

# Analysis of the Problems and Policy Suggestions of China's Macroeconomics Based on the Theory of Short-Term Economic Fluctuation and Numerical Simulation with Matlab

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**Abstract:** With the arrival of the "14th Five-Year Plan", China's economy has ushered in new opportunities but it is facing great challenges at the same time. According to the short-term economic fluctuation theory, through the visual chart study of macroeconomic indicators, this paper analyzes the changing trends of consumption, investment, import and export, which are the "troika" driving the economy. Furthermore, combining the relevant macro data and theoretical model, the calibration of parameters and numerical simulation are carried out with Matlab software, and the model results support the following conclusions well that China's macroeconomics faces four problems: first, the slow recovery of consumer demand; second, the weak growth rate of the investment; third, the rising proportion of structural unemployment; fourth, the unstable situation of international trade. In the end, this paper explores the causes of these four problems and gives a series of policy recommendations.

**Keywords:** Macroeconomics, Chinese Economy, Short-Term Economic Fluctuation Theory, New Normal, Double Cycle.

## 1 INTRODUCTION

### (1) Research Background

In 2021, China's epidemic prevention and control situation were good, and its economic recovery was relatively stable. Besides, China was the only country among the world's major economies which achieved the positive economic growth, and its overall situation was on the track of normalization. However, the global situation of the COVID-19 epidemic is not optimistic, and the international situation is not stable. Nowadays the world economy is complex and grim, and China's macroeconomics is also facing many new problems. At present, epidemics return frequently, and the domestic economic recovery is not stable yet; the consumption is frequently blocked, and residents' willingness to consume is declining; the investment growth is slow, and the investment structure needs to be reformed urgently; the number of structural unemployment is rising, and labor skills need to be updated urgently along with the improvement of the social security system; there are still risks in international trade and

the world economic situation is unstable. Against this background, it is of great practical significance to study and analyze the problems that China's macroeconomics is facing.

## (2) Literature Review

If we want to study the overall national economic activities and aggregate analysis of a country, we can not avoid the study of this countries' macroeconomics. Macroeconomics provides specific indicators for the analysis of the total national economy of an economy. According to it, people can judge the development of an economy by measuring these indicators, and they can use the same method to formulate development goals and plans of the economy. Much literature shows that the previous research on China's macroeconomics focuses on exploring how to implement macro-control into the development of the national economy, and studying both the differences of earnings management in different stages of the economic cycle and the means of macroeconomic governance under major public emergencies. Guo Hongmao (1994)<sup>[1]</sup> raised the question of how to implement macro-control in the development of the urban economy. The author holds that macroeconomic regulation and control must be a multi-level system dominated by central regulation and control, and he expounds his own views from three aspects of the national economic operation, regional economic level, and the relationship and difference between national and urban economic operation. In the end, he puts forward the methods to improve the level of urban macroeconomic management. Ji Yuechen (2008)<sup>[2]</sup> analyzed the evolution and existing problems of China's macroeconomic regulation and control, and put forward corresponding countermeasures and suggestions for the deviation of local governments from the regulation and control issued by the central government, and what she suggested is to make great efforts to straighten out the relationship between the central and local governments. Chen Wuchao (2013)<sup>[3]</sup> confirmed that people should consider whether the industry is cyclical or not and differences that exist in different stages of the economic cycle in the study of earnings management by setting up a model to test. Yang Zihui, Chen Yutian, and Zhang Pingmiao (2020)<sup>[4]</sup> started from the background of the COVID-19 in early 2020. Subsequently, they used the risk spillover network method to demonstrate the dynamic evolution of the risk transmission relationship among various sectors of China's financial market, and then they put forward relevant macro-governance mechanisms and risk prevention countermeasures.

In conclusion, we can find that there is a lack of analysis of problems faced by the macroeconomics under the background of the new normal in existing researches. In fact, literature that analyzes problems in macroeconomic operation does not have the current new normal background, while literature with the new normal background often only analyzes a specific industry instead of the overall macroeconomics.

## (3) Methods of Study

This paper uses Keynes's short-term economic fluctuation theory, collects the basic macroeconomic indicators data of different years and different periods in China, combines with current hot policies issued by the government, visualizes the problems faced by China's macroeconomics in the form of charts, and puts forward corresponding policy recommendations in the end. This paper also combines the relevant macro data, uses the relevant macroeconomic model, carries on the calibration of parameter and numerical simulation, verifies the conclusion of the article, and predicts the future trend of the corresponding economic index.

