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Study on the Spatial Pattern of Inter-provincial Population and the Effect of Regional Population Overflow Against the Background of the Implementation of the Universal Two-child Policy*

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***Abstract*—Based on the data of the sixth nationwide census, considering the background of the implementation of the universal two-child policy, the inter-provincial population size and the inter-provincial population flow scale are predicted. According to the population data in 2010 and 2020, the evolution of spatial pattern of inter-provincial population movement in China is compared and analyzed, and its spatial spillover effects are examined. The study found that: first, the universal two-child policy promotes regional population agglomeration to a certain extent; second, comprehensively considering the direction, intensity and scale of inter-provincial population flow, 31 provinces and cities in China are divided into 6 types of floating population areas including large-scale net inflow active areas, small-scale net outflow active areas, large-scale net outflow active areas, small-scale net outflow active areas, balanced active areas, and inactive areas; third, inter-provincial population inflows promote regional population spillovers, and the contribution to the population spillover effects of inflow areas is 26.3-45.2%.**

Keywords—China; floating population; area type; population attraction intensity

I. Introduction

At present, China's population as a whole is at historical stage of slow expansion, rapid ageing of the age structure, and frequent migration. On the basis of the intelligent information technology revolution and the innovation of the policy system, this can be regarded as the “new population” pattern of China corresponding to the new economy. As a unique type of floating population in China, the floating population flows from the registered residence to the real place of residence. Compared with the population movement in the province, the inter-provincial population movement is a large-scale and long-distance population migration phenomenon. According to the 2015 national sample survey of 1% of the population, the proportion of inter-provincial floating population to the total floating population is 33.15%. With the development of economy, society and transportation, the inter-provincial population mobility is more active. The inter-provincial flow and distribution pattern of the floating population have an important impact on the universal spatial and temporal pattern and concentration of the population. On January 1, 2016, the official implementation of the universal two-child policy will inevitably lead to changes in the size and spatial distribution of the national population. Therefore, based on the background of the implementation of the universal two-child policy, accurate prediction of natural population growth and inter-provincial spatial mobility is conducive to explaining the spatial differentiation of inter-provincial migrant population in China.

Since the official launch of the universal two-child policy, the research has focused on the prediction of future population structure development, with large divergence among views of different scholars. In terms of fertility behavior, some scholars believe that the fertility level of women of childbearing age in China continues to decline; the obvious increase in the birth of second child does not mean that the fertility level can be adjusted to the replacement level (Wang Jun, Wang Guangzhou, 2016; Guo Zhigang, 2017). Other scholars believe that China's current total

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fertility rate remains at 1.6~1.8 (Zhao Menghan, 2015; Chen Wei, 2015; Zhai Zhenwu et al., 2016), which is conducive to the dynamic balance of future population development and the universal security.

In terms of demographic effects, some scholars estimate the future population development based on the data of population sample survey, and believe that the two-child policy can improve the age structure of China's population (Li Guizhi et al., 2016; Zhen Zhenwu et al., 2017). Other scholars predict the population based on the census data by calculating the fertility level of the policy target group, and hold that the universal two-child policy is conducive to slowing the aging trend and increasing labor supply (Wang Jinying, Ge Yanxia, 2016; Long Xiaojun, etc. 2017; Gu Hejun, 2017). In general, for the comprehensive study of the two-child study, demographers mainly discuss the aging trend of population.

Considering the population size of different regions in China, the fertility levels of different regions are not equal. In recent years, the continuous adjustment of China's fertility policy will inevitably have regional differences, which will have an impact on the evolution of the population's spatial pattern. Deng Yu et al. (2014) considered the impact of "two-child fertility policy for couples where either the husband or the wife is from a single-child family" on fertility rate, and predicted the natural development of population and spatial mobility by provinces, and then judged the spatial development pattern of China's population. Wang Kaiyong et al (2016) found that before and after the two-child policy, the spatial distribution of inter-provincial population in China showed the overall pattern of highest population density in the eastern region, the second in the central region, then in the northeast region, and the lowest in the western region. Long Xiaojun et al (2018) believe that the full implementation of the two children will continue to increase the population density in the southeast half of the Hu's line, further aggravating China's overall population pattern of dense southeastern population and the sparse northwest population. In general, geographers have paid attention to the population spatial pattern adjusted by fertility policies in recent years, but the regional demographic effects of future mobility patterns have not been addressed.

In terms of research methods, the use of a single indicator including migration rate, immigration rate, net migration rate, and total migration rate has limitations. Liu Shenghe et al. (2010) comprehensively considered these indicators and proposed a composite index method for dividing the area types of population mobility in China, revealing the evolution pattern of the area types of floating population in China. Qi Wei et al. (2017) defined the net migration coefficient and the total migration coefficient to characterize the active characteristics of the floating population, and considered the difference in the size of the floating population between regions, to revise the composite index method and systematically analyze the spatial evolution pattern of area types of the mobile population at the county scale. It is worthwhile to explore whether it is suitable to divide the area types of future inter-provincial population movements in China.

