

Some thoughts on the relationship between medical development and economic growth

Qi Xuanlin

University of Glasgow, University Ave, Glasgow, G12 8QQ, United Kingdom

Keywords: Economic growth; commercial medical insurance; pharmaceutical innovation; medical reform

Abstract: Based on the experience of developed countries, this paper theoretically analyzes the effect of medical development on economic growth from the perspective of labor factor input and pharmaceutical innovation industry development. It is thought that the further development of commercial medical insurance in China is more conducive to promoting future economic growth. From the aspects of independent pharmaceutical research and development, centralized procurement of drugs by the government, and anti-corruption in the medical system, the reform of China's medical field was investigated. And the analysis shows that this series of reforms is more conducive to the formation of a virtuous circle between the medical system and economic growth.

1. Introduction

This article illustrated the relationship between economic increase and medical insurance system development with labor factors. With case study of China domestic situation and the experience of developed countries, the obligational measures involve pharmaceutical research and development, governmental procurement, anti-corruption in medical system and commercial medical insurance.

2. Theoretical analysis of the relationship between medical development and economic growth

2.1 The improvement of medical system and household consumption

From the perspective of economics, there are two views on the relationship between medical security and economic growth. One is from the perspective of production factors, which believes that medical security can maintain and promote the input of labor force in the economy, and then promote the improvement of total output through the Cobb-Douglas Production Function. The other analysis from the perspective of Keynesian aggregate demand believes that the improvement of the level of medical security can directly promote the increase of daily consumption ^[1]. For the former, Xu Hengqiu (2008) believes that the improvement of medical security level belongs to the category of human capital investment. The increase of medical expenses can increase the health level of the labor force, repair the damage of the labor force caused by various reasons in the course of time, and maintain the human capital of the whole country at a high level. Medical security plays a basic role in promoting economic development. In the latter view, Wang Genxian (2007) believes that if the

public medical and health security system tends to be perfect, it will reduce the motivation of residents to save preventatively to cope with future health risks, reduce the worries of ordinary people, encourage ordinary people to consume, and promote economic growth through the increase of daily consumption.

With the continuous development of society, the medical security system has been gradually established and continuously improved. The medical security system in modern society involves the application of cutting-edge medical technology, as well as the layout of medical industries such as drugs and hospitals, which is a complex system including many subsystems. It requires a large amount of capital investment to promote the improvement of technological level and breakthroughs (such as the research and development of new drugs), and also closely related to labor factors. On the one hand, many scientific researchers with modern medical and biological knowledge are needed to carry out research and development, diagnosis and treatment, and on the other hand, through modern medical technology, the health level of the labor force in the whole society can be improved. Especially in the context of information society and economic globalization, it is no longer possible for a single country to achieve rapid development under closed conditions. Only in an open society can information, technology, capital, labor and other factors of production be fully flowing. This will promote the continuous development of the medical security system itself, as well as the virtuous circle of the medical system and economic development.

2.2 The correlation between medical system, medical security and social economy

To measure the level of investment in medical security, economics generally uses two indicators, that is, the proportion of medical and health expenditure in the current GDP, and the number of hospital beds and medical personnel per 1,000 people. The former measure directly measures the level of funding for health care. The latter measure hardware investment and human resources investment. Using the composite index of these two indicators to measure the investment in the medical field has a certain rationality and professional basis, but it should be noted that the investment itself is not the end. Once the medical field has formed its own interest groups, there will be an unhealthy tendency to pursue the maximization of its own interests, and deviated from the ultimate mission of promoting the improvement of people's health. The high cost of health care expenditures is not only a heavy burden on patients' families, but also a social problem for entire economies, such as the United States.

The high income in the medical field will attract more outstanding talents to study medicine and enter the field. And a long learning time is a huge sunk cost for learners, which can only be compensated for by higher future earnings. At the same time, there are high professional barriers between doctors and the public, and there is huge information asymmetry between doctors and patients. If doctors have an unreasonable incentive to seek higher income, it is difficult for patients to detect or prove it. Once an interest group is formed in the medical field, it is difficult to break the interests of the group, which will form a path dependence on the medical field to absorb more and more social resources.

