Archive of SID

Original Article
http://mjiri.iums.ac.ir

Medical Journal of the Islamic Republic of Iran (MJIRI)
Iran University of Medical Sciences

Downloaded from mjiri.iums.ac.ir at 11:32 IRDT on Wednesday May 29th 2019

Determinants of healthcare expenditures in Iran: evidence from a time series analysis

Satar Rezaei[1], Razieh Fallah[2], Ali Kazemi Karyani[3], Rajabali Daroudi[4]
Hamed Zandiyan[5], Mohammad Hajizadeh*[6]

Received: 6 July 2015 Accepted: 20 September 2015 Published: 4 January 2016

Abstract

Background: A dramatic increase in healthcare expenditures is a major health policy concern worldwide. Understanding factors that underlie the growth in healthcare expenditures is essential to assist decision-makers in finding best policies to manage healthcare costs. We aimed to examine the determinants of healthcare spending in Iran over the periods of 1978-2011.

Methods: A time series analysis was used to examine the effect of selected socio-economic, demographic and health service input on per capita healthcare expenditures (HCE) in Iran from 1978 to 2011. Data were retrieved from the Central Bank of Iran, Iranian Statistical Center and World Bank. Autoregressive distributed lag approach and error correction method were employed to examine long- and short-run effects of covariates.

Results: Our findings indicated that the GDP per capita, degree of urbanization and illiteracy rate increase healthcare expenditures, while physician per 10,000 populations and proportion of population aged≥ 65 years decrease healthcare expenditures. In addition, we found that healthcare spending is a "necessity good" with long- and short-run income (GDP per capita), elasticities of 0.46 ($p<0.01$) and 0.67 ($p = 0.01$), respectively.

Conclusion: Our analysis identified GDP per capita, illiteracy rate, degree of urbanization and number of physicians as some of the driving forces behind the persistent increase in HCE in Iran. These findings provide important insights into the growth in HCE in Iran. In addition, since we found that health spending is a "necessity good" in Iran, healthcare services should thus be the object of public funding and government intervention.

Keywords: Healthcare expenditures, Autoregressive distributed lag approach, Error correction method, Time series analysis, Iran.

Cite this article as: Rezaei S, Fallah R, Kazemi Karyani A, Daroudi R, Zandiyan H, Hajizadeh M. Determinants of healthcare expenditures in Iran: evidence from a time series analysiss. *Med J Islam Repub Iran* 2016 (4 January). Vol. 30:313.

Introduction

Healthcare expenditure (HCE) and its determinants are major public health concerns in most countries (1). Health policy makers in developed and developing countries are concerned about rising in healthcare expenditures and are interested to identify the main factors affecting these costs (2,3). To date, several studies aimed to investigate factors explaining the increase in HCE around the world (2-8). These studies highlighted the effect of different variables such

[1]. PhD Candidate in Health Economics, Research Center for Environmental Determinants of Health, Kermanshah University of Medical Sciences, Kermanshah, Iran. satarrezaei@gmil.com
[2]. MSc in Health Services Management, Amol Imam Reza Hospital, Mazandaran University of Medical Sciences, Sari, Iran. r.fallah@gmail.com
[3]. PhD Candidate in Health Economics, Department of Health Management and Economics, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran. alikazemi2000@yahoo.com
[4]. PhD Candidate in Health Economics, Department of Health Management and Economics, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran. rdaroudi@yahoo.com
[5]. PhD Candidate in Health Policy, Department of Public Health, School of health, Ardabil University of Medical Sciences, Ardabil, Iran, h_zandiyan@razi.tums.ac.ir
[6]. (**Corresponding author**) PhD, Assistant Professor, School of Health Administration, Faculty of Health Professions, Dalhousie University, Halifax, Canada. m.hajizadeh@dal.ca

www.SID.ir

Archive of SID

Downloaded from mjiri.iums.ac.ir at 11:32 IRDT on Wednesday May 29th 2019

as income per capita, age and sex distribution and urbanization level on healthcare expenditure in different countries (9). For example, studies by Kleiman (4), Newhouse (5) and Leu (6) have established income as one of the main determinants of healthcare spending.