At present, the quantitative analysis of the spatial pattern of population mobility is mainly based on the traditional gravity model. On this basis, a series of models have been developed, such as "push-pull" model and spatial OD model (Fan, 2005; Wang Guixin et al., 2012; Pu Yingxia et al., 2016). These models are highly dependent on space and have strict requirements on data quality. It is difficult to measure the spatial spillover effect of population size and flow under the change of birth policy. The Wilson model can be used to measure the scale and scope of population flow between regions, effectively consider the attenuation characteristics of distance between domain elements, use the threshold correction method to reveal the attractiveness of provinces with large population inflow to other provinces, and then reflect the status in the role of space flow, so as to illustrate the process of the role of population spatial mobility and regional population spillover effects (Wang et al., 2002; Ai Bin et al., 2004).

In summary, based on the implementation effect of the universal two-child policy, this paper calculates the fertility potential released by the target group of the policy, estimates the fertility level of each province, uses the age-moving method and Markov chain to predict the inter-provincial population development and flow scale in China, applies the revised composite index method to divide the area types of future inter-provincial population mobility, and uses the Wilson model to analyze the population spillover effects brought about by the adjustment of fertility policies and inter-provincial population inflows, hoping to provide policy decision support for future population mobility and regional development in China.

II. Research Objects, Data and Methods

A. Research Objects and Data

This paper takes 31 provinces (municipalities, and autonomous regions) (excluding Hong Kong, Macao and Taiwan, the same below) as the research scope, and regards inter-provincial population and floating population as research objects. The inter-provincial floating population generally refers to the population who lives in the locality, with household registration in other province, and has left the household registration place for more than half a year. Based on the sixth China Census data (referred to as "the Sixth Census" data) in 2010, using the data of population divided by generation and age, survival rate, fertility rate, and inter-provincial inflow and outflow population of 31 provinces (municipalities and autonomous regions) in China in 2010.

B. Research Methods

1) Age deduction: The age deduction method takes the actual population by age as the base, and predicts the population recursively according to a certain survival rate. For the prediction of the population of women of childbearing age, the birth population is predicted under the conditions of fertility rate and gender ratio at birth.

$$P_{x+1}(t+1) = P_x(t)\, Sx \qquad (1)$$

When x=0, 1, 2, …, ω-1, it is described specifically as:

$$\begin{cases} P_1(t+1)=P_0(t)S_0 \\ P_2(t+1)=P_1(t)S_1 \\ \cdots \\ P_{\omega-1}(t+1)=P_{\omega-2}(t)S_{\omega-2} \end{cases};\quad B(t)=\sum_{x=16}^{49}W_x(t)f_x(t) \qquad (2)$$

Among them, $P_x(t)$ is the population of x-year-old people in t year; $P_{x+1}(t+1)$ is the population of x+1-year-old people in t+1 year; $P_{\omega-1}(t+1)$ is the predicted population of the highest age group; Sx is the survival rate of x years old; $B(t)$ is the birth population of t year; $Wx(t)$ is the number of women of childbearing age in t year; $f_x(t)$ is the fertility rate of women of childbearing age at x years old in t year.

2) Improved population flow composite indicator system: The sum of the inflow population and the resident population of the province is equal to the resident population of the province, and the outflow population and the resident population of the province are equal to the registered population of the province. Therefore, the following relationship exists between the inflow populations I_i of a certain province i, the outflow population O_i, the permanent resident population L_i, the resident population P_i, and the household registration population H_i:

$$L_i=P_i-I_i=H_i-O_i \qquad (3)$$

Based on this, it is possible to construct the basic indicators of the regional classification of the floating population: the net floating population NP_i and the total floating population GP_i. It is specifically expressed as:

$$NP_i=I_i-O_i \qquad (4)$$

$$GP_i=I_i+O_i. \qquad (5)$$

If NP_i is positive, it indicates the net inflow of population in the province, and otherwise, it indicates a net outflow of the province; the higher the GP_i, the larger the replacement scale of the floating population.

The net flow coefficient NR_i and the total flow coefficient GR_i are used to measure the activity degree of population mobility. It is specifically expressed as:

$$NR_i=\frac{NP_i}{L_i}=\frac{I_i-O_i}{L_i} \qquad (6)$$

$$GR_i=\frac{GP_i}{L_i}=\frac{I_i+O_i}{L_i} \qquad (7)$$

Positive NR_i indicates the net inflow, while negative NR_i indicates a net outflow. The greater the absolute value of NR_i is, the higher the net flow activity can be; the greater the GR_i is, the higher the total flow activity can be.

