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How Do Population Flows Promote Urban–Rural Integration? Addressing Migrants' Farmland Arrangement and Social Integration in China's Urban Agglomeration Regions

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Abstract: China's urban–rural relationships have been changed dramatically by the intensifying population flows, especially in urban agglomeration regions. This study contributes to the interpretation of urban–rural integration mechanisms in urban agglomeration by constructing a conceptual framework of migration-related resource flows. Taking the Wuhan urban agglomeration as an example, migrants' farmland arrangement, migration pattern, and social integration have been investigated to uncover the spatial and temporal characteristics of the urban–rural interaction, based on the data from the China Migrants Dynamic Survey in 2012–2017. The findings indicate that the farmland circulation in the Wuhan urban agglomeration was generally low, but slightly higher than that of the national average. The central city, Wuhan, had a high degree of family migration and social integration, indicating stronger resource flows in developed areas. However, its farmland circulation level was lower than that of non-central cities. The unsynchronized interaction of resources in urban and rural areas should be taken seriously, especially in areas with a relatively developed urban economy. The advantages of the central city in absorbing and settling migrants confirmed the positive impact of the urban agglomeration on promoting urban–rural integration.

Keywords: urban–rural integration; population flows; farmland arrangement; social integration; urban agglomeration region

1. Introduction

Since the reform and opening-up in the 1980s, China has experienced an unprecedented urbanization which brought forth not only economic advancement but also imbalanced developments in urban and rural areas [1,2]. The socio-economic transformation has seriously affected the rural areas, leading to the irrational use of land and economic recession [3–5]. In view of this, the national strategy called "urban–rural integrated development" has been proposed to bridge the urban–rural gap and achieve a coordinated urban–rural interaction [6]. The Chinese government further promoted national strategies, such as "new-type urbanization" and "rural revitalization", to improve the urban–rural resource efficiency, ecosystem sustainability, and common prosperity [7,8]. Understanding the mechanisms of urban–rural integration in China is becoming increasingly important. Gradually, urban–rural integration has become a frontier topic worldwide, and subjects such as urban–rural difference evaluation, urban–rural transition, and rural restructuring have attracted the interest of scholars from various fields [9–17]. These studies have greatly contributed to integrated and sustainable developments of urban and rural areas both in China and other countries, by providing theoretical and practical guidance for resolving conflicts between men and land and optimizing urban–rural linkages.

As a complex and systemic process, the urban–rural interaction is manifested in the resource flows of population, land, and industry, especially in urban agglomerations [5,18]. The models of land use have been well researched for balancing urban–rural growth, and scholars have promoted the development path based on land consolidation, agricultural production, and environmental protection [19,20]. Land resources have been addressed in the research field of urban–rural transition (URT) [21]. The population mobilization is regarded as a direct driver of an urban–rural system, which plays a vital role in the transition of employment patterns, industrial structures, and types of land use [22–24]. The most recent report released by the National Bureau of Statistics (NBS) shows that China had 380 million migrants in 2020, according to the Seventh National Population Census [25]. From 2010 to 2020, the scale of migration experienced a spectacular 69.73% increase and the tendency to gather towards urban agglomerations has become notably obvious. This epic-scale and ever-increasing migrant population has accelerated the change in the urban–rural relationships. Achieving "barrier-free" migration and the integration of the population is more than a significant component of an integrated urban–rural development, but the primary objective of China's "new-type urbanization" national strategy. However, scant research has targeted urban–rural integration within a migration-dominated system. Among all the elements of the urban–rural interaction, population is the only one that has decision-making power on migration and resource disposition, and, more importantly, it is also the ultimate beneficiary of an integrated development. In other words, the migrant population is the perfect link for various urban–rural resources. Discussing an urban–rural integration strategy without emphasizing the population flows is putting the cart before the horse.

