Measurement and Analysis of Social Health Insurance Level under the Aging Background[1]—— Case of Shanghai

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Abstract

The development of Shanghai' Social Health Insurance is advanced in China, especially in coverage, overall level, standard of compensation, the average life expectancy etc. This paper menstruates and analyzes its level and degree by interrelated indications and models, and concludes that the level of Shanghai' Social Health Insurance level is lower than minimum. It indicates that level of supply is deficient. In order to reach the moderate degree, the equilibrium tactics should be adopted through the income and expenses of fund. It will effect mutually good impact between the system and the whole society, economy and realize the sustainable development of social economy of Shanghai.

Keywords: Social Health Insurance; security level; Moderation; equilibrium tactics

Introduction

In the construction of medical security system, determining the appropriate level of national or regional social medical insurance is often regarded as the important foundation and key factors to medical security system construction. This is because of the social medical insurance level is appropriate, not only related to the realization of the goal, the medical security policy, at the same time, it will affect the overall objectives of social security which may have many direct or indirect influence, and even affect the development of national economy and society. For example, the western developed countries, especially Britain, France, Germany and other countries, because of social medical insurance level is not appropriate to the fiscal deficits, the medical insurance fund to run behind one's expenses, which restricted the development of economy, society. The low level of the appropriate level of national will lead to the poverty caused by illness.

Government departments of judgment of the social medical insurance is mostly positive, propagate it in practical operation results. The existing research or confirm influence health of people and value, and thus indirectly that provides important medical insurance for people; or directly relates to some aspect of the social medical insurance. There has been no study by quantitative model analysis and empirical method to objectively evaluate the social medical insurance level and moderate problems. Shanghai's social medical insurance level has been the lead among China, this research aims to study the evaluation of Shanghai, found that there are problems in system design, and puts forward the improvement measures, provide an empirical basis for Chinese government of promotion, improvement and development of social medical insurance.

1. Determination and Comparison of Shanghai Social Medical Insurance Level

Shanghai social medical insurance level refers to the Shanghai social medical insurance expenditure proportion of GDP accounted for Shanghai. Social medical insurance level hand directly reflect the degree of social medical insurance and the level of demand for funds size (the higher the level of insurance, the higher the guarantee degree, the bigger the fund demand is , the higher the insured farmers and the government's burden is), on the other hand, the social medical insurance level is directly related to the health and the quality of life of ordinary people.

[1] Fund: Shanghai universities young teacher training scheme(ZZGJD12090) ; The key project of the National Academy of Social Sciences (approval number: 14AZD027), the research of new generation migrant workers' citizenization

Social medical insurance level is based on the gross domestic product as the base of the social medical insurance expenditure which is:

$$M = Ma/G$$

Among them, M represents the social medical insurance level; Ma represents for social medical insurance expenditure; G represents gross domestic product GDP.

According to the measurement of Mu Huaizhong and Li Zhen and other scholars' models, combined with the 2002 to 2011 statistical yearbook of Shanghai statistical yearbook, China statistical yearbook, China labour statistics yearbook. We measured the Shanghai social medical insurance level, the results are listed in the following table:

Table 1: Shanghai Social Health Insurance Levels

Year	Medicarespending($ billion)	GDP($ billion)	Social health insurance level (%)
2002	72.37	5741.03	1.260575
2003	117.06	6694.23	1.74867
2004	119.45	8072.83	1.479655
2005	146.44	9164.1	1.597975
2006	156.12	10366.37	1.506024
2007	179.6	12188.8	1.473484
2008	212	14069.87	1.506766
2009	241.9	15046.45	1.607688
2010	300.2	17165.98	1.748808

Data sources: China Labor Statistical Yearbook, China statistical yearbook, Shanghai statistical yearbook, 2003-2011

From the table we can find, the 2010 Shanghai social medical insurance level is 1.75%, from 2002 to 2010 the average social medical insurance level of Shanghai is only 1.55%. Per capita social medical insurance level, the coverage of the social medical insurance and social health insurance system's system structure and other indexes should be put together, can led to an objective judgment and evaluation. By the end of 2011, Shanghai social medical insurance has reached 13,420,600 people, the system coverage rate reached more than 95%. But the calculation of the index above is a main index, from the availability of information, this indicator has unique advantages.