Referring to Qi Wei et al. (2017), we establish an improved classification of regional types of floating population (see "Fig. 1"). Considering the proportion and scale of the floating population, the active type of China's floating population is first divided according to the activity threshold γ, and then the net inflow active area and the net outflow active area are divided into two sub-areas by using the floating population size threshold θ.

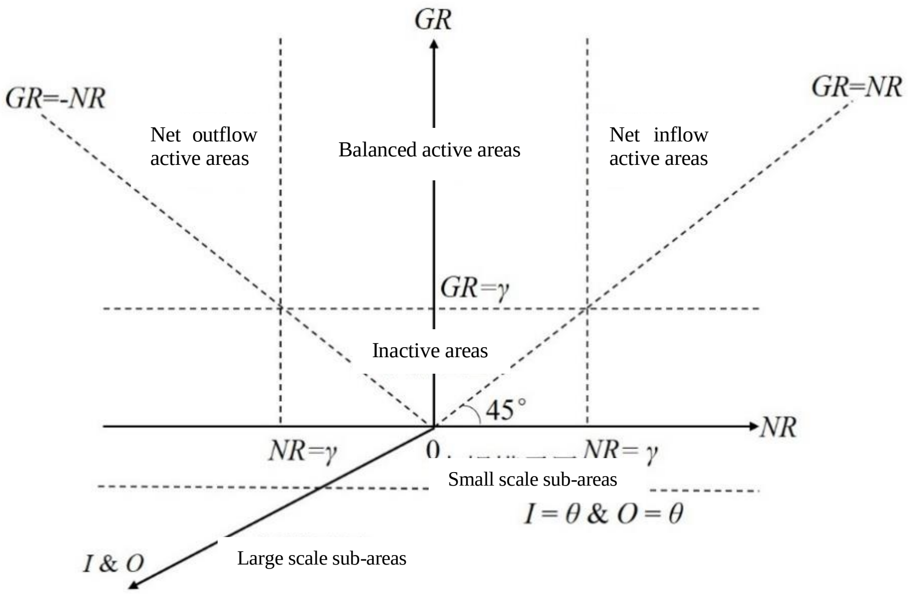

Fig. 1. Interpretation map of area type of inter-provincial floating population based on modified composite index method.

3) Measurement of spatial spillover effects of inter-provincial population: The Wilson model is a model for measuring the scale and extent of resource flows between regions. According to the principle of the model, there is a resource radiation and absorption relationship between the regions j and k, and the attraction power of region j to the regional resource of the region k is:

$$T_{jk}=KO_jP_ke^{-\beta R_{jk}} \qquad (8)$$

Among it, T_{jk} represents the number of resources derived from region k attracted by region j; O_j is the resource strength of region j; P_k is the total number of resources for region k; R_{jk} is the distance between the two regions; β is the attenuation factor, which determines speed of the decay rate in the region. The larger the β value, the faster the decay; K is the normalization factor, which is generally set as 1. Referring to Wang Zheng (2002), this paper simplifies the Wilson model as

$$\theta = P_k e^{-\beta R_{jk}} \qquad (9)$$

In the formula, θ is the threshold of the size of floating population, which represents the maximum range of external radiation in a region. When the scale of the inter-provincial floating population in a region decays below this value, it can be considered that the region has no radiation effect outside the radiation range. Taking the logarithm on both sides of Formula (9), the following can be obtained:

$$R = \frac{1}{\beta} \ln \frac{P_k}{\theta} \qquad (10)$$

Referring to Wang Zheng (2002), the value of β can be simplified as:

$$\beta = \sqrt{\frac{2T}{t_{\max} D}} \qquad (11)$$

Where t_{max} is the maximum number of regions with population absorption capacity; D is the domain element of the interaction region; T is the number of regions.

III. Inter-provincial Population Size and Current Forecast Under the Implementation of the Universal Two-child Policy

A. Forecast of Population Natural Growth

In general, changes in population size in an area are mainly affected by three factors: fertility factors, death factors, and migration factors. Any other non-population factors, including fertility policies, levels of economic development, medical and health conditions, and wars, all contribute to the size of the population by changing demographic factors. After the implementation of the universal two-child policy, population prediction needs to estimate fertility changes and potential fertility effects.

The age shift algorithm can predict the population growth under the normal state. In the years after the adjustment of the birth policy, there is a process of concentrated release of the accumulated fertility in the past. The birth population will be the sum of the regular birth population and the released birth population, which need to be considered separately. The key is to estimate the released fertility levels, as follows:

First, we need to estimate the target population of the policy. According to the general statistics, women of childbearing age are 15 to 49 years old. Considering that young women (15-19 years old) and senior women (45-49 years old) of childbearing age are not sensitive to adjustment of fertility policy, this paper sets the age range of women of childbearing age, the policy target to 20~44 years old. Based on the data of the sixth national census in 2010, the age shift algorithm was used to calculate the scale of women of childbearing age in 31 provinces in 2015, with a total of 10,000 people. Based on the survey data of the fertility willingness of the China Population and Development Research Center (Zhuang Ya'er et al., 2014), we further reduce the number of women of childbearing age who are eligible and willing to have two children, and calculate the target population of “two children” account for about 45.56%, with the scale of 96.522 million by referring to Qiao Xiaochun (2014). According to the National Health and Family Planning Commission, the proportion of births of second children was 45% in 2016 and 51.2% in 2017. The average of the two was calculated to estimate the released second-child of 46.427 million.

