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CHINA'S REGIONAL DISPARITIES

Abstract. There is a positive correlation between the development of China's regional economy and urbanization from 1993–2018. The resource endowment influences the degree of urbanization and determines the development of the regional economy. The next 10 years will be a period of economic transition for China and a tipping point for the regions. When the critical resource conditions cannot be met, China's regions should actively adjust their development strategies and focus on developing clusters of advantageous cities.

Keywords: Chinese regional economy, resident population, GDP, model analysis, model forecasting.

Chinese economic development is like a black hole, firmly attracting the world's attention. To this end, many scholars, politicians and entrepreneurs at home and abroad have used various economic tools and theories to explain it. The vast majority of them have failed, claiming that "Chinese economic data is falsified and watered down", or that "Chinese economy is an unsolved miracle", but some have succeeded – Lin Yifu's description of Chinese economic development in his 1994 book "Chinese Miracle" is almost identical to Chinese actual economic development between 1994 and 2015. To this end, while recognizing the flaws in Chinese official economic data, we should also recognize the value of these data, which equally reflect the foundations, structure, dynamics, growth and deficiencies of the Chinese economy. This study is about general phenomena in the regional economy, highlighting more the issue of the flow variation of economic growth, and we believe that official economic data from China can be used.

The object of this study, "China's regional economy", is an important aspect of China's economy, especially in the 40 years since China's reform and opening up, the differences in resource endowments, such as material capital, financial capital and human capital, have caused extreme imbalance in regional economic development; and the extreme imbalance in regional economic development in the past has also driven Chinese economic transformation today, forming a coordinated regional development strategy, China is creating a future with "both gold and silver mountains and green water and mountains".

At the heart of contemporary economic life is urban economic life, and this paper attempts to conduct a study of Chinese regional economy using the findings of urban economics on urban biogenesis. Based on the premise of "the existence of biology in the economy", we use population size and regional GDP data to build the "population – GDP" model, and combine the "economic growth equation" with economic data on per capita annual consumption expenditure, unit labor cost and

other economic data to study the causes and current situation analysis of regional economic development differences in China from 1993 to 2018.

George Zippf's empirical law states that the frequency with which a city of a given size (or other equivalents) appears is inversely proportional to its bit order. In China's regional or other economies of scale, this means that with limited resources and demand, only a small number of developed economies and a large number of developing economies exist, and that the proportion of these economies that exist is heterogeneous. We find that these economies are not necessarily organized as administrative units, but rather that larger regional economies where the club effect exists, the Zippf effect, is more pronounced. Multiplier effect for regional economies in response to the club effect.

Combined with the Bernoulli equation of "finite resources" theory, we are able to predict the future trends of China's regional economy regarding "population – GDP" at different spatial scales.

Considering the research results of China's regional economy in academia over the years, especially the analysis of the spatial-temporal scale of regional economic differences in China by the Key Laboratory of Geographic Information Science of East China Normal University, the model was obtained with full consideration of the current situation of the differentiated and differentiated development of China's regional economy.

$$y(t) = \sum GDP_i$$

$$y(t) = y_0[N(t)]^{\beta}$$

$$y = RN + E\frac{dN}{dt}$$

And collated to obtain:

$$\frac{dN}{dt} + \frac{R}{E}N(t) = \frac{y_0}{E}[N(t)]^{\beta}$$

To solve the equation:

$$N(t) = [\frac{y_0}{R} + \left(N_0^{1-\beta} - \frac{y_0}{R}\right)\exp(-\frac{R}{E}(1-\beta)t]^{\frac{1}{1-\beta}} \quad (\beta \neq 1)$$

$$N(t) = N_0 e^{\frac{(y_0-R)t}{E}} \quad (\beta = 1)$$

$$N(t) = \left\{[\frac{y_0}{R} + \left(\frac{1}{N_0^{\frac{1}{\beta-1}}} - \frac{y_0}{R}\right)\exp(\frac{R}{E}(\beta-1)t]^{\frac{1}{\beta-1}}\right\}^{-1} \quad (\beta > 1)$$

$$N_{\infty} = (\frac{y_0}{R})^{\frac{1}{1-\beta}} \quad (\beta < 1)$$

Spatial-temporal points   determined by the model:

$$t_c \approx \frac{E}{y_0(\beta-1)N_0^{\beta-1}}$$

Projections of future trends in the Chinese regional economy as we can draw the following basic conclusions:

(1) From the high scale spatial unit of the three major zones, between 1993 and 2018, the GDP growth rate and final consumption growth rate of the three major zones are highly overlapping on the basis of the size of the resident population, which indicates that the economic growth of the various zones in China is mainly dependent on final consumption, this caliber of final consumption includes the consumption expenditure of resident residents and government consumption expenditure, which indicates the expenditure of resident units on goods and services purchased from the regional economy, outside and abroad to meet the needs of material, cultural and spiritual life. The economic size of the eastern zone has been growing at a rate broadly in line with that of the western reginal zone, with the intermediate zone growing at nearly double the rate of the eastern zone, but the differences between the three major zones have been increasing. In terms of the economic growth of the three major industries, the industrial structure of the eastern zone is tight, and the industrial structure of the mid-western belt has the characteristics of transmission (service) to the east.

(2) Looking at the medium-scale spatial unit of regular regions, the performance of GDP growth and final consumption growth in regular regions over the period 1993 – 2018 is very similar to that of the three major regions based on the size of the resident population, with the exception of the Southwest region, which shows a long-term stable and balanced relationship between GDP and final consumption, and the development of industrial clusters with local advantages and characteristics in each region. Due to the low degree of economic openness to the outside world, the factors of production in the southwest region are mainly flowing within the province, the economic base is relatively weak, and the long-term reliance on government investment (central financial transfers) has been dependent on the development of the region, has not yet established a self-sufficient modern scale industrial cluster in the region.

(3) The differences in economic development and the process of change in Chinese provincial administrative regions, a basic-scale spatial unit, show more individualized differences and development rates. Basically obey the "limited scale effect", i.e.: the more barren and backward areas of economic development of the scale of the law of the faster speed; and in economically developed areas, the scale of final consumption growth is always slightly higher than the scale of GDP growth, the only counter example occurs in the agricultural economic growth rate remains above medium speed in the region (Tianjin, Guangdong). One plausible explanation is that the monetary multiplier effect is more pronounced in economically developed regions, which can absorb final goods and services from other regions.

(4) Examine the future development path of China's regional economy in the Bernoulli consumption equation for middle- and high-order spatial units. We find that less than 10 years after 2018, China's regional economy will face one new challenge after another. The urbanization development strategy that has driven China's economic development plan with extensive urbanization in the past is not sufficient to achieve shared economic prosperity in all regions of China in the future, or even to ensure continued regional prosperity. In order to secure the future of China's regional

economy, regions must make choices at the tipping point to make "significant qualitative changes that effectively "reset" the initial conditions and parameters of the population size equation and start a whole new economic cycle".

(5) Some of the plans and measures of the central government to eliminate the negative trends of urbanization and to strengthen the dynamics of economic development. It has to be said that some of the measures are creative, the western development strategy does not waver in the premise of tapping into the advantages of small areas in the central region to develop urban clusters, so that the cities in the region can enjoy the mutual spillover of resources, using the advantages of other cities to develop their own endowments.

In the countryside, the reforms have been bolder, with active urbanization on the one hand, with no statistically significant rural population in the Beijing region at the time of the 2018 national economic census, and the integration of heavily hollowed-out villages and the creation of new administrative villages at addresses with better economic endowments on the other. At the international level, the Chinese government is making further attempts to liberalize foreign investment restrictions and accelerate the opening up of financial markets in 2020, and has begun to solicit opinions from society on the Regulations of the People's Republic of China on the Administration of Permanent Residence of Foreigners.

The absorption of external resources, both financial and demographic, to supplement domestic shortfalls is a guarantee that China's economy will not collapse in an instant, but it may not be enough. China should complete the relocation of domestic industries in accordance with the differences in regional economic development. China's vast inland underdeveloped regions are new hotbeds of labor-intensive industries (China's Xinjiang is receiving garment manufacturing from the coast), the developed eastern and southern coastal regions should actively take advantage of the new round of scientific and technological revolution to vigorously promote the development of artificial intelligence, the Internet, intelligent manufacturing to achieve transformation and upgrading and improve quality and efficiency in high-end manufacturing and productive services to form a virtuous cycle of industry.

In conclusion, China's regional economy is an issue that cannot be ignored in Chinese economic research. The exploration of this paper is also preliminary. For example, attempts to explore data matching problems at smaller spatial units (e.g., municipalities) and larger time spans, modelling and analysis techniques, regional variations at different spatial-temporal scales and their causes, interpretation of parameter meanings, etc., all require in-depth research.