Table 2: Shanghai Urban Residents per Capita Health Spending Accounted for Total Household Consumption Expenditure and for the Proportion of Total Expenditure of Income

Project	2002	2003	2004	2005	2006	2007	2008	2009	2010
Per capita health expenditure of rural households	5.3	5.9	6.7	7.7	6.9	6.5	7.7	7.5	5.7
The proportion of total consumption expenditure（%）									
Urban residents per capita health spending	7.0	5.5	6.0	5.8	5.2	5.0	3.9	4.8	4.3
The proportion of total consumption expenditure（%）									
Per capita health expenditure of rural households	4.5	5.0	5.8	6.7	6.0	5.6	6.1	6.0	4.3
The proportion of total revenue expenditure（%）									
Urban residents per capita health spending	5.5	4.1	4.6	4.3	3.7	3.6	2.8	3.5	3.2
The proportion of total revenue expenditure（%）									

Data sources: Shanghai statistical yearbook,2002-2011

From table 2 we can find, Shanghai rural households per capita medical expenses in the total consumption expenditure percentages of overall is in a rising trend, while the city is the overall declining trend. Per capita spending on health of rural households in 2010 is 1.3 times as the per capita expenditure medical city households. Per capita spending on health of rural residents per capita income expenditure accounts for the proportion of the overall upward trend, but the per capita expenditure medical city households accounted for the proportion of total family income per capita is the overall downward trend. In 2010 the rural households for households living medical expenses according to total expenditure is 1.34 times the city residents family. Shanghai urban and rural medical insurance level huge gap.

2. The Determination of the "Moderate" Shanghai Social Medical Insurance Level

Determining a more clear Shanghai social medical insurance level is significant to the operation and adjustment of Shanghai social medical insurance system, but also has the certain difficulty, due to the security level is appropriate judgment, is not simply an objective concept, it is much influenced by the concept of value.

2.1 Mathematical Analysis Model for the Determination of Shanghai Social Medical Insurance Level "Degree"

The following assumptions are the mathematical model of Shanghai social medical insurance "moderation" level:
First, we use Shanghai's gross domestic product (GDP) as the general base, Shanghai social medical insurance level can be expressed as the Shanghai social medical insurance expenditure proportion of GDP.

Second, analysis of Shanghai social medical insurance level from the perspective of Shanghai social medical insurance fund supply, mainly to explain the social medical insurance expenditure level to government and supply of social economic ability in what kind of a "degree".

Third, based on the Cobb Douglas production function -- divided the GDP of Shanghai into two parts: one is the total output produced by the labor production factor input; the other is the total output produced by capital investment. From the distribution point of view, the labor factor of production total value created part of the input, through the allocation to the income of workers, in which social medical insurance expenses included in the total output value of labor employment creation in.

Fourth, the social medical insurance level to achieve "security and incentive of unity" and" adaption to the level of productivity", we set the social medical insurance level as appropriate criteria according to the target.

The following mathematical models to determine the Shanghai social medical insurance "moderate" level:

$M=Ma/G= (Ma/W)\bullet(W/G) =Q\times H$

M represents the medical insurance level of the whole society, Ma represents the social medical insurance expenditure; G represents Shanghai’s GDP; W represents labor income; Q represents for social medical insurance expenditure the proportion of total factor income. If Q is too low, it can not guarantee the medical needs of the residents, while the Q is too high, it will increase the burden on residents; H representatives of the residents income accounted for the proportion of GDP in Shanghai, if H is too low, the residents of the labor income will fail to get social security, labor enthusiasm of residents will be effected, if H is too high, the accumulation of funds will be reduced, thereby affecting the production and expanded reproduction smoothly.

The formula combines "social medical insurance expenditure" and "gross domestic product" these two variables,and add the introduction of an intermediate variable of "income", the purpose is to gradually lead the study of social medical insurance level to the microcosmic field. Because, in the absence of the profound theory based on the analysis of extension variables and specific circumstances, only by social medical insurance expenditure to GDP ratio coefficient of empirical facts to illustrate the level of medical care "degree", it is difficult to make the study more. And if the Shanghai social medical insurance level model is divided into Q * H ,we can through the analysis of the two coefficients, will research one step further.

2.2 The Comprehensive Analysis and the Lower Limit Value of the Shanghai Social Medical Insurance Level Caps

The social thought of application this mathematical model is:

First , determine the Shanghai social medical burden coefficient (Q) and labor factor of production distribution coefficient (H) of the upper and lower limit values according to specific data ; second, multiply the two coefficients of the upper limit value, and multiply the lower limit value, which we have two products, there are upper and lower limit values of the medical insurance level for the Shanghai agency; finally, compared the actual measurement of Shanghai social medical insurance level values with the security level of upper and lower limit.
In order to determinate the Shanghai social medical insurance "moderation" level, the key is to determine the upper and lower limit value, while the upper limit and the lower limit value of medical insurance and social burden coefficient (Q) and residents of labor production factor distribution coefficient (H) of isaccording to the international, domestic related medical insurance practice experience and the correlation theories the comprehensive judgment.

