

The Effect of Inequality Distribution of Income (Gini Index as Selected Indicator) on Health Indicators (Infant Mortality Rate and Life Expectancy as Selected Indicators) in Developing Countries: (1995- 2008)

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Abstract: The health is the one basic needs of human and base of each activities that people do. The evidences show that there are strong relationship between high levels of health and high levels of income. The high income causes to better health via accessing to healthy water, better nourish, regard of hygienic principles and ability more purchase as well as better quality of medicine watchfulness. On the other hand more and better health in immense and individualism level causes to increase labor productivity and this progress continues between health and income. This study is a descriptive – analytic research and it analyzes the effect of inequality distribution of income and control variables on the health indicators (life expectancy and infant mortality rate) for a sample 22 of developing countries during terms (1995-2008) with using panel data and the software Eviews 7. The results show that inequality distribution of income has adversely affect on life expectancy and a significant positive effect on infant mortality rate. Also, the per capita income, education and saving that are used as control variables and by taking constant income level, theses have a positive effect on life expectancy.

JEL Classification: D₃₃ · I₁₄ · O₅₀

Key words: Life expectancy · Inequality distribution of income · Infant mortality rate · Panel Data

INTRODUCTION

The health is one of basic needs and base on each activity that persons do them. As education, the health has noticed as one necessary sources of productivity and can be agent for quality of labor [1]. The evidences show there is strong relationship between health and income high levels. The high income causes to good health via healthy water, suitable nourish, regarding hygienic principles. If persons be healthy in society, they will work in all days, weeks and years. In immense level, the countries with high income have more cost in general hygienic and individual level, the family with high

income can use better food, shelter and remedial services. Also the better health causes to increase labor's productivity and this progress continues between healthy position and income [2].

Distribution income is two types: income distribution based on production's factors (such as land, labor and capital) and income distribution among different groups. The duty of inequality control of incomes is by governments and their economic policies [3]. One of the most important indexes of income distribution in society is inequality index of income. This index shows unsuitable income in society [4]. The hypothesis of income inequality and health has been investigated in different

methods that enforce on various aspects in different times. The hypothesis of absolute income states that this income in each person explains the effect of distribution of inequality income on health.

This belief has prolix history in economic literature that income is related to the health. Preston (1975) did studies in this context. He investigated relationship between life expectancy and per capita income for the sectional of countries and achieved a concaved relation. Also he showed that the effect of extra unit in income on health in persons with low income is more than persons with high income [5].

The comparative hypothesis of income concentrates on ratio the person's income to other persons in his/her group, so if all persons' income of a group increase except one person, the expectative health of that person will be worse. Based on this hypothesis when person deprives of financial dimension, the health decrease and the health is better when person achieves success [6].

The inequality hypothesis supposes that the inequality in income distribution will menace the society persons' health. This hypothesis concentrates on reverse relationship between health and income distribution. The inequality in income biases persons' health with different methods. The various studies show that high levels of inequality are one of important factors in insecurity of social capital. For example increasing in suspicion and worry as well as decreasing in social participation have reverse effect on individual health and perhaps causes that people react to what is happening around them [7].

Roodgress, (2002) did a sectional study in 56 developing and developed countries and achieved meaningful results about the effect inequality of income on life expectancy in birth, life expectancy in 5 age and mortality of babies. He realized that difference between life expectancy in birth in countries with low inequality, in front of countries with high inequality can increase from 5 to 10 years [8].

Deaton *et al.*, (2003) investigated the relationship between income inequality and mortality rate. Their results indicate that although the believable and plausible conceptual framework supports the relationship between income inequality and mortality rate but there is weak empirical results which support this relationship [9].

Li and Zhu, (2006) investigate the effect of income and community-level income inequality on individual health using survey data from China for the years 1989, 1991, 1993, 1997 and 2000 according to absolute income,

relative income and income inequality hypotheses. They use the probit model to test income inequality and relative income hypotheses. In this study, the health is dependent on the income inequality (measured by Gini coefficient) in the society. The control variables such as per capita income, per capita income squared, age and age squared, education, indicators for gender, marital status, source of drinking water are used in this research. The results reveal that the health is increased by per capita income but with the reduced rate (based on the absolute income hypothesis). With controlling per capita income, a significant correlation was observed between health and income inequality in society (income inequality hypothesis). This result shows that the above inequality threatens the public health. Moreover, by increasing in inequality, the probability of semi-destructive behaviors of health including smoking and alcohol consumption is raised [10].

Jones and Wildman, (2008) in the British Household Panel Survey, investigate the direct effect of income on health and indirect effects of income on health using parametric and semi-parametric panel data models. Using flexible forms of income, they ensure about the effect of income on self-reported measures of men and women health. The results for a wide range of techniques are robust and reflect the inclusion of relative deprivation. Also, the results to a large extent reject the effect of the parametric model for relative deprivation on health; however, some evidences reveal the effect of semi-parametric model [11].

