Study on the Factors Influencing Total Health Cost Based on Multiple Regression Model

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Abstract: In recent years, China's social economy and income level of residents have increased rapidly, the total cost of health has increased rapidly, and the level of medical expenditure of residents has been increasing. This paper establishes a multivariate linear regression model using data from 1996 to 2020, and analyzes several important influencing factors that affect overall health expenditure. The aim is to formulate a health financing policy suitable for the coordinated development of China's social economy, and to provide a basis for adapting to the needs of economic development, structural adjustment and institutional transformation.

Keywords: total cost of health, influencing factors, regression analysis

1. Build the data

Table 1. Total health costs and related variables

Year	Total health costs (100 million yuan) Y	Number of beds in health facilities (10,000) X_1	Birth rate (‰) X_2	Utilization rate of beds in township hospitals (%) X_3
1996	2709.42	309.96	16.98	37
1997	3196.71	313.45	16.57	34.5
1998	3678.72	314.3	15.64	33.3
1999	4047.5	315.9	14.64	32.8
2000	4586.63	317.7	14.03	33.2
2001	5025.93	320.12	13.38	31.3
2002	5790.03	313.61	12.86	34.7
2003	6584.1	316.4	12.41	36.2
2004	7590.29	326.84	12.29	37.1
2005	8659.91	336.75	12.4	37.7
2006	9843.34	351.18	12.09	39.4
2007	11573.97	370.11	12.1	48.4
2008	14535.4	403.87	12.14	55.8
2009	17541.92	441.66	11.95	60.7
2010	19980.39	478.68	11.9	59
2011	24345.91	515.99	11.93	58.1
2012	28119	572.48	12.1	62.1
2013	31668.95	618.19	12.08	62.8
2014	35312.4	660.12	12.37	60.5
2015	40974.64	701.52	12.07	59.9
2016	46344.88	741.05	12.95	60.6
2017	52598.28	794.03	12.43	61.3
2018	59121.91	840.40	10.86	59.6
2019	65841.39	880.70	10.41	57.5
2020	72306.40	910.10	8.5	53.6

Source: China Statistical Yearbook (1996-2020), official website of the China Bureau of Statistics

2. Regression analysis

In the SPSS software, using the multi-linear regression model for analysis, the original data is linearly regressed in all 3 arguments in SPSS, and the output result is as Table 2.

As can be seen from the table of direct regression coefficients, the number of beds in health institutions, the birth rate of the population and the utilization rate of the beds in township hospitals are all less than 10, which is explains that there is no significant multiple collinearity between them.

Table 2. Table of direct regression coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-12616.504	3597.132		-5.719	.003		
	X_1 Number of beds in health facilities (10,000)	96.370	3.082	1.016	36.776	.000	.256	3.907
	X_2 Birth Rate (‰)	-726.813	207.392	-.073	-6.833	.003	.626	1.597
	X_3 Utilization rate of beds in township hospitals (%)	-73.906	44.247	-.061	.143	. 112	.204	4.891

a. Variable: Total health costs Y (100 million yuan)

Table 3. Table of ANOVA[b]

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.924E9	2	2.462E9	1.682E3	.000a
	Residual	2.782E7	19	1464087.912		
	Total	4.952E9	21			

a. Predictors: (Constant), X_2 Birth rate (per thousand), X_1 Number of beds in health facilities (10,000)
b. Dependent Variable: Total health costs Y (100 million yuan)

As can be seen from Table 3, F is 1.682E3 and the P value is close to 0, indicating that the regression equation is significant, and that the number of beds in health facilities and the birth rate have a significant linear effect on the total cost of health.

$$Y = -16347.335 + 92.114\, x_1 - 562.073\, x_2$$

3. Policy recommendations

Based on the results of the above regression analysis,the following recommendations are made.

3.1 Raise the level of economic development and coordinate the relationship between individuals and society

Total health cost financing and the affordability of the composition affecting economic development, the development of health care and the disease economy burden, if the individual resident's health expenditure is too high will increase the economic burden of the resident's disease, resulting in "expensive medical care" and "causes". Disease leads to poverty, "the problem, without universal health then there will be no comprehensive (well-off. Socially, with the reform of China's financial system and medical and health system, the allocation of medical and health resources is gradually becoming more and more (commercial and market-oriented China's supply entities are pursuing market interests, and their dependence on market demand is gradually increasing. On the other hand, health services have gradually evolved into private goods, leading to the gradual withdrawal of government and social resources investment from the dominant position, and the gradual increase in individual health expenditure the important component of health expenditure, which is when the proportion of personal health expenditure gradually decreases and the proportion of social health expenditure gradually increases.It shows that social groups, charities and some social health institutions are helping residents with their medical services it has played a role in reducing the pressure on some residents to pay for health care, and the level of per capita funding has increased.The

proportion of the social care system in the entire health care fund-raising structure.