To sum up, medical security has the positive externalities of maintaining the health level of the labor force and promoting economic development, and the negative side of siphoning excessive social resources and forming special interest groups to hinder economic development. When arranging the system of medical security, we should not only consider the field of medical security itself, but also consider the relationship between medical security and economy and society. It is necessary to invest resources for breakthroughs in cutting-edge medical fields and pay attention to the improvement of efficiency, but also to ensure that the general diseases of the vast majority of ordinary people are effectively treated at a lower cost, and the bottom line of fairness is strictly observed. In the design or

reform of the medical security system, it is necessary to fully consider the stage and specific realistic conditions of the country's economy and society, and select different policy and model combinations according to its own development stage and actual conditions. For example, less developed areas should first ensure that there are enough doctors to basically meet local medical needs, rather than setting too high and difficult thresholds for doctors to enter as in economically developed areas. If the difficulty standard of medical examination is the same as that in developed areas, seems to be in line with the advanced. In fact, it will inevitably lead to a shortage of doctors in less developed areas, in chairman Mao' s period barefoot doctors in rural areas provide good experience in this regard.

2.3 The diversity and sociality of medical system revolution

As an important part of a country's medical and health system, many experts believe that medical security is the core of the next round of reform and has become a hot topic of concern in the whole society. However, the reform of the medical security system is no longer enough to meet the needs of society and the future development trend. First of all, uncertain risk factors may occur, and the outbreak of the coronavirus epidemic is a clear example. To deal with the crisis, the entire efficiency medical and health system and even social management system are needed, not only the medical security system. Secondly, China's aging degree is increasing, chronic diseases and senile diseases will inevitably increase in the future, while improving the level of medical security, the entire medical system must be adjusted accordingly. Third, the basic situation of different countries is different, and directly copying the model of developed countries may not be effective. Moreover, China has traditional Chinese medicine with low cost and good results, and it is worth further giving full play to its role.

Medical insurance is an important promoting force for pharmaceutical innovation in the United States. Compared with government-run medical insurance, the commercial medical insurance in the United States has the characteristics of "high financing and high payout", which invests more in pharmaceutical research and innovation and has a stronger incentive effect. According to 2019 data, commercial medical insurance payments reached \$1.2 trillion, accounting for 33.3% of national health expenditures, while government insurance payments for Medicare and Medicaid accounted for 22.2% and 17.1% ^[2], respectively, during the same period. In the United States, commercial medical insurance mainly covers middle and high income groups, and the participation rate of commercial medical insurance is positively correlated with income, the core feature of the US pharmaceutical industry is innovation, and the patented innovative drugs are sold to the world at a high price, which greatly promotes the economic growth of the United States. The high consumption expenditure of commercial medical insurance in medical care has stimulated pharmaceutical innovation, and the innovation level of research and development technology of pharmaceutical industry the US ranks first in the world, and the new drugs first approved by the US Food and Drug Administration (FDA) account for about 64% of the global market. The considerable profits brought by new drugs attract more capital investment in pharmaceutical research and development, forming a virtuous circle between market demand and pharmaceutical innovation, and thus becoming an important driving force for economic growth. The medical innovation experience of the United States has provided inspiration for China to develop commercial medical insurance, but China is a developing country after all, with a large population and per capita GDP lower than that of the United States, and it will take a long time to improve medical innovation by relying on commercial insurance investment ^[3].

At present, China's pharmaceutical products in independent research and development and innovation, still has a big gap with that of the United States. Many pharmaceutical products are based on imitation. If the pharmaceutical innovation can not get a reasonable return in the market, the huge amount of money invested in the early stage of new drug research and development is difficult to

make up, it will frustrate the enthusiasm of new drug research and development. The amount of government-led medical insurance is limited, and the development of commercial medical insurance can broaden the funding source of new drug research and development. Increasing the share of commercial medical insurance in the entire medical insurance can not only enable middle and high income groups to obtain better medical security, but also the spillover effect of the successful research and development of new medical technologies and new drugs can not only benefit the whole society, but also the pharmaceutical industry can form a new economic growth point. Government-run medical insurance and commercial medical insurance should complement each other, and the good development of commercial medical insurance can not only promote economic growth through pharmaceutical innovation, but also reduce the burden on the government. At the same time, commercial health insurance companies are reducing payouts for their own profit, the most reasonable way is to promote the health of the insured, and its business will be expanded. It can not only cooperate with medical institutions, but also promote the development of large health industry, such as providing health management services, health consultation, chronic disease management, and old-age care for insured people. The development of health management services can drive upstream medical devices, medical service practitioners' education and training and other related industries, forming the industrial scale of healthy economic development.

