

# Research on the Impact of Urban Labor Mobility on Regional Housing Economic Level

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## Abstract

This paper applies a model that can analyze the correlation between the mobile labor force and regional housing economy to examine 70 prefecture-level cities in the Yangtze River Basin from 2014 to 2023. The spatial autocorrelation of the two variables, mobile labor force and housing price, was first tested. Regression calculations were then carried out according to the correlation analysis model. The results showed that both the mobile labor force and housing price variables exhibited spatial autocorrelation. Moreover, mobile labor, medical security, educational conditions, and economic level were all significantly positively correlated with regional housing economy. Variables such as housing prices, mobile labor, medical security, educational conditions, economic level, and government spending demonstrated spatial spillover effects, which were found to affect the housing economy in the surrounding areas.

## Keywords

Correlation Analysis, Housing Economy, Mobile Labor Force, Spatial Weight

## 1. Introduction

Against the backdrop of accelerated globalization and urbanization, population mobility, particularly the cross-regional migration of the urban labor force, has become an important driving force behind regional social and economic progress [1]. With the gradual relaxation of China's urban and rural household registration system, the continuous optimization of its industrial structure, and the deepening advancement of the new urbanization strategy, an increasingly number of workers have been choosing to move from rural areas to cities, from small and medium-sized cities to major metropolitan areas and even metropolitan areas [2]. This trend has not only reshaped the population structure and employment patterns of cities but has also profoundly influenced the supply and demand relationship, price dynamics, and overall economic performance of the regional housing market [3]. Housing, as a basic guarantee of residents' lives and as an important component of social capital, plays a key role in urban development. Labor mobility affects housing demand, supply, prices, and market activity either directly or indirectly by changing the population size, income structure, and consumption capacity of a region.

Especially in first-tier cities and key urban clusters, due to the high density of employment opportunities and the agglomeration of high-quality public resources, the large-scale inflow of migrant

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workers often triggers an imbalance between supply and demand in the housing market and a rapid rise in housing prices [4]. In some central and western regions or in resource-based cities, the outflow of population may give rise to problems including higher housing vacancy rates and lower real estate investment. Therefore, a systematic study examining how urban labor mobility affects regional housing economic levels will not only enhance our understanding of how population mobility reshapes the housing market pattern but will also assist the government in formulating more scientific and rational housing policies, thereby guiding the orderly distribution of population and promoting coordinated regional development [5]. Riley et al. [6] utilized data from the Community Advantage Panel survey and applied the multiple proportionate hazards framework to study the correlation between house price dynamics, unemployment rate, mobility, and housing use rights decisions made by low-income homeowners in the United States from 2005 to 2012. Dumeignil [7] examined how cross-border labor mobility affects real estate price trends and discovered that cross-border labor mobility does not influence the real estate price trends in the border region of French. By introducing an extended core-periphery (CP) model of housing prices, Niu [8] proposed two hypotheses that urban housing prices inhibit urban labor mobility and the growth of urban high-tech industries. Through empirical analysis and testing, it was found that increases in urban relative housing prices encourage the influx of labor into cities and inhibits the growth of high-tech industries within urban areas. This paper applied a model that can analyze the correlation between the mobile labor force and regional housing economy to 70 prefecture-level cities in the Yangtze River Basin from 2014 to 2023.

## 2. A Model for Analyzing the Correlation between Labor Mobility and Regional Housing Economy

In the context of accelerated globalization and urbanization, population mobility, particularly the cross-regional migration of the urban labor force, has become an important driving force for regional economic development [9]. Labor mobility is essentially a spatial reallocation of human capital. When a large number of laborers enter a certain city or region, the first issue they face is housing, which will quickly stimulate the local rental market and the commercial housing market, thereby affecting the local housing economy.

The benchmark model [10] for analyzing the correlation between labor mobility and the regional housing economy is:

$$\ln y_{it} = \alpha_0 + \alpha_1 x_{it} + \sum_{j=1}^n \beta_j c_{itj} + \theta + \vartheta + \varepsilon_{it} \quad (1)$$

where  $y_{it}$  is the average selling price of housing in region  $i$  during period  $t$ ,  $x_{it}$  is an indicator of mobile labor in region  $i$  during period  $t$ ,  $c_{itj}$  is the  $j$ -th control variable of region  $i$  during period  $t$ ,  $\alpha_0$  is a constant term,  $\alpha_1$  is the regression coefficient of  $x_{it}$ ,  $\beta_j$  is the regression coefficient of  $c_{itj}$ ,  $\theta$  and  $\vartheta$  are year and region fixed effects [11], and  $\varepsilon_{it}$  is a residual term.

