Examining the Residential Patterns of Urban Immigrants
in Seoul Metropolitan Area

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Abstract

This paper measures and maps multi-dimensional residential segregation of immigrants in Seoul metropolitan area at city/county/district level as well as town level, thereby adding to our understanding of the urban structure and its spatial distribution impacted by immigration. The perspective offered here focuses on the segregation spurred by transnational migrants and their urban settlement. By drawing population data for 79 city/county/district administrative units from the Korea Immigration Service, residential segregation of immigrants in Seoul metropolitan area is measured based on Massey & Denton's four segregation indices: evenness, exposure, concentration and clustering. The empirical findings suggest that Seoul metropolitan area is highly segregated and the areas showing hyper-segregation appear in Seoul city and Gyeonggi province. As immigrants are foreseen to continue to increase in the future, this research contributes both empirically and theoretically to preliminary research on spatial segregation of immigrants by showing how ethnic places are segregated spatially through ethnic networks that support the geographic concentration of minority groups.

Keywords: Registered foreigners, immigrants, Seoul metropolitan area, residential segregation, hypersegregation

1. Introduction

The number of foreigners staying in Korea has rapidly increased since the late 1990s. It was accompanied by fast economic growth, a shift in the industrial structure, improved income level, and a lack of labor due to higher education and low fertility, which resulted in a huge increase in migrant workers over the past two decades. The number of registered foreigners was only 84,905 in 1994, but increased by 210,249 people in 2000 and 1,171,762 people in 2017, showing a rapid growth rate every year. Although the number of foreign residents in Korea has increased rapidly, the migration history of foreigners is relatively short compared to other countries, and the experience and understanding of various racial and ethnic minorities are still lacking. However, as the low fertility rate and the aging society are advanced in the future, the number of foreigners entering Korea such as low-skilled migrants, marriage migrants, foreign nationals, and international students will increase continuously and it is expected to bring divers social and spatial changes[1].

The purpose of this study is to analyze the spatial distribution of immigrants by city/county/district and town level in Seoul metropolitan area and examine how the residential segregation appears in area. First, I analyze the spatial distribution of immigrants residing in Seoul metropolitan area according to their characteristics such as nationality and status of stay. Based on this analysis, I apply the indicators of residential segregation proposed by Massey & Denton on immigrants' spatial distribution. By measuring and mapping the ethnic

enclaves, I focus on the residential segregation spurred by transnational migrants and their urban settlement. Spatial statistical research on foreign immigrants can be served as basic data to establish rational policies for immigrants who are continue to increase in the future, to improve the positive effects of racial and ethnic diversity in changing urban spaces, and to design support for them.

2. Data and Method

The increase of foreign immigrants and the expansion of their residential areas are found nationwide, but the metropolitan areas including Seoul city, Gyeonggi province, and Incheon city, Busan city and Daegu city etc. are at the center as considering the spatial distribution of immigrants. According to the 2017 Statistical Yearbook that the Korea Immigration Service of the Ministry of Justice released in June 2018, 60.7%, 711,377 registered foreigners out of 1,171,762 registered foreigners nationwide, live in Seoul metropolitan area. There are 33 cities/counties/districts with more than 10,000 registered foreigners residing nationwide; among the top 10 cities/counties/districts of the number of registered foreigners, all are located within Seoul metropolitan area including Danwon-gu, Ansan city (43,085) and Hwaseong city (36,516) in Gyeonggi-do, only except Gimhae city in Gyeongsangnam-do (18,626). The ratio of registered foreigners is also high in Danwon-gu, Ansan city in Gyeonggi-do (12.2%) and Yeongdeungpo-gu in Seoul (8.5%). In the top 10 cities/counties/districts, all belong to Seoul metropolitan area except Eumseong-gun in Chungcheongbuk-do (8.4%), Jincheon-gun in Chungcheongbuk-do (7.0%) and Yeongam-gun in Jeollanam-do (6.4%)[2].

Table 1. Top Ten Cities/Counties/Districts (2017)

	Number of Registered Foreigners(People)		Percentage of Registered Foreigners(%)	
1	Danwon-gu, Ansan city, Gyeonggi-do	43,085	Danwon-gu, Ansan city, Gyeonggi-do	12.2
2	Hwaseong city, Gyeonggi-do	36,516	Yeongdeungpo-gu, Seoul	8.5
3	Yeongdeungpo-gu, Seoul	33,474	Eumseong-gun, Chungcheongbuk-do	8.4
4	Siheung city, Gyeonggi-do	32,031	Pocheon city, Gyeonggi-do	7.7
5	Guro-gu, Seoul	30,817	Geumcheon-gu, Seoul	7.3
6	Bucheon city, Gyeonggi-do	21,345	Siheung city, Gyeonggi-do	7.2
7	Pyeongtaek city, Gyeonggi-do	21,340	Guro-gu, Seoul	7.1
8	Gimhae city, Gyeongsangnam-do	18,626	Jincheon-gun, Chungcheongbuk-do	7.0
9	Gimpo city, Gyeonggi-do	18,340	Jung-gu, Seoul	6.9
10	Geumcheon-gu, Seoul	18,337	Yeongam-gun, Jeollanam-do	6.4

Source: Korea Immigration Service Statistics 2017
Note: The percentage of registered foreigners is the ratio of the number of registered foreigners in the resident population of each city/county/district.

