Article
Analysis of the Housing–Jobs Separation Characteristics of Different Village Types in the Mountainous and Hilly Region of Southwest China

Huikun Hong, Ting Liu, Heping Liao *, Zhicong Cai and Gang Wang

School of Geographical Sciences, Southwest University, Chongqing 400715, China
* Correspondence: liaohp@swu.edu.cn

Abstract: The economic and social transition toward modernization is characterized by a massive outflow of rural labor, which raises problems such as rural job–housing separation and rural decline. Few studies have used rural labor employment microdata to quantitatively analyze the degree of separation between housing and jobs in different types of villages, especially in ecologically fragile mountainous and hilly regions. This article is based on a 2021 survey of 6181 rural households in 158 villages of Chongqing, a mountainous and hilly region of China, and divides villages into city edge, suburban, and outer suburban villages. In this study, the separation degree of housing–jobs (SDHJ) measurement model was created in order to explore the degree of separation between rural jobs and housing in terms of space–time dimension separation in these areas, and the different job–housing separation characteristics under different village types were distinguished. The results show the following. (1) The county’s rural SDHJ has a clear regional differentiation law, and the degrees of separation between housing and jobs in all counties are in the following order: main urban area < northeast of Chongqing < southeast of Chongqing. The degree of separation between housing and jobs presents a spatial pattern of “medium–low perimeter high, local prominence” according to both the degree of temporal separation and the degree of spatial separation. (2) The degrees of separation between housing and jobs in various village types are in the following order: urban fringe villages < suburban villages < outer suburban villages. The distance effect was verified. The SDHJ is typically low in urban fringe villages and moderate in suburban villages, with distinct geographical disparities in labor distribution. The SDHJ is typically higher in the outer suburban villages, where laborers choose long-term long-distance employment. (3) This study proposes some countermeasures that could reduce the SDHJ for different types of villages. The findings have important policy implications for China’s mountainous rural development and serve as a model for other developing countries.

Keywords: housing–jobs separation; rural labor; rural sustainable development; the hilly and mountainous region; China

1. Introduction
China is a country with a large rural population. The results of China’s seventh national census, in 2020, revealed that the urbanization rate of the registered population had reached 45.4%, indicating that rural homes continue to make up the majority of households in China. Since the economic reforms of 1978, agriculture and the countryside have made a large contribution to the rapid development of industries and cities in China and have been crucial to the sustainable growth of the nation [1]. At present, rural development in China is experiencing a transition period in terms of both society and the economy. There is a large gap between the development of urban and rural areas as a result of the long-term urban–rural dual structure and the emphasis on the urban development strategy. Rural villages face the problems of “rural diseases,” such as non-agricultural...
production factors, lowered vitality of rural residents, lagging industries, and hollowed-out villages [2–4]. In 2017, China proposed a rural revitalization strategy to solve a series of global problems, including “city development with rural decline” and inadequate rural development. Population is a key factor of the main body of the rural system, which has an essential impact on rural vitality [5]. With urbanization and new rural revitalization after the implementation of the strategy, life in some villages and towns is increasingly improving in terms of the employment environment, attracting rural populations, but most of the rural labor force still tends to move to cities to find nonfarm jobs to improve their income levels [6]. In 2021, in China, 292.51 million migrant workers left home to find employment in towns, an increase of 6.91 million compared with 2020 [7]. The outflow of rural labor has led to significant changes in rural social and economic structures, which has increasingly weakened and hollowed out rural areas, seriously restricting the sustainable development of rural areas [8], and the spatial separation between rural jobs and housing is severe. The goal of rural revitalization is to achieve the prosperity of the rural industry so that people may live and work in peace and contentment. Enabling farmers to live and be employed in villages and towns is the key to implementing a people-centered rural revitalization strategy [9]. To solve the jobs and housing separation problem, it is necessary to evaluate the current rural separation degree of housing–jobs (SDHJ) and explore the differentiation rules of rural residential employment separation to accurately understand the differentiation characteristics of rural development and formulate a targeted rural revitalization path based on different village types.

Housing and the job space is a classical topic in the study of the spatial structure within a region. The current studies on the relationship between jobs and housing are focused mostly on urban areas, and centered on the housing–jobs relationship [10]—for example, the housing–jobs balance [11] and the housing–jobs mismatch that leads to poverty and other problems [12]. As industrialization and urbanization change gears, the housing–jobs balance in cities is continually improving, providing the rural labor force with some livelihood opportunities in cities. To add to this, there is a lack of employment options in rural areas, leading to incomes that are insufficient for sustaining households [13]. Occupational choice theory and labor migration theory both contend that farm households can allocate their labor resources in a way that maximizes family earnings, while minimizing risk [14,15], and rural surplus laborers in rural areas frequently migrate to urban regions in search of employment. With the improved economic levels and transportation accessibility, farmers’ living requirements and travel capabilities have significantly improved, the types of jobs available have diversified, the living conditions for rural residents have grown more affluent and free, and the rural housing and jobs space has become increasingly complex and diversified. However, studies on the relationship between jobs and housing in rural areas are still rare. Previous studies have focused on the employment income of farmers [16] and the livelihood of farmers [17,18] or on the migration and mobility of rural populations [19,20]. The main research focus is still on the problem of migrant workers, the transfer of the surplus rural labor force, and the consequent “hollowing-out” phenomenon. In other words, the focus is on the spatial change characteristics of rural residential areas [21–23] and either rural jobs or housing, individually. There is a lack of systematic research on rural issues that integrates rural jobs and housing. Only a few scholars have studied the concept of rural housing–job coordination [24–26] and the measurement of rural housing–industry coordination [27,28]. For example, Cheng et al. constructed an evaluation index system of rural human–land–industry coordination and analyzed the pattern of residential–industry coordination [27]. Gao et al. analyzed the housing–industry symbiosis in terms of land use in rural China [28]. These studies provide new suggestions for the study of the spatial relationship between jobs and housing. However, existing studies are based mostly on land use and statistical macro-data, lacking a focus on villages and farmers from the microperspective, and the expression and formation process from the microperspective are different. The massive outflow of rural residents, specifically of the young and middle-aged labor force, and the resulting loss of rural human resources,
manifest in rural homesteads and cropland being abandoned. Rural development requires a steady population, and population changes can influence trends in rural development and food security. The rural labor force is the main cause of the rural hollowing-out effect [29]. Studying the degree of separation between rural housing and jobs from the perspective of rural labor and work in terms of time and distance is therefore important. To compensate for the lack of comprehensive population mobility measurement, this study examines rural labor migrants from the perspective of time and space, which can reflect the situations of and variations in rural population mobility. To identify the direction of development of different types of rural jobs and housing coordination, a systematic diagnosis of the spatial characteristics of the rural SDHJ and a comparative analysis of the SDHJ in different types of villages is needed. Therefore, a study, based on job–housing spatial mismatch theory, from the microperspective, of the pattern characteristics, spatial distribution rules, and rural-type heterogeneity of rural residential separation can provide a reference for promoting the sustainable development and revitalization of rural areas.