However, we should also pay attention to avoid the problems that may be caused by over-reliance on commercial medical insurance. The use of expensive new drugs increases medical costs, while the increase in medical costs promotes the development of more expensive new drugs. Although this cycle is beneficial to the medical industry, it is not necessarily beneficial to the whole society. The phenomenon of excessive medical treatment is also widely criticized by the society, such as a simple cold, often the patient has to go through a variety of instruments, costing thousands or even tens of thousands of payments. In the case of a new virus, it takes a lot of money to develop a vaccine or a targeted antiviral drug, but the alternative treatment of traditional Chinese medicine works by boosting the body's own immunity to fight the virus, spending less money can also play a role in maintaining health.

Drawing on the experience of the United States, China can continuously expand the scale of commercial medical insurance and vigorously develop commercial medical insurance through the preferential measures of tax reduction for the participants and insurance companies. At the same time, can further expand the types of diseases covered by commercial medical insurance, including various incurable diseases, and develop and design different insurance products according to the different needs of insured people. At the same time, in the payment of commercial medical insurance, the price control of drugs and medical technology can be appropriately relaxed, so that their prices can fully reflect the value of high-end medical technology and innovative drugs. Not only can the quality of medical services obtained by the insured be greatly improved, but also a large amount of funds raised by commercial medical insurance can be invested in the field of pharmaceutical research and development, and better promote the development of cutting-edge medical technology and innovative drugs.

With only government-run medical insurance, the high standard, personalized and diversified health security needs of middle and high-end income groups cannot be met through a single channel. In terms of social function orientation, government-run medical insurance should mainly solve the basic medical needs of residents, and its purpose is to improve the overall national health level, especially to give certain medical expenses compensation for middle and low-income groups, which is characterized by wide coverage, but low level of medical payment, with a certain social welfare nature. The development of commercial medical insurance can not only better meet the medical needs of middle and high income groups, but also reduce the burden on the government, so that the government can use more resources to ensure the medical expenditure of low-income groups.

3. A realistic survey of China's medical system reform

3.1 Brief to China's new medicine research and development

In view of the high burden of medical expenses on ordinary Chinese people, and the incidence rate of related diseases has increased in recent years, China's entire pharmaceutical innovation system has carried out targeted and effective research and development of new drugs. According to statistics, in the five years from 2017 to 2021, a total of 263 new drug varieties have been listed in China, and the coverage of diseases includes cardiovascular system diseases, respiratory system diseases, digestive and metabolic diseases, tumors, etc., further meeting the drug needs of patients^[4]. In addition to its own research and development of new drugs, China actively introduces foreign innovative drugs, at the same time, we actively participate in international multi-center clinical trials, and the international multi-center clinical trial initiated by domestic pharmaceutical companies has grown rapidly, fully reflecting the attitude of domestic pharmaceutical research and development institutions, enterprises to expand international cooperation. It has not only made its own contribution to the international chain of new drug research and development, but also played a role in reducing the suffering of patients, reducing expenses, maintaining a healthy level of labor in social participation, and thus promoting economic growth.

The problem facing China's new drug research and development is that most of the new drugs applied for clinical trials are developed by enterprises, accounting for more than 90%. The proportion of new drug application for clinical trials in medical colleges and research institutions is relatively small, both accounted for less than 5%^[4]. The possible reason for this phenomenon is that the profit motive of pharmaceutical companies is stronger, and only when the drug is finally used by patients, pharmaceutical companies can achieve profits and recover the previous research and development investment, so their clinical trial applications are more active. Universities and scientific research institutes undertake more difficult tasks and research projects that require a long time and period to break through, as well as some basic research projects, and are more cautious about the use of new drugs, so from the phenomenon, the speed of new drug application clinical trials of universities and scientific research institutes is slower than that of pharmaceutical enterprises. Therefore, in the future reform, universities and research institutes can be further loosened to allow them to commercialize successful drugs. Remove unreasonable regulations that restrict its commercial operation, increase the conversion rate of scientific and technological achievements.

