



**International Journal of Biology, Pharmacy  
and Allied Sciences (IJBPAS)**

*'A Bridge Between Laboratory and Reader'*

[www.jjbpas.com](http://www.jjbpas.com)

**THE IMPACT OF ECONOMIC GROWTH ON HEALTH EXPENSES**

**SEYED RAFI HOSSEINI<sup>\*1</sup>, MAHDIEH DEHBASHI<sup>2,3</sup>**

**1:** M. Sc. Department of Optometry, School of Paramedical

**2:** Sciences, Zahedan University of Medical Sciences, Zahedan, Iran

**3:** MS in economics, Department of Environment, Zahedan, Iran

**ABSTRACT**

Health expenses are important factors in forming economic growth that they can cause along with labor force and physical capital to improve and develop economy of the country. In the country Iran, health expenses are very important because, the population of Iran is young and the maintain health and wellbeing the labor force along with developing general better education can help to grow and develop economy.

The aim of this research is the effect of economic growth on health expenses in D8 members countries during the period of 1990 to 2011 that is estimated and analyzed by panel data method and specified pattern.

The results of this research indicate that the effect of independent variable of GDP on health expenses per capita as dependent variable is positive and significant and it shows that increasing GDP in addition to production market, either by increasing health share in families and also increasing the share of health expenses in government causes to improve the health situation of society which can finally cause to increase efficiency and welfare of society.

**Keywords: Health Expenses, Economic Growth**

**INTRODUCTION**

Economic growth and an increase GDP besides enhancing the quality of the life and equality of income distribution are the main aims of economic systems and developing

plans. In all done economic researches, effectiveness on economic growth has been considered directly and indirectly and several

approaches have been proposed to achieve this goal.

In all around the world, there are large varieties of expenses which countries spend on healthy. In countries with high incomes, the expense per capita related to health is more than 3000\$ on average while, in poor countries with low resources, these expenses per capita are 30\$ approximately. In year 2008, 64 countries have had expenses per capita less than 100\$. Also, there are large varieties of health expenses of countries with regard to their level of economic development. Some of the countries spend almost 12 percent of their GDP on healthy while, there are also some countries those the share of expenses related to health in their GDP are less than 3 percent.

There is wide literature in relation with health expenses in its share in economic growth of countries member in OECD. However, evidences in related to developing countries are almost rare and this issue can provide the study in order to fill this gap. For this purpose, data of developing countries and developed countries can be used. In addition, line model of health expenses can be drawn over time and the differences among groups of income can be investigated. The main questions posed in this field are as follow: 1- Is the growth of costs related to health faster

than the growth of income? 2- What are the other factors in relation with health expenses growth? 3- Do the government health expenses and the expenses rather than that follow same pattern? 4- Do the countries in different income levels follow same process?

### **Theoretical framework**

#### **Health system characteristics**

**Presenting service:** Using of health primary services can be a result of low expenses in health sector. Presenting the public health services in low level is related to low expenses in health sector (**Gerdtham et al, 1998**).

#### **Providing financial health**

A few studies in terms of financing structure have shown that in what amount the size of expenses related to health has been financed by government and how its relationship with levels of health expenses (**Leu, 1986; Culyer, 1988; Hitiris & Posnett, 1992; Van der Gaag & Stimac, 2008**). The difference in health costs among systems based on social and public insurance in countries member in OECD and Central Asia countries and European (ECA) has been studied (**Wagstaff & Bank, 2009; Wagstaff & R. Moreno-Serra, 2009**). The study related to countries of OECD shows that the expenses per capita related to health in countries those have social insurance systems, is higher. The study

related to European and Central Asian countries also mentions that the governmental expenses per capita in health sector when there are social insurance systems in a country to compare with when they are relied on tax system, is higher.

