evidence from Pakistan

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Abstract: Health is an essential element that enables people to live their lives with great potential. A healthy life helps to live with confidence and self-esteem. At the macro level, the fundamental basis of economic development is health. At the micro level, health can effectively ensure productive and rewarding lives for people. Health affects economic growth in many ways, for example, poor health of workers causes a decrease in productivity, on the other hand, due to a healthy increase in nutrition productivity. The central objective of carrying out this study is to investigate the impact of human health on worker productivity. The health proxies used in this study are life expectancy. The indicator of education is enrollment at secondary level; Labor force and gross capital formation are also used as independent variables. The study used a panel of South Asian countries from 1991 to 2019, using the OLS panel, fixed effects model, random effects model, and generalized moments method (GMM). The results show that health and education have a significant and positive influence on productivity. This study recommends that the government of all South Asian countries take essential measures and establish policies related to improving health status and advancing the education system.

Keywords: Health, Productivity, South Asia, GMM.

Research Paper

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1. INTRODUCTION

Worker productivity plays an important role in boosting business and raising economic growth. It is defined as the number of goods and services produced by the worker within a given period. It depends upon mental proficiency, physical capabilities, technological advancement as well as human capital investment (Jack 1999). It can be improved by investing in human capital and using advanced techniques in the production process. It is related to the variation of new technologies, human capital and physical capital (Gong et al., 2012). Human capital refers to the knowledge and skills needed to increase productivity. When performance increases with static working hours, it shows that workers are more creative, efficient and productive (Arabi and Abdalla 2013). A higher level of education leads to a higher level of human capital which ultimately increases productivity

Health is one of the indicators to increase productivity (Siddique et al., 2020). A healthy worker has the physical and mental capacity to work at efficiently and these capabilities improve productivity. Investing in health keeps workers healthy and helps them fight chronic disease. Countries with poor health have difficulty achieving sustained development (Soriano and Garrido 2016). There is a positive association between health and productivity (Bloom et al., 2001). Worker productivity is a key factor for economic growth. Manufacturing companies are more profitable and generate more employment. Skilled workers are more productive and have higher incomes and better living standards than unskilled workers (Arabi and Abdalla, 2013). In an economy, health is the engine of growth and health is considered creative capital (Barro, 1996). When a country's people invest in education and health, they ultimately receive benefits (Mushkin, 1962). According to Bloom and Canning (2000) and Grossman (1972), healthy people are more productive than unhealthy ones because they efficiently acquire knowledge and skills and, consequently, the level of productivity increases. According to Sorkin (1976) health decreases the mortality rate and for the 20th century the impact of health has a significant impact on growth, but for developing countries the scenario may be different as regards the link between health and economic growth. Jack (1999) identifies how health strategies influence economic growth in developing countries. Labor productivity depends on several factors, such as; mental competence, physical capabilities, investment in human capital, work management efficiency and improved health. Advances in health mean increased life expectancy for workers. The pattern of economic growth and socioeconomic transformation can be improved or slowed by health care reforms in a specific region

(Bryant, 1969). According to Arabi and Abdalla (2013), workers in developed countries are more productive than in developing countries due to their skills and abilities. Health strategies can help change the lifestyle of poor citizens (Malenbaum, 1970). According to Cole and Neumayer (2005), people are severely affected by health problems and diseases. Quantifying a person's loss of well-being due to poor health is also very difficult. Especially in developing countries where security and medical care are limited. Sick people do not provide a healthy lifestyle for their families and dependents. The burden of disease negatively affects productivity and ultimately the growth rate and thus economic development. Due to fatal diseases, the amount of work is less.