In the hilly and mountainous region in Southwestern China, the restriction of the terrain and the crisscrossing of the natural geographical and human environments reduce the district and county resources and the environmental carrying capacity. The socioeconomic foundation is weak, resulting in a large outflow of surplus rural labor to the eastern coastal economic developed region [30]. The issue of rural labor or long-distance migrant workers has developed over a long time period, and the problem of separation between housing and jobs will persist far into the future. However, there are few existing studies on mountainous and ecologically fragile areas. Chongqing is in the hilly and mountainous areas of Southwestern China. Migrant workers who travel out for work, influenced by the interaction of the natural environment, regional economic differences, and other factors, account for a large proportion of the population. At the end of 2021, the total number of migrant workers in the city was 7.563 million, among which 5.136 million migrant workers were those who came from a rural setting to work, and the rural hollowing problem was prominent. The question of how to break the separation of rural housing–jobs has become the key to promoting the sustainable development of rural areas in Chongqing and enabling it to play its role as a growth center in the west. The research has a considerable degree of representativeness, using the rural parts of Chongqing to carry out research on the county and village domain scales. In this study, the separation degree of housing–jobs (SDHJ) measurement model was created on the basis of the theory of the city jobs–housing balance and migrant workers in terms of rural labor outflow time and distance dimensions. This study quantitatively examines the SDHJ based on a 2021 survey of 6181 rural households in 158 villages of Chongqing, and different separation characteristics of jobs–housing under different village types were distinguished. This study deepens the rural geography microscale research on the rural separation degree of housing and jobs and provides a basis for promoting the sustainable development and revitalization of rural areas at the same time. The remainder of the paper is organized as follows. Section 2 explains the research ideas. Section 3 introduces the study area and provides information on the data collection and methodology. Section 4 reports the results of the descriptive statistical analysis. Section 5 discusses, explains, and compares the results with previous studies. Section 6 presents the conclusions and implications.

2. Analytical Framework

Howard was the first to put forward the concept of jobs–housing balance in tomorrow’s pastoral city [26,31], emphasizing the spatial proximity and balanced development between jobs and housing. Urban research on the separation of jobs–housing is based mainly on the theory of “spatial mismatch” [32–34]. To calculate and analyze the spatial relationship between urban jobs and housing from the aspects of commuting time and distance, most studies on the measurement of the jobs–housing relationship in cities use macro census data [35,36], big data such as bus card swiping data [37], and micro questionnaire data [38]. The spatial relationship between housing and jobs is closely re-
lated to commuting time and distance. From the perspective of the rural employment relationship flow, villages and towns with country advantage factors of agglomeration, industry concentration, and synergy between villages and towns in terms of living and employment growth [39] will encourage the rural labor force in the villages and towns to find employment in the vicinity, leading to the development of the rural population. Contrarily, a large number of young adult rural labor workers traveling over a long distances for long periods of time, shuttling between jobs and housing between urban and rural areas, will lead to jobs–housing separation, mainly of two main types: (1) people living in urban employment villages—that is, those who work in nearby towns and commute to rural areas every day—and (2) people under seasonal employment, which means that the residential employment space expands to other towns and even outside the province, but the urban residence is temporary and the rural residence is still the main place of residence, with migrants traveling back and forth between urban and rural locations within locations each year [40]. Urban geography studies on the jobs–housing relationship focus on the equilibrium concept: the lower the countryside employment appeal, the less the time dimension will influence off-farm workers, who can overlook the time dimension to work in far-off locations. To a certain extent, the working distance can reflect the strength of the county and town domain nonfarm payroll driving force so that, for off-farm workers, the farther the distance, the higher the cost of commuting and the higher the SDHJ. Therefore, characterizing off-farm workers by working time and working distance can reflect the SDHJ, but the rural SDHJ is more complex because of the diversity of the rural population, rural natural geography and location, and resource endowment. The diversity of rural components, differences in rural physical geography and location, resource endowments, and economic and social foundations complicate the degree and form of rural jobs–housing separation [41,42]. Therefore, according to the theory of the distance-decay effect and diffusion model, the material flow, energy flow, and information flow between urban and rural areas and the flow of other elements due to the different distances between the town centers and the villages and labor migration present different characteristics. The rapid urbanization and industrialization provide increased job opportunities for rural residents and attract labor to urban areas [23], especially near the city village. In theory, the SDHJ in these rural areas is lower than that in rural areas with poor geographical conditions. Therefore, to explore the characteristics of the rural SDHJ in different types of villages, they are divided into three types based on their distance from the city: urban fringe villages, suburban villages, and outer suburban villages.

