Research on Path Selection of Economic Growth Promoted by Supply-side Reform Based on Computer Simulation

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Abstract. Under the current economic situation in China and the world, it is impossible to promote sustained and effective economic growth by relying solely on the demand-driven model driven by exports, investment and consumption. Supply-side reform is a new normal for economic development. It is an important decision made by the Party Central Committee in the face of weak demand and a downward trend in the economy. It has defined the strategic focus of a new round of comprehensive reform. At present, the macro-economic problems facing our country have both cyclical characteristics, but they are mainly the trend problems brought about by structural contradictions. Promoting the structural reform on the supply side is a theoretical sublimation of our country's macro-economic environment and is also an adverse force of the current economic situation. Based on the computer simulation analysis of the connotation of supply-side reform, this paper sorts out the relevant researches on supply-side reform at home and abroad. Explains the necessity of supply-side reform in our country, and puts forward the path choice for our city to promote economic growth by supply-side reform.

1. Introduction
Supply-side reform provides new ideas to adapt to the new normal of Chinese economic development and is our "lifeline" to cross the middle-income trap. Supply-side reform has its inherent development logic and theoretical connotation, which together with demand-side management form the "two sides of one body" of economic development [1]. This is a major strategic choice made by the CPC Central Committee at an important moment in Chinese development, which is in line with the international development trend and the requirements of Chinese new normal economic development. This indicates that the Chinese government's idea of guiding economic work in the future will lead the overall innovative development with effective system supply in the difficult times of reform. Supply can automatically create its own demand, claiming that there will be no overproduction crisis in capitalist society [2]. The facts also show that during the global financial crisis, the fiscal policy implemented by our country has ensured the healthy growth of our economy, minimized the impact of the global financial crisis on our economy, and has also played a positive role in the recovery of the world economy [3]. It has already entered the ranks of middle-income countries. At this time, academic circles all over the world are concerned about whether China will fall into the middle-income trap, and are studying how high the growth rate China can maintain in the future and how long it will last. The key to this problem is how much economic growth potential China has, and
then how to realize this growth potential [4]. To push forward the supply-side structural reform based on computer simulation, we must do a good job in "transformation, innovation and reform", correctly handle the relationship between government and market, and realize the sustainable development of economy and society.

2. The Essence of Supply-side Reform

The essence of supply-side reform is production-side reform. The vast majority of economic operations depend on production and consumption. The weakness of the manufacturing industry has led to the economic downturn in China, that is, the supply-side reform can be specifically understood as the manufacturing industry reform, which requires further adjustment and overall optimization of the industrial structure [5]. There is no contradiction between supply-side structural reform and demand-side management. Both are macro-control measures to promote economic growth. Effective balance between supply and demand is the guarantee for sound and rapid economic development.

The fundamental purpose of structural reform on the supply side is to release market vitality, improve market competition and further increase total factor productivity through structural adjustment and optimization on the supply side. The fundamental approach is to activate the power of economic growth by relaxing control, reducing institutional transaction costs and improving the core competitiveness of enterprises [6]. Therefore, this paper holds that the key to the success of supply-side structural reform is to continuously improve the market economy system and enhance the core competitiveness of enterprises. This process is shown in fig. 1.

![Figure 1 Supply-side reform logic](image)

Adjusting the economic structure is the strategic focus of changing the mode of economic development. Adjusting the national income distribution structure and the urban-rural structure not only aims at resolving the contradictions and problems accumulated in the past, but also creates conditions for the economy to continuously step to a new level and maintain stable and rapid development for a long time. In these traditional industries, state-owned enterprises account for a large proportion. Because the competitive power of the competitors in the market is still very strong, and even if the state-owned enterprises with weak competitiveness lose money, they can still obtain subsidies from the government and preferential low-interest loans from the banks, resulting in all competitors fighting a price war and accumulating debts. Generally speaking, supply-side reform is not only an active choice to adapt to the new global economic situation after the international financial crisis, but also a major innovation and strategic policy to adapt to and lead the new normal of Chinese economic development.