Then, the people released by the “two-child fertility policy for couples where either the husband or the wife is from a single child family” should be deducted. In November 2013, China’s “two-child fertility policy for couples where either the husband or the wife is from a single child family” was officially implemented and will last for two years by the end of 2015. According to the data of the National Health and Family Planning Commission[1], up to the end of December 2015, there were 2 million pairs of “couples consisting of single-child wife or husband" applying for re-fertility in the country. After the deduction of the number of women of childbearing age released in this part, the estimated target population of the universal two-child policy started in 2016 can be estimated to be approximately 44.427 million.

According to the data of “the Sixth Census”, the total fertility rate in China is 1.18. Most scholars (Chen Wei, Zhang Lingling, 2015; Zhai Zhenwu et al., 2015; Wang Jinying, Ge Yanxia, 2016) believe that this data is not in line with China’s reality mainly because of fertility underreporting. We reappraise the underreporting situation and use other data including household registration data, public security data and educational data to estimate fertility. It is believed that the actual total fertility rate in China is 1.5 to 1.9, and the United Nations Population Division estimates that the total fertility rate in China is 1.73. Therefore, the current total fertility rate in China is around 1.7.

Based on the above analysis, the total fertility rate is set to two programs. The first plan assumes that the birth policy does not change during the forecast period, which is called the “reference plan”. The second plan considers the impact of changes in the birth policy on the fertility factors and assumes China’s total fertility rate has remained at 1.93 by 2020 around the release of “birth accumulation” since the implementation of the universal two-child policy, which is called “experimental plan”. This data is taken from the results of the National Fertility Desire Survey, with a certain scientificity and representativeness.

[1] National Health and Family Panning Commission. Statistical Communique on the Development of Health and Family Planning in China in 2015. http://www.nhfpc.gov.cn/guihuaxxs/s10748/201607/da7575d64fa04670b5f375c87b6229b0.shtml

The population prediction of the provinces is based on the "the Sixth Census" data and the national fertility desire survey data, and use the national total population forecasting method. Affected by the adjustment of the fertility policy, we assume that the total fertility rate of each province is 1.3 times that before the adjustment of the birth policy, and select the forecast result of 2020 (see "Fig. 2").

B. Population Flow Forecast

The flow of population between provinces can change the spatial distribution pattern of China's labor force, which in turn affects the socio-economic development of various provinces. The inter-provincial population mobility is a dynamic process of the national total population flow, which can be described and predicted by using the Markov process. The Markov process reflects the dynamic evolution of the transaction. It believes that the state where the process will reach at a certain moment or spatial position depends only on the current state and rather than the previous state. Therefore, China's inter-provincial population mobility can be characterized by the Markov process.

Referring to Cai Jianming et al. (2007), using the 2010 "the sixth Census" data, the statistical data of "current residence and household registration location" were selected to construct the inter-provincial population inflow probability matrix and outflow probability matrix (31×31 square matrix), and initial inflow probability vector and outflow probability vector (31×1 vector). By using Markov chain to measure the inter-provincial population flow, the inter-provincial population flow probability vector (31×1 vector) in 2020 can be obtained.

The national 1% population sample survey data and national census data show that the total inter-provincial population flow in China we 42.20 million, 50.52 million, 85.88 million, and 97.23 million in 2000, 2005, 2010, and 2015 respectively. Using the logistic curve extrapolation and the gray equivalent dimensions addition method (Li Yongfu et al., 2006), the total flow scale of the inter-provincial population in China is predicted, and average the two is calculated to measure the total flow of the inter-provincial population in China in 2020 as 109.21 million. (See "Fig. 2").

