Geographic Distribution of Remittance Transmission By Rural-Urban Migrants in China

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GIS 101 Introduction to GIS
Projection: Mercator (World)

Introduction

In developing countries, migrant remittance is a direct source of capital to households that are left behind. Remittance directly improves the economic condition of the households. One tenth of China's population are "floating population" (Scheineson, 2009), who migrate internally in China to another city which is different from the place where their *Hukou* were registered at birth. The objective of this project is to study the spatial distribution of remittance flows and invest into the patterns in geography of the remittance and its correlation with the expenditure behaviors and the socioeconomic characteristics of the left behind households in China. The dataset of remittance transmission comes from the Rural-Urban Migration in China (RUMiC) survey of 2009. The significance of spatial questions on remittance lies in tackling the current challenges of transferring remittances, including high human cost and high transaction cost of transferring remittance (Ratha, 2005). To bridge remittance transfer service providers and local postal and retail networks, and to provide more access to banking in poor areas (Ratha 2005), fundamentally aim to achieve a point-to-point transferring mechanism between remittance sending and receiving areas. The study on spatial distribution of remittance flows is critical for both policymakers in both public and private sectors. The major finding is that the motivation to remit is highly associated with physical proximity, which agrees with previous studies. Migrants with higher average incomes, send more remittances back home, but the long distance discourages individuals to remit. On an aggregate level, the largest flows of remittances take place within home provinces in China.

Methodology

Survey Data

The **Rural-Urban Migration in China (RUMiC)** dataset which consists three surveys: the Urban Household Survey, the Rural Household Survey and the Rural-Urban Migrant Household Survey. The new households Rural-Urban Migrant Household Survey in 2009 is selected. The survey data was collected in 15 cities, including one national central city, eight provincial capital cities and six prefecture-level cities. The survey questionnaire is designed into two sections, individual and household. The sampling frame is designed based on the workplaces in these cities, therefore, the dataset could omit other groups of migrants who do not reside at workplaces in these cities.

Calculation

Distance

The measurement of the distance that remittance travels adopts the place where migrants' *Hukou* are registered as the proxy for where the remittances are sent to, and the city where they have been interviewed as where they work. Figure 1 and figure 2 have summarized all the provinces and cities among the survey dataset. Since it is not practical to conduct the Rural Household survey to the direct "remittance-recipient households" the migrant workers send remittances to, it is inevitable that there are biases and uncertainty to measure the distance based only on the provinces of *Hukou* registration. The calculation of the distance between current city of work and places of origin can only be estimated by a centroid of the province to a centroid of a city in a straight line.

Remittances and Incomes

There is a bias on monetary data reported by migrant workers, especially on remittances and non-consumption expenditure on gifts. Choosing a set of data reported by the remittances recipient households on how much they actually receive can omit such a bias and to better capture the "pure" remittances actually arrived on the hands of the left behind households, excluding the transaction cost. However, the available dataset does not provide such ideal data. Therefore, for the GIS analysis, the remittance is calculated directly from the money migrant workers reported themselves.

Annual Remittance = G132(Non-Consumption Expenditure) + G136 (Total Net Value of Money Remitted Back to Hometown) + G137 (Children's education fees) + G133 (Gift)

Total Annual Income = G100 (Total Monthly Income of the Household) * 12

Data and Maps

The first step is to prepare 3411 entries of data, including cleaning blank and duplicated data, linking separate tables with household IDs and summarizing data components. The 3411 household data is summarized to a table based on current cities and a table of provinces of Hukou, including total annual remittance and total annual income correspondingly. Then joining the tables to the first and second administrative levels of China shape files based on "province of Hukou" and "current city". The first series of maps are produced based on the relationship between locations, either remittance-sending cities or remittance-receiving provinces, and the amount of total/average annual remittances and total/average annual incomes.