The migration pattern in China, primarily from rural to urban areas, is mainly motivated by the large urban–rural income difference. To obtain the maximum gain, most migrants choose coastal cities, capital cities, and mega cities as their main destinations [26]. Although the migrants' movement itself is an optimization process of labor allocation within the sectors of the industrial system, resources belonging to the migrant population have not become a strong support in the process of urban–rural integration. Migrants from rural areas find it difficult to turn their farmland and homestead into economic capital. The institutional segregations in public services further make it hard to realize the migrants' integration into the cities. That is, China's urbanization is a half-built project, which has merely achieved the allocation of labor resources and industrial resources, leading to a socially marginalized and economically vulnerable group of people. Addressing these focal points has become the core mission of China's urban–rural integration development. Existing research has concentrated more on the predicament of migrants and carried out analysis of the reasons behind and designed proposals for improvement, all of which have laid a solid foundation for follow-up studies. However, a comprehensive analysis based on a migration-centered urban–rural integration framework is seldom reported, which is bad news for formulating migration-oriented policies. As the migrant population is the key part of the urban–rural interaction system, a holistic perspective needs to be strengthened.
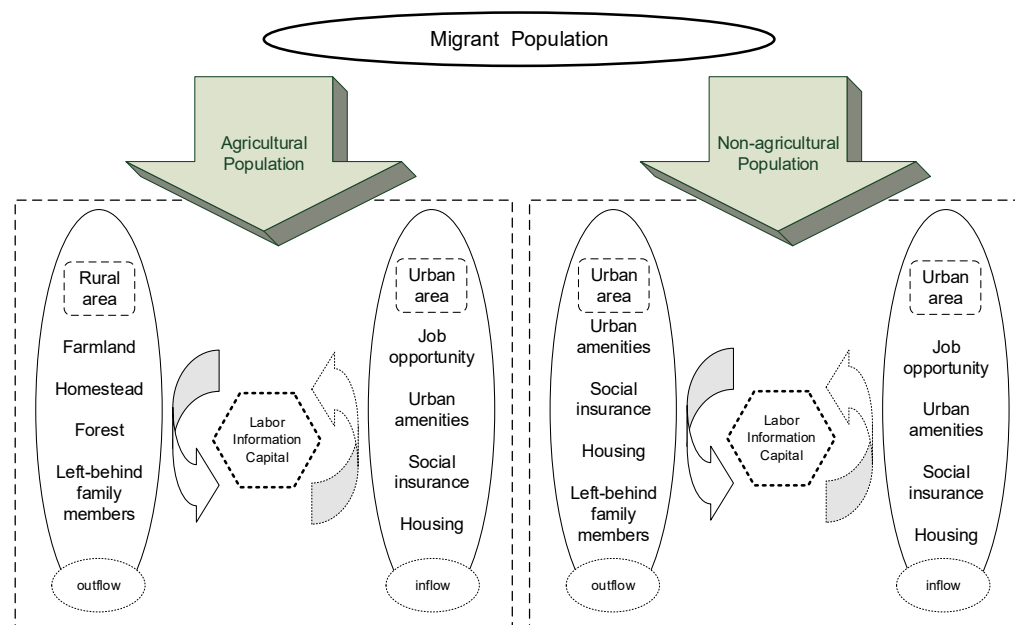
This study aims to shed light on the urban–rural integration by uncovering migration-related resource interaction, including rural land circulation and urban resource sharing. Meanwhile, the paper tries to investigate the empirical evidence to illustrate the farmland arrangement of outflow migrants, the migration patterns of inflow migrants, and social integration in an urban agglomeration. An urban agglomeration is characterized by high density and strong population flows [27,28]. As the main migration destination, urban agglomerations in China have been the body of China's implementation of coordinated urban–rural development. Empirical research on an urban agglomeration can identify its spatial features and expand our understanding of urban–rural integration in a city cluster system.

This paper is arranged as follows. Section 2 provides a conceptual framework for migration-centered urban–rural integration. Section 3 presents our empirical analysis, including the area in which the research was based, the sources of data, and the method of

study. Section 4 explains the findings based on statistical analysis. The last two sections provide a discussion and our conclusions reached based on the findings.

2. Migration-Centered Urban–Rural Integration

Urban–rural integration has been implemented nationwide as a major strategy for the balanced and sustainable development of China. The key is to construct a mechanism that facilitates the mobility of resources in urban and rural areas and cultivates a mutually beneficial and complementary urban–rural relationship [29]. Urban–rural integration is a complex process involving the economy, society, culture, and ecology, which has been well illustrated by analyzing the urban–rural transition determined by land and industrial factors [30–32]. On one hand, the population flows have been examined and are often seen as an indicator for research on the man–land relationship. On the other hand, migration is a great starting point for studying the urban–rural system. Considering the urban–rural integration from the perspective of migration helps us to better understand the significance of population flows in the urban–rural system and promote migrant integration in the destination. A conceptual framework was constructed to explain the migration-related resource flows in urban and rural areas (see Figure 1).

Figure 1. Conceptual framework.

2.1. Basic Structure of China's Migration

China's large-scale migration has undergone tremendous structural change in recent decades. At the beginning of China's economic reform in the 1980s, most of the migrant population came from rural areas in the central and western regions, where local economies lagged [33]. Academia even interpreted the idea of migration as the mobilization of rural migrant workers for some time. The labor force used to be restricted to the agricultural sector by the household registration system, also known as *Hukou*. China's household registration system classifies a population as either agricultural or non-agricultural, and it is an official record of an individual's place of residence. As reforms in the state-owned enterprises and the market economic system deepened, an increasing number of non-agricultural populations left their places of residence and sought better job opportunities in other cities. At present, the non-agricultural migrant population is already at a massive number that can hardly be ignored. According to the China Migrants Dynamic Survey of 2017, the ratio of non-agricultural population to agricultural population was about 1:4 in over 169,000 samples collected. Building a coordinated urban and rural system

became the objective of urban–rural integration. These urban-to-urban migrants cast a dramatic influence on outflow cities, usually small and medium-sized ones [34,35], thereby reshaping the cities' systems. The ordered urban-to-urban population movement has made a significant difference and ought to be incorporated into the framework, besides its rapid growth and large scale. That is, the rural-to-urban migrants and urban-to-urban migrants are restructuring China's urban–rural system jointly.

2.2. Resource Interaction Dominated by Migration

Generally, there are three types of resources involved in migration: land (including the affiliated houses, grains, and trees), population, and information. In consideration of measurability, the roles played by land and population in the resource interaction will be elaborated respectively.