In this research, we will establish an evaluation model from the perspectives of rural labor outflow time and distance, two dimensions for measuring the rural separation degree of housing–jobs (SDHJ). Then, we will elucidate the spatial pattern characteristics and current problems of the rural SDHJ in Chongqing County. We will also examine the differences in job–housing separation characteristics for three types of villages—urban fringe villages, suburban villages, and outer suburban villages—considering the potential influence of distance on the rural SDHJ. Finally, we will analyze how to promote the coordination of rural housing and jobs and suggest some countermeasures that could reduce the SDHJ for various types of villages, promoting the sustainable development and revitalization of rural regions.

3. Materials and Methods

3.1. Study Area

Chongqing (105°11′ E–110°11′ E, 28°10′ N–32°13′ N) is in Southwest China (Figure 1), which is located in the transition zone between inland Southwest China, the Qinghai–Tibet Plateau, and the middle and lower Yangtze River plain. Chongqing belongs to the eastern Sichuan parallel ridge valley region, with an elevation difference of 2723.7 m. More than 90% of the total area is mountainous and hilly, covering an area of 82,400 km², and it has a subtropical monsoon humid climate. It has jurisdiction over 26 districts and 12 counties. According to the 2020 census, the permanent resident population was 32.0542 million and
the rural population was 9.7901 million. The permanent resident urbanization rate was 69.46%, or 20.20% higher than the household registration urbanization rate, fully reflecting the unique regional background of Chongqing as a “big city, big countryside, big mountain, and big reservoir area”. The city’s economic development conditions are centered on the main urban area and gradually decrease to the northeast and the southeast of Chongqing. Influenced by natural conditions, the economic level, and cultural differences, there are obvious regional differences in the residential space and employment space in the countryside. Therefore, using Chongqing as an example to study the rural SDHJ has certain implications for the research of rural revitalization in the mountainous and hilly areas of Southwest China and other regions.

Figure 1. (a) Location of Chongqing in China. (b) Districts and counties in Chongqing. Notes: According to the main function division of the Chongqing Municipality and considering the integrity of administrative divisions, 38 districts and counties are divided into three categories: the main urban area (Yuzhong District, Jiangbei District, Shapingba District, Jiulongpo District, Nan'an District, Dadukou District, Beibei District, Yubei District, Banan District, Changshou District, Fuling District, Jiangjin District, Hechuan District, Yongchuan District, Nanchuan District, Qijiang District, Wansheng District, Dazu District, Bishan District, Tongliang District, Tongnan District, Rongchang District), the northeast of Chongqing (Wanzhou District, Kaizhou District, Liangping District, Chengkou County, Fengdu County, Jianjiang County, Zhong County, Yunyang County, Fengjie County, Wushan County, Wuxi County), and the southeast of Chongqing (Qianyang District, Wulong District, Shizhu County, Xiushan County, Youyang County, Pengshui County).

3.2. Data Source

The 158 villages in this study are distributed in 33 districts and counties of Chongqing. Yuzhong District, Jiangbei District, Shapingba District, Jiulongpo District, and Nan'an District were excluded from the study due to their high urbanization rates (all exceeding 90%). To ensure that the sample fully reflected the characteristics of the whole, this study was conducted using the 95% confidence level. To conform to the requirement of a sampling error ratio of 3%, based on the village domain natural geography and socioeconomic development difference, the research team adopted a stratified random sampling method to conduct a household survey. In each sample county, 3 to 4 administrative towns were randomly selected. In all, 158 administrative villages were selected from 33 sample counties. To ensure the accuracy of the experimental results, the project team systematically planned and implemented the experimental scheme selection, sampling, survey organization, and
completion of the selection experiment in January 2021. In July 2021, semi-open structured interviews were conducted with local village cadres and farmers, and a total of 158 valid village survey questionnaires and 6181 farmer survey questionnaires were obtained. This survey covered the village resident population, employment, migrant population, the seat of government of the county/township (town) that the village was located in, collective economic basic data of the village (such as income), interviews with labor farmers to obtain basic personal and family information, and working characteristics (in terms of migrant workers’ location, travel duration, income, and living situation). To accurately describe the connotations of the SDHJ, the survey excluded households that had bought houses in cities and towns; that is, only rural housing was considered. Generally, the closer a village is to the county center, the more employment opportunities there are for villagers, and, theoretically, the SDHJ is relatively low [43]. Therefore, on the basis of the distance from county centers, we selected three types of villages—urban fringe villages (39 in all), suburban villages (61 in all), and outer suburban villages (58 in all)—to verify whether there are spatial differences or other rules in the SDHJ in different types of villages and to provide a reference for the sustainable development of rural areas. Urban edge villages are those that are less than 30 km from the county center, suburban villages are those that are between 30 and 50 km from the county center, and outer suburban villages are those that are more than 50 km from the county center. The SDHJ is based on the spatiotemporal dimension of migrant workers.

3.3. Methodology

3.3.1. The SDHJ Based on the Spatiotemporal Dimension of Migrant Workers

In this study, we built a measurement model for the separation of rural housing–jobs from the two dimensions of rural off-farm employment time and distance using commuting time and distance in the urban job–housing balance. In China, migrant workers generally include migrant workers and local migrant workers. Local migrant workers are defined as rural laborers who have worked within the township where their household registration is located for at least six months. Migrant workers are defined as rural laborers who have worked outside the township where their household registration is located for at least six months. To account for the SDHJ in the temporal dimension, this study assumed that the rural labor force works outside the home for more than six months. The distance to work was based on the migrant workers’ work locations. The labor force that had been employed for more than six months was classified into three categories based on the benchmark of work area: out-of-city, interdistrict (county), and other townships (towns). The distance grade indexes of the three types were set to 3, 2, and 1, respectively, using the expert scoring method. It was calculated as follows:

\[ TDSI = \frac{\sum_{i=1}^{n} p_i}{\sum_{i=1}^{n} R_i} \]
\[ SDSI = \frac{\sum_{i=1}^{n} p_i \alpha_i}{\sum_{i=1}^{n} p_i} \]

where \( R_i \) is the actual total population of the \( i \) peasant household, \( p_i \) is the sum of the number of farmers who have gone out to work for six months or more, \( n \) is the number of research units, and \( \alpha_i \) is the grade index. TDSI stands for the time dimension on the separation index, and SDSI stands for the spatial dimension separation index of the SDHJ.