The second step was to create the flow map of remittances, based on pairs of remittance-sending cities and remittance-sending provinces. 226 pairs of remittance sending-receiving locations are summarized with aggregated annual amount of remittances and annual incomes. The xy coordinates for each remittance-sending city and each remittance-receiving province are prepared. .The table generates flow lines in ArcGIS with the XY to Line tool based on the decimal values of xy of origin and destination. The distance between each remittance-sending city to its remittance-receiving province is calculated.

The third step was to analyze in Excel the correlation between distance and the amount of remittances, based on the selected 200 entries data generated from the second step. A log distribution between the distance and aggregated amount of annual remittances is presented, along with the regression statistic analysis.

The fourth step was to create a Sankey diagram to visualize the 200 pairs of remittance flow in the descending order of amount of remittance within each remittance-sending city, and to map the specific flows of highest remittance-sending cites based.

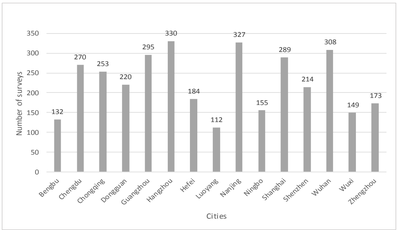


Figure 1. Survey data counts in Remittance-sending Cities

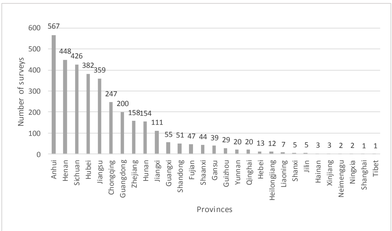
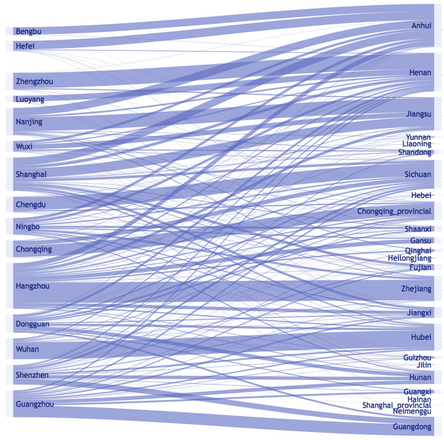
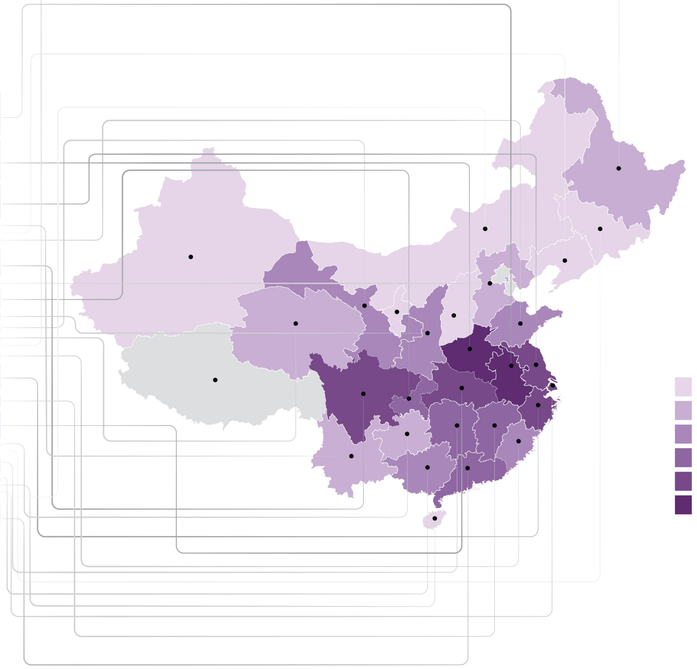


Figure 2. Survey data counts in Remittance-receiving Provinces





References

Akay, Alpaslan, et al. "Remittances and well-being among rural-to-urban migrants in China." *Review of Economics of the Household 12.3 (2014): 517-546.*

Ratha, Dilip. "Back to Basics-Remittances: A Lifeline for Development." *Finance and Development-English Edition 42.4 (2005): 42-43.*

Scheineson, Andrew. "China's Internal Migrants." 14 May 2009. Council on Foreign Relations.