## 2 CURRENT PROBLEMS FACED BY CHINA'S MACROECONOMICS

### (1) The Recovery Rate of Consumer Demand is Slow and the Willingness of People to Consume is Insufficient

According to the year-on-year and month-on-month growth rate of total retail sales of consumer goods in China since August 2020 (figure 1), since the year-on-year growth rate of the total retail sales of social consumer goods reached 34.20% in April 2021, the year-on-year growth in the later period has been in a downward trend. The first reason for the decline in the growth rate is the frequent recurrence of the epidemic situation in many places. For example, in August 2021, the total retail sales of social consumption increased by 2.5% year-on-year, which is 6 percentage points down from last month due to the restriction of residents' summer travel. Second, it is affected by the lack of the national consumption willingness and the decrease of the consumption tendency. From 2011 to 2020, the growth of residents' consumption level index slowed down, and it can be seen that the growth rate of consumption level index in 2020 was -2.22%, showing a negative growth trend (figure 2).

On the basis of Keynesian theory, the higher the disposable income is, the lower the marginal propensity to consume will be. However, the traditional theory can not fully explain the current situation of China. In 2018, China's macro marginal propensity to consume was 40.5% [6], while in the same period, the macro marginal propensity to consume in developed countries such as the United States and Germany was 68.4% and 52.4% respectively. In 2019, China's macro propensity to consume was 40.4%, while this index of South Korea and Japan that are at a similar stage of development with China, is 76.2% and 76.0% respectively. Therefore, in addition to the impact of the increase in disposable income of residents, the propensity to consume of Chinese citizens is also largely affected by housing and consumption habits. As housing prices continue to rise while residents' housing demand is still strong, this contradiction leads to a condition that people reduce their daily consumption in order to increase their savings, which inhibits their willingness to consume and hinders the growth of overall consumption.

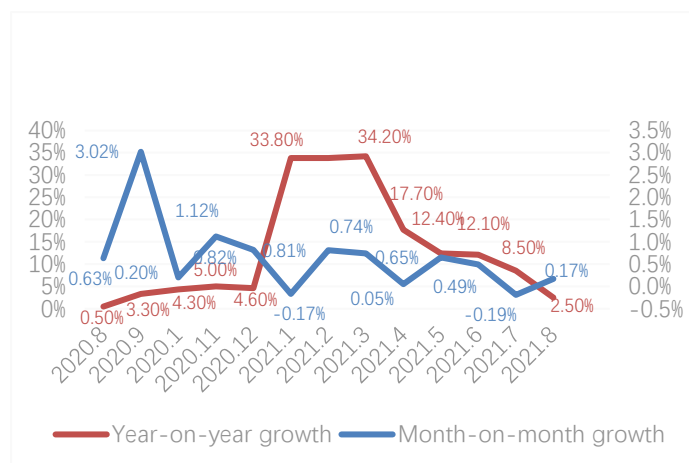


Figure 1 The year-on-year and month-on-month growth rate of total retail sales of consumer goods in China since August 2020

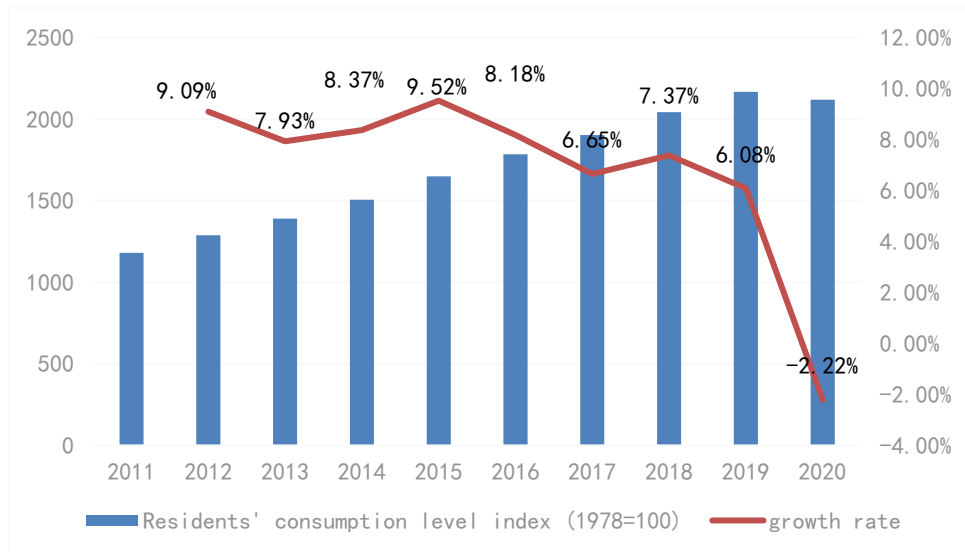
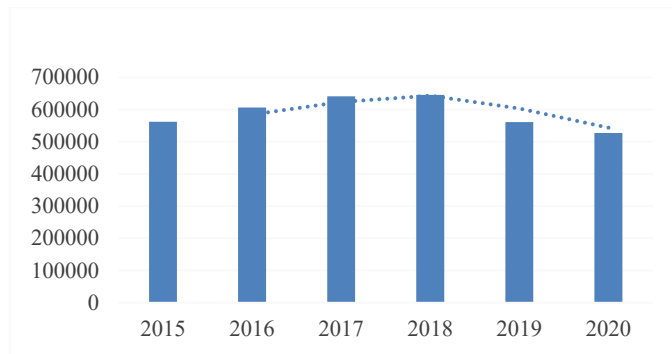