3.3.2. Measure of the Separation Degree of Housing and Jobs

The SDHJ was constructed from the two dimensions of time and space using the entropy weight approach based on the calculation of the single comprehensive index of each dimension. To create the SDHJ, the constituent elements of each dimension were thoroughly and comprehensively aggregated. It was calculated as follows:

\[ SDHJ_c = \sum_{i=1, j=1}^{n} W_{cij} \times Y_{ij} \]
\[ SDHJ_r = \sum_{i=1, j=1}^{n} W_{rj} \times Z_{ij} \]
where $W_{ij}$ is the weight of the $j$ dimension of the county and $W_{rj}$ is the weight of the $j$ dimension of the village, $Y_{ij}$ is the standard value of the $j$ dimension of the residential and occupational separation degree of the $i$ county, $Z_{ij}$ is the standard value of the degree of separation between residence and occupation in the $j$ dimension of the $i$ village, $SDHJ_c$ stands for the county comprehensive residential separation, and $SDHJ_r$ stands for the village comprehensive residential separation. The higher the value of the SDHJ, the higher the degree of residential separation. On the basis of the comprehensive residential separation index, using the natural breakpoint method, the temporal, spatial, and comprehensive residential separations were divided into four grades: low separation, moderate separation, high separation, and severe separation (Table 1). The spatial visualization was performed in ArcGIS software.

### Table 1. Classification of separation degree of housing–jobs.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Low Separation</th>
<th>Moderate Separation</th>
<th>High Separation</th>
<th>Severe Separation</th>
</tr>
</thead>
<tbody>
<tr>
<td>TDSI</td>
<td>(0, 0.524]</td>
<td>(0.524, 0.689]</td>
<td>(0.689, 0.854]</td>
<td>(0.854, 1]</td>
</tr>
<tr>
<td>SDSI</td>
<td>(0, 0.368]</td>
<td>(0.368, 0.571]</td>
<td>(0.571, 0.774]</td>
<td>(0.774, 1]</td>
</tr>
<tr>
<td>SDHJ</td>
<td>(0, 0.425]</td>
<td>(0.425, 0.608]</td>
<td>(0.608, 0.791]</td>
<td>(0.791, 1]</td>
</tr>
</tbody>
</table>

### 4. Results

#### 4.1. Spatial Pattern Characteristics of the Rural SDHJ at the County Level

4.1.1. The Rural Separation Degree of Housing and Jobs Based on the Time Dimension at the County Level

Based on the temporal dimension of migrant workers, Figure 2a displays the distribution of the rural TDSI in the counties and villages of Chongqing. Overall, it exhibits “low–medium and highly circular, locally conspicuous” spatial pattern qualities. TDSI high-value zones are primarily found in Chongqing’s northeastern and southeastern regions, with Tongliang and Tongnan counties serving as occasional high-value outliers. The northeastern and southeastern regions of Chongqing are separated from the central urban area and are therefore less influenced by its economic driving force. The level of social and economic growth is below average. The standard of living in a rural area is lower than Chongqing’s rural average level, being in a typical “small city, huge countryside” region [44]. In 2020, the development levels in terms of villagers’ disposable income, rural population density, rural nonagricultural employment rate, the number of township enterprises, and the quality of the rural living environment in Northeastern and Southeastern Chongqing were below the average level of the study area. Southeastern Chongqing is limited by the mountainous terrain, the ecological environment is fragile, the terrain is rugged and steep, the plots are fragmented, there are mainly karst landforms, and the area of high-quality arable land is limited [45]. To increase income, young and middle-aged laborers tend to adopt a combination of agricultural production and migrant work. The above reasons have become an important driving force for the long-term migrant workers in the two districts. The main urban area’s surrounding districts and counties are close to the hub of economic growth. The relaxation and transfer of industrial functions in the core urban region serve as the typical industrial development centers. Additionally, they are Chongqing’s primary agricultural and food production regions. The disposable income is more than the study area’s matching average value. The region depends on its excellent natural resources, pleasant rural living environment, and economic base to give the rural population a superior living and working environment. The TDSI is low.
Figure 2. The spatial patterns of TDSI and SDSI in Chongqing. Notes: TDSI refers to the time dimension on the separation index, while SDSI refers to the spatial dimension separation index of the SDHJ.

