
Investigating the Effect of Government Health Expenditure on HDI in Iran

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Human development is used as one of the most important indices to measure the level of countries development in recent decades. This study examines the effect of government health expenditure on human development index (HDI) by using the ordinary least squares method (OLS) over the period 1990-2009 in Iran. The results show a positive and significant relationship between government health expenditure and human development index. Also, Granger Causality Test indicates that there is no bilateral relationship between the government health expenditure and HDI in Iran.

Keywords: HDI, health expenditure, development.

JEL: I10, O20, O53

Introduction

In economic planning, human development is the main concern of the (as most objectives in planning for) developed and developing countries. Human capital is one of the factors affecting human development and has two main aspects: education and health. In studies that have been done in cross countries basis regarding economic growth and development, human capital in the most cases is considered as education and, less attention has been paid to the health. But in recent studies, health is not only considered as a component of human capital, but also, simultaneously and independently

health has entered into the field of the growth model and its effects.

Improvement in health results in human capital increase. This increase will happen through capital health accumulation, and health improvement through longevity and increased labor productivity. In turn these will result in human development. In studies of health and human development in different standards, different criteria for health are considered. These criteria can be cited, including government health expenditure.

The cost of governmental health expenses, same as government's spending cost on education and human resources will improve quality and increase life expectancy and longevity. In other words, the government's spending on health will result in promoting public health and health capital accumulation channel, and its impact on human capital and economic growth is affecting on human development. The purpose of this study is to examine the effect of government health expenditure on human development. On this basis, the question is: "How the government health expenditure has an impact on human development in Iran?" This question is asked to correspond to the assumption that government health expenditure has a significant positive effect on human development.

Therefore, in the next section, literature review will be on the health effects of human development. Then, a brief review on the experimental and theoretical studies is done for analyzing the relationship between health expenditure and human development. After that the model and data used in this study are discussed and model results are also summarized and conclusions will be at the end.

Literature Review

Human Development

Development is multi-dimensional process that involves changes in people, social structure, public attitudes and national institutions. Development process incorporates economic organizations and political and social systems.

Human development approach, at the first time, has stated by Amartya Sen and MahbubulHaq in the 80 decade, it is telling that, the human development is the process of expanding the real freedoms that people enjoy it. This is general and comprehensive approach, and it is as needed to overcome the major factors for dependency, that are poverty and injustice,

poor economic opportunities, including social exclusion and neglect of public facilities. According to human development reports, human development is the process of expansion options for human that the most important of these include a long and healthy life, education, enjoyment of a good standard of living, more choices include political freedom, guaranteed human rights and dignity breath. In fact, we can say that human development has two aspects: One aspect is related to human capabilities, such as improved health, knowledge and skills and other aspects of their capabilities to the opportunities and benefits purposes, such as being active in political, social and cultural issues. (Gustav Ranis, 2004).

This approach insists on the front counting the people in the community and practice to the formation of human capabilities in areas such as health, knowledge, and meet basic needs and focuses on the ability to create jobs and increase prosperity for stresses.

UN nominated, decade of the 1990s, as human development decade and introduced longevity, knowledge and minimum income level as three human development key indexes.

Based on this index, countries are classified with high human development (Human Development Index greater than 0.8), countries with medium human development (in the range of indicators 0.8-0.5) and countries with low development (human development index of less than 0.5).

In year 2011 by United Nations Human Development Report, human development index has been calculated and published for 187 countries. In this report, 187 countries are ranked in the four categories in terms of human development, ranking 1 to 47 are countries with very high human development countries , ranking 48 to 94 are the countries with high human development, ranking from 95 to 141 are countries with average human development and ranking above 142 are as low human development countries. In this report, Iran has 88 ranks as human development Index among the sample studied countries.

As mentioned, human development index is include the following components:

- 1 - Life expectancy
- 2 - The adult literacy rate and enrollment ratio in education levels
- 3 - GDP per capital (ppp)

Any factor that may increase these three parts, will lead to promoting human development. In this study besides health expenditure effect on human

development, the other three variables: Mortality rates, per capita GDP growth rate, and elementary completion rate will discuss as control variables.