This paper examines the correlation between labor mobility and the regional housing economy. Since different regions are not independent of each other, the mobile labor force will move from one region to another, and the housing economy level of a given region may also affect the housing economy of

surrounding regions. Therefore, the spatial effect should also be considered in constructing the correlation analysis model [12]. The formula of the model is:

$$\ln y_{it} = \alpha_0 + \rho_1 W \ln y_{it} + \alpha_1 x_{it} + \rho_2 W x_{it} + \sum_{j=1}^n \beta_j c_{itj} + \sum_{j=1}^n \gamma_j W c_{itj} + \theta + \vartheta + \varepsilon_{it} \tag{2}$$

where  $W$  is a spatial weight matrix [13] (the element in the matrix is the reciprocal of the distance between two regions),  $\rho_1$  is the correlation coefficient of  $\ln y_{it}$  under the influence of  $W$ ,  $\rho_2$  is the correlation coefficient of  $x_{it}$  under the influence of  $W$ , and  $\gamma_j$  is the correlation coefficient of  $c_{itj}$  under the influence of  $W$ .

### 3. Case Study

#### 3.1 Data Variables

This paper presents a case study of 70 prefecture-level cities in the Yangtze River Basin from 2014 to 2023. The relevant data are from the China Energy Statistical Yearbook, the China Statistical Yearbook, and the statistical yearbooks of the provinces in which the cities are located. The variables and their statistics required for analyzing the correlation between the mobile labor force and housing economy are presented in Table 1.

**Table 1.** Correlated variables and their statistics

| Variable type        | Variable               | Calculation method                                                                       | Maximum   | Minimum  | Average  |
|----------------------|------------------------|------------------------------------------------------------------------------------------|-----------|----------|----------|
| Explained variable   | Housing price          | Use the average price of commercial housing in the region                                | 33,815.21 | 2,236.65 | 6,458.98 |
| Explanatory variable | Mobile labor force     | The proportion of floating population within a region to the local registered population | 1.152     | -0.313   | -0.005   |
| Control variables    | Medical security       | The logarithm of the number of doctors in the area                                       | 11.39     | 7.46     | 9.47     |
|                      | Educational conditions | The logarithm of the number of ordinary middle school students in the region             | 5.21      | 1.25     | 3.22     |
|                      | Cultural conditions    | The logarithm of the number of books in libraries within a region                        | 12.10     | 5.39     | 8.50     |
|                      | Investment size        | The logarithm of real estate development investment within the region                    | 17.61     | 11.67    | 13.17    |
|                      | Economic level         | The logarithm of per capita gross domestic product (GDP) within a region                 | 12.20     | 9.46     | 11.04    |
|                      | Government spending    | The logarithm of general public budget spending within a region                          | 18.24     | 13.25    | 15.59    |
|                      |                        |                                                                                          |           |          |          |

### 3.2 Methods of Analysis

First, the Moran's I method [14] was employed to test the spatial correlation between housing prices and mobile labor force. The formula for calculating the Moran's I is:

$$MI = \frac{\sum_{i=1}^n \sum_{j=1}^n w_{i,j} (x_i - \bar{x})(x_j - \bar{x})}{(\sum_{i=1}^n (x_i - \bar{x})^2) \cdot (\sum_{i=1}^n \sum_{j=1}^n w_{i,j})} \quad (3)$$

where MI is the Moran's I,  $n$  is the number of regions,  $w_{i,j}$  is the weight between regions  $i$  and  $j$ , depending on the distance between the two regions,  $x_i$  and  $x_j$  are the housing price or mobile labor of regions  $i$  and  $j$ . The value of MI was between -1 and 1.

After verifying the spatial correlation between housing prices and the mobile labor force, regression calculations were performed on the correlated variable data using the constructed correlation analysis model [15].

### 3.3 Experimental Results

The Moran's I values for housing prices and mobile labor across different years are shown in Table 2. It can be seen that from 2014 to 2023, the Moran's I values for housing prices and for the mobile labor force across the studied prefecture-level cities were both greater than 0 and both passed the significance test at the 5% level. These results indicate that both the housing price and the mobile labor force variables had a positive spatial correlation, and that the spatial effect can be taken into account in subsequent correlation analyses.