The reason why foreign immigrants are concentrated in Seoul metropolitan area is related to the concentration of population, industry and education in this area. As European and North American countries had experienced in the early 20th century, foreign immigrants residing in Korea tend to be concentrated in large cities. In this study, the metropolitan area including Seoul, Gyeonggi, and Incheon is set as a spatial scope, and the spatial distribution of the foreign immigrants is examined from the perspective of residential segregation. In addition, the statistics on foreigners residing in Korea can be obtained through the Statistical Yearbook published by the Korea Immigration Service of the Ministry of Justice. 'Registered foreigners' are defined as ones who had completed their alien registration at the Korea Immigration Service to stay longer than 90 days from the date of entry. In addition to the Statistical Yearbook of the Ministry of Justice, the statistical data published by the local government of Seoul, Gyeonggi and Incheon respectively were used in this study. Arc GIS 9.3 was used to map the residential segregation index of foreign immigrants residing in 1,131 towns and 79 cities/counties/districts in Seoul metropolitan area[3-5].

Massey and Denton (1988) verified five distinct dimensions of segregation such as evenness, exposure,

concentration, centralization and clustering, but in this study I will apply four indices except centralization as a quantitative methodology to measure the residential segregation of 79 cities/counties/districts in Seoul metropolitan area. This will help to identify the areas that appear hyper-segregation. At a general level, residential segregation is the degree to which two or more groups live separately from one another, in different parts of the urban environment. It has been used as an indicator of spatial discrimination and segregation by race and ethnicity in U.S. cities.

3. Residential Pattern of Urban Immigrants in Seoul Metropolitan Area

Massey and Denton verified five dimensions of segregation including evenness, exposure, concentration, centralization and clustering as quantitative indicators for measuring the residential segregation, which have been consistently utilized by many researchers[6-7]. In this study, I attempted to measure the segregation of 79 city/county/district administrative units in Seoul metropolitan area by using evenness, exposure, concentration, and clustering.

The first dimension, evenness, can be measured by using the index of dissimilarity. The results for each city/county/district, calculated using the number of Korean populations and the number of registered foreigners by city/county/district are shown in [Figure 1]. The higher the index, the higher the degree of spatial segregation between the majority and the minority groups, and it can be judged that registered foreigners are concentrated in the area and segregated from the Koreans. The areas where the dissimilarity index has a high level of 0.6 or more is Siheung city, Gyeonggi-do. The dissimilarity indices of Gimpo city and Gunpo city in Gyeonggi-do are close to 0.6, so that the degree of spatial segregation of registered foreigners living in the areas is high. In Seoul, the indicators of Guro-gu, Gwangjin-gu, Seodaemun-gu and Yeongdeungpo-gu are high. On the other hand, Eunpyeong-gu in Seoul, Gyeyang-gu and Dong-gu in Incheon, Seocho-gu in Seoul, Ongjin-gun and Yeoncheon-gun in Incheon, and Dobong-gu in Seoul have relatively low segregation of foreign residents with their index below 0.2. These counties and districts are areas with relatively few foreign residents in each city and province.

Secondly, residential exposure refers to the degree of potential contact, or the possibility of interaction, between minority and majority group members within geographic areas of a city, and the index vary between 0 and 1.0. In other words, the closer to 1, the greater the degree of exposure of foreign immigrants to each other, and thus the greater the degree of isolation from the Korean population. [Figure 2] below shows that foreign immigrants residing in such areas as Danwon-gu, Ansan city and Siheung city in Gyeonggi-do, and Guro-gu and Yeongdeungpo-gu in Seoul, and Gimpo city in Gyeonggi-do are low in exposure to Koreans, and only exchanges among homogeneous group members are high. On the other hand, Gwacheon city in Gyeonggi-do, Dobong-gu, Nowon-gu, and Eunpyeong-gu in Seoul and Ongjin-gun in Incheon have relatively small number of foreign immigrants, so that it is hard to see them isolated from the Korean people.