3. The Era Background of Supply-side Reform in China

At the end of last century, the debt ratio of Korean enterprises actually reached 449%, and some reached 518%. However, the industries with the most overcapacity are steel and automobiles, resulting in Koreans consuming 1 ton of steel every year. The reason for this incredible overcapacity and corporate debt is the deep collusion of the rights of all parties [7]. At the same time, overcapacity, commercial housing inventory, high tax and fee costs, labor costs, factors of production costs, financing costs, logistics costs and other issues, financing leverage, short-term economic development and other issues have become the main problems facing Chinese economic transformation and upgrading. In the end, supply-side reform is also to create new demand while solving the supply problem through the transformation and upgrading of economic structure. Moreover, this new demand is more reliable, stable and sustainable. The level of capital stock is low, so the total amount of
depreciation is less, but at this time the total amount of investment formed according to the established savings rate exceeds the total amount of depreciation, thus the per capita capital stock in the next period will increase and the per capita output will correspondingly increase. After that, the external environment has not improved significantly. Europe, America and other countries have taken trade protection actions to tide over the crisis and affected Chinese exports. However, China has adopted the way that real estate drives the high-intensity development of traditional industries such as steel, cement and glass. Taking into account the accelerated aging process of our population, the sharp increase in the burden of social support for the aged, the ever-expanding scale of government debt and other factors, the fiscal policy of expanding domestic demand has become more restrictive. Therefore, the pattern of stimulating economic growth through expansionary fiscal policies is no longer sustainable.

As two basic tools of macroeconomic policy, demand management and supply management are significantly different. The first is that the objects of action are different. Demand management directly affects consumers, including living consumption and production consumption. The former is expressed as residents' consumption demand while the latter is expressed as enterprises' investment demand. At present, China has sufficient foreign exchange reserves and the trade surplus of Chinese primary manufacturing industry, so the base currency based on foreign exchange reserves is usually stable. However, due to the huge amount of reserves accumulated by Chinese issuance of credit currency, once capital outflows will have a profound impact on financial markets. Therefore, considering the appreciation of RMB in the long term in the future and the rapid rise in labor costs caused by aging, it is not realistic to expect exports to continue to maintain high growth to stimulate the economy. State-owned enterprises and small and medium-sized enterprises are the core of industrial restructuring and the focus of supply-side reform. Of course, the path of balanced growth is not unchangeable, it depends on some exogenous basic factors, such as saving rate, education level, market economic order, national innovation ability, social infrastructure, speed of scientific and technological progress, etc. The pulling effect of exports on the economy is also declining day by day. In the process that the government continues to promote economic growth through investment, due to the diminishing marginal effect of investment, the role of relying on investment to promote economic growth also gradually decreases, and there is also a waste of resources caused by repeated investment, repeated construction, etc. Issue new credit currencies to further promote new economic cycles and business expansion [8]. At the same time, the removal of currency accompanying the removal of inventory is an important link in solving the problem.

4. The Misunderstanding of the Current Supply-side Structural Reform

4.1. Oppose supply management and demand management.

At present, Chinese macroeconomic cyclical contradictions and structural contradictions coexist, but the main contradiction is structural problems. It is true that the implementation of supply-side structural reforms needs to fade out from the past fiscal and monetary policies of flooding irrigation, but this does not necessarily mean that tight fiscal and monetary policies must be implemented. Facts have proved that there is still little effect. The released funds did not enter the real economy as expected, but mainly flowed into the stock market and the real estate market. Based on the relationship between the efficiency of Chinese economic development and currency issuance, even if the newly issued currency is put into the manufacturing industry which is not optimistic, there is extremely limited room for the sustained economic development that can be stimulated by the currency increment ceiling. In fact, demand management and supply management have never been opposite, and demand contraction is not a necessary condition for supply regulation [9]. In a fundamental sense, increased consumption should be the goal of economic growth, not the source of means and major new impetus. Through auditing, we can reduce the institutional transaction costs of enterprises, reduce the tax burden of enterprises, enhance the innovation ability of enterprises, and improve the quality and efficiency of supply. At present, the promotion of structural reform on the supply side requires a
stable macro environment. The demand management policy should be changed to "refinement and precision". Strong stimulus is no longer allowed, but periodic tightening should be avoided.