2.2.1 Analysis the Upper Limit of Shanghai Social Medical Insurance Level

The upper limit value of social medical insurance level is generally based on the peak of population aging (the condition is the proportion of the elderly population is 30.59%) to determine the upper limit of Q, because most of the the medical expenditure is used for older people, which is decided by the physiological factors of individuals, medical insurance expenditure under this condition according to the domestic and foreign experience and security regulations, generally accounts for 10% to 12% of the total income, so the limit of Q is 12%, Q = 0.12. Residents income labor factor of production value "H" also has a "degree" boundary and scope, the theoretical basis is the famous "Cobb Douglas production function -- the total" principle, the distribution of labor factor of production proportion coefficient "degree" is defined as 75%. Total wages and other income accounted for 75% of GDP, limit the economists proved the distribution coefficient of factors of labor production, can be used as the upper limit to measure the distribution of labor elements proportion is reasonable. Of course, the specific proportion in real economic activities may differ, and some countries are higher than this limit, some countries are below the limit. Such as the western developed countries are mostly in between 70% - 80%, China now is about 62.2%, but in fact its less than 75% part of the town has the potential of fixed assets form or in the form of wages indirectly assigned to labour and raise population, insurance fee income of about 12.7%, in the rural areas in various transfer payments to the rural population, the Cobb Douglas production function -- the total principle from the overall perspective is also suitable for China, i.e. H = 0.75.

The Q value and H value by the formula:

M = Q *H= 0.12 * 0.75= 0.09= 9%

From the analysis results we can infer, upper Shanghai social medical insurance level "degree" of the value is about 9%, which is to say, even in the condition of aging population, if the Shanghai social medical level is more than 9%, has exceeded the warning line "ceiling", the medical insurance level of salvation is the result of huge medical expenditure, which will appear run behind one's expenses phenomenon, cause a negative impact on economic development. The social consequences of the security level of salvation has been proved from the major Western industrialized countries practice lessons, these countries are mostlyhas exceeded its moderate level cap in twentieth Century in the late 70's to the early 80's, leading to the high welfare state system of social security crisis, while the government is committed to reform, but because of the rigid effect of social security expenditure reform, there is no obvious effect, the reform is being in a nice hobble situation, and this is very useful for Chinese new social security system planning and implementation.

2.2.2 Analysis the Limit of Shanghai Social Medical Insurance Level

There are different numerical calculations of the lower and upper limit value of Shanghai social medical insurance "degree" level. The upper limit value is set to the future population aging peak condition calculation, the limit setting is to the population and the current economic situation as the conditions are calculated, the residents of labor production factor distribution coefficient "H" reasonable boundaries by economists verification, which is determined, so we can take the Shanghai social medical bound formula the insurance level "degree" set: M = 0.75Q.

According to the experience from China and other countries and Shanghai social medical insurance policy, the current Shanghai 65 years old population proportion is 16.6%, the endowment insurance and medical insurance expenditure proportion coefficient limit shall not be less than 16.6%, unemployment security expenditure proportion coefficient is generally around 1% ~1.5%, the lower limit of 1% is appropriate; work injury, maternity protection expenditure proportion coefficient is generally in the 0.016% 1.5%, the lower limit of 0.016% is appropriate; social welfare, social expenditures proportion coefficient is generally 1% - 1.5%, lower 1% is appropriate. Put into the formula of these parameters, we will have the Shanghai current security limit the social value, and then multiplied by the proportion coefficient of social medical insurance in the whole social security expenditure in 0.3439 (see table below), we can get the lower limit of Shanghai social medical insurance level "degree" of the value.

Table 3: Itemized Expenditures of the Proportion of Social Security

Itemized expenses	Old-age insurance expenses	Medicare spending	Unemployment insurance spending	Work injury and maternity insurance spending	Social welfare spending
The formula	O/Q	E/Q	Z/Q	J/Q	M/Q
The proportion of social security itemized spending of total expenditure in the social security（%）	52	34.39	4.54	4.29	4.29

Source from: Mu Huaizhong, "the national wealth and social security redistribution of income", P48, labor and social security Chinese, 2003.

Shanghai social medical insurance level lower value

$M_L = 0.75Q$

$= 0.75 * (0.166+ 0.01+ 0.00016+ 0.01) * 0.3439$

$= 0.048$

$= 4.8\%$

Shanghai social medical insurance level lower value $M_L = 4.8\%$ which is to say, if the Shanghai social medical insurance level is lower than the lower limit value of 4.8%, indicates that the lack of the medical and health, which will affect the physical quality of population.