### External budget

Recently, great interest in the relationship between external budgets and expenses related to the health sector in developing countries has occurred. Gaag and Stamic have shown that there is not any significant relationship between official developments aids (ODA) related to health on expenses related to health sector. Official developments aids of the health sector have stretch in amount of 0/138 against public expenses on health sector (Van der Gaag and Stimac, 2008). Leu et al (2010) have shown that these types of aids have positive aids with public expenses of government in health sector through non-governmental sector while this relationship becomes negative when these expenses happened through governmental sector (Leu et al, 2010). Farag et al have shown that one percent increase in these aids leads to reduce the public expenses of the government in health sector in amount of 0/027 percent that this statistic related to countries with medium to high income has been almost 0/04 percent till 0/09 and in

countries with low income is almost 0/14 percent till 0/19percent (Farag et al, 2009).

### Mechanisms of payer

Payer systems of costs on average lead to cost higher to compare to tax system per capita (Gerdtham et al, 1998; Gerdtham & Jonsson, 2000). In a study in relation to countries of ECA is been observed that change in resources of financing of hospitals through budget paid for presenting services and or payment mechanisms based on patient is the result of increasing both components of health expenses of public sector and health expenses of private sector (R. Moreno-Serra & Wagstaff, 2010). In addition, the ratio of patient costs to total health costs has had positive relationship with the expenses related to health sector (Gerdtham & jonsson, 2000; Gerdtham et al, 1998). Also, the total supply of doctors has positive relationship with health expenses (Gerdtham & Jonsson, 2000; Gerdtham et al, 1998). However, the study of Murthy & A. Okunda in relation to African countries has not found any significant relationship between the number of doctors and expenses related to health (Murthy & A. Okunda, 2009).

### Research model

In this research, data panel method and adjusted method are used to estimate and analyze the results.

$$\begin{aligned}
 EXP_{it} = & \alpha_i + \rho EXP_{it-1} + \beta_3 GDPTREND_{it} + \beta_4 POSGAP_{it} + \beta_5 NEGGAP_{it} \\
 & + \beta_6 GDPTREND_{it} DPRIV_i + \beta_7 POSGAP_{it} DPRIV_i \\
 & + \beta_8 NEGGAP_{it} DPRIV_i + \delta OLD_{it} + \varepsilon_{it}
 \end{aligned}$$

Health expenses per capita is the dependent variable

The independent variables:

Last year health expenses per capita, GDP, the ratio of population higher than 60 years old, working population.

### **The test of normal distribution of dependent variable of research**

To do this research, in order to estimate parameters of the model, least normal squares method is used and this method is assumed that dependent variable of the research has normal distribution in a way that abnormal distribution of dependent variable leads to violate of assumptions of this method for estimating parameters and it will not present correct results. In this research, this issue is studied by Kolmogorov-Smirnov (K\_S) statistical. Zero hypothesis and opposite hypothesis in this research are as follow:

$$\begin{cases}
 H_0: \text{normal distribution} \\
 H_1: \text{abnormal distribution}
 \end{cases}$$

If statistical significant level of this test is more than 0/05 (Prob> 0/05), the H0 hypothesis based on normal distribution of the variables will be accepted. In **Table 1**, the results of test of Kolmogorov-Smirnov for the

variables of health expenses per capita are presented.

With regard to the issue that for dependent variables of the research, the statistical significant level of K\_S is below 0/05, therefore, the H0 hypothesis based on normal distribution of these variables in significant level of 95% is rejected and it indicates that dependent variables of the research do not have normal distribution.

The normality of dependent variables is the necessary condition for regression models; therefore, it is required to normalize this variable before testing the hypotheses. In this research, Johnson Transformation is used to normalize data and it is analyzed by Minitab software. The results of K-S test after data normalizing process are as follow:

According to the **Table 2**: since after normalizing data, the significant level of Kolmogorov-Smirnov statistical for dependent variables is more than 0/05, therefore, the H0 hypothesis in the significant level of 95% is confirmed and it indicates that dependent variables have normal distribution after normalizing process.