4.2. Worried that supply-side structural reforms will lead to the restoration of planned economy.

The management of supply in economic development is not a special creation of China, nor is it just a theoretical discussion. Its theoretical origin is investigated. However, it is unnecessary to worry that the supply-side management currently being implemented in China will lead to the restoration of planned economy. Relevant empirical studies abroad also show that there is a high correlation between consumption level and urbanization level, that is, the increase in consumption level should be the result of economic growth and urbanization level, rather than the main reason [10]. Chinese GDP per capita is only 0.14 times that of the United States. Since Chinese economy is capable of catching up with the United States, we can calculate how many years it will take to catch up at a certain growth rate. If the gap between China and the United States in science and technology, culture and education will last for a long time, it will be very difficult for China to fully reach the per capita GDP level of the United States in a long period of time, which means that catching up requires a discount. Therefore, it is necessary to correct the system and mechanism that used to rely too much on administrative forces to allocate resources, to define the boundaries of government actions, to be neither offside nor wrong, and to better play the decisive role of market mechanism in resource allocation. Improving the supply structure and increasing the total factor productivity will become the "accelerator" for industrial restructuring.

4.3. It is believed that supply management is a long-term economic policy and cannot play a role in short-term economic fluctuations.

Traditionally, Keynes's demand management is a short-term policy whose main objectives are full employment and price stability. The supply management of the classical school is a long-term policy, and the policy objective is long-term economic growth. In terms of supply management, it has creatively realized the transition from a planned economy to a market economy, greatly releasing the supply potential, and at the same time managing the total demand more effectively. With reform as a means, starting from improving the quality of supply, with structural adjustment as its content, and with the balance between supply and demand as its ultimate goal, a reform will be carried out. If an economy is far from the path of balanced growth, its per capita capital stock is relatively low and lower than that of developed countries. According to the law of diminishing marginal return on capital, the return on capital of less developed countries is higher than that of developed countries, which will attract capital to flow from developed countries to less developed countries. In fact, supply management can be divided into long-term policies and short-term policies, and their modes of action are also different. The resource endowment and technological level of the economy are both stocks in the short term and cannot be used as short-term control variables by the government. Chinese path of scientific and technological progress does not duplicate that of western developed countries, but skips the initial stage of scientific and technological progress in western countries and develops directly on the track of modern science and technology. Chinese continuous scientific and technological progress in the past ten years has been achieved in the process of learning from the West.

5. Path Choice of Promoting Economic Growth on Supply Side

This paper believes that the current path of implementing supply-side structural reforms can be represented by fig. 2. As can be seen from fig. 2, the key to the success of the supply-side structural reform is to guide the inflow of funds into the real economy through financial innovation and further promote the improvement of technological innovation level of enterprises. The success of enterprise technological innovation depends on the financial support of financial innovation, and the ultimate realization of economic growth depends on the success of technological innovation.
5.1. Adhere to both supply-side reform and demand-side expansion, and accurately connect supply with demand.

As the engine of economic growth, the supply side and the demand side are indispensable. Pushing forward the structural reform on the supply side does not mean giving up the demand side to expand demand. From the supply-side reform is the reform of producers, in simple terms is the reorganization of industrial renewal companies, the actual process will be very difficult, backward enterprises without innovative technology in order to survive and kill each other, this is more expensive than to let the bankrupt enterprise collapse and then save the whole market. At present, the cost of enterprises is too high and their profitability is relatively low. Auditing should give full play to its supervisory role, effectively control the cost of infrastructure and basic services, promote decentralization, promote enterprises to improve their management and economic benefits. In this sense, these aspects are still targets, and they are intermediate targets compared with the ultimate goal of "promoting quality change, efficiency change and power change in economic development".

