

# Experience on the Influence of Living Environment on Population Migration

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**Abstract:** The impact of living environment on population migration is reflected by the voting system of feet. In China, whether such design based on different systems plays the same role or not is the core of the study and discussion. Therefore, the data based on the Chinese population census and population sampling survey, the analyzing method of individual fixed effect panel, and the testing on the influence of living environment on population migration based on the gravitation model, all of them provide China's experience for the study. The study deals with the role of discrepancies in local fiscal expenditure of China in inter-provincial migration, the comparison between fiscal expenditure in production and the people-to-people financial expenditure, and the impact of differences in living conditions including climatic conditions, cultural and educational conditions on population migration and other aspects.

## 1. Introduction

For free-floating population, no matter where people migrate to and which factors their decision are based on will promote the effective utilization of public resources to a certain extent. The difference lies in that if the preference of migrating population can be more clearly defined, the efficiency of resource allocation will have a greater degree of promotion. On the contrary, it may not be conducive to the sustainable use of resources and the sustainable development of the region. Therefore, at the moments when China deepens its reform and people are seeking pluralism, the comprehensive study about the effect of living environment on population migration shows that the preference of population migration is more conducive to the advancement of supply-side reform and the overall social harmony.

## 2. Literature Review and Variable Selection

Among the many factors affecting population migration, public goods (including public facilities such as education and medical services) and the environment can be considered as major living environment considerations. Zhang Qichun et al. (2008) conducted a study on the emigrants of Hubei in 2000 and 2005. They found that the impact of basic public services on the migrants was negative due to insufficient input of basic public services in different regions and access restrictions in China. Liang et al. (2008) examined the relationship between housing prices and the supply of local public goods in 35 large and medium-sized cities using a dynamic panel regression model to test the suitability of the Tiebout model in China. The results of the measurement showed that there was a significant positive impact on the real estate prices in terms of the intensity of both local and national fiscal expenditures<sup>[1]</sup>. In addition, Tang et al. (2009) also used the gravity model of resident relocation to make an empirical study on the correlation between the transfer of provincial residents and local public expenditure in China<sup>[2]</sup>. In addition, Xue et al. (2009) used the power-law model to examine the impact of Taiwan's annual fiscal distribution on the population changes in counties and cities. The result showed that the fiscal distribution effect could only have a temporary and intensive effect on the population. Similarly, Wang et al. (2009) held that the growth rate of per

capita GDP and the number of health technicians per 1000 population in China had a significant impact on the net inflow of human capital using the micro data of the Chinese Census and drawing a conclusion with the multiple regression analysis. Wu et al. (2016) conducted empirical tests using 283 panel data and non-linear threshold measurement models and found that the net effect of production-related public expenditures and consumer-public expenditures on labor migration showed "U"-shaped and reverse "U"-shaped single threshold effect, which guided the reasonable and orderly migration of labor force, In addition to adjusting the scale of public expenditure, differential public finance policies can be implemented according to the heterogeneous reaction of labor migration to different types of public expenditures<sup>[3]</sup>.

The environment of this article includes not only man-made greening environment but also natural environment such as climate and temperature. Some studies have analyzed the impact of environmental factors on population migration (Chen Qiushi, 2015; Yu Qingnian et al., 2010). Fang Jinqi (1989) studied the climate changes and the impact of environmental changes resulting from them on the population migration in China's historical period, emphasizing the impact of climate change on historical population migration without considering it as the only influential factor. Yu Qingnian and Shi Guoqing (2010) analyzed the action mechanism of human migration caused by climate change and sorted out the hot and difficult issues in the field of environment, climate change and population migration. Based on the actual situation of China's population migration and flow, Xiao Zhouyan (2010) put forward the hypotheses about the transformation of population migration potential energy, believing that population migration was a function of individuals, environment and intermediate channels. Cao Zhijie and Chen Shaojun (2012) analyzed the history and reality mechanism of climate risk and population migration. They also put forward a series of countermeasures and suggestions on the status quo and development trend of climate immigrants caused by climate warming in order to solve the problems of climate immigration. Qingnian et al. (2011) focused on the impact of extreme climate events on population migration, conducted a survey on the 2010 super-drought event in southwest China, and introduced the theoretical framework model of "climate change-population migration response."