Figure 2 Residents' consumption level index in 2011 and 2020

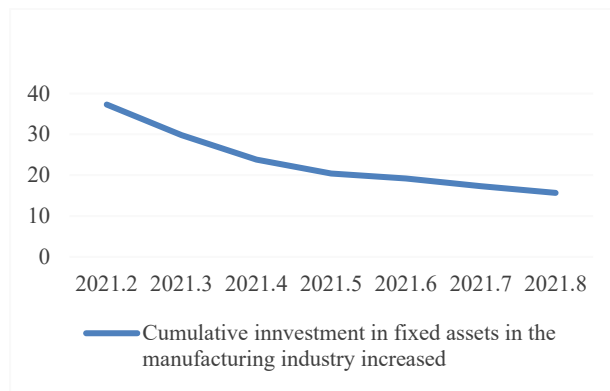
## (2) The Domestic Economy is Transforming, the Investment Growth Rate is Slow

Under the background of "double cycle" development pattern <sup>[10]</sup>, domestic economic transformation and international economic recovery, the situation of weak investment is gradually becoming an objective trend. In 2020, the growth rate of fixed assets investment in the whole society was 2.9 and it dropped dramatically this year compared with 23.6% in 2011 (figure 3). Changes in the manufacturing and real estate industries were obvious, and it can be seen in figure 4 that the cumulative growth percentage of fixed assets investment in the manufacturing industry declined month by month, which dropped from 37.3% in February 2021 to 15.7% in August. The trend shows that the manufacturing industry lacks confidence in the future market and investment growth is facing downward pressure <sup>[8]</sup>.

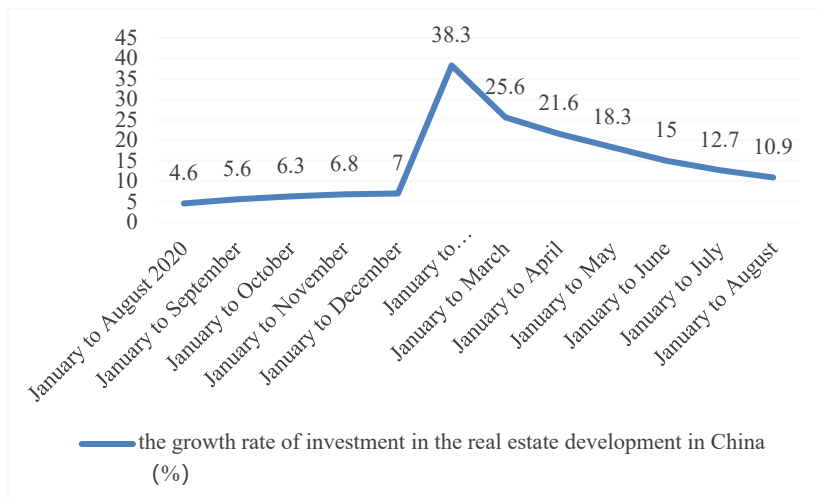
According to figure 5, it shows that the growth rate of investment in the real estate development in China began to decline month by month after rising to 38.3% in January-February 2021, and it has fallen back to 10.9% from January to August 2021. Reasons for this decline are closely related to real estate policies issued by various regions. Nowadays, the whole country generally adheres to the basic requirement of "no speculation in housing", and some cities have introduced strict policies to curb the hot property market which has brought great pressure to real estate developers. The solvency of developers has weakened, and liquidity risk has strengthened, as a result, the housing boom index <sup>[5]</sup> has also dropped from 101.44 in February 2021 to 100.85 in August. (figure 6)