In this paper, manufacturing purchasing manager index (CI) is used as the tool variable of enterprise's technological innovation ability. Purchasing manager index reflects the future profitability of the enterprise. When the enterprise's technological innovation ability is strong, the enterprise's future profitability will be enhanced, and the purchasing manager index value will be high, otherwise it will be low. The Macroeconomic Prosperity Leading Index (MI) is used to reflect the economic development situation. When the index is greater than 100, the economy shows an upward trend. When the index is less than 100, it indicates that the economic downward pressure is great. The bank profitability index (BI) reflects the bank's financial innovation ability. The stronger the bank's financial innovation ability, the higher its profitability index. The relationship between the three is shown in table 1.

| Original hypothesis | F statistics | probability value | Original hypothesis | F statistics | probability value |
|---------------------|--------------|-------------------|---------------------|--------------|-------------------|
| A B                 | 6.031        | 0.007             | A B                 | 1.332        | 0.226             |
| B I                 | 3.459        | 0.014             | M I                 | 3.872        | 0.037             |
| C I                 | 1.638        | 0.022             | M I                 | 5.206        | 0.146             |

We should realize that supply and demand are never contradictory and opposite, but two different aspects of a problem. Demand-side management solves the short-term growth problem of economic development, while supply-side reform solves the long-term growth problem of economic development. A successful new product adds hundreds of billions of dollars of consumption every year, which is to create consumption demand and supply-side reform. In terms of fiscal and tax policies, the focus is on supervision and inspection of the optimization of fiscal expenditure structure in various regions, acceleration of fiscal expenditure progress, implementation of preferential tax policies for the supply-side real economy and small and medium-sized enterprises, and the availability
of project funds. Through improving the bank's financial innovation ability, the use efficiency of funds will be improved, and the development of technological innovation ability of enterprises will be assisted, thus realizing the optimization of industrial structure, stimulating economic vitality and finally realizing economic growth.

5.2. Give full play to the main role of the market in the supply-side reform, cultivate new subjects, and improve the total factor productivity.

At present, Chinese economic environment has entered a new normal. We should transform the medium-high economic growth rate, structural adjustment and dynamic factors into innovative plans. In view of the "deliverability" problem and distortion of factor allocation, which are the first contradictions in supply-side reform, we should speed up the pace of deliverability, improve total factor productivity and promote economic transformation and development. Auditing should aim at improving the efficiency of state-owned capital, perfecting the supervision system of state-owned assets, preventing the loss of state-owned assets, and comprehensively promoting the rule of law for enterprises, so as to continuously enhance the vitality and control of state-owned economy. The development of human resources is especially critical. Human resources include natural labor force and human capital condensed on labor force. When Chinese demographic dividend tends to disappear, the increase in human capital is especially important when the supply-side reform proposes the goal of improving total factor productivity.

Using computer simulation to analyze the impact of financial innovation on technological innovation and macroeconomic growth. Looking at fig. 2, it can be found that when a standard for financial innovation is positively impacted in the current period, the technological innovation level of enterprises reaches the maximum in the second period, then gradually decreases, decreases to 0 in the sixth period, and then reaches a negative value. This shows that financial innovation is time-sensitive to technological innovation, and the improvement of enterprise's technological innovation ability requires a large amount of financial support, which is consistent with the actual situation.

Figure 3 CI response to one standard deviation BI

Structural adjustment means that the previous government's goal of ensuring growth has begun to take structural adjustment as the first priority, and the extensive to intensive policy reform has reached the point where it is urgent. In view of the distortion of capital factor allocation, labor factor allocation, land factor allocation and energy factor allocation, China should cultivate new economic growth points and resolve overcapacity through the market. Enterprises should change their management mode and continuously cultivate new economic growth points. Computer simulation results show that in different periods of regional economic development, the growth momentum tends to be relatively concentrated on the economic individuals with superior geographical conditions and leading and innovative industries, i.e. growth poles. Through the improvement of technological innovation capability of enterprises, the competitiveness of their products can be enhanced, the improvement of product quality and profitability of enterprises can be realized, the contradiction between supply and
demand can be solved, the problem of overcapacity can be solved, and finally the purpose of improving economic vitality can be achieved.