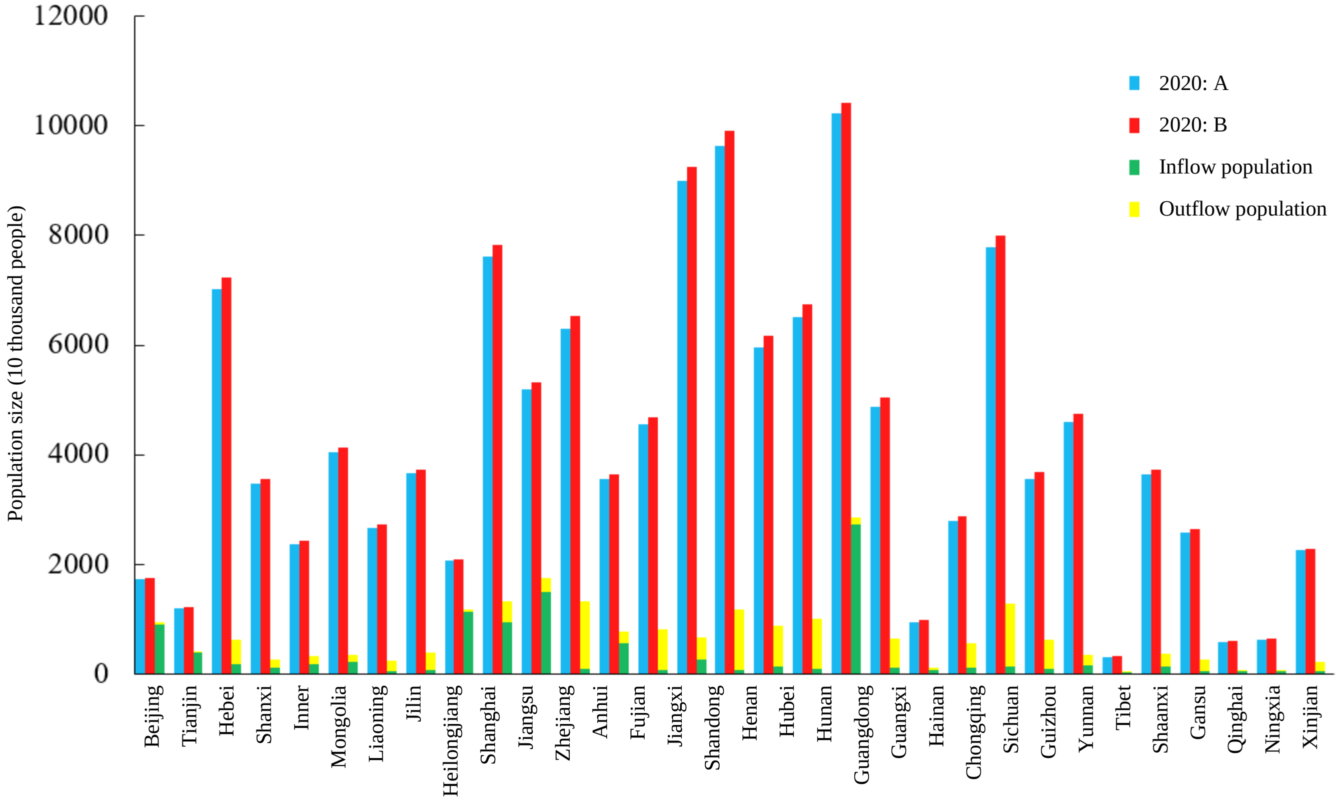

Fig. 2. Prediction of population size and floating population in 2020 (10,000 people).

[a] Remarks: A is the reference plan, B is the experimental plan, the same below.

IV. Forecast of the Evolution of Inter-provincial Population Mobility Pattern

According to the classification standard of "Fig. 1", the types of inter-provincial population flow areas are divided. First, the thresholds for population active and inactive areas are estimated. Considering that the proportion of inter-provincial migrants to total population in 2010 and 2020 is 6.44% and 7.65% respectively, the activity threshold γ is set to 0.07 and 0.08. Next, the floating population size threshold θ is estimated. In this paper, the scale threshold θ is set to 7 million. According to the scale of China's inter-provincial population movement from 2010 to 2020, this estimate is more reasonable. Selecting 10 million or 5 million people will result in too few or too many regional type sub-regions. Then according to the classification criteria in "Fig. 1", the regional population of the 2010 and 2020 experimental programs and the inter-provincial scale of the reference plan in 2020 are divided into according to regions, and the results are shown in "Fig. 3".