Gravitation models are widely used in the study on influencing factors of population migration. We mainly use the gravity migration equation used by Lewer et al. (2008) to incorporate public goods and environmental factors into the model, and adjust the gravitational equation of migration based on China's actual conditions. In order to compare the impacts of different types of public goods on population migration, the expenditure of substitute variables of public goods are divided into two parts: production-type fiscal expenditure and people-live-type fiscal expenditure. Among them, production-based fiscal expenditures refer to expenditures for capital construction as well as industrial transport and circulation sectors that make more contribution to economic growth; People's livelihood expenditures refer to those expenditures for improving the life quality of residents and for their own sustainable development, mainly including culture, education and health care, as well as social security expenditures. Taking into account of the non-competitive and non-exclusive public goods, financial indicators are total indicators. Specific to the climate, greening and other natural environment, the main consideration covers the temperature and green area. All variables belong to control variables except the living environment. See Table 1 for the meaning of specific variables.

Table1 Variable Meaning

	Variable name		Variable meaning
Explained variable	Migration variables		The logarithm of migrations between the two provinces
Explanatory variable	Fiscal expenditure variable		The fiscal expenditure of emigration origin/immigration destination
	Construction expenditure variable		The construction expenditure of emigration origin /immigration destination
	Living condition	Culture, education and health variable	The culture, education and health variable expenditure of emigration origin/immigration destination
		Environment variable	The greening areas (air standard days) of emigration origin/the immigration destination
		Climate variable	The average temperature of emigration area/immigration destination

In order to improve the accuracy of the regression, the model also includes the emigration origin and immigration destination population variables, per capita output variables, resident consumption variables, average wage variables and distance dummy variables. In addition to the distance dummy variables (when the distance between emigration origin and immigration destination more than 1000 kilometers, the variable value will be 1), the rest are the ratio of actual economic population data of the emigration origin and immigration destination.

After the integrations of interprovincial migration data, the equilibrium panel data of 2610 observation values with a cross section of 870 and a time of 3 were obtained. Due to the large number of explanatory variables selected, excluding the interference of collinearity on regression, we selected the lagged data of all explanatory variables basically. So the population controlled by the explanatory variables was based on the data of nationwide census of 2000 and 2001, the population migration data of 1% residents in 2005 which according to the data of the present and five years ago. The explanatory variables data are based on China Statistical Yearbook of 1996, 2001 and 2006. The reason why we chose the data of the current residence and the permanent residence population five years ago mainly for considering living environment plays a more significant role in the medium and long term relocation.

### 3. Result Analysis Above Regression

The research mainly adopts STATA software for panel data processing. Between the selection of the fixed effect model and random effect model, we found that the individual effects has no relationship with the explanatory variables which based on Hausman test. The basic assumption of random effects could not be satisfied, we adopting the fixed effect regression model of panel data finally. The regression was from the public goods supply and the natural environment of human settlements two perspectives separately. Public goods were represented by financial expenditure, and the natural environment was as the representative of the temperature and green area. Table two indicates the effect of public goods on population migration at different stages. Table three indicates the effect of natural environmental factors on population migration at all stages.