Rural-to-urban migrants usually consider their right to the use of farmland and the homestead as a basic guarantee for their lives. China's land policies confer on the agricultural population the right to use the land, which is owned by village collectives or the national government [36]. This means that the farmlands, forests, and homestead cannot be sold by individuals. In some regions, the farmland has been converted into forest land under reforestation programs. Farmers in these areas have likely joined the migrant population. Without a well-developed land rental market, rural-to-urban migrants would rather leave their farmlands to family members, or give up farmland to forest production, or keep it idle, but not to renounce the right to use. Due to the institutional segregations in pensions, housing, healthcare, and education in inflow cities, it is very difficult for rural migrants to give up their last resort, especially those with a lower economic status and a limited social network. Thus, increasing the efficiency of the use of farmland and the homestead for rural migrants is crucial for the vitalization of rural resources [37]. On a positive note, the government has already issued a series of policies to improve the land rental market and promote agricultural-scale management [38], which is very effective in promoting land use efficiency. Similarly, urban-to-urban migrants have been segregated and excluded by the household registration system as well, causing disadvantages in accessing social welfare in destination cities. However, urban migrants still benefit from the non-agricultural *hukou* in their home cities, which is more generous than those in the rural areas [33]. Their resources in education, information, and social networks are likely to be much greater than those of the rural migrants. It is worth mentioning that a small portion of urban migrants (or their ancestors) own houses in their hometowns thanks to the housing reforms in the 1990s, which transformed the public-owned houses into private assets. With the complete monetization of the urban housing market and socio-economic development, these privately owned properties have gradually seen appreciation. The accumulation of estates enhanced these migrants' chances of becoming homeowners in destination cities. By contrast, the realizable wealth among all the resources that can be mobilized by the rural migrants is very limited, leading to a lower degree of life satisfaction and weaker intentions to settle in destination cities.

Aside from land and housing, the population factor is another important component of the migration strategy, namely migrants' household arrangement. Split-household migration, a common arrangement among first-generation rural migrants, is regarded as the optimal choice to obtain a high income in destination cities and, at the same time, enjoy less spending in their places of origin [39]. Taking family spending into consideration, the split-household migration pattern has been employed for years and even decades. As a result, serious social problems surrounding left-behind family members emerged. For example, the physical and mental health of left-behind children are negatively affected by being separated from their parents, mainly manifested in terms of their inferior learning abilities, insufficient school participation, self-cognitions, and lack of self-esteem [40]. The availability of family care during childhood plays a very important role in determining individual development, which eventually influences the overall population quality and national innovation ability [41]. In 2016, guidelines in regard to strengthening the care and
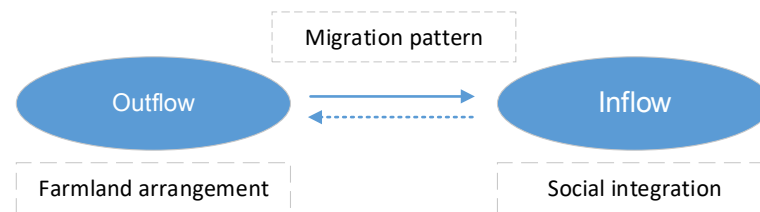
protection of left-behind children in rural areas were issued by the State Council, which aimed at improving the environment of their growth and safeguarding their legitimate rights [42]. The regulation stipulates that governmental support should be provided in areas such as child care, compulsory education, and supportive business policies for returning migrants. Additionally, benefitting from the vigorous economic development and the increase in labor costs, the wages of migrants were significantly increased. The improved economy and policy support, together with increasing importance attached to children's upbringing, have contributed to the widespread migration of family units in recent years.

Migration patterns such as sole migration, couple migration, and spouse and children joint migration represent totally different resource allocations in every aspect. Each pattern is a rational choice made after a trade-off between the migrant's own resource endowment and social security systems in both their hometowns and destination cities. On average, the more family members move to cities, the greater the demand for urban accommodations and public services, especially resources in healthcare and child education. These demands have brought about a huge amount of pressure on the urban infrastructure and public sector, but at the same time spurred the city's process of development. In turn, the access to public accommodations and social welfare could stimulate the tendency to capitalize possessions back in their hometowns, which consequently generates resource flows. Compared with split-household migration, family migration induces stronger resource interaction in the urban–rural system. Therefore, the completeness of the migrator's household in the destination city is a manifestation of intensified interaction among the urban–rural resources.

Migrants' social integration in the host city is an important reference for assessing the quality of urban–rural resource interactions in terms of their allocations. A migrator's successful integration into the urban system indicates the maximum utilization of resources, that is, the value of human resources has been well embodied, the demands for urban accommodations and public services have been basically satisfied, and accordingly the sense of identity and intention to settle are stronger. Scholars have carried out multidimensional analysis on the migrant's social integration, mainly focusing on one's economic status, social relations, and psychology [43,44]. However, when considering resource interaction, the public service dimension should be emphasized. Therefore, the economic integration, public service integration, social participation, and psychological adaptation are all included in the framework of analysis. Social participation is the extension of human capital, representing a migrator's ability to mobilize potential resources. Psychological adaptation is a subjective feeling deemed as the feedback of the satisfaction of the uninvolved demand. In summary, migrants' social integration is not only a matter of personal well-being and happiness, but also a crucial representation of urban–rural integrated development.