**Figure 3** Fixed assets investment in the whole society(hundred million yuan)



**Figure 4** Cumulative investment in fixed assets in the manufacturing industry increased



**Figure 5** the growth rate of investment in the real estate development in China (%)

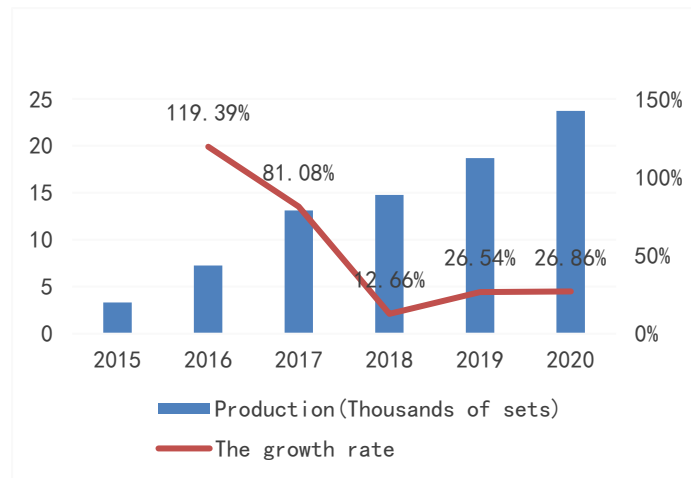


**Figure 6** real estate climate index

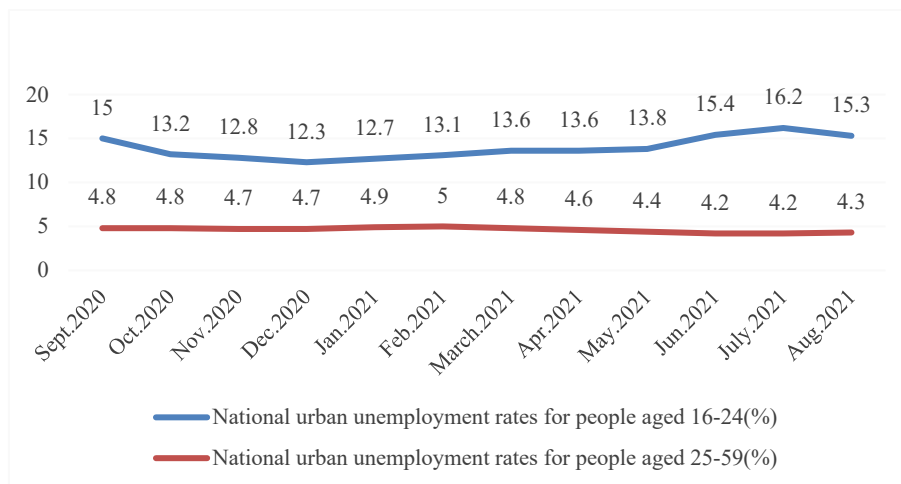
### (3) Structural Unemployment in the Labor Market is Growing Rapidly

During the epidemic, the risk of labor supply boosted the process of replacing "human" with "machine", and more and more enterprises began to adopt industrial robots to improve production efficiency. Besides, the output growth rate of industrial robots also increased from 12.66% in 2018 to 26.86% in 2020. (figure 7)

On the one hand, the replacement of manual labor by robots has greatly improved production efficiency. For instance, the unmanned stator lamination workshop adopted by Dongfang Electric Machinery Co., Ltd. of Dongfang Electric Group has reduced labor intensity by more than 90%, and increased per capita output by 620%, and energy utilization by 56.6%. On the other hand, the popularity of robots has exacerbated structural unemployment, for that intelligent production has challenged the traditional mode of labor. In the labor market, young unemployed persons between the ages of 16 to 24 account for a large proportion of the population, (figure 8) so how to achieve full employment in the new labor market is becoming a hot topic in today's era.



**Figure 7** Production and the growth rate of industrial robots in China from 2015 to 2020



**Figure 8** National urban unemployment rates for people 16-24 and 25-59 from September 2020 to August 2021

#### (4) The Export Situation of the International Trade is Unstable

With the vigorous development of international trade in the Internet era, cross-border e-commerce transactions have already become a part of people's daily life. However, in recent years, the international situation has been unstable and some kinds of big events such as the Sino-US trade war, Britain's exit from Europe and the global spread of the new coronavirus epidemic have all indeed brought a great impact on China's import and export trade <sup>[4]</sup>.

Since the reform and opening up, import and export trade has made a great contribution to China's gross national product. In 2020, the contribution rate of imports and exports of goods and services to GDP growth reached a new high of 28% in recent years. However, this mode is

facing a very serious situation when the current international trade situation is changing because China's participation in the international cycle is in the form of trade and direct investment. Once the international circulation is blocked, China may not be able to retreat and eventually return to the mode of domestic circulation [9].