Babakhani, (1387) examines the relationship between economic development variables and income inequality on health during the period 1355-1385 in Iran. He also investigates the power analysis of variance of health variable with income inequality, economic development and economic growth variables. This research is analytical and ecological correlation study and stepwise regression test is used for examining these associations. His results show that income inequality has the highest correlation with the health and comparing to economic development it has more power of developing. The results also indicate that the reduction of inequality and income (less inequality) is the best strategy for provision and promoting health [12].

Emadzadeh *et al.*, (1390) in the article "the effect of income inequality distribution on health status in the selected OIC Member countries", investigate the effect of income on health in 18 countries for the years 1980 to 2005. They use the life expectancy index multiplied by the per capita income as the dependent variable. The results

indicate that income and education have a significant positive effect on health [13].

Human capital is one of important contexts that general actions can cause to great difference in incomes distribution. There are two reasons that governments have increased their costs in education context. At first, social yield of this action is high and investments in this context cause to increase labor productivity and national income and to decrease inequality of income distribution [14]. Second, observations show that daughters' education have tidy negative effect on productivity and positive effect on hygiene and health, hence it affects on improvement of income distribution [15]. Studies show increase in entry to high school improves meaningfully distribution of human capital and its income capacities [16]. Auster, (1993) investigated the education effect on health and found that more education cause to improvement of health position. Also high levels of education attend increasing medicine watchful, suitable nourish, healthy jobs and more knowledge of hygienic adventures [17].

The saving affects on health level. The little health biases motive and ability of saving. Sick has important effect on remedial costs. Indeed if the more budget spend individual health, little amounts will save. So persons should have more saving for health [18].

Whereas there are degrees of inequality in income distribution, the much difference find between income of poor and rich families in developing and developed countries. So with increasing this inequality decrease people's purchase power in countries special developing countries, hence families allocate little percent of their income to health [19]. One of modern problems in our country is available inequality in people's health position that the most important reasons include unjust distribution of wealth among people that disregarding of this matter will cause not to access to hygienic equipment and services. Regarding to the importance of this subject, this article show the effect of income distribution as well as some control variables on health position in developing countries that life expectancy and infant mortality rate as health index and Gini coefficient as inequality index of income distribution have been supposed.

Methodology: In this research, the data of income, education, saving, life expectancy rate, infant mortality rate and Gini coefficient have been collected from published statistics of world development indicators and world income inequality database and central bank information from 1995 till 2008. Due to data limitations in

developing countries, 22 countries including Argentina, Armenia, Belarus, Brazil, Bulgaria, Colombia, Costa Rica, Iran, Latvia, Hungary, Slovakia, Slovenia, El Salvador, Uruguay, Lithuania, Moldova, Estonia, Panama, Peru, Poland, Romania and Venezuela have been selected and for estimating and analyzing data, Eviews 7 software has been used.

In this section, the effect inequality of income distribution on health indexes has been test base on 3 models using panel data method.

$$Hit = f(Yit, Qit, EDUit, SAVit)$$

$$H_{it} = \beta_0 + \sum \beta_{j1} Y_{it} + \sum \beta_{j2} Q_{it} + U_{it}$$

$$H_{it} = \beta_0 + \sum \beta_{j1} Y_{it} + \sum \beta_{j2} Q_{it} + \sum \beta_{j3} EDU_{it} + U_{it}$$

$$H_{it} = \beta_0 + \sum \beta_{j1} Y_{it} + \sum \beta_{j2} Q_{it} + \sum \beta_{j3} EDU_{it} + \sum \beta_{j4} SAV_{it} + U_{it}$$

where:

- Hit* : Position of health in i country in t time
- Yit* : Per capita income level in i country in t time
- Qit* : Inequality of income distribution in i country in t time
- EDUit* : Education level in i country in t time
- SAVit* : Saving level in i country in t time

In this research is used F test to determinate estimate type via panel data or pooling data and panel data model is selected. Also Husman test has been presented to determinate fixed effect or random effect.

RESULTS

Hardy Z-test is used for ensuring about the reliability of data and the result of this test is represented in Table 1.

To specify the type of estimation using panel data, F-Limer test is used. The results of this test reveal that F-Limer is equal to 113.45 which is more than the critical value of table and thus the model is estimated using panel data.