4.1.2. The Rural Separation Degree of Housing and Jobs Based on the Spatial Dimension at the County Level

Based on the dimension of working distance, Figure 2b displays the distribution of the rural SDSI in the counties and rural areas of Chongqing. The division of rural SDSI in the county is clearly differentiated along a geographic gradient. The “low–medium–weak–high” circle is clear, and the overall pattern is comparable to the time dimension pattern. Rural workers on the two wings (Northeast Chongqing and Southeast Chongqing) still primarily choose long-distance employment. Rural housing and jobs are still mostly separated between Northeast and Southeast Chongqing. The reason is the same as that provided for the time dimension. However, from the location of migrant workers’ geographic distribution, the majority of the rural laborers in these two regions prefer to work outside of Chongqing, with an average of over 41.39%. The city inside and outside the counties is the second choice (the average of the two districts is over 23.53%). The reason is that this type of county is far from the central urban area of Chongqing. There are few opportunities for rural laborers to find suitable jobs in this county, the districts within the county, and the neighboring districts and counties. The area is adjacent to Hunan, Hubei, Sichuan, and Shaanxi Provinces, where interregional accessibility is relatively strong. There has been a rural labor outflow to peripheral provinces, regions beyond the metropolis, and the eastern coastal districts for jobs. The counties in the central urban area of Chongqing are situated in the frontier area of economic development or close to the core area of economic development and are obviously driven by the radiation of the core area, in contrast to the counties in the northeastern and southeastern areas of the city, which lack economic vitality. Urbanization and agricultural modernization are relatively high in the main urban area, county economic development is relatively active, and the function of rural living and employment is relatively complete, providing more suitable options for the rural population. The proportion of employment in the county is relatively high, and the proportion of employment in the county exceeds 60.75%. The study indicates that Tongnan, Rongchang, and Dazu, which are on the fringes of Yuxi District, have good natural resources and economic foundations but have an SDSI exceeding 35.34% (which is high compared to the average of 25.56% in Yuxi District) and a high percentage of rural migrant laborers who live outside the county (the value exceeds 64.78%, compared to the average of 67.56%).
This type of county is impacted by the “siphon effect” in the central business district of the metropolitan area; rural labor is more likely to seek jobs there or in more developed regions outside the province, resulting in a lower SDSI.

4.1.3. The Rural Separation Degree of Housing and Jobs at the County Level

Figure 3 presents Chongqing’s rural SDHJ. There are obvious spatial differences; the overall presentation is “spreading in circles and low in the west and high in the east”. The SDHJ is much higher in Chongqing’s northeastern and southeastern regions than in the city’s core urban area, with the northeastern area being higher than the Southeastern Chongqing area. The counties in the central urban area are situated in the frontier area of economic development, and the TDSI and SDSI are low. The northeast area of Chongqing has a relatively high TDSI, with a regional average of 0.777 (the average of the study area is 0.741), and a high SDSI in the spatial dimension, with a regional average of 1.880 (the average of the study area is 1.666), leading to the SDHJ being high, with a regional mean of 1.432 (the mean of the study area is 1.290). The counties in the central urban area are situated at the border of economic development, and the TDSI and SDSI are low, with regional mean values of 0.622 and 1.078, respectively, resulting in a low SDHJ, with a regional average of 0.893.

Figure 3. The spatial patterns of SDHJ in Chongqing.

4.2. Spatial Pattern Characteristics of the Rural SDHJ at the Village Level

To further analyze the features of the SDHJ in different types of villages, the 158 sample villages in the study region were used as the basic unit to perform histogram statistics on the SDHJ in all sample villages and villages with varied locations. The results of the separation ranking are displayed in Figure 4. A four-quadrant map was built using the statistical results of the SDHJ based on the TDSI, SDSI, and SDHJ, in which the red, blue, and green spheres represent the urban edge villages, suburban villages, and outer suburban villages, respectively. The radii of the spheres are arranged in descending order according to the SDHJ (Figure 5).

Figure 3. The spatial patterns of SDHJ in Chongqing.
Figure 4. Statistical analysis of TDSI, SDSI, and SDHJ of various village types.

Figure 5. Bubble chart of SDHJ of sample villages in Chongqing.

4.2.1. Statistical Evaluation of the SDHJ in Various Village Types

As seen in Figure 4, while the mean differences in the SDSI and the SDHJ are rather large, the mean differences in the TDSI of the three types of villages are minor. Between them, the average TDSI, SDSI, and SDHJ value is the lowest among the villages in urban edge areas, while the proportion of high separation and severe separation in the three dimensions is the lowest; the TDSI is 33.33% (the total sample villages are 58.23%), the SDSI is 33.34% (the total sample villages are 53.17%), and the SDHJ is 33.33% (the total sample villages are 54.43%). In addition, the standard deviation of the degree of separation between housing and jobs in each dimension is relatively large, indicating that the SDHJ in urban fringe villages is relatively light. The farmers’ employment locations in the sample urban
fringe villages vary greatly, with most in proximity to the village. In contrast, the outer suburban villages have the highest median TDSI, SDSI, and SDHJ of the three types of communities. The proportions of the three dimensions are 74.13%, 67.24%, and 72.42%, respectively, and there is a significant divergence between them. Because the SDHJ is more severe in outer suburban villages and rural workers tend to work in locations far from their houses for long periods, the standard deviation of the SDHJ in each dimension is rather low. The average TDSI, SDSI, and SDHJ values of suburban villages are between those of urban fringe villages and outer suburban villages, and the proportions of high and severe housing–jobs separation in the three dimensions are 59.02%, 52.46%, and 50.81%, respectively. The standard deviation of each dimension is relatively large, indicating that the SDHJ in suburban villages is moderate, and there are obvious spatial differences in the locations of farmers’ places of employment.

4.2.2. Analysis of the Characteristics of the SDHJ in Different Types of Villages

As illustrated in Figure 5, the SDHJ in urban fringe villages is relatively low, being less than 0.902. The average distances between villages, counties, and towns in the urban fringe are 30.056 km and 5.731 km, respectively, as per the results of the questionnaire survey and statistical data. In 2020, the average road network density was 1.548 km/km², the average village collective income was RMB 91,170.000, and the migrant population ratio was 67.71%. The center towns, which are obviously influenced by the polarization of the cities and towns, are close to the urban fringe villages. There are a large number of enterprises agglomerating in the townships, with an average of 3.628 enterprises above the township scale. Because of the central town’s strong economic basis and transportation infrastructure, there are adequate job prospects nearby for the rural labor force. Furthermore, the geographical advantages of urban fringe villages are obvious, and the reasonably high level of basic public services entices the rural population to live and work there, largely preventing jobs–housing separation in such villages. In urban fringe villages, the separation spheres of housing and jobs are primarily distributed along the upper left and lower half of the axis, as seen in Figure 4. The proportions of the SDHJ with high separation and severe separation in urban fringe villages of the central urban area, northeast Chongqing and southeast Chongqing are 15.00%, 46.15% and 66.67%, respectively.