In developing countries, extremely common diseases, such as malaria, waterborne diseases and malnutrition, affect workers. Siddique et al., (2020) examined that capital accumulation is necessary to achieve growth. To achieve growth, physical capital, as well as human capital are considered to be the most influential. Health is a kind of human capital and is an important indicator to stimulate the development process. According to Choudhry (2009), physical capital includes the plant, equipment and machinery used by a business. Physical capital also includes transportation and infrastructure because they contribute to economic development. Umoru and Yaqub (1987) found that investment in health increases worker productivity. The Nigerian economy is very industrious. To maximize productivity, healthy employees play a vital role. Health capital not only increases people's well-being, it also helps raise productivity levels and fuel growth. When life expectancy is shortened, it negatively affects the workforce. When the amount of labor decreases, productivity also decreases and negatively impacts Nigeria's economic growth. Education plays a vital role for individuals and for entire societies. At the primary level, 22 million children are out of school in South Asia. South Asia faces challenges in the health sector on both a geographic and demographic scale. Pakistan, India, Bangladesh, Sri Lanka and Nepal are home to around 1/5 of the world's population. South Asian countries are devoid of malnutrition, low life expectancy, infant mortality, tuberculosis, HIV and AIDS. These countries also have health problems such as poor sanitation, lack of health services, poor maternal health and malaria (Goode et al., 2014; Cole and Neumayer 2006; Ali, 2011). The purpose of this study is to examine the impact of human health on worker productivity in South Asia from 1990 to 2019. This study is planned as Section 2 presents the selective literature overview. Section 3 presents a theoretical framework. Section 4 presents a brief explanation of the variables and data. Section 5 shows the discussion and debate on the results. Section 6 suggests appropriate conclusions and policy implication.

LITERATURE REVIEW

In this section, the review of the previous literature on the relationship between human health and worker productivity was discussed. Siddique et al., (2018) explored the existence of a positive relationship between life expectancy and economic growth, while there is a negative relationship between infant mortality and economic growth for 76 middle-income countries from 1991 to 2016. The results show that economic growth increases at because of the educational contribution. The study also found that in upper-middle-income countries the impact of infant mortality, life expectancy and education is stronger than in lower-middle-income countries. Biyase and Maleka (2019) also studied life expectancy positively impacting economic growth in 10 South African countries from 1985 to 2017. Ullah et al., (2019) studied the impact of health on labor productivity in Pakistan over the period 1980 to 2010. The results show that improved health increases productivity. The results also show that education was positively and significantly associated with worker productivity. Chaabuni et al., (2016) also investigated the bidirectional causality between health expenditure and economic growth for a panel of 51 countries over the period 1995-2013, using simultaneous dynamic equation models. Zortuk and Ceken (2015) also found that health expenditure is most important in the European Union from 1995 to 2011. The study by Amiri and linden (2016) show that the linkage between GDP per capita growth and change in child mortality rate has two-way relations for 175 countries from the period 1990 to 2014. The study of Shahbaz *et al*., (2019) reveals that in Sub-Saharan African countries, productivity and economic growth can be increased by improvement in health. The literature shows that life expectancy increases per capita income and economic growth (Mahumud *et al*., 2013; Ngangue and Manfred (2015). Lu *et al*., (2017) investigated the dynamic relationship between environmental pollution, economic development and public health in china. The study used panel data and cross-sectional data from 30 Chinese provinces from 2002 to 2014. The study shows that due to China's faster economic growth, the environmental pollution problem has become a serious problem leading to the deterioration of health.

Arabi and Abdalla (2013) also examined the impact of human capital on economic growth in Sudan over the period 1982 to 2009 and found that quality education and health have a positive effect on growth. Goca (2014) studied a long-term relationship between human capital and economic growth in Mozambique for the period 1975 to 2006.Lenkei et al., (2018) studied that investment in education play a crucial role in economic development and growth in 14 Asian countries, including eight East Asian countries (Indonesia, Philippines, South Korea, Hong Kong, Malaysia, Taiwan and Thailand, and China) five southern countries. Asian countries (Sri Lanka, Nepal, Bangladesh, India and Pakistan) for the period 1960-2013. The study by Bloom et al., (2014) suggested that improved higher education stimulated economic growth in Africa from 1975 to 2010. Findings by Ogundari and Awokuse (2018) show that primary and secondary education has an significant on the growth of

Africa. 35 sub-Saharan African countries from 1980 to 2008 using dynamic analysis of panel data. Awel 2013 recommended that investment in education drives long-term economic growth for Sweden from 1870 to 2000. This study also shows that there is a two-way causality between education and output per worker.