Table2 The regression results of public goods at different stages

	2000-20 10	2000-20 05	2005-20 10	2000-20 10	2000-20 05	2005-20 10	2000-20 10	2000-20 05	2005-20 10
Population variable in immigration destination	0.140** (-2.5)	0.804** (-2.22)	0.171*** (-2.64)	0.148** (-2.6)	0.936** (-2.56)	0.149** (-2.19)	0.147*** (-2.61)	0.782** (-2.16)	0.157** (-2.33)
Population variable in emigration origin	-0.055 (-0.98)	1.132*** (-2.85)	-0.105 (-1.63)	-0.063 (-1.11)	0.491 (-1.22)	-0.082 (-1.21)	-0.059 (-1.05)	0.757* (-1.93)	-0.088 (-1.3)
Per capita output variable	0.006** (-2.45)	0.953*** (-7.13)	0.012*** (-4.34)	0.006** (-2.26)	1.001*** (-7.39)	0.012*** (-4.26)	0.006** (-2.24)	0.988*** (-7.42)	0.011*** (-3.65)
Resident consumption variable	0.035 (-1.07)	0.147** (-2.58)	-0.080** (-2.03)	-0.033 (-1.01)	0.157*** (-2.7)	-0.04 (-0.97)	-0.046 (-1.39)	0.115** (-2)	-0.035 (-0.86)
Average wage variable	0.286*** (-3.8)	-0.206 (-1.03)	0.170* (-1.83)	0.229 (-3.01)	-0.331* (-1.65)	0.194** (-2)	0.345*** (-4.5)	-0.156 (-0.78)	0.254*** (-2.6)
Fiscal expenditure variable	-0.251** (-10.06)	-0.261** (-6.64)	-0.466** (-11.68)						
Production expenditure variable				-0.068** (-6.87)	-0.059** (-3.85)	-0.174** (-6.4)			
People's livelihood expenditure variable							-0.227** (-9.13)	-0.226** (-6.57)	-0.281** (-6.77)
Distance variable	6.045*** (-15.78)	1.095* (-1.92)	0.634 (-1.28)	1.257*** (-2.82)	1.287*** (-7.73)	0.851 (-1.63)	1.100*** (-9.13)	1.073* (-1.88)	0.982* (-1.9)
N	2610	1740	1740	2610	1740	1740	2610	1740	1740
R-sq	0.3564	0.1441	0.3979	0.3368	0.1179	0.3344	0.3501	0.1454	0.338

Note: Brackets for the t value; \*, \* \* and \* \* \* represent 10%, 5% and 1% significant levels respectively.

Through the regression results of Table 2, we can see that the population density, per capita output, average wage and other control variables play a significant role in the overall regression of the year 2000-2010. While the coefficient of public expenditure on behalf of public goods is significantly negative, indicating that there is a significant relationship between the migration quantity and the public product allocation. At the same time, higher public goods spending are conducive to attracting more people to move in and for the non-exclusive and non-competitive of public goods, unless the population is saturated to a certain extent. Its positive externalities should be more obvious. The area where the population moved into is dense while the pulling force is still high, the relocation of the population density while the force is still full are the specifically reflection in the regression. It is mainly due to the public goods configuration in the move out origin which affects people's life is for it's not rich and people's livelihood environment needs to be improved. In the comparison of different types of public goods, we found that people's livelihood public goods which represented by the educational and health expenditure has greater effect to population migration than the production of public goods. It indicates that the elements which are conducive to the survival and development living environment have been paid much more attention among those who choose to immigration in the medium and long term. In addition, it can also be found in the phase comparison, whether the fiscal expenditure spending is conducive to economic development or to people's livelihood spending. The significance and intensity of the regression during the 2005-2010 period is greater than that from 2000-2005. It shows that people pay more and more attention to the convenience and the protection level of living environment with the

improvement of population quality and economic development.

