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Some Statistical Issues in China's Economic Reform

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Abstract: Many new problems have arisen in China as a result of the economic reform, for instance, the need for and the method of estimating total economic demand and total supply in a given period; the purpose of setting up a macro-economic monitoring and warning system in China, economic prediction, and price statistics.

Key words: Total demand; total supply; macro-economic monitoring; warning system.

1. Introduction

China has carried out economic reform since 1979. A new system of contracted responsibility has been introduced in the rural areas. The peasants can freely dispose of their grains and other agricultural products after having sold the agreed upon amounts (the peasants sign explicit contracts with the government). In addition to the state-owned and collective-owned business sectors, other merchants and handicraftsmen are allowed to run their private businesses. Those who can raise funds are also allowed to run their privately-owned factories. Foreign investment is encouraged. The scope of the planned economy has narrowed while market forces are playing an increasingly important role in the country's economic development. Businesses have changed their systems of management and demonstrate more decision-making power than previously. Competition in the variety and quality of products among producers is encouraged. Changes have also taken place in pricing, taxation, finance, employment, wages, housing and other fields. These reforms have allowed China's economy to develop rapidly in the past decade. China's 1991 gross domestic product (GDP) amounted to 1958 billion RMB yuan, i.e., 2.53 times that of 1980 (in constant prices). The standard of living of the Chinese people has also improved.

Nevertheless, the economic reform has not been smooth sailing. Many new problems have arisen, for instance, the demand for investment and consumption in 1988, 1989 and other years was greater than the economy could bear and notable inflation followed; the growth rate of the manufacturing industry was too rapid to be sustainable; and central government's control over the macro-economy was once improperly weakened. The Chinese government has

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implemented some remedial measures during the past three years. Inflation has been effectively curbed. The market, however, slumped in 1990. New measures have been taken to deal with the new problems, and these measures have produced the desired effect of a steadily growing economy.

The State Statistical Bureau (SSB) is the leading statistical office in China. It not only provides the Chinese government with statistical information, but also has the function of developing and suggesting various kinds of programmes and measures to the decision-making body. The SSB also monitors the socio-economic development as a whole. In the light of economic reform, the SSB should provide timely information about the economy and advise the Chinese government on various new issues.

2. Some Statistical Issues

2.1. *Estimation of total demand and total supply*

During 1988–1989, one problem in China was that total demand was greater than total supply. This happened when the central government's control over the economy was slackened and local governments and enterprises were able to invest in housing or equipment and the masses of the people rushed to purchase commodities in a panic generated by large price increases. The resulting inflation was inevitable. In 1990, the opposite problem occured: total supply was greater than total demand, because the government had taken measures to reduce investment and the public's panic purchasing ceased. As a result, the market slumped for over half a year. In order to achieve steady economic development, the Chinese government had asked the SSB to estimate total demand and total supply in different periods, and the SSB fulfilled this task.

In the SSB's estimate, total supply is equal to the gross domestic product (GDP) plus all goods and services imported from abroad. Total demand refers to total purchasing power for final products and services for a given period in the country as a whole, including the demand for investment, the demand for consumption, and the demand for export.

A very important issue in estimating purchasing power is bank deposits. When prices remain stable, only the level of current deposits is a factor of purchasing power. But in a period of price instability, not only the current deposits, but also time deposits may influence purchasing power.

The computed demands for investment and consumption are the abilities of payment with currency, which is not equivalent to the investment and consumption actually realized. The realized total supply and total demand are always balanced, because the imbalance has been offset by a rise or fall in prices. But the computed supply and demand differ from each other because they are computed given a certain price level. In order to remove the influence of the price fluctuation on the supply scale of the current year, the total supply of all goods and services should be computed given the prices of the previous year, then compared with the total demand, given the prices of the current year. In this way, the difference between the two aggregate figures can be shown clearly (Zhang 1990).

In order to do an in-depth analysis, it is necessary to estimate disaggregate demand and supply. In the first quarter of 1990, after conducting a structural analysis, the SSB found that the market had slumped mainly because of inadequate demand for investment, and therefore advised the Chinese government to increase investment, totalling 40 billion RMB yuan. The Chinese government accepted the suggestion and the market became brisk again (Zhang 1991).

2.2. *Macro-economic monitoring and warning system*

Another problem in the economic reform has been the sudden rise and fall in its economic growth, which has caused social instability and wasted manpower and material resources. In order to achieve steady economic development, the Research Institute of Statistical Science of the SSB set up an economic monitoring and warning system in December of 1990. It aims at monitoring the movement of the macro-economy and giving warning when bad signs appear.

The system is composed of two subsystems, namely the monitoring system and the warning system. The whole system contains 24 economic indicators, which are grouped into three types: the leading indicators, the coincident indicators, and the lagging indicators.