2. THEORETICAL FRAMEWORK AND METHODOLOGY

The linkage between human health and worker productivity is not simple. Support for a causal association between health and productivity has been obtained from previous studies. According to Schultz (1963) and Becker (1962), there is a correlation between salary and education, as the level of education increases, so does the salary rate. A healthy person actively went about their activities and enjoyed their life much more than an unhealthy person. A healthy person does not depend on others. The health function displays information about the health of an economy. Then Ali (2015), Ali (2018), Ali and Bibi (2017), Ali and Ahmad (2014), Ali and Audi (2016), Ali.e Audi (2018), Ali and Rehman (2015), Ali and Senturk (2019), Ali and Zulfiqar (2018), Ali et al., (2016), Ali et al., (2021), Ali et al., (2021), Ali et al., (2015), Arshad and Ali (2016), Ashraf and Ali (2018), Audi and Ali (2017), Audi and Ali (2017), Audi et al., (2021), Audi and Ali (2016), Audi et al., (2021), Audi et al., (2021), Audi et al., (2021), Haider and Ali (2015), Kaseem et al., (2019), Roussel et al., (2021), Senturk and Ali (2021), Audi et al., (2022), the model of this study was like;

$\underline{Y = AL^{\alpha}K^{\beta}e^{\mu}}$

Here Y is total production, A represents knowledge, L is used for labor, and K is used for capital. The wages ω and individual productivity of one unit of labor is,

$\omega = \Delta Y = A\alpha L^{\alpha-1}K^{\beta}e^{\mu}$

$\omega = {}^{\alpha}L^{-1}K^{\beta}e^{\mu}$

$AL^{\alpha}K^{\beta}e^{\mu}$

$log\ Y = log\ A + \alpha\ logL + \beta\ logK + \mu$

$log\ Y = \alpha_0 + \alpha\ logL + \beta\ logK + \mu$

Several approaches are employed for developing productivity across the countries over time, but we are following the approach used by Bloom *et al*., (2001). Labor productivity (LP) varies from country to country in the long run.

$\Delta(LP) = \delta[LP^{*} - LP] + ü$

Several variables are used to demonstrate the link between health and productivity in South Asia; data from 1991 to 2019 were used. South Asian countries are Pakistan, Bangladesh, Nepal, India, Sri Lanka, Maldives, Afghanistan, and Bhutan. The World Development Indicators (WDI) is the data source for all variables (Table 1). The dependent variable is the productivity of the worker and several independent variables have been taken. The health proxies used in this study are life expectancy (EL at birth indicates how many years a newborn would live). Gross capital formation is the symbol of economic growth also used in this study. The indicator of education is enrollment at secondary level. Labor force (the population participating in work over the age of 15 is included in the labor force). Life expectancy is the average age of people in a given population at the time of death. It refers to the expected age of a person. Life expectancy decreases due to ill health and disease. It can be improved by other factors, such as raising living standards, improving education, improving lifestyles, and accessing health services. Shahbaz et al., (2019) showed that in sub-Saharan African countries, productivity and economic growth can increase through improved health.

Table shows descriptive statistics of the data. The maximum worker productivity (PRO) is 33,296.13 and the minimum is 3,001.508, measured as per capita income. The maximum life expectancy is 76.7210 years and the minimum LE is 54.3030 years in South Asian countries. Details of other variables are mentioned in Table 2.

Table 3 shows the direction of the relationship between the variables. Life expectancy (LE), capital and education are positively associated with PRO. The negative symbol for work indicates that work (L) is negatively correlated with worker productivity.