**Table 2.** Moran's I for housing prices and mobile labor in different years

| Year | Housing price | Mobile labor force |
|------|---------------|--------------------|
| 2014 | 0.471**       | 0.472**            |
| 2015 | 0.594**       | 0.531**            |
| 2016 | 0.545**       | 0.415**            |
| 2017 | 0.544**       | 0.462**            |
| 2018 | 0.574**       | 0.435**            |
| 2019 | 0.493**       | 0.484**            |
| 2020 | 0.458**       | 0.552**            |
| 2021 | 0.486**       | 0.491**            |
| 2022 | 0.488**       | 0.423**            |
| 2023 | 0.446**       | 0.514**            |

\*\* indicates passing the significance test at the 5% level.

A regression model was constructed according to the formula described in the previous text. Model 1 only considered the impact of the mobile labor force on housing prices, i.e., only the explanatory variable of mobile labor force underwent regression calculation. Model 2 was built upon Model 1 by introducing other control variables and performing regression calculations on them. Model 3 was constructed by adding spatial weights to the correlated variables, incorporating them into Model 2, and performing regression calculations on the variables with spatial weights. The regression results for the three models are displayed in Table 3. Model 1 showed that the regression coefficient of the mobile labor force with

respect to housing prices was 2.326 was significant at the 1% level, demonstrating that the mobile labor force is positively correlated with housing prices. However, the  $R^2$  of Model 1 was 0.479, meaning that the explanatory power of the model was only 47.9%, which is not particularly high. After introducing control variables into Model 2, the regression coefficient for mobile labor was 1.655, which was significant at the 1% level. Among the control variables, the regression coefficient for medical security was 0.990, the coefficient for educational conditions was 1.707, and the coefficient for economic level was 0.805. All three control variables were significant at the 1% level, and the  $R^2$  of Model 2 was 0.766, indicating that the model's explanatory power was improved. Model 3 introduced the correlated variables with spatial weights. The regression coefficient for the mobile labor force was 1.454, which was significant at the 1% level. The regression coefficients for the control variables of medical security, educational conditions, and economic level were 0.403, 0.884, and 1.030, respectively, all significant at the 1% level. Among the correlation variables with spatial weights, the regression coefficients for housing prices, mobile labor, medical security, educational conditions, economic level, and government spending were 0.372, 1.542, 0.556, 0.624, 0.182, and 0.405, respectively, all significant at the 1% level. Model 3's  $R^2$  was 0.987.

**Table 3.** Regression results of the three models

| Variable                          | Model 1  | Model 2  | Model 3  |
|-----------------------------------|----------|----------|----------|
| Mobile labor force                | 2.326*** | 1.655*** | 1.454*** |
| Medical security                  |          | 0.990*** | 0.403*** |
| Educational conditions            |          | 1.707*** | 0.884*** |
| Cultural conditions               |          | 1.746    | 0.516    |
| Investment scale                  |          | 0.328    | 1.913    |
| Economic level                    |          | 0.805*** | 1.030*** |
| Government spending               |          | 1.655    | 0.222    |
| Housing price $\times$ W          |          |          | 0.372*** |
| Mobile labor force $\times$ W     |          |          | 1.542*** |
| Medical security $\times$ W       |          |          | 0.556*** |
| Educational conditions $\times$ W |          |          | 0.624*** |
| Cultural conditions $\times$ W    |          |          | 0.532    |
| Investment scale $\times$ W       |          |          | 0.617    |
| Economic level $\times$ W         |          |          | 0.182*** |
| Government spending $\times$ W    |          |          | 0.405*** |
| $R^2$                             | 0.479    | 0.766    | 0.987    |

\*\*\* indicates passing the significance test at the 1% level.

To sum up, for the regional housing economy, the mobile labor force is significantly positively correlated. An increase in the mobile labor force within the region leads to an increase in regional housing prices. In addition, variables including medical security, educational conditions, and economic level within the region are also significantly positively correlated with the regional housing economy. Moreover, there exist spatial spillover effects for variables such as housing prices, mobile labor, medical security, educational conditions, economic level, and government spending, i.e., changes in these variables in the local area will also have an impact on the housing economy of surrounding areas.