Thus, this research selected farmland arrangement, family migration, and social integration as the representatives of resource flows to analyze the migration's influence on the urban–rural interaction system. The chosen indexes are mainly based on the resources involved and data available, which have covered the key process of migration (see Figure 2). Furthermore, the spatial characteristics of these indicators are presented in an urban agglomeration, and the findings can better satisfy national strategic needs. Example research questions include: Has the status of urban agglomeration migration been improved significantly under the integration-promoting policy? How is the coordinated development in the sample area between urban and rural regions demonstrated in terms of migration? This research will take the Wuhan urban agglomeration as an example to address the questions above.
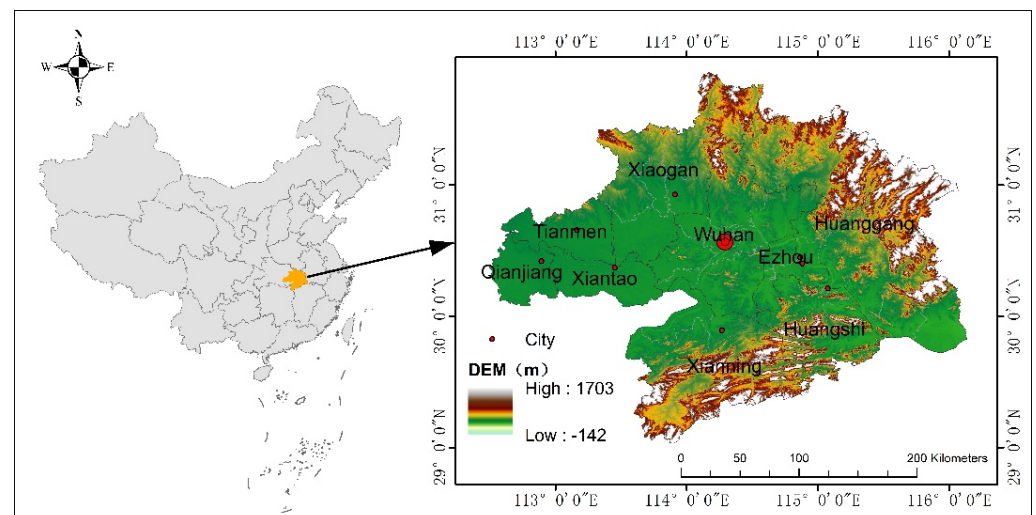
Figure 2. Relationship between representative indexes and the migration system.

3. Data and Method

3.1. Study Area

The Wuhan urban agglomeration, a city cluster located in the middle reaches of the Yangtze River, is one of China's most dynamic areas of economic growth (see Figure 3). Located in Central China, Wuhan is also the capital of Hubei Province. Wuhan has attracted a large number of migrants and shown great potential in absorbing migrant populations. Other adjacent cities are Huangshi, Xianning, Huanggang, Xiaogan, Ezhou, Xiantao, Tianmen, and Qianjiang. The Wuhan urban agglomeration contributed over 60 percent of the total GDP of Hubei Province in 2020. It is a transportation hub with strong support from the central government. Wuhan is on pace to become the most important contributor to the development of the Yangtze River Economic Belt.

Figure 3. Spatial location of the Wuhan urban agglomeration.

3.2. Data Source

In this section, the farmland arrangement, family migration, and social integration in the Wuhan urban agglomeration will be examined. The data were obtained from the Migrant Dynamics Monitoring Survey (hereafter referred to as MDMS) from 2012 to 2017. A sub-survey of the MDMS 2013 focusing on migrants' social participation and psychological health was also used. The survey was conducted by the National Health Commission in China. The respondents were those who have stayed in their current location for one month or more without local household registration. The data collection on urban and rural residential committee units was based on the three-stage stratified probability to size (PPS) sampling scheme from each sub-district, which guaranteed the reliability of the spatial analysis on indexes of migration. The survey is representative as it collected a large variety of data related to demographics, migration status, employment traits, social activities, healthcare, etc.

In addition, data on the disposable income of residents living in sampled cities were obtained from the statistical yearbooks (2017) for the measurement of economic integration [45].

3.3. Index and Measurement

3.3.1. Farmland Arrangement

The farmland arrangement is defined as the choice of the farmland's disposal. Detailed options were subdivided in the questionnaire of MDMS 2017, namely farmland under self-cultivation or cultivation by family members, farmland cultivated by hired labor, farmland cultivated by relatives or friends, farmland that was rented to individuals or village collectives, farmland that was rented to enterprises, farmland left idle, farmland that was used to plant trees, and others. The rental arrangement can be regarded as the most efficient utilization of the land within the existing framework of the land system. Cultivation by relatives or friends is a common operation to keep the migrator's farmland in use, so they do not have to worry about agricultural production themselves. This is the preferred choice of migrants as they can commit to working in cities, find better-paid jobs, and thus maximize their total income. Cultivation by hired labor is not popular now but it is an effective way to achieve a win–win situation for both the hirer and the hiree. Therefore, all the arrangements are summarized into two groups: those cultivated by others and those not cultivated by others. The percentage of this arrangement, including of those rented to individuals, village collectives, or enterprises and of those cultivated by relatives or friends or hired labor, is counted to measure the efficiency of the farmland circulation. Because the whole sample consists of agricultural migrants without contracted farmland and non-agricultural migrants, to ensure the credibility of the calculation, respondents who have contracted farmlands were selected as the denominator. Therefore, this proportion of farmland being "cultivated by others" could, to a great extent, mirror the degree of land resource flow.