Findings

First, higher amount of remittance-receiving provinces are clustered around remittances-sending cities. Heilongjiang province is distant from the remittance-sending cities, but receives relatively more remittances compared to other distant provinces. The total income of migrants from Heilongjiang is relatively big compared to adjacent provinces. Guangdong includes three remittances-sending cities, but it does not receive the most amount of remittances. Therefore, the correlation between distance and remittances could be weaker in the case of provincial internal migration, and high level of income can overcome the distance in remittance transmission. **Second, there is a negative correlation between the distance and the aggregated annual remittances,** with a log-normal distribution. The remittances higher than 1000000 (yuan) are distributed in the distance range from 0km to 250km. In China, 250km is a reasonable distance within a provincial boundary. The remittances sent home tend to be bigger when the migrant workers migrate "within home province", which is consistent to Akay's finding (Akay, 2014).

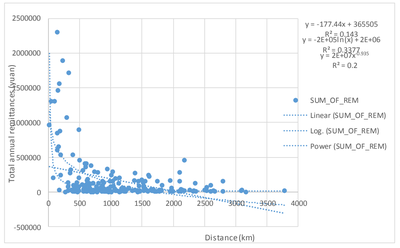
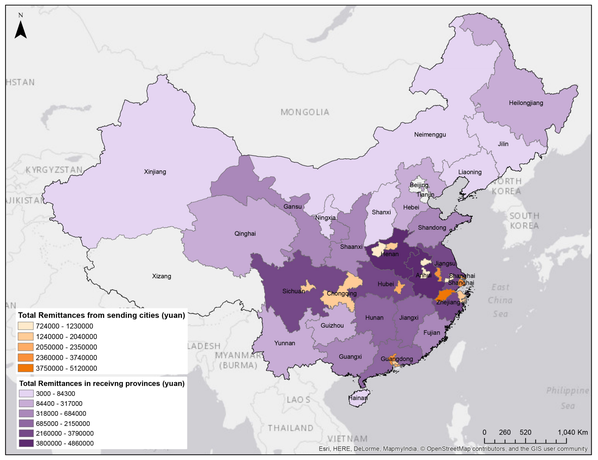


Figure 3. Correlation between distances and total amount of remittances

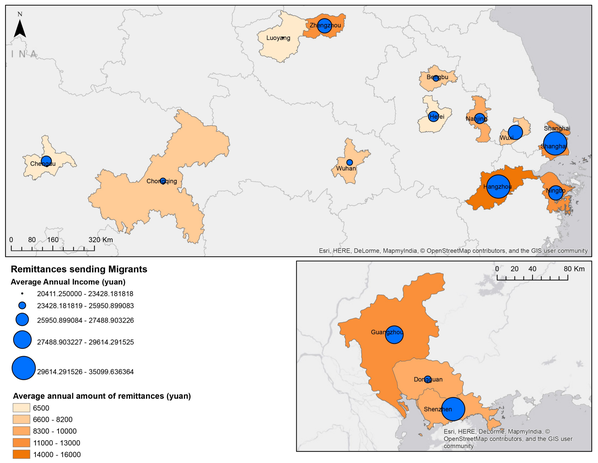
Third, the remittances flows between sending cites and receiving provinces further on indicate the large of remittances sent within home provinces. In the year 2009, **Hangzhou sends the most of remittances within the provincial boundary, and Shanghai is the major migrant-receiving city which sends the most remittances outside the province.**

Hangzhou's remittance flows

Shanghai's remittance flows



Total annual remittances in both sending cities and receiving provinces (2009)



Average annual income and remittances by migrants in sending cities (2009)