The SDHJ in suburban villages ranges from 0.14 to 0.978, which is a moderate level (Figure 5). The average distances between villages, counties, and villages in the town are 42.431 km and 6.608 km, respectively, according to statistical data and questionnaire survey results. The average road network density is 1.379 km/km², the average altitude is 554.874 m, the percentage of villages with a slope greater than 25° is 18.716%, and the area of soil and water average loss area is 2.536 ha. In terms of travel accessibility and location distance, suburban villages are at a disadvantage compared to urban fringe villages. With an average of only 2.820 businesses above the township size in suburban villages, there are not as many opportunities for the residents of suburban villages to choose employment near their homes as there may be, due to the relatively unstable and basic nature of the working environment. However, the SDHJ is lower than it is in outer suburban villages. Nevertheless, the arable land resources of suburban villages are relatively superior and provide a good foundation for future agricultural growth. New operational organizations, such as agricultural cooperatives and family farms, now rely on the advantages of transportation circumstances and arable land resources due to the advancement of agricultural market information and contemporary agricultural construction, which helps to maintain the relative stability of the number and composition of the family population, so the SDHJ of suburban villages is lower than that of outer suburban villages. In suburban villages, the housing–jobs separation spheres are predominantly focused on the upper left and lower half of the axis, and the proportion of SDHJ with high and severe separation in the main urban area is 37.14%, while proportions in Northeast Chongqing and Southeast Chongqing are 70.59% and 66.67%, respectively.
The outer suburban villages have a high SDHJ, with spheres grouped in the top half of the axis (82.75%, 48) and the SDHJ ranging from 0.313 to 0.964 (see Figure 5). The outer suburban villages are far away from the central towns. The typical distance between villages and counties is 63.393 km, whereas the average distance between villages and towns is 8.545 km. The average road network density is 1.235 km/km², and the traffic accessibility is relatively low. The average collective income of outer suburban villages in 2020 was only RMB 55,520, much lower than that of urban fringe villages and suburban villages. In addition, most of the outer suburban villages are in medium and high mountain terrain, with an average altitude of 770.272 m. The average proportion of village slopes greater than 25° is 32.218%, and the average soil erosion area is 4.489 ha. The economic output value per mu and per capita income are both poor, as is the output efficiency. Elevation and slope have greatly influenced the safety and convenience of residents in terms of living and production conditions. The location conditions and natural and cultural tourism resource endowment of the outer suburban villages are poor, and township development is generally below average. Because there are fewer businesses on average above the township scale, there is less employment available. The SDHJ of the outer suburban villages is significantly greater than that of urban fringe villages and suburban villages, and the population loss is severe. The majority of the housing–job separation spheres in the outer suburban villages are concentrated in the upper-right quadrant, and the proportions of their SDHJ with high separation and severe separation in main urban area is 46.15%, while it is 89.29% in northeast Chongqing, and 64.71% in southeast Chongqing. The development of agriculture and industry has been significantly hampered by the ongoing loss of the labor force, rural area aging, and substantial abandonment of cultivated land. The results of the study show that 53.85%, 10.71%, and 35.29% of the outer suburban villages located in the central urban area, the northeast of Chongqing, and the southeast of Chongqing, respectively, have medium and low occupations.

5. Discussion

5.1. The Degree of Separation between Rural Housing and Jobs Is Correlated with Both the Conditions of Resources and Socioeconomic Factors of the County

Rapid urbanization and industrialization have increased the employment opportunities for rural labor and attract rural laborers to work outside for extended periods of time. This rural labor force outflow phenomenon generally exists in all types of villages. Due to variations in market location conditions, natural resource endowments, and economic development levels, many types of regions and villages exhibit heterogeneity in the SDHJ.

The main urban area, where the county economic level is more developed, has a lower SDHJ when viewed at the county scale. In this county, the majority of rural residents want to work close to their living places. Part of the rural population has succeeded in finding local jobs because certain towns and villages have successfully performed residential and employment roles. In the survey sample, the research findings indicate that in 2021, 48.74% of the rural labor force in the main urban area had found nearby employment. The majority of the counties with a high SDHJ are located in the northeast and southeast of Chongqing, which is more in line with the districts and counties that have a high incidence of poverty and a relatively slow rate of economic development. The incidence of poverty is comparatively high in Chongqing’s northeast and southeast due to the absence of natural resources and market location characteristics. In these two regions, there were 14 destitute counties before the battle against poverty was successful. The rural population is mostly employed in long-term, long-distance work outside the village, the level of development is comparatively below average, the living and employment environments are inadequate, and the SDHJ in the county area is quite high. According to the study’s findings, in 2021, the proportion of long-distance employment was higher, especially in the northeastern and southeastern regions of Chongqing. In 2021, only 23.39% of the rural labor force in the two wings of the survey sample had found local employment, where the lack of economic vitality of the county made it difficult to drive nonagricultural employment, leading to
the large-scale, long-distance employment of rural migrant workers across counties. This supports the findings of other researchers, who found that regional income disparities attract residents to gather in high-income areas [23,46].

Socioeconomic factors have a significant impact on rural housing–jobs separation. Thus, we suggest that local governments should enhance basic public services and strengthen local economies to provide farmers with access to more plentiful employment opportunities and better living conditions. This will reduce rural housing–jobs separation. Government intervention is also required to balance county development in order to foster the growth of counties with inadequate socioeconomic and resource endowments and reduce the gap with urban centers.

