Health and Its Impact on Labour Productivity and Labour Market

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Abstract-**The paper examines the impact of the various parameters of health on the labour market.It is ultimately the health condition of the workforce which affects labour productivity which in turn is an important determinant of the growth rate of an economy. The paper deals exclusively with the developing and emerging nations which are lower in the rank of human development and examines the extent to which health indicators affect the labour market. The results of the estimated equation reveals that infant mortality rate, child malnutrition, death due to malaria and tuberculosis and diarrheal cases emerge as the chief factors which affect the different components of the labour market such as the output per worker, vulnerable employment and also the work participation rate.**

Index Terms: **health, labour market, labour productivity, economic development, emerging economies**

I. INTRODUCTION

Health has now been universally accepted as an important determinant of long term economic development and growth of nations since good health can raise the overall productivity of the labour force. The end of all developmental goals is not only jump in growth statistics, but more crucially the living conditions of its people, of which health constitutes an important factor. Good health is not only the goal of all developmental policies, but also an important means to achieve economic development. Therefore the relationship between good health and economic development cannot be underestimated and overlooked by policy makers. Nations which have already achieved rapid strides in their development, realising this crucial relationship had taken adequate care to invest in the health sector and have also ensured that health statistics of their population do not lag behind their growth statistics. The same realisation has yet to dawn upon the planners and policy makers of the less developing and emerging countries. Such countries in most cases put greater emphasis on the policies for economic growth, little realising that all the growth efforts will not be sustainable in the long run if the people of their nations are characterised with poor health statistics.

A nation with healthy workforce can help to raise the productivity in different sectors of the economy. In contrast, nations where the population are frequent victims of epidemics, illness and diseases will abstain from their work with higher frequency than in nations where the workforce is strong and healthy. The scarce resources of the less developing and emerging nations will then need to be diverted for controlling diseases and epidemics, the opportunity costs of which is extremely high. There is also a circular link between good health and higher income (Sengupta,2015).Population of those nations with good health can, not only help to raise the overall productivity of the labour force, but will also be able to raise their own income. Higher income enables them to provide better education and training which is again plays a pivotal role for economic development. Planning for better health has therefore formed an integral part of economic development, and emphasis only on investment in physical infrastructure, ignoring the health sector can be disastrous for long term developmental of a nation (Myrdal, 1968).

Most emerging nations in their urge for rapid growth have often ignored the health sector, ignoring the fact that health is an important input in the production function. Labour productivity in such nations therefore is much lower than that of the developed countries, because they can work for longer hours, have access to better education and training. This is possible both due to investment by themselves because of their higher income and also due to the ability of the state to invest more in their training and education. Little do they realise that investment in only the various sectors of the economies is not sufficient to expedite their growth .These nations have extremely poor records in infant and maternal mortality rates which is ten times higher than that of the developed countries (Sengupta,2015), morbidity rates too is extremely high. It is with this aim that the present work will examine the relationship between some important indicators of health in less developing and emerging nations with some important economic parameters of the labour market.

II. REVIEW OF LITERATURE

Many studies have been undertaken to study the relationship between good health and economic development, labour productivity and income earning capacity. (Saved off and Schultz 2000.Schultz 1999, 2002.Schultz and Tansel 1992, Weil 2005, Bloom and Canning, 2005.Bloom and Canning's2005) work revealed that one percentage point increase in adult survival rates increase labour productivity by about 2.8 percent. They had compared the estimated effects of health in a macroeconomic production function model of economic growth with the effects that are found using calibration based on wage regressions. Their study focussed attention to the fact that macroeconomic effects of health are positive and not significantly different from microeconomic estimates. Cole and Neumayer(2007) focussed attention to

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the relationship between health and economic growth highlighting the crucial mechanism through which health affects growth in the total factor productivity(TPF).The three indicators of health used by the authors are malnutrition, malaria and water borne diseases. The study by Soukiazis and Cravo (2007) highlights the connection between health, human capital and economic growth .With the help of panel data for 77 countries the study revealed that good health can increase human capital stock and labour productivity and can also reduce the gap between the rich and the poor countries.

The authors also conclude that human capital is more important in rich countries and health is more important in poor countries in determining the levels of income. Tompa (2002) also focuses attention to the importance of health that is assigned to the formation of human capital, which is crucial in raising productivity, which was revealed by studying the situation in both developed and developing countries over a period of 200 years. Harris (2000) too highlighted the role of productivity growth for raising the income earning capacity of the people and the subsequent rise in their living standards through their ability to purchase more goods and services.

III. OBJECTIVES AND METHODOGY OF THE STUDY

The work will confine mainly to the study of the impact of the various parameters of health on labour productivity, in the emerging and the developing countries. The main reason for choosing only these countries is because the developed nations have already realised the importance of health in raising labour productivity and economic development and accordingly incorporated issues relating to health in their general policies for economic development. The importance of the contribution of good health for economic growth and development has yet not been realised by the less developing and emerging nations. In their desire for rapid economic development, health sector is pushed to the background. The result however could be disastrous for their long term economic development, though economic growth in the short term may reveal rapid strides.