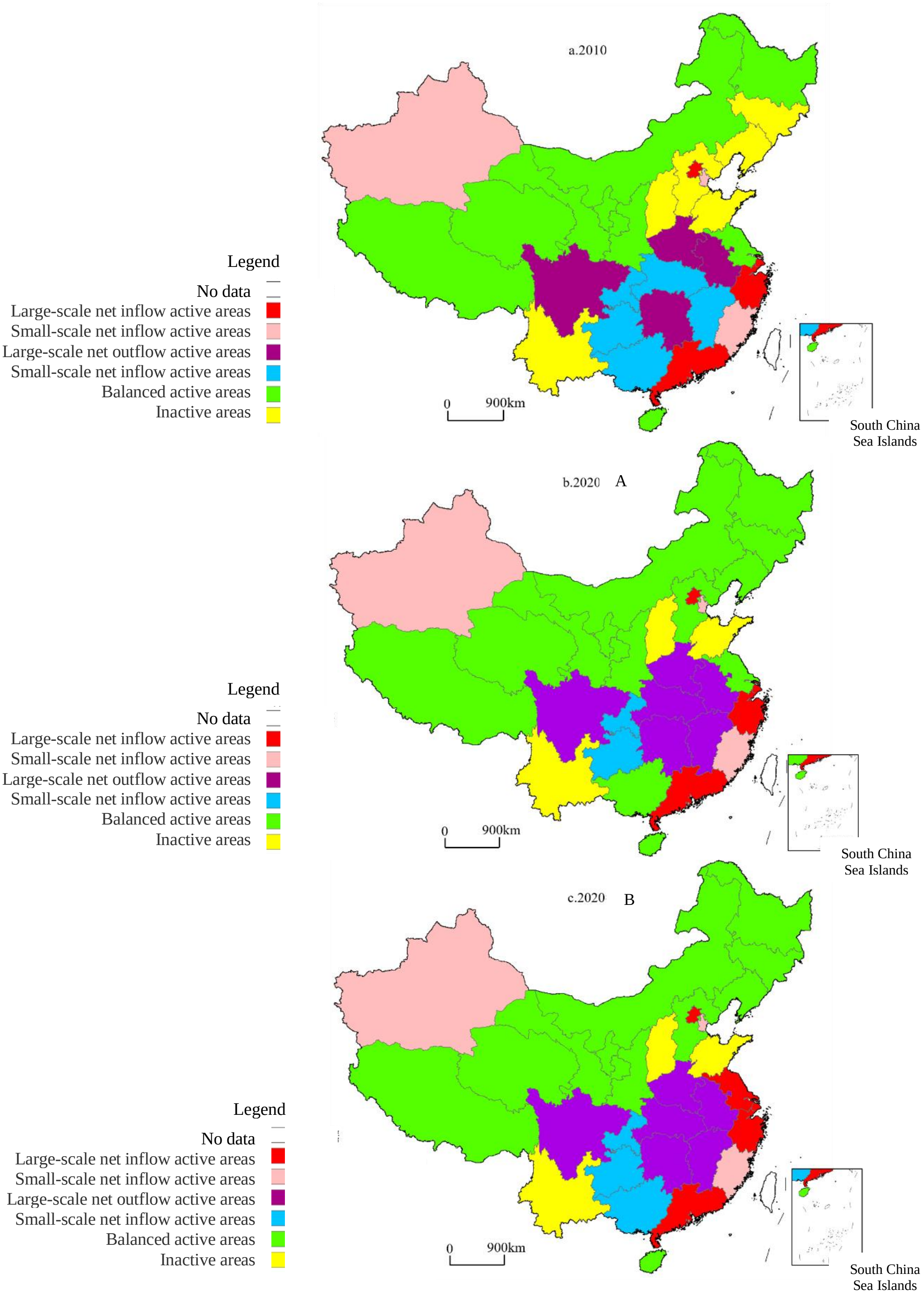

Fig. 3. Regional Types of Inter-provincial Floating Population in China in 2010 and 2020.

Comparing the regional pattern of inter-provincial population flow in the experimental program and the reference program in 2020, it is found that the regional types are basically the same. The only difference is that under the experimental plan, namely the implementation of the universal two-child policy, Jiangsu is transformed from the net inflow active area to a balanced active area, while Guangxi is transformed from a net outflow active area to a balanced active area. The possible reasons are: First, the rapid development of inter-provincial transportation and the acceleration of information dissemination have prompted the population mobility in Jiangsu and Guangxi, especially the growth of Guangxi inflow population and the growth of Jiangsu outflow population; the second is the higher fertility level of second child has led to the natural growth of the local resident population in Guangxi and Jiangsu, increasing the population base of the two places.

Comparing the area pattern of inter-provincial population movements in the experimental schemes of 2010 and 2020, it was found that the large-scale net outflow active area has increased. Due to the increase in the size of the outflow population, Hubei and Jiangxi provinces have changed from small-scale net outflow active areas to large-scale net outflow active zone (see "Fig. 3"). In 2020, the net inflow active area is mainly concentrated in the southeast coastal zone. The balanced active area changes greatly. First, it is transformed from the net outflow active area. Due to the increase of the local resident population, the absolute value of the net flow coefficient is reduced, such as Guangxi; the second is transformed from the inactive area, such as Liaoning, Hebei, Jilin; the remaining balanced active areas are mainly distributed in Hainan in the eastern region, Tibet, Ningxia, Inner Mongolia, Qinghai, Shaanxi, Gansu and Heilongjiang in the northeastern region in the western region. The number of net outflow active areas has declined. Among them, due to the surge in the size of the outflow population, the proportion of net outflows has become the main body, which has been transformed into large-scale net outflow active areas such as Hubei and Jiangxi. The inactive areas are Shanxi, Shandong and Yunnan. Due to the concentration of local permanent residents and relatively small inter-provincial floating population, the total flow coefficient is low. For example, in 2020, the local resident population of Shandong Province reached 89.35 million; inter-provincial inflow population and outflow population are only 2.69 million and 3.94 million respectively.