Furthermore, a number of cross-country studies examined the determinants of healthcare expenditures (10-12). These studies, however, are subject to some problems, such as the definitions of what comprises healthcare spending are not the same in all countries, input prices may vary across countries and countries' income maybe correlated with health expenditures which, in turn, can increases the income elasticity of health expenditures. In addition, using cross-country data in the analysis of healthcare expenditures imposes some limitations due to country-specific heterogeneity in the characteristics of organization, the financing and political decision making in healthcare (9,12).

There is a great cross-country variation in health spending. Per capita HCE varied from $US 3,000 in high-income countries to $US 30 in low-income countries. While some developed countries allocate more than 12 percent of their Gross Domestic Product (GDP) to health, this figure is less than 3 percent in some developing countries (10). In Iran, total expenditures on health (% of GDP) increased from 4 percent to 7 percent over the period between 2004 and 2012. Similarly, there was a four-time increase in per capita health expenditures from 117 (current US$) in 2004 to 490 in 2012 (13). Notwithstanding this increase in health expenditures, there is not a study that attempted to analyze macro-level determinants of health expenditures in Iran. Thus, in this study we attempted to provide a new insight into the country-level determinants of healthcare expenditures in Iran using a time series analysis approach. The results of this study enable health policy-makers to better understand the factors affecting HCE in Iran, and thereby take necessary steps in managing and controlling the upward trends in overall healthcare expenditures.

Healthcare system in Iran: Healthcare system in Iran comprises of three sectors viz., public, private and not-for-profit. While the public sector plays a key role in the provision of all three levels of healthcare (i.e., primary, secondary and tertiary), the private sector mainly provides secondary and tertiary healthcare in urban areas. Non-governmental organizations (NGOs) are active in providing health services for chronic (e.g., diabetes) and severe patients such as cancer patients (14).

The Ministry of Health and Medical Education (MOHME) is responsible for Iran's healthcare system. The Ministry sets healthcare policies and standards at the national level and monitors performance and compliance with those policies and standards. Medical Sciences and Health Services Universities (MSHSU) are regulatory bodies that supervise the operation of health system at the provincial level. There are at least one MSHSU in all 31 provinces of Iran that oversees the operation of public healthcare system and monitors the performance of private healthcare providers. Some ministries within the Government of Iran (e.g., the Ministry of Petroleum, the Ministry of Defense and Armed Forces Logistics) and special organizations (e.g., Social Security Organization) have their own healthcare facilities and hospitals that deliver secondary and tertiary healthcare services to their employees and their dependents. These healthcare facilities and hospitals nonetheless follow regulations established by the MOHME (15-18).

Healthcare in Iran is funded through the government's general revenue (primary raised from general tax revenue and sale of natural resources), health insurance organizations, and individual out-of-pocket payments (OOP) (17). There are four main health insurers in Iran:

1. Iranian Health Insurance Organization (IHIO) is the largest health insurer in Iran and covers government employees, residents of rural/urban areas with a total popu-

www.SID.ir

Archive of SID

Downloaded from mjiri.iums.ac.ir at 11:32 IRDT on Wednesday May 29th 2019

lation of less than 20,000, the self-employed and students. In 2014, the IHIO extended health insurance coverage for approximately eight million of the Iranian population who did not have health insurance.

2. Social Security Organization (SSO) provides health insurance for formal sector employees (with exception of government officials) and their dependents.

3. Armed Forces Medical Service Organization (AFMSO) covers military members, and their dependents.

4. Imam Khomeini Relief Foundation (IKRF) provides health coverage for the poor (15).

In addition, some special organizations such as oil companies, radio and television broadcasters and banks have their own health insurance plans. Moreover, some private health insurance organizations offer supplemental insurance plans. Overall, although there is not a single publicly funded health insurance, healthcare in Iran is close to being universal following the extension of IHIO coverage in 2014. Notwithstanding achieving near-universal health insurance coverage in recent years, healthcare system in Iran suffers from inequality in healthcare and OOP contributes more than a half of total health financing in Iran (15,18).

Methods

Data

The data for this study were derived from the Central Bank of Iran (CBI), Iranian Statistical Center (ISC) and World Bank. Based on the availability of information from the CBI, ISC and World Bank, we constructed a time series data set containing information on per capita HCE and some of the country-level determinants of per capita HCE over the period between 1978 and 2011. Based on the previous empirical work (3,7,19-28), we used GDP per capita, proportion of population aged ≥ 65 years and illiteracy rate as socioeconomic and demographic determinants of HCE per capita. Number of physician per 10,000 populations and degree of urbanization were used as measures of healthcare demand and supply, respectively.