5.2. The Importance of Rural Industry Development and Level of Basic Public Services in Resolving the Housing–Jobs Separation

We find that urban fringe villages have relatively less housing–jobs separation compared with outer suburban villages. This result is closely related to the level of rural industry development and basic public services. Urban fringe villages are found on the outskirts of cities and benefit from more favorable market conditions. They gain from a succession of improvements implemented by state and local governments addressing the rural living environment. Towns and villages on the outskirts of cities have relatively complete infrastructure, including transportation, education, and health care, thanks to laws and other rules, as well as the role that cities play in supporting the countryside. The nonagricultural economy is relatively developed, and towns and villages have a good industrial foundation [47,48]. Farmers have abundant sources of livelihood, and the improved development environment of the village leads to a high concentration of villagers, creating a distinctive rural town that attracts migrants looking for work while keeping the rural population in the town and adjacent villages. Due to their proximity to cities and towns, rural laborers in urban fringe villages are more likely to find nonagricultural employment alternatives nearby and are more likely to choose local jobs. The findings of the study support the theory advanced by some academics that employment encourages the coordinated development of rural housing and jobs while also providing inhabitants with the financial security they need to pursue better living conditions [49], and residents of urban suburbs have much better living conditions than those of remote rural areas, which encourages population agglomeration [50,51]. Because of regional development and economic interests, the location, size, and purpose of residential areas are changing quickly for farmers, but this is also a result of the continual extension of urban boundaries [52]. Conflicts such as those caused by economic or social issues—for example, home destruction and land acquisition—continue and need to be addressed.

The development of a synergy between rural housing and jobs is relatively slow compared to suburban villages and urban fringe villages, and the endogenous development momentum of towns and villages is insufficient, particularly in terms of industries. Due to a lack of employment opportunities, some researchers have found that it is difficult for towns and villages to retain rural residents [28], and the percentage of local employment in suburban villages (11.23%) and outer suburban villages (8.64%) is lower than that in urban fringe villages (15.01%). The effect of distance attenuation, which states that the closer one is to the city center, the more are the employment options and the shorter is the commute time, has been further indicated [53]. Suburban village migrants are more likely to choose to cross towns, counties, and cities, and the proportion of long-distance employment is greater. The results indicate that the high-severity separation of SDHJ areas comprises 70.59% and 66.67% of the suburban villages in Chongqing’s northeastern and southeastern regions, respectively, which are in the high-severity housing–job separation areas. Additionally, central towns have a significant impact on rural jobs and habitation. The hubs of the resources used by cities and villages and central towns serve the surrounding communities by providing essential public services and nonagricultural jobs. Although the infrastructure of these central towns has improved the living and working conditions of rural residents,
the superior location conditions can also encourage rapid population migration. Superior location conditions can not only promote village population agglomeration but also cause rapid population migration [54] and accelerate rural population loss due to the development gap between towns and villages [55]. For instance, the study’s findings indicated that around 15% of the labor force was employed in other towns and streets, primarily in the county’s central towns, in 2021. As a result, it is critical for suburban and outer suburban villages to implement pertinent preferential policies to promote industrial development in these types of towns and villages, encourage talented individuals to establish businesses in their hometowns, and increase the momentum for the inward development of the villages.

5.3. Limitation and Future Research

Rural housing–job synergy is the basis for sustainable rural development and rural revitalization [25]. Many of the current research viewpoints on the connection between rural housing and jobs are based on statistical and land use information. The formation mechanism and manifestation of this connection between rural housing and jobs are different from the separation of jobs caused by the loss of the rural labor force. The microperspective based on the combination of village and rural employment population surveys largely ignores the differences in the degree of separation between various types of rural residences and employment, as well as the characteristics of rural housing–jobs following the large-scale transfer of rural labor. To examine the variations in the degree of separation between rural households, the investigation starts from a micro viewpoint, using the microsurvey data on the farmer households in the work force, from the standpoint of regional type and village type. The study offers a more reliable basis for determining the degree of separation between rural housing and jobs because it is more microscopic and focused. The scope of the investigation should be broadened in the future for more accuracy and generalization, as this study has analyzed data related to only some villages in Chongqing.

Currently, most of the research is restricted to research on urban fringe areas or plain areas, primarily in the eastern and central regions of China. There is a lack of related research on mountainous and hilly areas with fragile ecological environments and low natural resource endowments. This paper has discussed the example of Chongqing, a typical representative of the hilly and mountainous regions in Southwest China, by illustrating the diversification and differences in rural labor employment situations in various types of villages. It may help to provide a better understanding of the current situation, challenges, and potential turning points in the rehabilitation of rural development in Southwest China’s mountainous and hilly regions, and provide a scientific reference for the government to implement targeted sustainable rural development. This study expands on the application of rural housing synergy theory, particularly in ecologically vulnerable regions. However, the separation state and spatial distribution characteristics of rural housing and jobs are complex and variable, and they are influenced not only by subjective factors, such as farmer preferences, but also by objective factors, such as resource endowment, the physical environment, and locations’ economic conditions. Future research will be focused on how to develop a model of influencing factors, scientifically choose the appropriate indicators, and further explore the internal factors behind the rural housing–jobs imbalance at the village scale.