To determine that whether using data panel in estimating model is efficient or not, F Limer

and in order to determine which method (fix effects and or accidental effects) is more suitable for estimating (determining fix or accidental the differences the sectional units), Hasman test is used. The obtained results of these tests are presented in **Table 3**.

As it is observed in **Table 3**, the results indicate the rejection hypothesis of zero. Therefore, panel data with fix effect is accepted. So, for choosing the method between panel data with fix effect and accidental effect, Hasman test is done. The results related to this test are presented in **Table 4**.

As it is observed in **Table 4**, the results indicate the rejection hypothesis of zero; as a result, the panel data method with fix effects is accepted. Finally, with regard to the F Limer and Hasman tests, the research model with using panel data with fix effect is estimated by equation 1. The summary of results of tests in above is presented in **Table 5**.

According to the obtained results of F Limer and Hasman tests and also the results of statistical hypotheses of classic regression, model 1 of research is estimated with panel data method as fix effects. The results of model estimation are presented in **Table 6**.

Determine coefficient shows good fitting of model and used variables in that show the

power of model explanation in amount of 48 percent which with regard to the issue that panel data method is used, it is a good number. Durbin-Watson also shows the lack of auto correlation and it shows the number of 1.8. F statistical in this estimation rejects the equality of zero. Coefficient sign are also according to presented theories and theoretical frameworks and with regard to probability of coefficients indicates the effectiveness of all used variables in this research and their significant. J statistical which is known as Sargan statistical and it is used for waste correlation test and instrumental variable. As it is observed in **Table 6**, all estimated variables have signs consistent with theory. Sargan test statistical which has KHI 2 distribution with equal freedom degree to numbers of high limitations rejects zero test based on waste correlation with instrumental variables. As results, the authenticity of results is confirmed for description.

In denotative, the results are as follow:

The results of research indicate that the effect of independent variable of GDP on health expenses per capita as dependent variable is positive and significant and it shows that increasing GDP in addition to improving production market, either by increasing share of family health and also by increasing the

share of government health expenses has welfare.  
caused to increase efficiency and society

**Table 1: the results of normal test of dependent variables of research**

Significant level (Sig)	Statistical (K-S)	Variable
0/000	3/856	Health expenses per capita

**Table 2: the results of normal test of dependent variable of research after normalizing process**

Significant level (igS)	Statistical (S-K)	Variable
0/845	0/751	Health expenses per capita

Source: research findings

**Table 3: the results of F Limer test**

Accepted method	Error level	Statistical
Panel data method	0/000	35/841

**Table 4: the results of Hasman test**

Probability	Freedom degree	Square statistical	Results of test
0/05	2	30/14	Fix effects

**Table 5: the results of tests related to the statistical hypotheses of model (1)**

Statistical Ramsey		Statistical Durbin-Watson	Statistical Breusch-Pagan		Statistical Jarque-Bera	
<i>P-Value</i>	<i>F</i>	<b>D</b>	<i>P-Value</i>	<i>F</i>	<i>P-Value</i>	$\chi^2$
0/7845	0/2427	1.8	0/0097	32/841	0/3394	1/4672

**Table 6: the results of first hypothesis of research by fix effects (GMM)**

Significant coefficient	Statistical t	Coefficient	Variable
0.0001	6.930252	-0.040264	Intercept
0.0216	2.643951	0.235890	Last year health expenses per capita
0.0001	10.65236	0.71542	GDP
0.0216	2.643951	0.12465	The ratio of population higher than 60 years old
0.0001	10.53119	0.24563	Working population
Determine coefficient ( $R^2$ )	0/48	Durbi-Watson statistical	1/8
Adjusted $R^2$	0/39	Sargan statistical:3.15	
F Limer statistical $32/841=$		Prob F	0/00

Source: research findings

**DISCUSSION**

The results of research indicate that the effect of independent variable of last year health expenses per capita on dependent variable of health expenses per capita is positive and

significant and it shows that this index has dynamic situation.