3.3.2. Family Migration

The phenomenon of family migration has been well stressed in current studies, despite the slight discrepancy in the definitions of "family". The forms of migration have gone from the "single or married men", to "a couple", and to "a family" stage, with an increasing number of family members involved in the migration. Researchers have reached the consensus that family migration, the most mature form of migration, has become a major trend among migrants in China [46]. Given the shrinking household size and nucleation of the family structure in China, the "family" in the definition of family migration is scoped to "spouse and unmarried children" for married migrants and "parents and unmarried siblings" for unmarried migrants. That is, the degree of family migration is measured by the wholeness of the nuclear families listed above. Based on the respondents' marital status and the locations of their nuclear family members, we divided them into two categories: family migration and non-family migration. Only when all the nuclear family members completed migration could it be counted as family migration.

3.3.3. Social Integration

The social integration of a migrant population has a sophisticated framework, which includes the economy, social relations, psychology, and culture [47–49]. The weight assigned to each dimension is different according to the theoretical basis of the study or target of research. Given the significance of public service in our study, its integration was brought into the framework [50]. Considering the difference in each dimension's importance in social integration, Delphi's method was used in the grading of the four dimensions. The structured interviews were constructed by ten experts in two rounds. The weights were finally assigned based on approximate average scorings. Therefore, the assessment of social integration included economic integration, public service integration, social participation, and psychological adaptation with the weights of 20%, 30%, 20%, and 30%, respectively (see Table 1).

Table 1. Indicator system of migrants' social integration.

First-Level Indicators	Second-Level Indicators
Economic integration	Per capita monthly income Per capita monthly expenditures Rent/mortgage-to-income ratio
Public service integration	Medical insurance Personal social insurance card Temporary residential permit/residential permit Healthcare record
Social participation	Participate in political activities Participate in activities of social organizations Social circle
Psychological adaptation	Willingness to integrate into local society Willingness to settle down Willingness to stay in the future Estimated time to stay

At the same time, the choice of sub-dimension indicators was based on reference to previous studies and trade-offs were made depending on the adjustments made to the questionnaires. For example, "social circle" in the second-level indicators represents the extent of migrants' social network in host cities. The corresponding question in the survey of 2017 is "Have you participated in any of the following activities since 2016?", and the choices of answers were designed to be multiple: "labor union", "volunteer association", "fellow-students' association", "fellow-folks' association", "fellow-folks' chamber of commerce", and "others". The similar question could be found in the survey of 2013. The answers of respondents were standardized by the Min-Max Normalization method. Given the hierarchy of social integration, all the data of the second-level indicators were standardized.
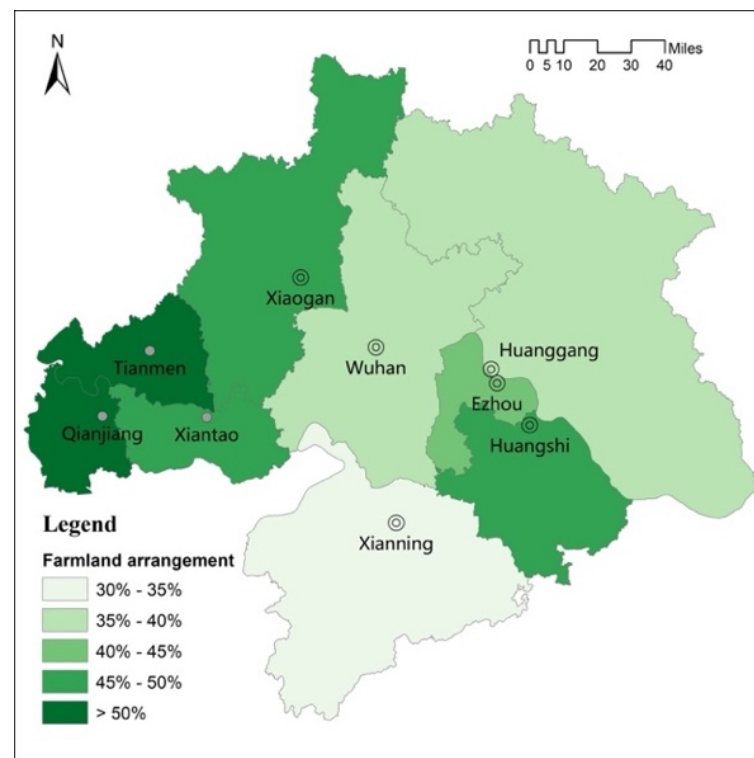
To measure the two-level indexes, an equally weighted method was employed in the second-level indicators. Particularly, the per capita disposable income of urban residents in sample cities was used as the benchmark in the calculation of per capita monthly income. The other second-level indicators of economic integration also took residents' data from the statistical yearbook as the benchmark. A special survey on migrants' social integration was conducted in 2013, and Wuhan was one of the sampled cities. The data obtained enabled us to make a comparison between the social integration in 2013 and that in 2017.