6. Conclusions and Implications

Rural housing–jobs separation has become more pronounced as a result of urbanization and industrialization, which have encouraged the outflow of rural labor. This study draws on the theory of urban job–housing balance and proposes a two-dimensional spatial–temporal measurement model for rural housing–jobs separation. The time dimension is used to identify the attractiveness of rural residential employment, and the spatial dimension is used to explore the strength of the driving force of nonagricultural employment in towns, villages, and counties. Data from questionnaires given to microfarmer households are used to assess the features of the separation between housing and
jobs in the counties and villages of Chongqing. The findings of the study can serve as a guide for the creation of sustainable rural development strategies considering regional characteristics in mountainous and hilly regions and offer new insights into the spatial relationship between rural jobs and housing. The following are the findings of this research. (1) There is significant housing–jobs separation in the majority of the sample villages in Chongqing. Only 12.66% of the sample villages fall into the category of the smallest degree of separation between housing and jobs, while 54.43% of the villages belong to the high and severe separation categories. The SDHJ and the conditions of resource and environmental endowment are correlated to some extent. The main urban metropolitan areas, with better location conditions and more developed county economies, have a low SDHJ, while the SDHJ in Northeastern and Southeastern Chongqing is higher, with poor resource and environmental endowments, relatively lagging economic development, and relatively fragile rural production space systems. The degrees of separation between housing and jobs are in the following order: main urban area < northeast of Chongqing < southeast of Chongqing. The overall SDHJ presents a spatial pattern of “low–medium perimeter high, circle-based diffusion”, and the TDSI and SDSI present a spatial pattern of “medium–low perimeter high, local prominence”. (2) Due to variations in location, terrain, infrastructure, and economic foundations, the types of villages have varied features. Compared to suburban and outer suburban villages, urban border villages have a significantly lower SDHJ. The choice of employment location varies greatly among the labor force. The SDHJ in suburban villages is primarily moderate, and there are obvious spatial differences in the employment locations of the labor force. The mean difference in the TDSIs of the three types of villages is small, and the average difference in the SDSIs is obvious. The SDHJ in the outer suburban villages is generally more serious, and the labor force is more inclined towards long-distance employment. The degrees of separation between housing and jobs in various villages are in the order urban border villages < suburban villages < outer suburban villages, which shows a certain “distance” effect. (3) According to the research findings on rural housing–jobs separation, different types of villages in different regions of Chongqing differ greatly from one another due to their various natural geographical conditions and economic development levels, and different types of villages should receive targeted and differentiated revitalization policies.

On the basis of the analytical findings of the degree of separation between housing and jobs in various types of rural areas in the research area, this paper makes the following recommendations. (1) To take advantage of the fast industrialization and urbanization happening today, the urban border villages should focus on the development of secondary and tertiary industries. The living and employment conditions will be improved; more opportunities will be provided for rural residents to return to their hometowns and start businesses; production, living, and ecological space will be coordinated; appropriately scaled land management will be encouraged; the level of intensive land use will be increased; and livable and business-friendly villages will be built. The industrial and residential space in townships also impacts how villages will develop in the future [34]. As a result, it is essential to actively establish distinctive center villages and towns, as well as to encourage and promote the internal and external growth of the villages from the township level. (2) When suburban villages have better location conditions, the income of farmers will increase, the rural environment will be improved, the ability of the components of the village to agglomerate will be improved, and the power behind rural development will be strengthened by changing the agricultural structure and encouraging the modernization of agriculture. The towns and villages, particularly in the northeast and southeast of Chongqing, where the economy is below average have a large agricultural population and rely mostly on agricultural output. Infrastructure and public services should be built, and the living environment should be improved to provide crucial assistance. Specialized vocational training and entrepreneurship training should be provided based on the needs of the region. To keep the most active groups in rural areas, to encourage employment and entrepreneurship locally, and to stop the rural brain drain, more preferential policies for talent should be developed [1].
(3) Outer suburban villages, with poor location conditions, far from the urban development center, are relatively lagging in terms of economic development. Especially in the remote mountainous villages in Northeastern and Southeastern Chongqing, the altitudes are high, the slopes are steep, the terrain is undulating, soil erosion is serious, and the production and living conditions are relatively poor. The fragmentation of cultivated land is serious, moderate-scale management of cultivated land and popularization of mechanization are difficult, and the low level of agricultural modernization contributes to the outflow of rural residents. Such villages in mountainous areas urgently need to implement innovative, highly specialized, high-value-added, and high-value agricultural activities to raise farmers’ incomes. Farm land consolidation projects should be performed concurrently and in accordance with local circumstances. Land consolidation plays a crucial role in providing resource support for population agglomeration and industrial development, increasing the amount of arable land, and expanding large-scale production through the development of efficient farming methods [56,57]. The goal of farmland consolidation projects is to solve problems in regional agricultural development and realize agricultural modernization, which can support sustainable rural development and rural revitalization [58]. In addition, we should expand vocational skill training, judiciously support migrant workers, ensure secure and high-quality employment for migrant workers, and boost farmer incomes while energetically promoting the rural economy.

Author Contributions: Conceptualization, H.H. and H.L.; data curation, T.L. and Z.C.; formal analysis, T.L. and G.W.; investigation, Z.C. and H.H.; writing—original draft, H.H. and T.L.; writing—review and editing, H.H. All authors have read and agreed to the published version of the manuscript.

Funding: This study was supported by The National Social Science Fund of China (Grant No. 20BSH079).

Data Availability Statement: The data presented in this study are available on request from the corresponding author.

Acknowledgments: The authors are grateful to the National Statistics Office for providing the data and the editors and anonymous reviewers for their comments and suggestions.

Conflicts of Interest: The authors declare that they have no conflict of interest.

References
2. Liu, Y.; Fang, F.; Li, Y. Key issues of land use in China and implications for policy making. Land Use Policy 2014, 40, 6–12. [CrossRef]
3. Liu, Y.; Li, Y. Revitalize the world’s countryside. Nature 2017, 548, 275–277. [CrossRef]
6. Mohabir, N.; Jiang, Y.P.; Ma, R.F. Chinese floating migrants, rural–urban migrant labourers’ intentions to stay or return. Habitat Int. 2017, 60, 101–110. [CrossRef]
8. Wu, Y.; Zhou, Y.; Liu, Y. Exploring the outflow of population from poor areas and its main influencing factors. Habitat Int. 2020, 99, 102161. [CrossRef]

47. Ilaria, Z.; Artemi, C.; Filippo, G.; Gianluca, E.; Luca, S. Industrial Sprawl and Residential Housing: Exploring the Interplay between Local Development and Land-Use Change in the Valencian Community, Spain. Land 2019, 8, 143. [CrossRef]


50. Eberhardt, M.S.; Pamuk, E.R. The Importance of Place of Residence: Examining Health in Rural and Nonrural Areas. Am. J. Public Health 2004, 94, 1682–1686. [CrossRef]