Table3 Regression results of environmental factors at different stages

	2000-2005	2005-2010 (Greening)	2005-2010 (Air)	2000-2010
Population variable in immigration destination	0.8432321** (-2.29)	0.1409305** (-2.16)	0.1450974** (-2.15)	0.1378433** (-2.46)
Population variable in emigration origin	0.5480342 (-1.45)	-0.076264 (-1.17)	-0.0758524 (-1.21)	-0.051888 (-0.92)
Per capita output variable	0.9248442*** (-7.15)	0.0116146*** (-4.12)	0.0106242*** (-3.65)	0.0058779** (-2.38)
Average wage variable	-0.1919217 (-0.95)	0.1079491 (-1.15)	0.2191648** (-2.28)	0.3101455*** (-4.03)
Distance variable	1.061577* (-1.86)	0.9601703* (-2.26)	1.015298* (-1.97)	1.117427** (-2.53)
Climate variable	-138.9336 (-1.47)	-185.8967** (-2.02)	-215.7521** (-2.48)	-182.3082** (-2.48)
Environment variable	-0.020002 (-0.6)	0.0343994*** (-7.47)	0.0622163 (-0.52)	0.0088367** (-2.24)
Culture and education variable	-0.2311255*** (-6.74)	-0.3024336*** (-7.53)	-.2854064*** (-6.87)	-0.2304226*** (9.28) ***
N	1740	1740	1740	2610
R-sq	0.1442	0.3821	0.3423	0.3536

Note: Brackets for the t value; \*, \* \* and \* \* \* represent 10%, 5% and 1% significant levels respectively.

Table three shows the influence of environmental factors on population migration at different stages. It can be seen that in the process of population migration from 2000 to 2010, the cultural and educational variables are significantly negative. It's indicating that the humanistic education environment is a common issue for migrants to choose their residence. Moreover, comparing the two stages of 2000-2005 and 2005-2010, the intensity of the latter stage has also been enhanced. Another is the climatic factor in the natural environment; the place where the average temperature is higher is more likely to be the immigration destination. Combining with the actual Chinese geography, locates in subtropical area, there is a long period of livable time in the warm and humid natural environment in low latitude, while there is only a short livable time in high latitude for its cold and dry climate. People paid much more attention on climate and environment during the period of 2005-2010.

In the living environment variables, the environmental variable have different results with we respected. City greening area and air standard days were included. The regression coefficient is significantly positive in the stage of year 2005-2010, that is to say the city greening area did not play a role in attracting the influx, but even played a role in promoting the population outflow. As far as we concerned, when population migration takes place between regions where economic development reaches a certain level, such variables as greening area and air index can attract some population influx (Xi Penghui et al., 2015), but in our country, the economic development differences between Inter-provincial play a more important role.

#### 4. Conclusion

The study takes the population migration since 2000 as the object and selects the medium- and long-term population migration data as the explanatory variables. It is found in the examination of

the natural conditions of public goods and human settlements that public goods variables represented by financial expenditure have great influence on the population migration. In particular, expenditure on public goods such as culture, education and health, which is closely related to the survival and development of migrants, has a greater effect on population migration than production-type government expenditures. And it has been gradually increased with the time passed by. The climate variables and culture, education and health variables in living environment have a significant effect on population migration, which is consistent with theoretical research expectations. It's increasingly important year by year indicates that with the progress of society, people have more significant diversified needs. Improving the living environment is good for attracting population inflow, and increases the economic vitality of the region. Due to the large gap between the economic development levels of various provinces in China, most of the inter-provincial migrations are from underdeveloped areas to the developed areas. It has not been active in the migration of underdeveloped areas to underdeveloped areas and the developed areas to the developed areas. That is the reason why the environmental variables have not obtained the expected estimation results. In the future, with the balance of economic development and the expansion of data, the estimation of environmental variables will become more accurate.

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### **Reference**

- [1] Liang Ruobing, Tang Yun. Tiebout Model in Local Public Goods Supply: An Empirical Research Based on Urban Housing Prices in China [J]. World Economy, 2008 (10): 71-83.
- [2] Tang Yun, Liang Ruobing. Inter-provincial Migration and Local Public Expenditure in China: An Empirical Study Based on Gravity Model [J]. Finance and Economics Study, 2009 (11): 16-25.
- [3] Wu Weiping, Liu Naiquan. The Threshold Effect of Heterogeneous Public Expenditure on Labor Migration: Theoretical Model and Empirical Analysis [J]. Finance and Trade Economics, 2016,03: 28-44.