Econometrics Model

Autoregressive Distributed Lag (ARDL) Approach

In order to investigate the effects of some of the common determinants of HCE in Iran, autoregressive distributed lag (ARDL) approach proposed by Pesaran and Shin (29) and extended by Pesaran and colleagues (30) was used. The main advantage of ARDL model is that it provides short- and long-run relationship between independent variables and dependent variable without losing long-term information.

Suppose we have a log-linear regression model linking the log of per capita healthcare expenditures to a set of the explanatory variables, as defined in Equation 1:

(1)

$$LHCE_t = a_0 + a_1 LGDP_t + a_2 LPOP_t + a_3 LDOC_t + a_4 LURB_t + a_5 LILIT_t + u_t,$$

where HCE is per capita healthcare expenditures (current US$), GDP represents GDP per capita (PPP, current international $), $POP65$ indexes the proportion of the population aged≥ 65 years, DOC is the number of physicians per 10,000 population, URB represents percentage of people who lived in the urban relative to the total population and $ILIT$ indicates illiteracy rate. The u_t is the error term. An ARDL representation of Equation 1 can be written as:

(2)

$$\Delta LHCE_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} \Delta LHCE_{t-i} + \sum_{i=0}^{n} \alpha_{2i} \Delta LGDP_{t-i} + \sum_{i=0}^{n} \alpha_{3i} \Delta LPOP_{t-i} + \sum_{i=0}^{n} \alpha_{4i} \Delta LDOC_{t-i} + \sum_{i=0}^{n} \alpha_{5i} \Delta URB_{t-i} + \sum_{i=0}^{n} \alpha_{6i} \Delta LILIT_{t-i} + \beta_1 LPOP_{t-1} + \beta_2 LGDP_{t-1} + \beta_3 LDOC_{t-1} + \beta_4 LURB_{t-1} + \beta_5 LILIT_{t-1} + \varepsilon_t,$$

www.SID.ir

Archive of SID

Downloaded from mjiri.iums.ac.ir at 11:32 IRDT on Wednesday May 29th 2019

where Δs are the first difference of variables, α_0 is the draft component, and ε_t is a white noise error process. While the expressions with summation sign indicate the short-run dynamics of the model, the expressions with β_1 to β_5 represent the long-run relationship (31).

Error Correction Model (ECM)

If there is a long-run relationship between variables (i.e., the variables are cointegrated), the next stage is to employ the error correction model (ECM). In the ECM, changes in the explanatory variable are related to last period's equilibrium error. The model uses the differences of the dependent and explanatory variables and determines the speed of reversion towards equilibrium (30). Equation 2 in the ARDL version of ECM can be written as:

(3)

$$\Delta LHCE_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} \Delta LHCE_{t-i} + \sum_{i=0}^{n} \alpha_{2i} \Delta LGDP_{t-i} + \sum_{i=0}^{n} \alpha_{3i} \Delta LPOP_{t-i} + + \sum_{i=0}^{n} \alpha_{4i} \Delta LDOC_{t-i} + \sum_{i=0}^{n} \alpha_{5i} \Delta URB_{t-i} + \sum_{i=0}^{n} \alpha_{6i} \Delta LILIT_{t-i} + \lambda ECM_{t-1} + u_t,$$

where ECM_{t-1} is the lagged residuals obtained from the long-run relationship ARDL (31); the λ represents the speed of adjustment to the long-term equilibrium and ranges from zero to minus one. A negative value of the λ indicates a short-term adjustment in the percentage changes of HCE towards its long-term equilibrium.

Test for Unit Root, Cointegration and Stability of Coefficients

The initial step in a time series analysis is to determine the existence or absence of a unit root. In general, time series data are not stationery and the use of non-stationary data can lead to a spurious regression (32). We used the Augmented Dickey–Fuller (ADF) unit root test to assess the unit root and level of integration.

In addition to the unit root test, we examined whether or not the non-stationary variables are cointegrated. If the variables are cointegrated, then a long-run relationship between HCE and its determinants exists. Bounds test (30) was employed to examine cointegration amongst variables. The Bounds testing approach is based on the F-statistics. The null (no cointegration among the variables) and alternative hypotheses of this test can be formulated as:

(4)

$$H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0 \; H_1: \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq 0$$

The computed F-statistic in this test is compared with upper and lower critical bounds because the distribution of the F-statistics is not standard. The H_0 is rejected if the estimated F-statistic is above the upper critical value. In contrast, if the calculated F-statistic is below the upper critical value, the H_0 is not rejected. The result is not conclusive if the F-statistic lies between the two critical bounds (30).