4. Results

4.1. Analyzing the Farmland Arrangement in the Wuhan Urban Agglomeration

Based on MDMS 2017, we obtained the statistics of rural migrants' farmland arrangement in the Wuhan urban agglomeration. Firstly, respondents who came from the Wuhan urban agglomeration were selected from the national sample. Then, respondents who have contracted farmland were selected from the 4070 samples in a preliminary screening. Finally, 1435 samples were collected in the calculation of rented farmlands. The average level of the "cultivated by others" farmland arrangement in the Wuhan urban agglomeration was 43.6%, higher than the national average (39.2%). The percentages of farmland "cultivated by others" in Wuhan, Ezhou, Huanggang, Huangshi, Qianjiang, Tianmen, Xiantao, Xianning, and Xiaogan were 39.8%, 42.3%, 35.7%, 45.7%, 53.3%, 51.9%, 50.0%, 32.2%, and 48.7%, respectively (see Figure 4). This shows that the efficiency of farmland circulation in the central city is relatively low, and almost 70% of migrants in Xianning chose to leave their farmland idle.
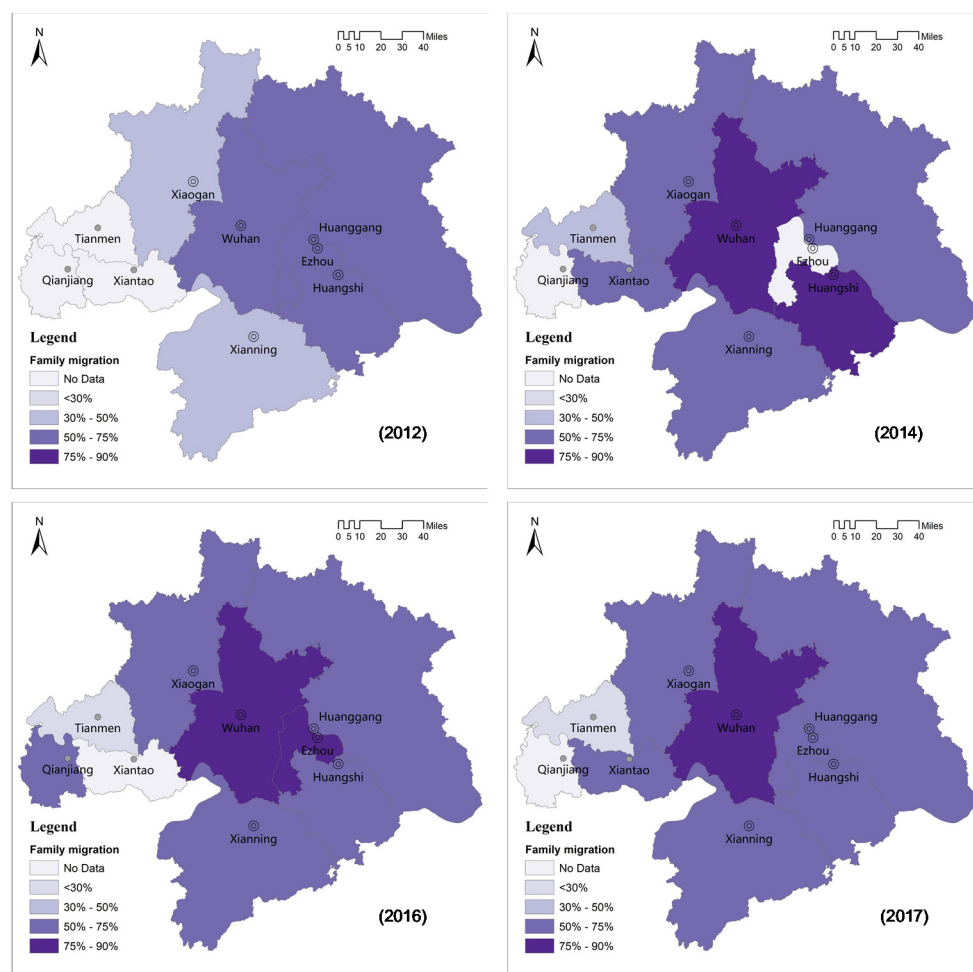
Figure 4. Spatial distribution of farmland arrangements in the Wuhan urban agglomeration.

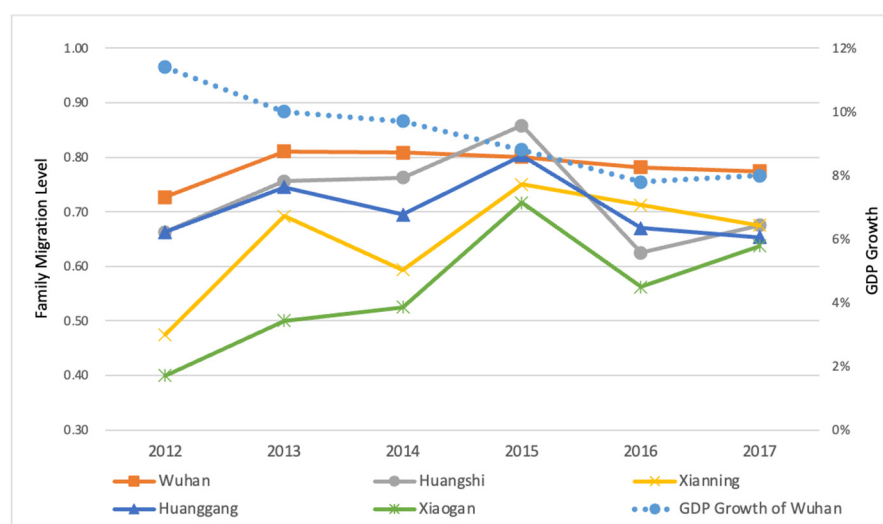*4.2. Exploring the Family Migration and Social Integration in the Urban–Rural Integration System*