The assignment of control variables is taken with the following justifications:

Mortality rates show improvement in health status and life expectancy, as increasing longevity is due to increased components of human development index. Thus there is an inverse relationship between mortality rate and human development.

Per capita GDP is one of the indices of human development, much higher growth rate in this variable represents the increase in GDP and increase in human development, and it shows the positive and direct relationship between these two variables.

More and more growing completion rate for primary school is also indicate that the number of people entered the primary school courses and passed successfully; this variable also has direct and positive relationship with human development.

Health expenditure

In today's world, by the enjoyment of health, human rights are inalienable, because improving the health status and providing better health services is one of the fundamental aspects of social and economic development. So investing in the health sector, like other social sectors, are considered among the infrastructure investments as the pattern of planned human resource development.

Health and health services can be considered as any other economic commodity and a durable commodity. All people are born with reserves of health; some people have less and some more. Health inventory like any other durable goods will be depreciated over the time. When adequate health inventory was reduced, the people efficiency is lost; this process is called depreciation of health capital. Therefore the natural life shows that the depreciation period is happening. Increased life expectancy in the last century shows that the rate of depreciation over time due to health within the health service has occurred. The individual health inventory will be the function of health expenditure.

So, we can say that health expenditure includes public and private health expenditure, its components is funds needed for health services

including treatment and prevention, plan future services for families and predicted emergency feeding.

Health Expenditure and Human Development

Health expenditure will improve human development through of a few channels: economic growth, reduce mortality rates and improve the learning process. Economic growth is the process of increases in capacity of economic generation over its time, which will raise income level and production. Health directly and indirectly affects economic growth. Health promotion makes human capital increase through capital health accumulation, and has direct effect on growth. On the other hand, health promotion improves labor productivity through increased longevity and reduced working days due to illness, and indirectly affects the production.

According to some economists, health expenditure will decrease the GDP since it diverts resources from productive investment. The new concept of human capital by Becker (1964) has opened another route to show health expenditure influence on GDP. In this new direction, health expenditures by improving health indicators will increase human capital inventory and GDP growth in countries.

It's possible to say that, the main duct of health impact on the economic growth is due to health effect on labor productivity. As healthy workforce is more motivated and higher productivity, so if health expenditure improves public health, it can be leading to increased produced through efficiency improvements. Usually the final efficiency is concerned the factors such as individual characteristics (cognitive abilities, health, work, work time, and physical and mental abilities) factors of production (land inventory, capital, machinery, equipment and intermediate inputs) and technology. Health, as one of the inputs of productivity function, has a direct impact on efficiency of labors and as the result on workforce. Because more healthy people are more efficient with a certain measure of capital and other institutions, and probably the work done by them equal to their calories will be more as compared with patients.

As explained, the positive impact of health spending on economic growth is observed directly and indirectly and then the relationship between economic growth and human development can be examined.

“Economic growth is effective on human development if administered

properly. In the growth process, intermediate is necessary, since it will be as growing interest in people's lives and human developments will be important at the whole economy levels. Economic growth provides the resources that produce a sustainable improvement in human development because economic growth by rising incomes, increases families and government circles of choices and their ability and will increase the level of human development" (Gustav Ranis, 2004).

Human development as the ultimate goal of human activity and is therefore among the objectives of the development process in other hand, economic growth is used as a representative and the display of social welfare. So by the human development index, economic growth increases has increased social welfare and human development.

Besides improvements in health manpower, increases life expectancy and decreases in mortality and as results Longevity and also acquire motivation for better study and skills, since the improvement of health conditions will increase the attractiveness of investment and education and training opportunities, and on the other side by increased ability to learn, people will be more susceptible to further education and skills. Therefore, increasing health expenditure will associated with improved ability to learn and increase longevity from this way it will promote human development.

As it explained, health expenditures will provide positive impact on human development through increased economic growth and reduction of mortality rate and improve the learning ability. Government health expenditure is as a whole of total health expenditure, so that a health is recognized as a public goods that the private sector have minor willing to invest in. Thus, government health spending has caused public health promotion and through specified channels will lead to human development.