Additionally, the cumulative sum of recursive residuals (CUSUM) and cumulative sum of square of recursive residuals (CUSUMSQ) tests, suggested by Brown et al. (33), were used to examine the stability of coefficients. According to these two tests, if the estimate of CUSUM and CUSUMSQ lie within the two critical lines, the coefficients of the model over the study period are structurally stable. All the analyses were carried out using the Microfit5 econometric software.

www.SID.ir

Archive of SID

Downloaded from mjiri.iums.ac.ir at 11:32 IRDT on Wednesday May 29th 2019

Results

Descriptive Statistics

The descriptive statistics of variables used in the study indicated that per capita health expenditure (as measured in current US$) increased from $30 in 1978 to $13,600 in 2011. GDP per capita in current international dollars at purchasing power parity (PPP) also rose from $2019 to $13,600 over time. While there was an increase in the proportion of Iranians who live in urban areas from 48 per cent in 1978 to 72 percent in 2011, illiteracy rate decreased significantly (from 49 per cent to 13 per cent) during the study period. Number of doctors per 10,000 populations increased from 0.34 at the beginning of the study to 1.42 at the end. Proportion of population ages 65 years and above increased from 3 percent in 1978 to 5 percent in 2011.

Regression Results

The results of the ADF unit root test were reported in Table 1. The results of ADF test suggested that per capital HCE, GDP per capita, physician per 10,000 populations and illiteracy rate are stationary at the first level with both constant and constant and trend. The degree of urbanization and the proportion of the population aged ≥ 65 years are stationary at the level with both constant and constant and trend.

The ADF unit-root test determined the order of integration of a time series that are mixed of I (0) and I (1) (Table 1). Thus, we used the Bounds test to assess long-run equilibrium relationships between explanatory variables and our dependent variable. The result of the ARDL Bound test indicated F-Statistics of 3.91, which is higher than upper bound critical values of 3.35 and 3.79 at 10 and 5 per cent levels (30). These results thus confirmed the existence of cointegration among the variables.

The results of long- and short-run relationships between the dependent and explanatory variables were reported in Tables 2 and 3, respectively. Our empirical findings showed that the GDP per capita, degree of urbanization and illiteracy rate increase healthcare expenditures. The physicians per 10,000 population and the proportion of ages 65 years and above decrease healthcare expenditures. Also, the results revealed no significant relationships between HCE and the proportion of ages 65 years and above in both short- and long-run. The coefficients on GDP per capita were 0.46 and 0.67 in short- and long-run, respectively. This finding, thus, indicates that healthcare can be considered as a "necessity good". Further, the results suggested that while a 10 per cent increase in urbanization degree increases HCE by 14 per

Table 1. The ADF Unit-root Test of Levels and First Difference of Variables in the Study

	Level		First Difference		Order of Integration
	Constant	Constant and Trend	Constant	Constant and Trend	
LHCE*	-2.56 (0.09)	-2.90 (0.16)	-4.97 (<0.01)	-5.02 (<0.01)	I(1)
LGDP*	1.56 (0.99)	-0.98 (0.95)	-3.84 (<0.01)	-4.54 (<0.01)	I(1)
LDOC*	-1.06 (0.74)	-2.95 (0.14)	-6.36 (<0.01)	-6.23 (<0.01)	I(1)
LURB**	-3.13 (0.02)	3.01 (0.03)	-	-	I(0)
LPOP65**	-4.30 (<0.01)	-4.76 (<0.01)	-	-	I(0)
LILIT*	-1.67 (0.44)	0.43 (0.99)	-3.4 (0.01)	-3.74 (0.02)	I(1)

*Stationery at the first difference, ** Stationery at level and P-values in parentheses

Table 2. Results of Long-run Coefficients of Determinant of Health Care Expenditure in Iran by ARDL (1, 0, 0, 0, 0, and 0) Selected Based on Schwarz-Bayesian Criteria (SBC)