Ten indicators are selected as the leading indicators. They are state financial expenditure, financial allocation for capital construction, industrial loan, urban savings deposit, domestic loan for capital construction, newly increased fixed assets due to capital construction, newly started construction projects, stock of steel products, stock of cement and stock of timber.

Ten indicators are selected as the coincident indicators. They are gross output value of industrial enterprises, total sales of industrial products, total retail sales, total consumer goods sold to institutions, total net purchases of all domestic commercial units, total imports (customs statistics), money supply, total cash receipts of banks, cash payments of banks for salaries and wages, and total investment in capital construction.

Four indicators are selected as the lagging indicators. They are total stock of all commodities, commercial loan, overall retail price index and state revenue.

The growth rate of an indicator may vary in different periods, sometimes high and sometimes low, sometimes good for the development of the economy and sometimes economically detrimental. Therefore the growth rates of each indicator are classsified into five categories and they appear in five different areas, namely the red area, yellow area, green area, light blue area and blue area. Between two adjacent areas, a critical point of the indicator is shown in terms of its growth rate in the past 12 months. The red area signifies that the economy is in a state of "overheat," which means that the growth rate is too high and detrimental to the economy. The yellow area signifies that the growth rate is quite high and may become higher and it is possible for the economy to become "overheated" or it may slow down and become stable. The green area signifies that the economy is stable. The light blue area signifies that the growth rate is low and may become lower or become higher. The blue area signifies that the economy is in an "overcold" state, which means that the growth rate is too low or even negative and the economy is in recession. The red and blue areas serve as warnings about which the Chinese government should be informed.

Take the state financial expenditure, for instance. When the growth rate is 20% or higher, it is in the red area. When it is 15% or higher but lower than 20%, it is in the yellow area. When it is 6% or higher but lower than 15%, it is in the green area. When it is 1% or higher but lower than 6%, it is in the light blue area. When it is lower than 1%, it is in the blue area. Take the newly started construction projects, for instance, then the critical points are 32%, 24%, 10% and 2%, respectively.

As for the indicators about stocks (stock of steel products, stock of cement, stock of timber, and stock of the domestic trade),

Table 1. Ten leading indicators and their critical points between areas

Names of indicators	Areas				
	Red	Yellow	Green	Light blue	Blue
1. State financial expenditure	20.0	15.0	6.0	1.0	
2. Financial allocation for capital construction	21.0	16.0	5.0	0.0	
3. Industrial loan	28.0	22.0	13.0	7.0	
4. Urban savings deposit	43.0	38.0	30.0	25.0	
5. Domestic loan for capital construction	24.0	18.0	9.0	3.0	
6. Newly increased fixed assets due to capital construction	28.0	21.0	11.0	4.0	
7. Newly started construction projects	32.0	24.0	10.0	2.0	
8. Stock of steel products	−2.0	2.0	9.0	13.0	
9. Stock of cement	−3.0	6.0	18.0	26.0	
10. Stock of timber	−2.0	3.0	10.0	14.0	

they are inverse indicators. When the growth rates are negative or very low, they are in the red area. When they are very high, they are in the blue area.

All the critical points are stipulated relative to the current situation in China (see Tables 1, 2, 3).

As shown above, the critical points are different for different indicators. In order to compute three single figures to describe the leading indicators, the coincident indicators, and lagging indicators, three steps are taken. Firstly, the red area is given 5 marks; the yellow area is given 4 marks; the green area is given 3 marks; the light blue area is given 2 marks and the blue area is given 1 mark. Secondly, the marks of all indicators of the leading, coincident and lagging indicators are added separately. If every leading indicator or coincident indicator is in the red area, the sum should be $5 \times 10 = 50$ marks. If every lagging indicator is in the red area, the sum should be $5 \times 4 = 20$ marks. Thirdly, the sum is divided by 50 for the leading indicators or coincident indicators or divided by 20 for the lagging indicators. The quotients are expressed in the form of percentages. They are called the monitoring or warning indexes or signs.

The formula is given below:

$$\text{monitoring (warning) index (\%)} = \frac{\sum_{i=1}^{N} x_i}{5N}$$

where x_i denotes the marks given to the ith indicator; and N denotes the number of indicators.

Example: If the 10 leading indicators were in red, red, yellow, red, red, red, yellow, red, red, yellow areas respectively, in a given month, then the warning index $= (5 + 5 + 4 + 5 + 5 + 5 + 4 + 5 + 5 + 4)/50 = 94\%$.