Research Background and Empirical Studies

Opreana & Mihaiu, 2011, in a study entitled "Analysis of the relationship between health systems and human development levels in Europe" have shown that there is a correlation between health expenditure and human development. They have mentioned that life expectancy and longevity are as one component of the human development index, so there are strong correlation between health and attempts to make the health and human development. Also, Health expenditure in public and private sectors

were count in and concluded that in countries where private sector funding to further, efficiency of public health expenditure is larger. The findings of this study show that: The cost for the health will increase human development and human development itself will increase health promotion too. So there is bilateral relationship between health expenditure and human development.

Himanshu (2006), in a study examining the effects of education and income on health expenditure, Great Britain and Latin American experiences shows that to reduce mortality depends improve the standard and life is not associated with medical progress. Disastrous can be causes of poverty and ill health the resulting loss of income so significant improvements in health can help the people whom their daily earnings are less than a dollar. This research shows that increase in income and education will increase health expenditure. Health and treatment is not only a function of health care, but also the function of social and cultural development, economic factors, education and politics. So to raise the health status and quality of life should generally focus on the integration of social development, cultural needs, economical training.

Baldacci, Teresa (2003), in an article reviewed the cost effectiveness of public health and education and concluded that social programs like health care and education in general are associated with human development. Thus, government spending on these two should granted good results, although empirical studies have shown weak effects in both developed and developing countries.

Clovis, Nobuko (2011), in an article on health care expenditure in achieving the millennium development goals , concluded that market failure in providing health, social and personal savings, which is referred to as capital, provided government involvement in this important field. The UN Millennium Development also has a strong emphasis on development of health indicators. This has caused the supply of health and education needs to be put on the shoulders of government. In this research, positive and significant effect of government spending on health variables confirmed and the most important variable is the per capita income and that three-quarters of the development goals with the private sector and public health expenditure can be explained. Therefore proposed that developing countries to achieve the Millennium Development Goals should be increase consistent with their health expenditure per capita income and the proportion of the population

Data and Model

This study is a descriptive analysis survey of time series relationship between health expenditure and human development over the period 1990-2009 in Iran. This paper follows below design process model:

$$\text{IHDI} = \alpha \text{IHEg} + \beta \text{Gr} + \eta \text{PRr} + \lambda \text{DTr} + \phi \text{dumi}$$

So that, HEg represent public health expenditure, Gr is growth rate of GDP per capita, DTr is total mortality rate, PRr is the primary school completion rate and HDI is the human development index. Dummy variable are also used in the design of the model and this variable reflects the global crisis of 2007.

It should be noted that data on human development index of UNDP and the government health expenditure data have been collected from the Statistical Yearbook. The data on mortality rates, primary school completion rates and per capita GDP growth rates have been extracted from the World Bank. Dummy variable for the crisis of 2007 is added to model, for more consistent of model with economic reality. The main characteristic of this crisis is reducing liquidity in the banking and credit system.

Iran cannot remain immune to these crises, in the years 2000 to 2010 economic growth decrease rate in Iran was equivalent to countries like UK and the United Arabic Emirates, Iran economic drop rates was even more than economic decrease rate of America's economic who's was the main victim in this crisis. This was the main reason on adding Dummy 2007 variable to the model.

Model Estimation Results

Variables stationary examined by using Dicky Fuller test, it shows that all variables in the 10% are stationary. GDP growth rate, mortality rate and primary school completion rate with intercept at this level make stationary but government health spending make stationary with intercept and trend. The results of this test are shown in Table 1.

Table 1: The test results of the ADF for the stationary of the model variables

Variables	Lag	Intercept	Trend	Calculated ADF	10% Statistics
Government health Expenditures	Without	with	with	-4.67	-3.32
Mortality rate	Without	with	Without	-4.68	-2.65
completion rate for primary school	Without	with	Without	-2.81	-2.65
Per capita GDP growth rate	Without	with	Without	-3.01	-2.65

Source: Research Calculations

According to described equation, this model is estimated by using ordinary least squares. In this model, all estimated coefficients are statistically significant at 5% level so that all relevant control variables and main variables are statistically significant except dummy variable which is significant at 10% level.