	Coefficient	t-statistic	p
LGDP	0.67	2.83	<0.01
LDOC	-1.1	-5.39	<0.01
LURB	2.08	5.96	<0.01
LPOP65	-0.15	-0.16	0.87
LILIT	0.98	3.00	<0.01
R2= 0.92, F-statistic = 61 (p<0.001), Durbin Watson= 1.89			

www.SID.ir

Archive of SID

Downloaded from mjiri.iums.ac.ir at 11:32 IRDT on Wednesday May 29th 2019

Table 3. Results of Short-run Coefficients of Determinant of Healthcare Expenditure by ECM in Iran

	Coefficient	t_ Ratio	p
*ΔLGDP	0.46	2.62	0.01
ΔLDOC	-0.76	-3.50	<0.01
ΔLURB	1.44	3.37	<0.01
ΔLPOP65	-0.10	-0.16	0.87
ΔLILIT	0.68	2.49	0.02
ECM(-1)	-0.69	-4.79	<0.01
	R2= 0.5, F-statistic = 6 (p<0.001), Durbin Watson= 1.89		
Diagnostic tests	Hypothesis		Statistics (p)
Serial Correlation	Lagrange Multiplier Test: H_0= No serial correlation		0.15 (0.68)
Functional Form	Ramsey RESET test using Powers of the Fitted Values of LHCE: H_0= Model has no omitted variables		0.10 (0.74)
Normality	Skewness and Kurtosis Tests: H_0= The residuals are normally distributed.		1.30 (0.51)
Heteroscedasticity	Based on the Regression of Squared Residuals on Squared Fitted Values: H_0= The error term has a constant variance (no-heteroscedasticity)		0.61 (0.43)

*Δ: First difference of variables;

cent, a similar increase in the proportion of the population aged ≥ 65 years reduces HCE by 1 per cent. As reported in Table 3, the coefficient on ECM (-1) is statistically significant (-0.69, p<0.01). This revealed that about 69 per cent of equilibrium in last year is corrected in the current year.

The results revealed no significant relationships between HCE and the proportion of ages 65 years and above in both short- and long-run. The coefficients on GDP per capita were 0.46 and 0.67 in short- and long-run, respectively. This finding, thus, indicates that healthcare can be considered as a "necessity good". Further, the results suggested that while a 10 per cent increase in urbanization degree increases HCE by 14 per cent, a similar increase in the proportion of the population aged ≥ 65 years reduces HCE by 1 per cent. As reported in Table 3, the coefficient on ECM (-1) is statistically significant (-0.69, p<0.01). This revealed that about 69 per cent of equilibrium in the last year is corrected in the current year. The results of estimation model showed that Adjusted R^2 was 0.92, indicating a high correlation between healthcare expenditures and explanatory variables used in the model. Also, the results of the diagnostic tests showed no problem of serial correlation, stability or functional form, normality and heteroscedasticity.

Figure 1 demonstrates the results of stability in coefficients of parameters tests. As illustrated in the figure, it is apparent that the plots of CUSUM and CUSUMSQ lie

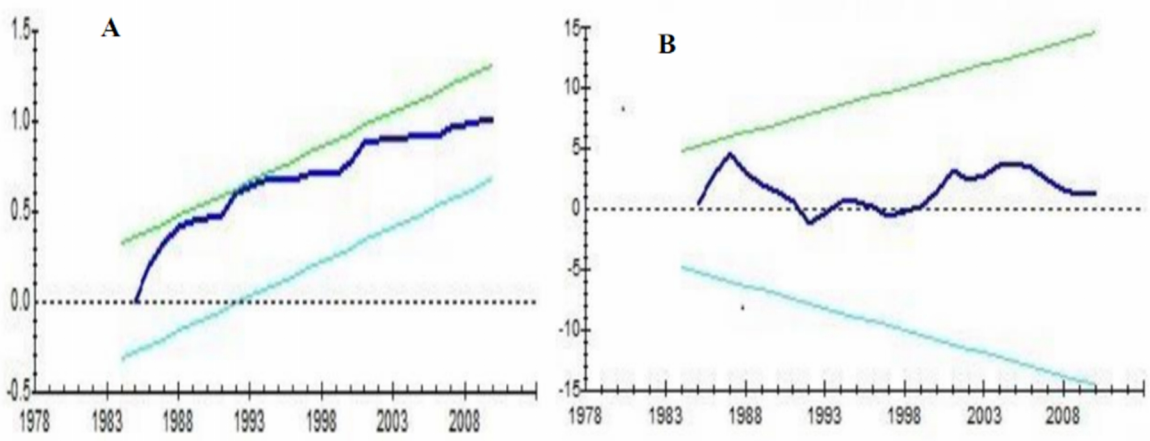

Fig. 1. Plots of cumulative sum of squares of recursive residual (A) and cumulative sum of recursive residual (B)