- Spatial and temporal variations in family migration

Family migration is the most prevalent form of migration in the Wuhan urban agglomeration, and the average household size reached 3.21. Statistically, more than 80 percent of migrants in the region migrated by a family of three or four. The high degree of family migration stands for greater mobility of human resources, and a more reasonable allocation of human resources. As previously discussed, the wholeness of a nuclear family was defined as the criterion of family migration. Thanks to the detailed survey on migrants' family members, the location of every member of the nuclear family is clearly recorded. According to MDMS 2012 to 2017, the spatial–temporal change in family migration in the Wuhan urban agglomeration is illustrated. Because data on four cities (i.e., Ezhou, Qianjiang, Xiantao, and Tianmen) were not available in the national survey for some years, Figure 5 displays four typical years to analyze the variation trend, and an integrated line chart of five representative cities was drawn as a supplement (see Figure 6).

After 2013, the proportion of full household migration in all five representative cities exceeded 50%, with Wuhan consistently maintaining a relatively high level. In contrast, Xianning and Xiaogan experienced significant improvements and large fluctuations. From 2015 to 2016, the family migration level of the whole region fell obviously, which is in line with the trajectory of the central city's GDP growth. Population flows were closely bound to economic factors, and the fluctuation in the family migration level could be explained by the region's economic growth to a certain extent, especially in a stable and sound environment for public policy.

Figure 5. Spatial distribution of family migration in the Wuhan urban agglomeration (years 2012, 2014, 2016, and 2017).

Figure 6. General trend of the family migration level in five cities and the GDP growth of Wuhan.

● Elaboration of social integration in the Wuhan urban agglomeration

Along with the increasing emphasis on migrants' social integration on a national basis, migrants' social relations were gradually added to the national questionnaire from

2012 to 2017. Therefore, the information related to social integration in multiple years differs in quantity and quality. Additionally, the sub-survey of MDMS 2013 covers eight representative large cities and districts in China, in which Wuhan was included. To ensure the consistency of the index selection and the richness of the index system, only the data collected in Wuhan in 2013 and 2017 were selected for comparison. Thus, 1999 and 2000 samples were collected, respectively. The results show that the overall score of migrants' social integration in Wuhan increased significantly from 2013 to 2017 (see Figure 7). Particularly, the improvement was mainly shown in public service integration and social participation.
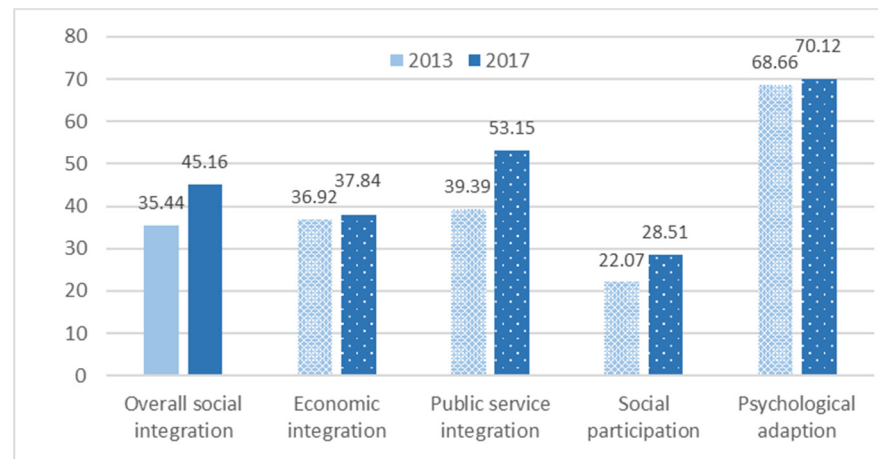

Figure 7. Migrants' social integration in Wuhan (years 2013 and 2017).