Table 1: Descriptive Statistics

Variables	Obs.	Mean	Std. Dev.	Min	Max
PRO	142	10943.64	6723.131	3001.508	33296.13
L	146	60.3723	12.6758	49.1100	86.15400
K	135	1.2411	2.1611	2155897958.73	991383766124.85
LE	142	66.1331	5.1256	54.3030	76.7210
POU	86	14.5601	3.8534	6.3000	23.5000
SE	104	54.3784	19.4403	20.8072	100.2252

Table 2: Correlation Results

Variables	PRO	L	K	LE	SE
PRO	1.0000				
L	-0.4201	1.0000			
K	0.1712	-0.3237	1.0000		
LE	0.6451	-0.0481	-0.0415	1.0000	
SE	0.6134	-0.0162	0.1221	0.7088	1.0000

Table 3: Results

Variables	Dependent Variable: Productivity							
	Panel OLS		FE Model		RE Model		GMM Model	
	Coef.	Prob.	Coef.	Prob.	Coef.	Prob.	Coef.	Prob.
PRO(-1)							0.844	0.0000
L	-2.4315	0.0000	-0.6682	0.0000	-2.3275	0.0000	-0.1776	0.0042
K	-0.0126	0.54733	0.4621	0.0000	0.0038	0.5806	0.0465	0.0037
LE	2.5526	0.0017	2.9232	0.0008	4.1135	0.0000	0.9877	0.0270
SE	0.0075	0.0011	0.0533	0.6267	0.1242	0.0038	0.0015	0.8958
C	8.1921	0.0350	-2.6572	0.3023	0.7171	0.5625	0.2523	0.3385
R-square	0.8213		0.7811		0.7816		0.7188	
Obs.	89		89		89		80	

3. RESULTS AND DISCUSSION

Section contains the empirical results of the study. Table 3 shows the results of the OLS panel, the fixed effects model, the random effects model, and the generalized method of moments (GMM). The main objective of our study is to examine the influence of human health on worker productivity. Ullah et al., (2019) demonstrated that improved health would increase productivity and the education coefficient was positively and significantly associated with worker productivity. The results of the OLS panel show that life expectancy has a positive correlation with worker productivity. The LE coefficient is 2.55, which indicates that a 1% change in LE causes a 2.55% change in worker productivity. The study also reveals that education has a positive effect on worker productivity; the coefficient shows that a 1% increase in education generates a 0.0076% change in worker productivity. The labor factor (-2.4326) shows a negative impact on productivity. Productivity is measured by GDP per employee relative to work, so the trend of increasing work has an inverse impact on productivity. The results are consistent with the literature (Siddique et al., 2020).

The results of the fixed effects approach also show that life expectancy is an increasing factor in productivity; the coefficient of LE is 2.9243 which indicates that a 1% change in LE causes a 2.92% change in worker productivity. The study also reveals that secondary education results in a 0.0645% change in worker productivity. The work factor is -0.6693 which shows a negative correlation with productivity. The capital ratio is 0.4632 which expresses the positive and significant correlation with productivity. According to the results of the random effects approach, the life expectancy coefficient is 4.1146, which indicates that a 1% change in LE causes a change in productivity of 4.1146%. The study also reveals that secondary education results in a 0.1253% change in productivity. The labor coefficient is -2.3286 which shows a negative but significant correlation with productivity. The GMM results show that health, education and capital are the increasing factors of worker productivity, while the labor coefficient (-0.1777) shows a negative but significant correlation with productivity. The results are consistent with studies by Biyase and Maleka (2019), Lenkei et al., (2018) and Siddique et al., (2020).

4. CONCLUSION

This is recognized that there is a strong association between economic development and health. Improved health directly affects productivity and thus economic growth increases. However, this study investigates the association between health and productivity in South Asian countries from 1991 to 2019. Health not only elevates life expectation, but also increases productivity. Skilled workers contribute more to economic growth than people without education and training. A healthy life increases prosperity and improves the living standards of citizens Village. Both the federal and provincial governments are expected to increase investment in the health care sector. For the health system to function better, the government needs to increase its participation in the financing of the health sector.

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