www.SID.ir

Archive of SID

Downloaded from mjiri.iums.ac.ir at 11:32 IRDT on Wednesday May 29th 2019

within the two critical lines and therefore there is not any structure break in the model. On the other hand, this shows that long-run and short-run estimates are stable and efficient.

Discussion

The rapid increase of healthcare spending is a major public health concern for national and international governments and health policy makers (34). In Iran, the share of HCE as per cent of GDP has increased from 5.7 per cent in 1995 to 6.5 per cent in 2010. Understanding factors that explain the drastic increase in healthcare expenditures is one of the key steps for controlling and management of healthcare costs. In spite of this, there is not a study that attempted to analyze macro-level determinants of healthcare expenditures in Iran. This study aimed to address this gap in the literature and examine the determinants of healthcare expenditures in Iran using a time series analysis approach.

Similar to the findings of other studies in Italy (35), Canada (36) and Tunisia (37), our empirical results revealed that GDP per capita and degree of urbanization had significant positive effects on HCE in Iran. In addition, the long- and short-run effects of GDP per capita on HCE revealed that healthcare is a "necessity good" (see the less than one values of coefficient on $LGDP$ and $\Delta LGDP$ in Tables 2 and 3). These results are consistent with the findings of a study by Mehrara and Fazaeli (38) that investigated the relation between healthcare expenditures and economic growth in Middle East and North Africa (MENA) regions using a panel data of 13 countries. A study by Costa-Font and Pons-Novell (2007) also demonstrated that healthcare is a "necessity good". They concluded that elasticity of healthcare may differ according to private and public expenditures and type of healthcare financing (12). Using a multi-African country data set, Gbesemete and Gerdtham (3) showed that healthcare is a "necessity good" and GDP per capita was the most significant determinant of healthcare expenditures. Moreover, similar to previous studies (2,3,34), we found that an increase in the percentage of Iran's population living in urban areas resulted in an increase in healthcare spending, perhaps due to an increase in accessibility of health services.

Similar to the results of a study conducted by Samadi and Homaie Rad (20), our study indicated that total number of physician per 10,000 populations had a statistically significant negative impact on healthcare expenditures. This can be explained by the fact that increase in the number of physicians may improve accessibility to the primary and basic medical services, which in turn, reduces the utilization of more expensive services such as hospitalization. The proportion of the population aged ≥ 65 years had a negative (albeit statistically insignificant) effect on HCE in Iran. Population aging is known as a factor to increase healthcare expenditures. Nevertheless, several studies including our results revealed that demographic factors such as age have little impact on rising healthcare costs. In fact, the large share of this increase in expenditures is due to the increase in GDP (national income), rapid advancement of new technology and the costs of dying that occurred simultaneously with the aging of the population (39-42). For example, studies conducted by Getzen (43) and Martins et al. (42) demonstrated that there was no positive correlation between healthcare expenditure and aging. The "red herring" hypothesis advanced by Zweifel et al. (44) also highlighted the ambiguous impact of aging on healthcare expenditures. In other words, the current literature does not establish a clear conclusion between aging and HCE.

In addition, literacy is considered to be another factor that had a statistically significant negative effect on HCE. The higher literacy rate in a society could help people to improve health awareness and increase the utilization of the healthcare service. This process increases the healthcare ex-

www.SID.ir

Archive of SID

Downloaded from mjiri.iums.ac.ir at 11:32 IRDT on Wednesday May 29th 2019

penditures in the short-run. For example, there is some evidence showing that more-educated women use more health services and have more healthcare expenditures compared to their less-educated counterparts (45). However, in the long-run, the higher literacy rate could decrease total HCE because people choose healthy life style and seek to solve their health problems at their early stage, which is more effective and less costly.

It should be noted that although our results indicated significant impacts of GDP per capita, physician per 10,000 populations, degree of urbanization and illiteracy rate on HCE in Iran, there are other important factors (e.g., technological change (46, 47), cost-of-dying and time-to-death (42, 48) that might have played important roles in the dramatic increase in health spending over the last three decades in Iran. These factors, however, were excluded from the study due to the lack of time series information.