5.3. Reduce the burden on enterprises and increase the expected rate of return on investment.

Tax reduction is one of the main measures of supply-side structural reform, especially in the current economic downturn and difficult business conditions, tax reduction can reduce business operating costs in the short term, thus reducing the overall operating costs of the economy, which is conducive to hedging the economic downturn and stabilizing economic growth. The western supply school mainly emphasizes the research on the policy means of stimulation, and stimulates the labor, enterprises and other production subjects to increase their enthusiasm of supply. However, under the new normal, there are many problems, such as the relative imbalance of capacity demand, how can we rationalize and balance and realize the optimal allocation of resources. The whole computer simulation process of the formation and development of regional economy shows that those economic individuals designated as financial support industry advantages develop relatively fast, are more likely to form growth poles, and have relatively strong polarization effect. The structural reform of Chinese supply side should be implemented in order to improve the quality and efficiency of Chinese supply system and enhance the supply capacity that can meet the "upgraded version" of Chinese consumption. The increase in such supply needs to be realized through innovation and entrepreneurship, increasing investment in research and development, and promoting the development of specialized segmentation and new formats. It is also an organic unity of supply management and demand management, a more systematic, comprehensive, rigorous and scientific theoretical system of supply management, and an innovative achievement of the theoretical system of socialist political economics with Chinese characteristics in the new era.

5.4. Vigorously break financial supply constraints and support the upgrading of the real economy.

Judging from both domestic savings and foreign exchange reserves, China seems to be the "richest" country in the world. However, from the perspective of financing support for the real economy, it faces extremely serious supply constraints. If the social parties have stronger expectations of the reform policies, they will be able to adjust their individual behaviors as soon as possible according to their requirements, and the social resistance to the reform will be reduced, thus promoting the implementation of the relevant policies of the reform quickly and well. Computer simulation makes the development axis change from a straight-line extending state to a net-like interweaving development structure by strengthening the organic connection between different development axes, forming a three-dimensional development axis network which is criss-crossed and runs through from top to bottom. We believe that it is necessary to solve various problems in Chinese current economic development and promote structural reforms on the supply side. While standardizing the market, we will encourage the development of various types of capital and financial institutions, including a large number of small and medium-sized banks, community banks and village banks. Strengthen the restriction and supervision of the power operation of state-owned enterprises, pay attention to the reform of state-owned enterprise equity diversification, reduce monopoly, promote free competition in the market, and promote the in-depth integration of state-owned enterprises with the market economy. Bank financial innovation can improve the efficiency of the use of funds and urge enterprises to use funds to improve their technological innovation ability. According to the basic characteristics of small and medium-sized micro-enterprises such as innovative, technological and entrepreneurial ones, financial products and services that meet their needs should be developed, accompanied by innovations in policy finance and development finance.

6. Summary

The structural reform on the supply side is to explore how to improve the production level of producers. By increasing the demand of consumers, the economic and industrial restructuring will be promoted through reform. To correct the uneven allocation of resources and effectively expand
effective supply. At present, the key to the supply-side structural reform is to improve the bank's financial innovation ability, but different types of financial innovation have different influences on the success or failure of the reform. Financial innovation that reduces financing costs and alleviates the problem of information asymmetry can improve the efficiency of capital use, guide capital flow to the real economy, help enterprises to improve the level of technological innovation, and further improve the quality of economic growth. We will take cost reduction as the current priority in pushing forward structural reforms on the supply side. We will stick to the combination of overall planning and coordination with problem orientation and key breakthroughs. We will stick to the combination of implementing various cost reduction policies and innovating local policies and measures. Therefore, at present, our country should vigorously promote the level of financial innovation of banks in reducing the cost of lending management and improving the ability of risk management, and realize the ultimate goal of supply-side structural reform by implementing effective "financial innovation" of banks to promote "technological innovation" of enterprises and a new path of economic growth driven by "technological innovation" of enterprises.

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