The work will be based on cross sectional data for the less developing and emerging countries of the world. The data will be entirely based on secondary sources, which will be taken from the various reports of WHO, Human Development Reports (UNDP),World Development Report (World Bank).The dependent variables used for the work will be the output per worker (OPW), labour participation rate(LPR) and also the number of people as a percentage of the workforce whose jobs are highly vulnerable(VULEM),implying that such workers do not have any regular jobs and the percentage of employed people engaged as unpaid family workers and own account workers(UNDP,2015) is high in that country.

Consequently, the ability of the labour force to contribute to growth will be extremely low in such countries. Though there are many factors responsible for the behavioural pattern in the labour market, health condition also plays an important role. The study will therefore regress the various parameters of the labor market on the health statistics such as the infant mortality rates (IMR),children without immunisation (NOIMMZ), life expectancy rates (LE),malnourished children (CMALN)death due to malaria (DMAL),death due to tuberculosis (DTB), diarrheal cases(DIARR).Though it may be contended that since deaths implies the persons are no more in the labour force and therefore the current state of illness is more relevant for determining the condition of the labour market. However, actual deaths that have occurred due to malaria and tuberculosis (Selected for the present work) brings about a state of instability and uncertainty in the labour market due to poor health.

For the purpose of homogeneity wherever necessary data have been converted into percentages. Linear multiple regression have been used with at least two years lag. The lag of two years is denoted by (t-2), outlined below:

$$yi= \alpha - \beta_1 xi1_{(t-2)} + \beta_2 xi2_{(t-2)} + \ldots + \beta n \text{ xin}_{(t-2)} + \varepsilon i, \; i=1,\ldots,n,$$

The other values used in the models are as follows:

α = the constant

β_1, β_2, β_3, and βn = the coefficient of the different explanatory variables

ε = the error term

The vector of the variables of output per worker, labour participation rate, vulnerable employment are represented by yi and the vector of the explanatory variables such as life expectancy, death due to malaria, tuberculosis, malnourished children, children without immunisation and diarrheal cases will be represented by xi.. The negative/positive sign before the coefficient shows the inverse/direct relationship between the vector of the dependent and the independent variables.

On the basis of the above the hypothesis developed for our study is that:

$H:_1$ Good health parameters increase the labour productivity

$H:_2$ Good health parameters improve the condition in the labour market such as labour participation rate, reduce vulnerability of employment and unemployment rate.

IV. ANALYSIS OF THE ESTIMATED RESULTS

Examination of the estimated results of the models developed above reveal that no single parameter of health status of the less developing nations affect the different parameters of the labour market in a similar manner. In fact, different factors assume dominance in influencing the various parameters in the labour market. This only reveals that the process through which the health indicators work in determining either the labour productivity, work participation rate or the vulnerable employment selected for the purpose of our work varies from case to case. All the parameters of the labour market is not affected by the same health indicators. Some factors have direct and others have indirect effect on the labour market.

A. Output per Worker:

Based on the estimated results of the single equation model, child malnutrition emerges as the most dominant factor determining output per worker followed by, infant

mortality rate. The study reveals that 1% decline in child malnutrition and infant mortality rate can improve the output per worker by 30 % and 29 % respectively. In other words, quality of health at the childhood level affects the rate of output in a significant manner as adults in the labour market. Poor health due to morbidity also adversely affects output per worker. These are mostly the cases of people affected by diarrheal cases, which is still a serious problem in most developing countries. Death due to malaria, which is another serious health hazard in most of these countries also affect labour productivity, because 1% decrease in these two factors can increase output per worker to the extent of 29 % and 23 % respectively. Death due to other types of illness or the number of children without immunisation do not impact labour productivity significant as per our estimates.

The results of the multiple regression model reveal that the explanatory power of the model as revealed by the value of R^2 is as high as .601 which is also statistically satisfactory. The estimated results stated below is as follows:

OPW = 16359.998 ─ 3.849LE ─.267 DIARR-
t= (2.462) (4.723) (1.792)

.387DMAL ─3.830DTB +.184 NOIMMZ-
(2.462) (4.723) (1.792)

.211IMR ─.123CMAL
(1.960) (─0.871) (1)

R^2=.601;F=6.016

The results of Eq.1 reveal that the significance of diarrheal cases remain the same in the multiple regression equation and the explanatory power of the coefficient of death due to malaria increases to 0.387 and the coefficient of child malnutrition which was insignificant earlier has now become significant, with their coefficients being all statistically significant. Death due to tuberculosis

Table I. Coefficients of Single Regression Equation

Explanatory variables	Output per Worker	Vulnerable employment	Labour participation Rate
LE	-.039 (-.345)	.278 (1.939)	-.064 (-.433)
DIARR	-.286 (-1.978)	.499 ((3.642)	.027 (.167)
DMAL	-.233 (-1.420)	.598 (4.346)	.202 (1.625)
DTB	.011 (.077)	.293 (2.055)	-.008 (.072)
NOIMMZ	.196 ((1.353)	.181 (1.232)	-.027 (-.243)
IMR	-.287 9-2.030)	.618 (5.267)	.186 (1.669)
CMAL	-.307 (-2.191)	.325 (2.279)	.283 ((2.576)

Figures in bracket are't' values

has now become highly significant as a determinant factor. The value of the coefficient of IMR has gone down marginally and the coefficient of children without immunisation has changed the sign.In none of the models life expectancy emerges as a significant determinant. The indicators of health which emerge as the crucial determinants of labour productivity are diarrheal cases, death due to malaria, child malnutrition and death due to tuberculosis.