#### (5) Calibration and Numerical Simulation

In order to make the conclusions reached above more reliable, the paper establishes the corresponding macroeconomic model, and uses Matlab software for calibration of parameter and numerical simulation, finds that the model of the article can better fit the trend of several major economic indicators such as consumption, investment, export, and makes an extra-sample forecast of the future trend of several major economic indicators, and finds that in the short term, the trend of change of these indicators will not change fundamentally. For the readability of the paper, there is no specific process reported here.

### 3 CONCLUSIONS

In conclusion, China's macro economy is facing four problems: First, China's consumption continues to be weak due to the impact of the epidemic and changes in the consumption end of the supply chain. Second, the overall decline in confidence in the investment industry, the fluctuation of infrastructure construction and the rise of raw material prices make the overall decline in China's investment. Third, due to the combined influence of endogenous and exogenous variables, China's structural unemployment risk increases. Fourth, the sensitive international economic situation has hindered the development of international trade.

### 4 RELEVANT POLICY RECOMMENDATIONS

#### (1) Reduce Tax Reduction, Fee Reduction and Upgrade Consumption Structure and Narrow Income Gap

First, according to the tax multiplier  $k_t = \frac{-\beta}{1-\beta}$  ( $\beta$  is the marginal propensity to consume), we can get the viewpoint that national income will increase with the decrease of tax revenue. At present, the starting point of income tax in China is relatively low, and the tax rate of labor remuneration is relatively high. Through tax reduction and fee reduction, the disposable income of low-income people can be increased and the marginal propensity to consume of low-income people can be increased. Consequently, the consumption demand is expected to be expanded. [7]

Second, improve the quality of consumption. Upgrading consumption structure, reducing purchase expenditure and medical expenditure will increase the proportion of consumption with marginal propensity to save. Based on the perfect social security of residents, it is also an important measure to promote total consumption and increase consumption growth rate.

Third, narrow the income gap between urban and rural areas, improve the social redistribution system, and promote the consumption expansion of middle-income groups. These policies can promote the stable growth of consumption.



## (2) Optimize the Investment Structure and Reduce the Dependence of China's Economy on the Real Estate <sup>[12]</sup>

First, China should make up for the shortcomings of investment in infrastructure, ecological environment protection and public safety, and expand the proportion of investment in emerging industries. Enterprises can enhance their innovation and competitiveness through investment such as intellectual property monopoly.

Second, standardize the management of the real estate industry and reduce its debt risk. The real estate investment is an important part of China's fixed asset investment that can not be ignored, and it is the mainstay of promoting China's GDP growth. Therefore, it is significant to establish an impeccable regulation and management system for the real estate industry and to set up a special fund for stabilizing the bond market in order to avoid sharp fluctuations in the market. At the same time, reducing China's dependence on the real estate industry and reaching the transformation of economic structure and economic growth momentum should be the only way for China's economy.

## (3) Create New Formats and More Jobs

First, improve the social security system and enhance national confidence in employment and life.

Second, China should promote the "expansion and upgrading" of employment and introduce preferential policies to encourage relevant employment. Establishing a complete labor training system, paying attention to adapting to the needs of the labor market, and promoting the deepening reform of higher education are practical ways. In addition, China should also popularize the re-employment training after laid-off workers, improve the quality level of workers, and let workers establish the concept of lifelong learning.

## (4) Strengthen the Domestic Cycle and Further Deepen the Development of the "Double Cycle" Model

First, regard innovation and high quality as the standard, and promote the smooth flow of production, distribution, circulation, and consumption throughout the country. Besides, establish a strong domestic market, study and master relevant core technology. To sum up, China's macro economy is facing four problems: first, China's consumption continues to be weak due to the impact of the epidemic and changes in the consumption end of the supply chain; Second, the overall decline in confidence in the investment industry, the fluctuation of infrastructure construction and the rise of raw material prices make the overall decline in China's investment; Third, due to the combined influence of endogenous and exogenous variables, China's structural unemployment risk increases; Fourth, the sensitive international economic situation has hindered the development of international trade, and promote the realization of import-free important resources and technologies <sup>[12]</sup>.

Second, open wider to the outside world, along with strengthening the ability to deal with international risks and establishing a sound risk management system.

Third, jointly build "The Belt and Road Initiative" with high quality, improve the quality and efficiency of foreign cooperation, flexibly handle international economic relations, and promote the coordinated development of domestic and external demand.

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