Table 1: the results of collective unit root test on research variables

Variables name	Hardy Z-Test	
	Prob.	Value
<i>H</i>	0/000	12/1989
<i>Y</i>	0/000	12/1655
<i>Q</i>	0/000	6/8183
<i>EDU</i>	0/000	8/3141
<i>SAV</i>	0/000	10/6616

Source: Compiled by Author

Table 2: The Effect of Income Inequality Distribution on Health Status (Life Expectancy Measurement)

Independent variable		<i>C</i>	<i>Y</i>	<i>EDU</i>	<i>SAV</i>	<i>Q</i>	<i>R</i> ²
First Model	Coefficient	69/68	0/0003	....	....	-0/012	0/97
	Statistic	138/98	31/24	....	....	-1/03	
Second Model	Coefficient	67/07	0/0002	0/033	....	-0/012	0/97
	Statistic	119/24	24/98	9/28	....	-1/12	
Third Model	Coefficient	66/52	0/0002	0/033	0/013	-0/0003	0/96
	Statistic	110/04	23/74	8/85	1/74	-0/26	

Source: Compiled by Author

Table 3: The Effect of Income Inequality Distribution on Health Status (The Infant Mortality Rate)

Independent variable		<i>C</i>	<i>Y</i>	<i>EDU</i>	<i>SAV</i>	<i>Q</i>	<i>R</i> ²
First Model	Coefficient	12/706	-0/0007	....	....	0/271	0/97
	Statistic	4/75	-13/23	....	....	4/79	
Second Model	Coefficient	28/50	-0/0005	-0/192	....	0/247	0/96
	Statistic	9/98	-11/11	-10/37	....	4/94	
Third Model	Coefficient	28/93	-0/0005	-0/1189	-0/056	0/1006	0/95
	Statistic	16/33	-19/52	-9/38	-2/47	2/75	

Source: Compiled by Author

Moreover, to determine the presence of fixed or random effects Hausman test is used. The results show that the null hypothesis based on random effects is rejected and it is necessary to estimate the model based on fixed effects.

In order to explain the effects of research variables on health status, step method is used and each variable is examined separately. Research variables are estimated through three models. The final model which is including all research variables is as follow:

$$H_{it} = \beta_0 + \sum \beta_{j1} Y_{it} + \sum \beta_{j2} Q_{it} + \sum \beta_{j3} EDU_{it} + \sum \beta_{j4} SAV_{it} + U_{it}$$

As the results of model estimating in Table 2 shows, in first model, the effect of income inequality distribution on health is investigated. Estimated coefficients are indicated that per capita income in 99 percent confidence level has impact on life expectancy in selected developing countries. Thus, with 100 \$ increase in per capita income, health is increased by 0/3%. Coefficient of income inequality distribution indicates that in all selected developing countries, the inverse relationship exists with life expectancy. It can be said that life expectancy is a summary measure for health status.

In second model, education variable (The gross enrollment ratio in secondary schools) is added to first model as a human capital development measurement and its impact on life expectancy has been studied. This model shows that education variable in 99% confidence level has positive and significant effect on life expectancy. With higher education, life expectancy is increased so that with each year increase in education, life expectancy is increased 0.033.

Therefore, human education improves income through increasing people skills and expertise. The increase in income leads to increase in saving and this in turn helps to further investment in staff training. Moreover, the educated people are more aware of the factors affecting health and care more about their health and less involve in risky behaviors such as drug abuse. Finally, the results of estimating this model show that income inequality distribution has a negative effect and per capita income has a positive effect on life expectancy in selected developing countries.

In third model, saving is added to the second model and the results of estimating this model show that saving has impact on life expectancy and increase in saving leads to more life expectancy. In this model like previous models, per capita income and education have positive and significant effects on life expectancy in selected developing countries.

Regarding this fact that in Table 3 the infant mortality rate is a dependent variable, in the first model, the results show that per capita income has an inverse relationship with infant mortality rate so that with 1 \$ increase in per capita income, the infant mortality rate is decreased 0/07%.

The coefficient of income inequality distribution implies that the infant mortality rate also increases with increasing inequality. Even in these countries, reducing income inequality in comparison with increasing per capita income has a stronger effect on reducing infant mortality rate. In second model, the effect of education on health status is estimated and the results show that education has a negative and significant effect on infant mortality rate in 99% confidence level. The result of third

model also indicates that with increasing in saving, the infant mortality rate decreases and this result confirms the negative and significant impact of saving on infant mortality rate in selected developing countries.

CONCLUSION

Income is only reason that has more effect on persons and people's health of a country. Also, correlation between low level of income and unsuitable position of health has been proved in world level. With little except, bad position of income attends sick and people's mortality [20]. The position of income distribution can effect on people's health. The amount of income difference among different income groups show the amount prejudice among these groups in using of services that cause to welfare and comfort. Researches show that income crack increases mortality [21]. In this article, has been tried to decrease available gap in this context via income distribution as Gini index and life expectancy and infant mortality as health indexes using panel data and effect fixed method. The results show increasing in income cause to increase life expectancy and decrease mortality rate of children. Also, the results show that when record rate increase in high school and saving, life expectancy increases and infant mortality rate decreases. So, justify incomes distribution is necessary via government for accessing of people to hygienic services and life developing.

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