## 4. Discussion

With the intensification of urbanization and the transformation of the economic structure, labor mobility has become one of the core driving forces reshaping China's regional development landscape. The rural-urban population migration, composed mainly of migrant workers and the reallocation of high-tech talents within cities, not only promotes the rapid development of industrialization and the service industry but also exerts a profound impact on the urban spatial structure, public service supply, and the real estate market. As an important part of the urban economy, the housing economy is directly linked to the quality of residents' lives, social equity, and macroeconomic stability. Its price fluctuations, supply-demand structure, and spatial distribution are increasingly and profoundly affected by the large-scale and high-frequency mobility of the labor force. Throughout China's economic development, the majority of the labor force has gathered in the eastern coastal areas and emerging central and western central cities. This labor reallocation driven by differences in economic opportunities not only improves the overall labor efficiency but also leads to a rapid surge in demand for urban housing. Especially in cities experiencing a net inflow of population, the housing demand generated by the mobile labor force is quickly converted into purchasing power within the housing market, becoming a key factor driving up housing prices.

This paper took 70 prefecture-level cities in the Yangtze River Basin from 2014 to 2023 as its research subject and employed the spatial Durbin model to analyze the correlation between the mobile labor force and the regional housing economy. In the analysis process, the spatial autocorrelation of the mobile labor force and housing prices was first tested, and then the correlation analysis model was used for analysis. In the results of spatial autocorrelation analysis, within the sample range, the Moran's  $I$  values for the mobile labor force and housing prices across all years were significant, indicating that spatial autocorrelation exists between these two variables. In other words, there are significant interregional differences in mobile labor force and housing prices, and they mutually influence each other. The reason lies in the fact that the available mobile labor force varies across regions. Moreover, mobile labor tends to concentrate in regions with more employment and economic opportunities—that is, first-tier cities tend to attract labor from surrounding second- and third-tier cities. Since land resources are scarce in first-tier cities, the impact of the mobile labor forces on housing prices is even greater.

When analyzing the correlation between the mobile labor force and the regional housing economy, in order to gradually identify the factors affecting regional housing prices, a simple regression model was first constructed, and then other factors were gradually introduced. Finally, it was extended to a spatial Durbin model for analysis. Model 1 was the simplest regression model, in which, only the impact of the mobile labor force on housing prices was considered. The analysis results showed that there was a significantly positive correlation between the mobile labor force and housing prices, but the model's explanatory power was only 47.9%, indicating that other factors affect housing prices. Model 2 introduced control variables on the basis of Model 1, and the explanatory power of the model increased to 76.6%. This indicates that among the introduced control variables, there are variables that can affect housing prices, namely medical security, educational conditions, and economic level. The above three variables were all significantly and positively correlated with housing prices. The construction of infrastructure such as medical security and educational conditions can improve the quality of life in the city, thereby driving up housing prices near the facilities. An improvement in the economic level enables

the government to generate more tax revenue and thus have more capacity to invest in basic public facilities, which in turn drives up nearby housing prices. Model 3 added spatial weights to each variable on the basis of Model 2, and the explanatory power of the model rose to 98.7%, indicating that the spatial area also has an impact on each variable.

The limitations of this paper lie in the fact that the sample data coverage was not sufficiently broad, making it difficult to generalize the analysis results to a wider context. In addition, the analysis model employed in this paper mainly analyzed static data and did not fully consider the impact brought by temporal correlation. Therefore, the future research should focus on expanding the sample data coverage and incorporating the impact of time lags when constructing the correlation analysis model.

## 5. Conclusion

This paper applied a model capable of analyzing the correlation between the mobile labor force and the regional housing economy to analyze 70 prefecture-level cities in the Yangtze River Basin from 2014 to 2023. The spatial autocorrelation of the two variables, the mobile labor force and housing price, was first tested. Regression calculations were carried out according to the correlation analysis model. Both the variables of mobile labor and housing prices were significantly positively correlated with space. For the regional housing economy, the mobile labor force, medical security, educational conditions, and economic level were all significantly positively correlated. There were spatial spillover effects for variables including housing prices, mobile labor, medical security, educational conditions, economic level, and government spending, i.e., changes in these variables in the local area had an impact on the housing economy of surrounding areas.

## Conflict of Interest

The author declares no competing interests.

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