3.2 Improve the level of health financing and optimize the allocation and use of health costs

On the one hand, China is facing a new economic normal, maintaining economic growth and appropriately expanding its fiscal deficit in stages.To raise the level of total health expenditure, on the other hand, to optimize the structure of government and social health expenditure, increase government health insurance expenditure and social health expenditure, social health insurance expenditure. The structure of social health expenditure in social health expenditure also needs to be optimized. The growth of the total population will undoubtedly lead to the consumption of various resources, health and health care resources will inevitably increase, and thus lead to. The increase in the total cost of health, now the level of medical care in our society is slowly improving, a variety of diseases that were previously incurable. (Most are now treatable and become common diseases that can be cured by surgery and medication, and most residents typically spend more on health care.)

3.3 Continue to increase government investment in health and promote China's health construction

China is in the final stage of building a well-off society in an all-round way and deepening medical reform,however, there is still a big gap between the level of health invested by the Chinese government and the developed countries of the world, in accordance with the "one outline, two plans" proposed "to establish results-oriented health input mechanism", "to establish a fair and effective sustainable financing system" under the requirements of the goal, whether now or in the future every period must be We will continue to increase the direction of government investment in health, promote the medical reform, a project that the people attach great importance to, and take important measures on the economy, all of which contribute to the construction of a healthy China.

3.4 Take preventive measures in a timely manner to (avoid the rapid growth of health costs

China's comprehensive strength in all aspects is constantly increasing, and the city is constantly developing. In terms of population, the number of young people is decreasing and the number of elderly people is increasing. The types of people's illnesses are also constantly changing. In the future, social health expenditures must increase unabated. In order to promote the steady and reasonable growth of health expenditures and ensure the realization of the goals of medical reform and cost control, a scientific prevention and detection system must be established. We must always pay attention to the development of health expenditure and improve the governance level of health development. Time should be adjusted according to the situation in a timely manner. At the same time, it is not possible to unilaterally pursue the maximization of benefits to cause excessive increase in health expenses, and not to make urban and rural people feel an excessive economic burden.

References

[1]   Li Xiangrong, Tang Wei, Zhang Chenxuan, Ma Wei. Analysis of the factors influencing the total cost of health in China. *Health Soft Science*, 2018(01).
[2]   Wang Dan, Guan Xiaoguang, Yu Xueping. Research and analysis of the health service situation in China. *Chinese Medicine Guide*, 2018(06).
[3]   Chen Chunyan, The current situation of public health expenditure of our government and the countermeasure research. Yunnan University of Finance and Economics, 2018(05).
[4]   Sun Shujun. The relationship between health spending, people's health and economic growth. Shenyang Pharmaceutical University, 2018(05).
[5]   Li Yan, Zhang Weihui, Wan Quan, et al. Results and Analysis of China's Total Health Expenses accounting for 2016. *China Health Economy*, 2018(05).
[6]   Wang Gaoling, Zhang Yiqing. Based on the ARIMA model, the trend and composition of China's total health costs are predicted and analyzed. *China Health Statistics*, 2019(02).
[7]   Ma Xinmei. Analysis of the investment of health expenses in China over the past ten years. *Economist*, 2018(04).
[8]   Wen Jie, Du Fuxuan, Li Liqing, Lu Zuxuan. The influencing factors and empirical research of china's total health cost. *General Medicine of China*, 2016(02).
[9]   Yang Yue, Liu Junlan, Teng Haiying, Xiong Linping. The progress of health cost analysis and its enlightenment to the accounting of health cost in China. *China Health Management*, 2015(03).
[10] He Ruibo, Yin Xiaolu, Liu Qiuxu, Li Junshan. Empirical research and predictive analysis of the factors influencing the total cost of health in China. *China Health Economy*, 2015(04).
[11] Hong Ting. Regression Analysis of The Main Components of the Total Health Cost Influencers in Guangdong Province. *Health Soft Science*, 2015(12).
[12] Gao Zhifang. Empirical analysis of the factors influencing the total cost of health in China. *Business*, 2016, (32): 70.

[13] Wang Chaoyang, Xiao Hui. Research on the forecast and influencing factors of total health cost in Hubei Province. *Medicine and Society*, 2020, 33(10): 11-15, 25.

[14] Gao Yu, Zhang Bei, Gao Qianqian, Jing Qi, Sheng Hongqi, Ma Guifeng, Ma Anning, Cai Weiqin. Study on the Changes of Influencing Factors of my country's Total Health Expenditure before and after the New Medical Reform. *Chinese Health Economics*, 2020, 39(08): 39-41.