B. Vulnerable employment:

The health determinants of the vulnerable employment, which emerges to be significant in the single equation model are infant mortality rate, death due to malaria, diarrheal cases, child malnutrition as well as death due to tuberculosis. Such type of employment do not contribute to labour productivity and the growth rate of the economy and also reduces the status of the labour as well as their income earning capacity. Hence such workers are unable to contribute to the growth rate of GDP of the country. The study reveals that infant mortality rate, death rate due to malaria, diarrhoea cases, child malnutrition and death due to tuberculosis, increases the extent of vulnerable employment in a crucial way.

In fact, nations which are characterised by high infant mortality implies that the overall condition of health in the economy is in poor condition and hence 1 % rise in infant mortality can result in 62 % rise in vulnerable employment. When the health of the population is characterised by malaria and diarrhoea the extent of vulnerable employment too rises and 1 % rise in such cases of death due to malaria and diarrhoeal cases increases vulnerable employment by as much as 60 % and 50 % respectively. The results of the multiple regression which is stated below reveals that the significance of the coefficient of death due to malaria increases to 70 %,but the impact of diarrheal cases is reduced slightly, though it still continues to be high. The estimated equation stated below reveals that the sign for the other coefficients which were significant in the single regression equation have changed. This is only natural due to the presence of multi collinearity in such interrelated variables. The explanatory

VULEM = 23.269 +1.229LE +.364DIAR
t =(1.007) (1,418) (2.073)
+.698DMAL -1.133DTB -.023NOIMMZ
(3.379) (─1.301) (─0.160)

-.211IMR-.016 CMALN(2)
(-.767) (-.094)

R^2=.542; F =4.049

Power of the model in Eq.2 has improved considerably with R^2 being as high as .542, which is much higher than all the single regression models estimated earlier and is also statistically significant. On the whole therefore, what is revealed is that poor health condition, particularly deaths due to malaria and diarrheal cases results in low job profile and insecure jobs. The result is, though such people are in jobs they are not able to contribute to the economic growth of the country.

C. Labour Force Participation:

The next question which is related to vulnerable employment is the actual level of participation of the population of the country in the labour force in those nations which are characterised by poor health condition. The work force participation can also convey the idea about the condition of the labour market in a country. This is mainly due to the fact that those nations who are burdened by ill health and diseases witness poor work force participation rate since the work force is often out of work either due to ill health or are unable to work due to illness, diseases and epidemics.

The results of the single regression equation reveals that child malnutrition is major factor determining labour force participation, followed by deaths due to malaria and infant mortality. The results of the multiple regression model as stated in Eq.3 outlined below

LPR = 72.706 +.635LE+.134DIARR
t= (9.224) (1.732) (.896)

+.646DMAL ─.705DTB ─.368NOIMMZ
(3.373) (1.816)(─2.841)

─.501IMR─.120 CMALN
(─.2.095) (─0.876) (3)

R^2=.306; F = 3.152

reveals thatlife expectancy which did not have any impact on output per worker or vulnerable employment emerges to be asignificant factor in determining work participation rate in the developing countries.As much as 64 % of the change in labour participation rate can be explained by only 1% rise in life expectancy.

The impact of death due to malaria does not appear to be significant,but the impact due to the death due to tuberculosis on work force participation increases to 70 % and of infant mortality rate to 50 %, and the coefficients are statistically significant also, though the impact of child malnutrition goes down but continues to have an impact on labour participation. Thecoefficient of the impact of the cases of children without immunisation which were insignificant in single regression model has now become significant and explains 37% change in work participation rate, with the coefficients of the explanatory variables being statistically significant also. The explanatory power of the model, explained by the value of R^2 though not too high can still be acceptable and is also statistically significant as well. Therefore the health determinants of labour force participation in emerging and developing countries which plays a pivotal role are child malnutrition, infant mortality rate, death due to malaria, death due to tuberculosis and the number of children without immunisation.

V. CONCLUSION

The work reveals that health status plays a pivotal role in determining the condition of the labour market and labour productivity, which in turn is related directly with the economic growth and prosperity of a nation. However, all the indicators of health status do not affect the various aspects of the labour market and labour productivity in a similar manner. The main factors identified by the study influencing the labour market are the infant mortality rate, child malnutrition, death due to malaria and tuberculosis and diarrheal cases. It is therefore extremely important for emerging and developing nations striving to expedite their economic growth rate to put equal emphasis in improving the health status of their nation, for long term sustainable economic development.

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