For a long time in the past, hospital purchasing department heads, department directors, and doctors had the final say in which drugs to use among many others. In order to make the drugs produced by their companies be used, many pharmaceutical companies send pharmaceutical representatives to the medical institutions for lobbying and public relations. Once the drug is finally selected, the hospital's purchasing leader and director will also receive rebates, pharmaceutical companies and pharmaceutical representatives invest significant resources in the hope that their drugs will be selected. There is a lot of corruption in the medical sector when it comes to the purchase of drugs. On the one hand, there is a professional information asymmetry between patients and doctors, and patients can only trust doctors and choose their prescribed drugs. On the other hand, patients are more urgent to restore their health, and there is no more time to deal with medical institutions on the rationality of drug selection, so the only people who pay for corruption are the end patients. The result is that, first, the ex-factory price of the drug is very low, but the final price paid by the patient is very high, and the drug expenditure of the patient is much higher than the ex-factory price of the drug, which greatly increases the burden of the patient, and then leads to the increasing tension between the doctor and patient, and even increases the contradiction between the doctor and patient; Second, a large proportion of the cost of pharmaceutical enterprises is used for marketing expenses, which

occupies the capital investment that should be used for research and development, and is unfavorable to innovative drug research and development; Third, the leaders of the key departments of the hospital obtained excessive and unreasonable income through kickbacks, corruption and other means. However, the grass-roots medical staff worked in the front line, pay a large amount of labor, often in the extreme fatigue state of overload work, get little income, but have to face the dissatisfaction of patients, questions and even personal injury. This seriously violates the socialist principle of distribution of income according to work.

3.2 Medical revolution powered by legal supervision

The need for reform has increased. China established the National Medical Insurance Administration in 2018, which has driven huge reforms in drug procurement and access negotiations. The medical insurance department involves the expenditure of the medical insurance costs of the people. In order to protect the medical insurance funds of the people during the purchase and price negotiation, the medical insurance department adopts the strategy of lowering the drug prices. The centralized procurement of drugs by the state has stipulated the upper limit of drug prices, shortened or even eliminated many intermediate links between pharmaceutical companies - pharmaceutical representatives - hospital leaders - terminal patients, and greatly reduced the expenditure of patients. By 2021, drug prices as a whole be cut in half, and some drugs prices even be cut by 80%. By the summer of 2023, China also started an anti-corruption campaign in the medical sector, which can be expected to be implemented smoothly, helping to put money into the research and development of medical technology and innovative drugs (rather than through intermediate channels to breed corruption)^[5]. At the same time, it can reduce the excessive medical expenditure of patients, and play a virtuous circle of promoting people's health level and stimulating daily consumption, thus promoting economic growth.

4. Conclusion

This paper analyzes the effect of medical development on economic growth from the theoretical perspective of labor factor input and pharmaceutical innovation industry development. Combined with the experience of foreign developed countries, it is concluded that the further development of commercial medical insurance in China is more conducive to promoting future economic growth. At the same time, from the aspects of independent pharmaceutical research and development, centralized procurement of drugs by the government, and anti-corruption in the medical system, the reform in the field of medicine in China was investigated. The conclusion is that this series of reforms is more conducive to the formation of a virtuous circle between the medicine system and economic growth.

References

- [1] Uzawa Hirofumi, *On the dynamics stability of economic growth [M]. The Neoclassical versus Keynesian Approaches, In Trade, Stability, and Macroeconomics, 1974, London: 523 - 553*
- [2] Cockburn, I. M., Stern, S., *Finding the endless frontier: lessons from the life sciences innovation system for technology policy [J]. Capitalism and society, 2010, 5(1): 1-50.*
- [3] Mahlich J., *The Japanese pharmaceutical industry in transition: has higher research orientation resulted in higher market value? [J]. Asian business & management, 2007, 6 (1): 78-94.*
- [4] Barro, R. *Health and Economic Growth [C]. Annals of Economics and Finance, 2013, 14 (2): 12- 35.*
- [5] Davis, E., Hu, Y., *Is There A Link Between Pension - Fund Assets And Economic Growth [C]. Public Policy Discussion Papers, 2004.*