According to table 2, based on the results it can be seen that the Completion rate for primary school and per capita growth rate has a positive impact on Iran’s human development index with coefficients 0.006 and 0.014, respectively. Mortality rates has a significant and opposite relationship as indicators of human development. As it is also shown in the table 2, an increased of one unit mortality rate, human development will decrease by 0.13. It can be observed that Control variables effect have expected.

Table 2: Model estimations by ordinary least squares

Variables	Coefficient	T Statistic
Intercept	-1.7102*	-2.5922
Government health Expenditures	0.17352*	2.0717
Mortality rate	-0.1305*	-5.1231
Completion rate for primary school	0.00686*	2.1890
Per capita GDP growth rate	0.01473*	2.9634
Dummy	0.0595**	1.7764

R ² = 0.84		
D-W=1.87		
Regression F=11.56		

Source: Research Calculations (symbol * indicates significant at 5% level and ** indicates a significant at 10% level)

Calculations show that public health expenditures have positive and significant (+0.17) impact on human development. In other words, by increasing percentage of government expenditure on health, human development health increases at the level of 0.17 percent. The hypothesis of this research for the positive impact of health expenditures on human development can be confirmed and it shows the importance of budget spent by government on health. Since the D-W is 1.87, so the estimated equation isn't autocorrelation. The determination coefficient of 84% indicates that 84 percent of the dependent variable variation (human development) in the form of explanatory variables is explained by the presented linear model.

The Granger causality test results obtained as below and the optimal lag length is at 4, and as estimated test results zero hypothesis $H_0: \text{Hex}_g=0$ is rejected and the opposite hypothesis is accepted with the critical area and t-statistics at 5% level. So it can be concluded that health expenditure is effective and is cause of human development change. And every one percent increase in healthcare spending will promote human development by 0.17.

Also, estimation shows that hypothesis $H_0: \text{HDI}=0$ is approved at 5% level and is accepted so the human development cannot be agreed as the cause of health expenditure. As the results there is one-way relationship between human development and health expenditure and human development is established due to health expenditure. The results are presented in Table 3.

Table 3: Granger causality

Dependent Variable	Independent Variable	Coefficients	Lag	H ₀	P -Value
HDI	HEX _g	0.17	4	HEX _g =0	0.79
HEX _g	HDI	0.38	4	HDI=0	0.00

Source: Research Calculation

Discussion

Granger causality test results indicate that there is one-way relationship between health expenditure and human development and by theoretical principles in this study; human development is due to health expenditure. The estimated coefficients of this model indicates that GDP per capita rates and primary school completion rates, have a positive impact and mortality rates have a negative impact on human development. The model was also estimated that government health expenditure index rate have positive impact affects on human development index. For analysis of this effect, health expenditure through the channel of human capital on economic growth has efficient effects on human development. Since increased health expenditure will improve labor productivity and increase the supply of work force and as the results increase productivity and economic growth that this variable growth is as important components of human development index. On the other hand increasing health expenditure is reducing mortality and increasing life expectancy, so by these channels it can be said that government health expenditure is effective on human development. Indeed, healthy people may have longer life and also can work better with higher production rate and more educational opportunities is granted for him since he is a rather educations cost to treat costs. All these have effects on the components of the human development index and causes promotion to the index. Calculations and estimates have also confirmed, "the promotion of health spending and expenditures (prevention and health services) to involves promote human development"

Conclusions

In this study, the ordinary least squares method is commonly used to assess the effect of health expenditure on human development. Government health expenditure is considered as public goods that invest in this sector. Indeed health expenditures are services that will be used to prevent disease and according to empirical studies and theoretical foundations and numerical calculations in this study positive and significant impact on human development has shown.

It is recommended that in spite of treated expenditure, a larger part of government budget allocate on health expenditures (prevention). It is recommended that the most portion of government budget spend on public

health improvement, public awareness, health promotion and development of role of active nongovernmental organizations (NGO) to the health. Hope to reach higher rating of human development through this compared to other countries. Other things can be done in this area:

1 - In future research two other approaches can be used. First one is investigating effects of human development on health and the second is examine the effects of human development and health effects of using the VAR methods.

2 - Review and analyze the relationship between health expenditure and human development in developing countries.

3 - By private sector important role in providing health and treat, it is recommended for future researches in the field of health and human development the part of private sector health expenditure that is important in preventing to be considered.

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