As shown in Figure 8, the distribution of social integration levels in 2017 was high in the middle and low on the edge. Although Wuhan gained the best score in the urban agglomeration, the social integration score in non-central cities seemed uneven compared with the distribution of the family migration level in the same year (see Figure 5).
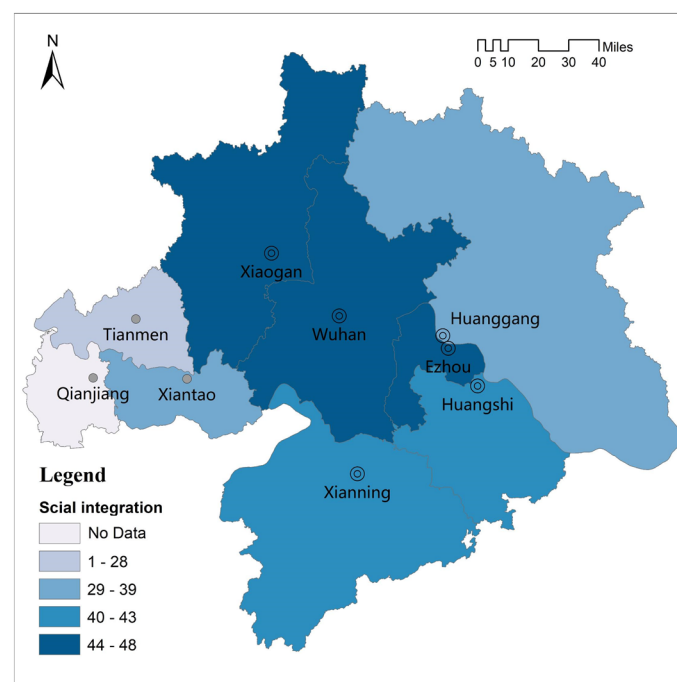

Figure 8. Spatial distribution of migrants' social integration in the Wuhan urban agglomeration.

5. Discussion

Migration, as the main driver of urban–rural resource interaction, is reshaping China's urban–rural system. The robust population flows are backed by the latest nationwide population census in 2020. Using data from MDMS 2013–2017, the migrants' farmland arrangement, family migration levels, and degree of social integration in the Wuhan urban agglomeration were analyzed. This study contributes to the literature in two ways. First, a migration-dominant urban–rural resource system was formulated, which concentrates more on the population in the research on urban–rural integration. Second, it emphasized the spatial and temporal features of the representative indicators in an urban agglomeration, which is conductive to pro-migration policy adjustments within the urban agglomeration.

The migration-generated urban–rural resource flows in the Wuhan urban agglomeration were analyzed by three indicators: farmland arrangement, family migration, and social integration. The results of farmland arrangement show an opposite tendency of that of social integration. That is, a region with higher social integration in the urban area produces a lower level of farmland circulation. A prime example is the city of Wuhan. This phenomenon was interesting, and a similar situation could be found in research on idle farmland [51,52]. The low efficiency of farmland circulation in developed regions can partly be explained by a strong attraction to the labor force. Under the influence of urban society, farmers in more developed regions tend to be non-agricultural in production and lifestyle. Under normal conditions, the regions with a developed urban economy should be better positioned to assist with rural development. However, the lower agricultural production level and higher scarcity of labor together lead to a lower efficiency of farmland use.

Additionally, the obvious increase in the degree of family migration in Wuhan confirmed the effectiveness of China's integration-promoting policies. The results positively affirm the performance of Wuhan's public service construction and community governance. Although the development of family migration and social integration in non-central cities in the Wuhan urban agglomeration is uneven, the sustained advantages of the central city in advancing migrants' status and social integration are leading factors in absorbing the migrant population and the main driving forces of resource interaction in the whole urban–rural system.

6. Conclusions

Based on the resources involved, we constructed a migration-centered urban–rural integration system to analyze the main resource flows. Migration itself is an important sign of resource flows. Moreover, the migrant population has the ability to mobilize a variety of other resources in many ways. More specifically, a change in a migrator's location could lead to a shift in the supply of and demand for resources, further driving the allocation of resources, including farmland, housing, healthcare, and education. In the framework of migration-centered urban–rural integration, two groups of migrant populations, agricultural and non-agricultural populations, were analyzed from the perspective of resource allocation. Further, three indicators were introduced to explain the urban–rural resource interaction.

The differences in the original resource accumulations of agricultural migrants and non-agricultural migrants have contributed to the former's disadvantaged status in resource allocation. The deepening of marketization in the real estate business has further widened the wealth gaps among rural migrants, urban migrants, and locals. More attention should be paid to this unfair baseline that was drawn for institutional reasons, and interventions should be made to avoid the deepening of income gaps. For non-agricultural migrants, the movement from one city to another is more like a "vote with their feet" without dependence on land resources [53]. With better accumulations of wealth, urban migrants could give more consideration to long-term income and permanent integration into local communities [54]. Urban-to-urban migration is a vital force in the reshaping of China's urban system [55]. Therefore, the ordered movement of urban migrants is also of great significance in urban–rural integrated development.

From the migration point of view, indicators of farmland arrangement, family migration, and social integration were explored with the aim of promoting the urban–rural resource interaction. The intrinsic logic is to facilitate more efficient resource flows on the premise of guaranteeing migrants' basic needs. In rural areas, a social security system has been established and improved gradually, which offers positive support to rural migrants' one-way or circulating flows. However, the percentage of farmlands "cultivated by others", including rentals and farmlands "cultivated by hired labor", is still at a low level, which indicates great potential for the improvement of land use efficiency and rural migrants' revenue. This should prompt policymakers to build a more mature farmland rental market. In urban areas, family migration and social integration manifest the degree of resource allocation. It is a new perspective from which urban–rural integration can be better understood. In brief, these three indicators are closely linked to the migration behaviors, and they can properly represent the overall urban–rural resource interaction.

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