Conclusion

Health expenditures could be affected by several factors including GDP per capita and degree of urbanization. Although some other factors such as aging can have a moderate impact on per capita HCE, we could not find evidence to support this hypothesis. Meanwhile, our findings also revealed that healthcare in Iran was a "necessity good" during the studied period. Therefore, the Iranian authorities should implement policies aiming to extend publicly funded healthcare services. Also, it is noteworthy to mention that some other factors such as advancement of new technology and the costs of dying might have had a considerable impact on HCE in Iran. Future research may investigate how these factors impact HCE in Iran.

References

1. Di Matteo L.The determinants of the public–private mix in Canadian healthcare expenditures: 1975–1996. Health Policy, 2000, 52(2):87-112.

2. Gerdtham U-G, Søgaard J, Andersson F and et al. An econometric analysis of healthcare expenditure: a cross-section study of the OECD countries. J Health Econ, 1992, 11(1):63-84.

3. Gbesemete KP, Gerdtham U-G. Determinants of healthcare expenditure in Africa: a cross-sectional study. World Dev, 1992, 20(2):303-8.

4. Kleiman E. The determinants of national outlay on health. The economics of health and medical care, Macmillan, London. 1974:369-76.

5. Newhouse JP. Medical-care expenditure: a cross-national survey. J Hum Resour, 1977, 12(1): 115-25.

6. Leu RE. The public-private mix and international healthcare costs. Public and private health services. 1986:41-63.

7. Parkin D, McGuire A, Yule B. Aggregate healthcare expenditures and national income: is healthcare a luxury good? J Health Econ, 1987, 6(2):109-27.

8. McCoskey SK, Selden TM. Healthcare expenditures and GDP: panel data unit root test results. J Health Econ,1998, 17(3):369-76.

9. Di Matteo L, Di Matteo R.Evidence on the determinants of Canadian provincial government health expenditures: 1965–1991. J Health Econ, 1998, 17(2):211-28.

10. Kea X, Saksenaa P, Hollyb A. The determinants of health expenditure: a country-level panel data analysis. Geneva: World Health Organization; 2011.

11. Or Z. Determinants of health outcomes in industrialised countries: a pooled, cross-country, time-series analysis. OECD Economic Studies. 2000:53-78.

12. Costa-Font J, Pons-Novell J. Public health expenditure and spatial interactions in a decentralized national health system. Health Econ. 2007, 16(3):291-306.

13. World Bank, [11/2/2014], available at: http://databank.worldbank.org/data.

14. Mehrdad R. Health system in Iran. JMAJ. 2009, 52(1):69-73.

15. Hajizadeh M, Nghiem HS. Out-of-pocket expenditures for hospital care in Iran: who is at risk of incurring catastrophic payments?. Int J Healthcare Finance Econ, 2011, 11(4):267-85.

16. Hajizadeh M, Nghiem HS. Hospital care in Iran: an examination of national health system performance. Int J Health Manag, 2013, 6(3):201-10.

17. Hajizadeh M, Connelly LB. Equity of healthcare financing in Iran: the effect of extending health insurance to the uninsured. Oxford Devel. Stud. 2010, 38(4):461-76.

18. Hajizadeh M, Connelly LB, Butler JR and et al. Unmet need and met unneed in healthcare utilisation in Iran. Int J Soc Econ. 2012, 39(6):400-22.

19. Freeman DG.Is healthcare a necessity or a luxury? Pooled estimates of income elasticity from US state-level data. Appl Econ, 2003, 35(5):495-502.

www.SID.ir

Archive of SID

Downloaded from mjiri.iums.ac.ir at 11:32 IRDT on Wednesday May 29th 2019

20. Samadi A, Homaie Rad E. Determinants of Healthcare Expenditure in Economic Cooperation Organization (ECO) Countries: Evidence from Panel Cointegration Tests. Int J Health Policy Manag, 2013, 1(1):63.

21. Toor IA, Butt MS.Determinants of Healthcare Expenditure in Pakistan. Pak Econ Soc Rev, 2005, 13(1):133-50.

22. Pan J, Liu GG.The determinants of Chinese provincial government health expenditures: evidence from 2002–2006 data. Health Econ, 2012, 21(7):757-77.