When the index is 86% or greater, it is in the red area. When the index is 72% or greater but less than 86%, it is in the yellow area. When the index is 48% or greater but less than 72%, it is in the green area. When the index is 34% or greater but less than 48%, it is in the light blue area. When the index is less than 34%, it is in the blue area. The four critical points (86%, 72%, 48%,

Table 2. Ten coincident indicators and their critical points between areas

Names of indicators	Areas				
	Red	Yellow	Green	Light blue	Blue
1. Gross output value of industrial enterprises	15.0	12.0	6.0	3.0	
2. Total sales of industrial products	21.0	16.0	8.0	4.0	
3. Total retail sales	24.0	19.5	10.5	6.0	
4. Total consumer goods sold to institutions	25.0	20.5	11.0	6.5	
5. Total net purchases of all domestic commercial units	24.0	19.0	11.0	6.0	
6. Total imports	35.0	26.0	11.0	2.0	
7. Money supply	23.0	19.0	10.0	5.0	
8. Cash receipts of banks	34.0	28.0	17.0	11.0	
9. Cash payments of banks for salaries and wages	24.0	19.0	12.0	7.0	
10. Total investment in capital construction	22.0	17.0	9.0	4.0	

34%) are stipulated relative to China's overall situation. When the index is in the red or blue area, it is called a warning index. When the index is in other areas, it is called a monitoring index.

The monitoring and warning indexes are computed every month and from month to month. These fluctuations are depicted in diagrams which show how the indexes change in different periods and how they move in different areas. The Research Institute of Statistical Science of the SSB has provided quarterly monitoring or warning reports to the leading organisations in China and the newly set-up system is helpful to the leading work of the Chinese government.

2.3. *Economic prediction*

To meet the needs of the Chinese government's macro-economic decision-making, the SSB has performed economic prediction since 1987. In the first quarter, the SSB should provide the year-end prediction data of GDP and the major indicators of agriculture, industry, construction, transport and

Table 3. Four lagging indicators and their critical points between areas

Names of indicators	Areas				
	Red	Yellow	Green	Light blue	Blue
1. Stock of the domestic trade	20.0	16.0	9.0	5.0	
2. Commercial loan	21.0	17.5	13.0	9.5	
3. Overall retail price index	10.0	8.0	4.0	2.0	
4. State revenue	24.0	19.0	9.0	3.0	

Source: Luo 1991

tele-communication, and trade. The prediction is made on the basis of data from the previous year. Regression models, including the auto-regressive moving-average model, are used. The statisticians of the Bureau had to learn the technique through trial and error. As for the medium and long term economic prediction, the task is fulfilled by another Chinese research institute.

2.4. *Price statistics*

Price reform is the most arduous task in China's economic reform. The Chinese government has paid large amount of subsidies in past years to maintain the low prices of certain commodities, such as, grain, vegetable oil, coal, etc. Because the Chinese people are weak in their capacity to endure price increase, only along with increases in their salaries and wages can the prices of these commodities be raised gradually. But many other kinds of goods and services have free prices in the reform.

In recent years, the prices of certain commodities have become more complicated than previously. There are different prices for the same commodity, such as list price, negotiated price, market prevailing price, etc. The quantities sold at different prices are different. To compute an accurate price index, the statistical agencies should collect the different price data from different sources and use different weights.

To meet the needs of the Chinese government in the economic reform, in 1982 the SSB abandoned the old method of collecting price data from the reports of the specialized corporations. Enumerators were sent to the shops and fairs by the sample survey organizations in cities to collect price data directly. The sample size was enlarged from 29 cities and 26 counties to 107 cities and 76 counties in 1985. The sample cities and counties were asked to submit the sample data to the SSB directly. The data of the prices of more than 330 kinds of commodities were collected. Since January 1981, the retail price index and the index of the living standard of the workers and employees have been computed monthly, not quarterly as in the past.

During the economic reform, the Chinese people are much more concerned with the price indexes than before. They often compare the figures published by the SSB with what they experience in their daily lives. Since September 10, 1988, to protect the interest of the depositors and avoid potential disturbances in the market, the Chinese banks have adopted an effective measure to deal with the depreciation of the deposits due to the price increase. When the retail price index is higher than the interest rate of the deposit of three years or longer, the banks must pay the depositors an amount of interest equal to the rise of the retail prices in the period. Since the retail price index is published by the SSB, and it is of great interest to the entire nation, the SSB has an obligation to constantly improve the quality of the price statistics.

3. References

Zhang Sai (1990). The Position and Roles of China's Official Statistics in the Macro-economic Management. Second Independent Conference of the International Association for Official Statistics, Beijing, 1990.

Zhang Sai (1991). On the Methodology of Economic Analysis. Statistical Research, No. 1.

Luo Jianguo (1991). The Macro-economic Movement and Its Warning Signs in 1990–1991. Statistical Research, No. 3.

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