2.3 The Judgment of Shanghai Social Medical Insurance "Moderation" Level

As we mentioned before, compared the actual measurement of Shanghai social medical insurance level value and security value to the minimum level, if the actual measured value between the upper and lower limit values, show that Shanghai's current social medical insurance level is moderate, which is moderately lower limit < M< moderate limit; if the actual measured value is higher than the upper limit value, social medical insurance level is in turn state; if the actual measured value is lower than the lower limit, that Shanghai social medical insurance level is in the low state.

From the above calculation:

The 2010 Shanghai social medical insurance level is M=1.75%, $M_L = 4.8\%$, $M_H = 9\%$, or $M< M_L$, 1.75% < 4.8%, security level is far below the lower limit value. From 2002 to 2010, the average social health level is 1.5%, far below the 4.8% threshold. This shows, on one hand Shanghai social medical insurance level is low, the level of institutional supply is in shortage, and the level of economic development in Shanghai do not suit; on the other hand, show, Shanghai can be in productivity and economic development on the basis of existing, greatly improve the social medical insurance level, let people share the economic development.

3. Analysis of Equilibrium Strategy of Shanghai Social Medical Insurance "Moderation" Level Regulation

Determination and the study of Shanghai social medical insurance level "degree", from the objective view, that Shanghai should improve the social medical insurance level to achieve the harmonious development of economic growth and the quality of life for the residents. Because the M= Ma/G, in GDP under certain conditions, Ma is a key factor restricting the security level, its value becomes larger, the medical insurance level of M increased; conversely, a drop in M. Therefore, if the GDP under certain conditions, as long as the realization degree of balance is in the total amount of social medical expenditure on Ma, it realizes the overall social medical insurance level balance. Equilibrium strategy two aspects below from the medical care fund expenditure and fund supply analysis of Shanghai social medical insurance level "moderation" regulation.

3.1 The Balance Policy of “Moderation" Regulation from the Expenditure of Social Medical Insurance Fund Angle

There are three factors of affecting Shanghai social medical insurance fund expenditures of Ma: the first one is to enjoy the benefits of social medical insurance population, denoted by P; the second is the social medical insurance program, denoted by N; the last one is the degree of protection of social medical insurance, denoted by R. Using the function is expressed as: Ma= f (P, N, R)

3.1.1. The Balance Strategy of Spending of Gross Domestic Product, "G" Under Certain Condition

In the condition of Shanghai's gross domestic product G is under certain conditions, may be appropriate to increase the number and degree of P, N, R, Shanghai social medical insurance expenditure level of Ma is gradually increased, M will gradually increase to the moderate level of close to 4.8%.

3.1.2 The Gross Domestic Product "G" Growth Strategy under the Condition of Equilibrium Expenditure

While at the same time of Shanghai GDP growth, increased P, N, R growth rate faster than the G growth rate, so that the Ma growth rate is more than G growth, the social medical insurance level will lead to moderate level of development. In recent years, as the GDP of Shanghai grow, building and adapting the economic development of Shanghai social medical insurance level has been a crunch time.

3.2 The Balance Strategyof "Moderation" Regulation of the Supply from the Perspective of Social Medical Insurance Fund

As we mentioned before, increase the social medical insurance expenditure level Ma, can make Shanghai social medical insurance level to moderate the development. But the medical insurance fund expenditures depends on fund supply, only increase the fund supply can increase the fund expenditure, otherwise, the fund expenditure increases will become “passive water without source". On the supply system of medical insurance fund, supply sources have three aspects: the residents, all levels of government, economic organizations (enterprises). F represents the insured residents, T represents the government at all levels of medical fund supply subsidy amount, C represents the economic organization of the expenditure amount of fund. If the supply of Ms represents the medical insurance fund, the Ms= F+ T+ C.

Since the factors restricting the social medical insurance fund supply level has three aspects: F, T, C, derived from the theory that to achieve the appropriate level of security in Jiangsu and Shanghai social medical insurance, Shanghai M< moderately lower case, in order to enhance the M, can be considered in these three factors, the specific balance strategy and methods are:

3.2.1. Equilibrium Strategy of Supply Gross Domestic Product "G" under Certain Condition

Increase their own money supply among F, T, C with different growth rates, such as low speed increases the total supply of F, the total supply to the high speed increase of T and C. According to the developing situation of Shanghai social medical insurance and the related regulations, the major source of medical insurance fund is provided by residents and enterprises, the coverage of social medical insurance to expand, the total supply of F and T will increase, while Shanghai economy has maintained a rapid development speed in recent years, the next stage can appropriately raise the fund supply.

3.2.2. The Balance of Growth Strategy Supply of Gross Domestic Product "G"

On the basis of Shanghai's GDP growth rate, with higher growth rate increased F, T, C fund supply ratio, improve the Shanghai social medical insurance fund supply level, in order to ensure that the Ma increases, let the M close to the appropriate level.

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