The results of research indicate that the effect of independent variable of GDP on dependent variable of health expenses per capita is

positive and significant and it shows that increasing GDP in addition to improving production market, either by increasing share of family health and also by increasing the share of government health expenses has caused to increase efficiency and society welfare. The government also with increasing tax received from income can increase the public costs of health but on the other side, it can be said that increase the economic growth can impose some costs on human, on the other words, increase the economic growth can increase pollutions and increase problems and sicknesses, all and all can increase the costs of society health.

Also, the results of research indicate that the effect of independent variable of the ratio of population higher than 60 years old on dependent variable of health expenses per capita is positive and significant and it shows that increase the ratio of population higher than 60 years old will be a resonator factor of health expenses in the country. On the other words, non-active population requires higher share of health costs.

Also the results of research indicate that the effect of working population on health expenses is positive and significant. This issue is investigable in two ways. In one side, increase the number of workers increases the income earners which increase the costs of

health and on the other side, people with higher works face to more problems and sicknesses which increases the costs of health.

## **CONCLUSION**

According to the results of research which indicate that the effect of independent variable of last year health expenses per capita on dependent variable of health expenses per capita is positive and significant and it shows that this index has dynamic situation, it is recommended policy makers for predicting and managing health costs, pay more attention to its situation in last year carefully.

The results of research indicate that the effect of independent variable of GDP on dependent variable of health expenses per capita is positive and significant and with increasing the GDP and economic growth the government spend more costs in health of society and it is recommended to increase this share applies the policy based on economic growth.

Also, the results of research indicate that the effect of independent variable of the ratio of population higher than 60 years old on dependent variable of health expenses per capita is positive and significant and it shows non-active population requires higher share of health costs and on the other hand, the country will face to the huge part of this

population in future, making long term policies of insurance and retirement from present seem necessary.

## REFERENCES

- [1] Bac, C., Le Pen, Y., 2002. An international comparison of health expenditure determinants. 10th International Conferences on Panel Data, Berlin, July 5–6.
- [2] Baltagi, B.H., Moscone, F., 2010. Health care expenditure and income in the OECD reconsidered: evidence from panel data. IZA Discussion Paper Series, 4851.
- [3] Beck, N., Katz, J.N., 1995. What to do (and not to do) with time-series cross-section data. *American Political Science Review* 89, 634–647.
- [4] Beck, N., Katz, J.N., 2009. Modeling Dynamics in Time-series-Cross-section Political Economy Data. New York University, Department of Politics.
- [5] Bruno, G.S.F., 2005. Approximating the bias of the LSDV estimator for dynamic unbalanced panel data models. *Economics Letters* 87, 361–366.
- [6] Cantarero, D., Lago-Peñas, S., 2010. The determinants of health care expenditure: a reexamination. *Applied Economics Letters* 17 (7), 723–726.
- [7] Cantarero, D., Lago-Peñas, S., 2012. Decomposing the determinants of health expenditure: the case of Spain. *The European Journal of Health Economics* 13 (1), 19–27.
- [8] Carrion-i-Silvestre, J.L., 2005. Health care expenditure and GDP: are they broken stationary? *Journal of Health Economics* 24, 839–854.
- [9] Chakroun, M., 2009. Health care expenditure and GDP: an Int. Panel smooth transition approach. Munich Personal RePEc Archive, 14322.
- [10] Dregerd, C., Reimers, H.E., 2005. Health care expenditures in OECD countries: a panel unit root and cointegration analysis. IZA Discussion Paper Series, 1469.
- [11] Greene, W.H., 1997. *Econometric Analysis*. Prentice Hall, New Jersey.
- [12] Hagist, C., Kotlikoff, L., 2009. Who's going broke? Comparing growth in public healthcare expenditure in ten OECD countries. *Hacienda Pública Española* 188, 55–71.