V. Prediction of Inter-provincial Population Spatial Spillover Effect

This paper uses the Wilson model to measure the spatial spillover effect of inter-provincial population in large-scale net inflow active areas. First, the average area of administrative land area of 31 provinces is used to represent the zone element area D, which is 301,500 square kilometers. The number of provincial-level administrative region indicates T, which is 31; the large-scale net inflow active area is highly polarized in developed regions such as the Pearl River Delta, the Yangtze River Delta, and the capital, which can form a population with provincial influences, which means t_{max} is 4. Substituting the data into the formula (11), the attenuation factor $\beta = 0.00705$ can be obtained. The threshold θ is still 7 million. Substituting the above data into formula (10), the radius of population attraction intensity of each province and city is obtained (see "Fig. 4" and "Fig. 5")

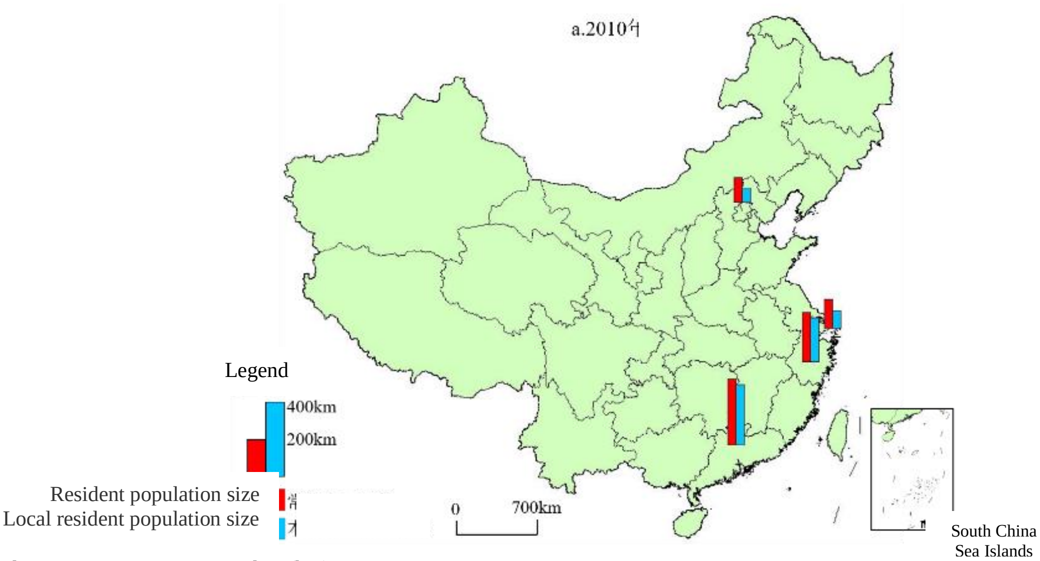

Fig. 4. Interprovincial population attraction intensity radius (km)-1.

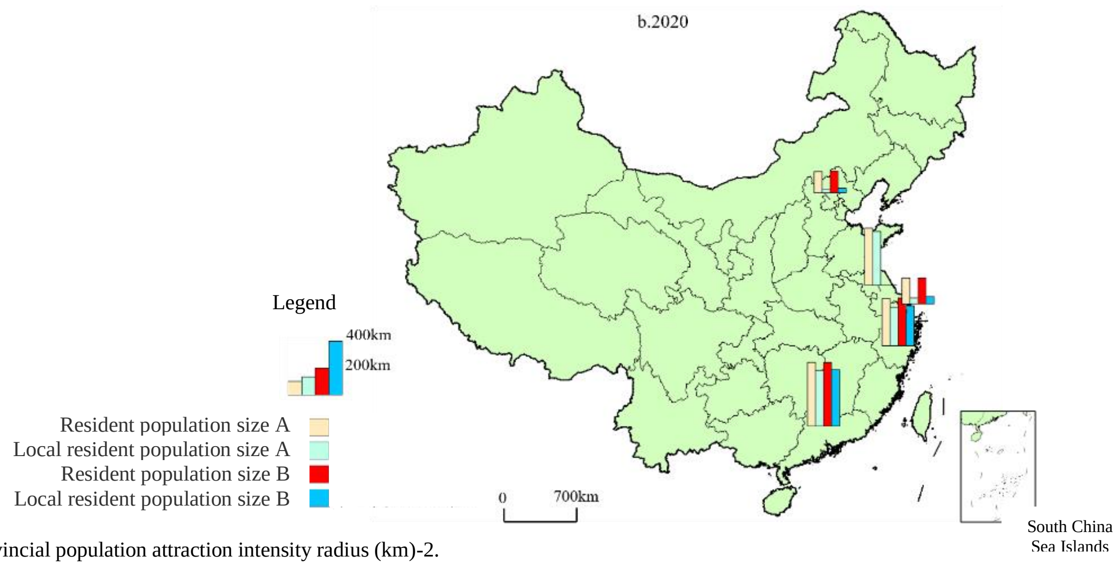

Fig. 5. Interprovincial population attraction intensity radius (km)-2.