23. Blomqvist ÅG, Carter RA. Is healthcare really a luxury? J Health Econ. 1997, 16(2):207-29.

24. Cantarero D. Decentralization and healthcare expenditure: the Spanish case. Appl Econ. 2005, 12(15):963-6.

25. Giannoni M, Hitiris T. The Regional Impact of Healthcare Expenditure: the Case of Italy. Appl Econ. 2002, 34(14): 1829-1836.

26. Hitiris T. Healthcare expenditure and integration in the countries of the European Union. Appl Econ. 1997, 29(1):1-6.

27. Moscone F, Tosetti E. Health expenditure and income in the United States. Health Econ. 2010, 19(12):1385-403.

28. Yu Y, Zhang L, Li F, Zheng X. Strategic interaction and the determinants of public health expenditures in China: a spatial panel perspective. Ann Regional Sci. 2013, 50(1):203-21.

29. Pesaran MH, Shin Y . An autoregressive distributed lag modelling approach to cointegration analysis. 1999 Chapter 11 in S. Strom (ed.), Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium. Cambridge University Press, Cambridge. .

30. Pesaran MH., Shin Y, Smith R J. Bounds testing approaches to the analysis of level relationships. J Appl Econom 2001, 16: 289–326.

31. Dritsakis N. Demand for Money in Hungary: An ARDL Approach. Review of Econ Financ. 2011:1-16.

32. Granger CW, Newbold P. Spurious regressions in econometrics. J Econometrics. 1974, 2(2):111-20.

33. Brown RL, Durbin J, Evans JM. Techniques for testing the constancy of regression relationships over time. J Roy Stat Soc B Met. 1975:149-92. .

34. Okunade AA, Karakus MC, Okeke C. Determinants of health expenditure growth of the OECD countries: jackknife resampling plan estimates. Healthcare Manage Sci. 2004, 7(3):173-83.

35. Magazzino C, Mele M. The Determinants of Health Expenditure in Italian Regions. Int J Financ Econ. 2012, 4(3):61-72.

36. Bilgel F, Tran KC. The determinants of Canadian provincial health expenditures: Evidence from dynamic panel. Appl Econ. 2013, 45(2): 201-12.

37. Chaabouni S, Abednnadher C. The determinants of health expenditures in Tunisia: An ARDL bounds testing approach. Inform Syst Serv Sector. 2014, 6(4): 60-72.

38. Mehrara M, Fazaeli A. A study on health expenditures in relation with economics growth in Middle East and North Africa (MENA) Countries. Journal Health Admin. 2009, 12(35): 49-60.

39. de Meijer C, Wouterse B, Polder J, Koopmanschap M. The effect of population aging on health expenditure growth: a critical review. European J Ageing. 2013, 10(4):353-61.

40. Gray A. Population ageing and healthcare expenditure. Ageing Horizons. 2005, 2:15-20.

41. Breyer F, Felder S. Life expectancy and healthcare expenditures: A new calculation for Germany using the costs of dying. Health Policy, 2006, 75(2):178-86.

42. Martín JJM, Puerto López del Amo González M, Dolores Cano Garcia M. Review of the literature on the determinants of healthcare expenditure. Appl Econ, 2011,43(1):19-46.

43. Getzen TE.Population aging and the growth of health expenditures. J Gerontol, 1992, 47(3):S98-S104.

44. Zweifel P, Felder S, Meiers M. Ageing of population and healthcare expenditure: a red herring? Health Econ, 1999, 8(6):485-96.

45. Kruk ME, Galea S, Prescott M, Freedman LP. Healthcare financing and utilization of maternal health services in developing countries. Health Policy Plan, 2007, 22(5):303-10.

46. Newhouse JP. Medical care costs: how much welfare loss? J Econ Perspect, 1992, 6(3):3-21.

47. Okunade AA, Murthy VN. Technology as a 'major driver' of healthcare costs: a cointegration analysis of the Newhouse conjecture. J Health Econ. 2002, 21(1):147-59.

48. Payne G, Laporte A, Deber R and et al. Counting Backward to Healthcare's Future: Using Time-to-Death Modeling to Identify Changes in End-of-Life Morbidity and the Impact of Aging on Healthcare Expenditures. Milbank Q. 2007, 85(2):213-57.

www.SID.ir