Comparing the results of two statistical specifications, we can observe the contribution of inter-provincial influx to the spatial spillover effect of population agglomeration. In 2010, the population flowing into the large-scale net inflowing active area accounted for 57.46% of the inflows of the province's inter-provincial population. The large-scale net inflowing active area has a significant population diffusion effect and a significant population growth advantage. Based on the calculation results, it is found that with the growth of inter-provincial inflow population, the contribution of inter-provincial inflow to population agglomeration effect is gradually increasing, reaching 45.17% in 2020, an increase of 18.87 percentage points over 2010 (see "Fig. 4"). In the large-scale net inflow active area, the variable coefficient of the population attraction intensity radius when there is inter-provincial population mobility (i.e., the resident population size) and there isn't the inter-provincial population mobility (i.e., the local resident population size) is 0.495 and 0.948, respectively and in 2010, they are 0.448 and 0.653. It can be seen that the spatial spillover effect when there is no inter-provincial population inflow is smaller than that without inter-provincial population inflows, indicating that the spatial redistribution of inter-provincial floating populations increases regional differences in spatial spillover effects, and the focus of China's population agglomeration gradually shifts toward the southeastern coast.

Comparing the population attraction intensity radius of the reference scheme and the experimental scheme, it is possible to quantitatively examine the impact of the universal two-child policy on the spatial spillover effect of the inter-provincial population. The high concentration of population means the accumulation of human capital. As time goes by, the agglomeration effect becomes more and more obvious. According to the calculation results, taking the resident population as an example, the implementation of the comprehensive two-child policy is 1.24 percentage points higher than the population attraction radius when the two-children are not implemented. This indicates that the comprehensive two-child has a certain role in promoting the spatial spillover effect of the inter-provincial population.

VI. CONCLUSION

Based on the implementation background of “the universal two-child policy”, this paper uses the data of the sixth national census in 2010 to measure the scale of China's inter-provincial population and the size of floating population in 2020. According to the population data of 2010 and 2020, the evolution of the inter-provincial population flow pattern and the spatial spillover effect in China are explored and following conclusions are gained:

Considering that fertility levels are affected by changes in fertility policies, it is estimated that the full implementation of the two-child policy will promote the development of China and the inter-provincial population in 2020. With the strengthening of inter-regional linkages, the study suggests that the spatial pattern of inter-provincial population movement in China in 2020 will tend to be stable. At that time, the provinces with large-scale net migration of population are Guangdong, Zhejiang, Shanghai, and Beijing.

Considering the direction, activity and scale of population movement, 31 provinces can be divided into six types of areas including large-scale net inflow active areas, small-scale net inflow active areas, balanced active areas, large-scale net outflow active areas, small-scale net outflow areas, and inactive areas. Among them, large-scale net inflow active areas are distributed in the eastern coastal areas, and small-scale net inflow active areas include Fujian and Tianjin in the east and Xinjiang in the west; balanced active areas are mainly distributed in the northeast and western regions; large-scale net outflow active areas are mainly distributed in the central region; the small-scale net outflow active area is located in south of the Hu's line; the inactive area is mainly Yunnan.

The inflow of population is vital to regional development. The inter-provincial population inflows promote regional population agglomeration, and the focus of China's population agglomeration gradually shifts toward the southeast coast. The capital, the Yangtze River Delta and the Pearl River Delta are the gathering centers for the inflow of population from other provinces. Among them, the radiation effect of Beijing and Shanghai on the surrounding areas is weak, mainly driven by the inter-provincial inflows of the two places, and their contribution to the concentration of inflows to the provinces accounted for 72.98% and 79.55% respectively. The attraction intensity of the inter-provincial population is stepped up from north to south, and the spatial spillover effect of population in Guangdong Province is basically stable.

The full implementation of the universal two-child policy is a major adjustment of China's fertility policy in recent years, which will inevitably have an impact on China's population development and affect regional population agglomeration to a certain extent. Due to the lag in the changes in birth policy, the policy adjustment was not obviously manifested in the early stage. In order to reduce the side effects of policy adjustments, it is necessary to make forward-looking predictions and studies on the social impact of the universal two-child policy.

Based on the data of the sixth national census in 2010, this paper discusses and analyzes the spatial spillover effects of inter-provincial population movements in 2010 and 2020. The impact of different floating population size thresholds on the estimation of spatial spillover effects and the zone element unit is worth further exploration. In the actual application process, considering the interaction of the zone element for an inflow province or outflow province, it is analyzed that the spillover effect of inter-provincial flow should have more distinct regional characteristics, which provides more scientific decision support for the development of China's birth policy, regional population mobility policy and population redistribution.

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