As a third dimension, the delta index [Figure 3] was calculated to examine the spatial concentration of foreign immigrants in Seoul metropolitan area. Concentration refers to relative amount of physical space occupied by a minority group in the urban environment. Groups that occupy a small share of the total area in a city are said to be residentially concentrated. Sujeong-gu in Seongnam city, Gunpo city, and Siheung city in Gyeonggi-do, Yeongdeungpo-gu in Seoul, Danwon-gu, Ansan city in Gyeonggi-do, Jung-gu in Incheon, Guro-gu in Seoul, and Gwangmyeong city in Gyeonggi-do show the high level of delta index as the foreign immigrants are concentrated in these specific areas.
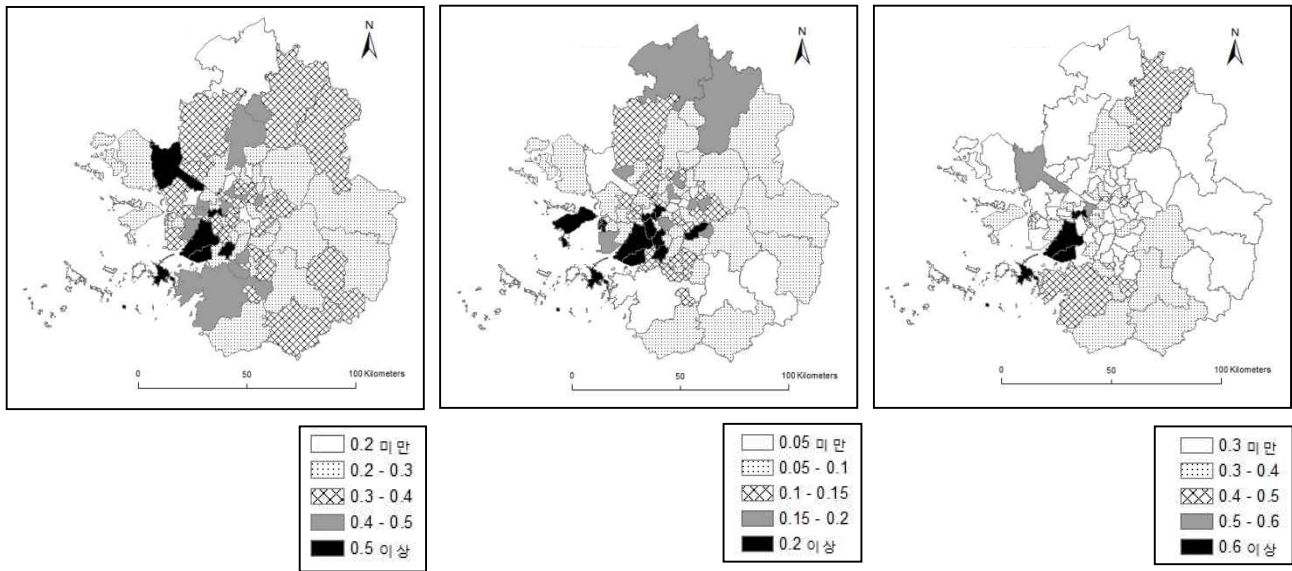
| 0.2 미만 |
| 0.2 - 0.3 |
| 0.3 - 0.4 |
| 0.4 - 0.5 |
| 0.5 이상 |

Figure 1. Dissimilarity index[1]

| 0.05 미만 |
| 0.05 - 0.1 |
| 0.1 - 0.15 |
| 0.15 - 0.2 |
| 0.2 이상 |

Figure 2. Isolation index

| 0.3 미만 |
| 0.3 - 0.4 |
| 0.4 - 0.5 |
| 0.5 - 0.6 |
| 0.6 이상 |

Figure 3. Delta index

Lastly, in order to investigate the spatial autocorrelation in terms of residential segregation by immigrants, the Global Moran's I Index for the city, county and district of Seoul metropolitan area was measured every five years from 2000 to 2005, 2010 and 2016. In Seoul metropolitan area, when the similar level of foreign immigrants reside in adjacent cities, counties and districts, the Global Moran's I indices have a high positive (+) spatial autocorrelation. On the other hand, when the adjacent cities, counties and districts have different values, they show high negative (-) spatial autocorrelation. Looking at the results of Global Moran's I indices in 2000, 2005, 2010, and 2016, all showed clustering patterns. In other words, positive coefficients larger than 0 are calculated, and it can be said that there is a spatial autocorrelation as the foreign immigrants are clustered in the neighboring areas where the similar results are presented.

In addition, since 2000, the proportion of foreigners residing in Seoul has begun to increase gradually. Yeongdeungpo-gu and Guro-gu have been continuously developed as ethnic enclaves for foreign residents since the early 2000s, and foreign immigrants have greatly increased in Geumcheon-gu and Gwanak-gu in Seoul. In the case of Gyeonggi-do, the areas that indicate high clustering (HH) are widely known as ethnic places for migrant workers. Ansan city and Siheung city have been developed continuously since the early 2000s as foreigners' residential areas, and Hwaseong city and Pyeongtaek city also are formed as a residential areas for foreign immigrants. A High-High (HH) type hot spot, which is represented through the Local Indicators of Spatial Association (LISA) analysis, is shown in [Figure 4] as follows[8]. As shown in the [Figure 4], clusters of foreign residents tend to expand gradually from Seoul to the southern part of Gyeonggi-do over time.

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[1] In Figure 1 to 4, the map of Gunnae-myeon, Jangdan-myeon, Jindong-myeong, and Jinseo-myeon in Paju city, Gyeonggi-do are a restricted area so that the map boundaries are not provided from the Statistics Geographic Information (SGIS). In addition, the number and the ratio of foreign residents in Baekryeong-myeon, Daecheong-myeon, and Yeonpyeong-myeon in Incheon are very low and therefore not included in the map.
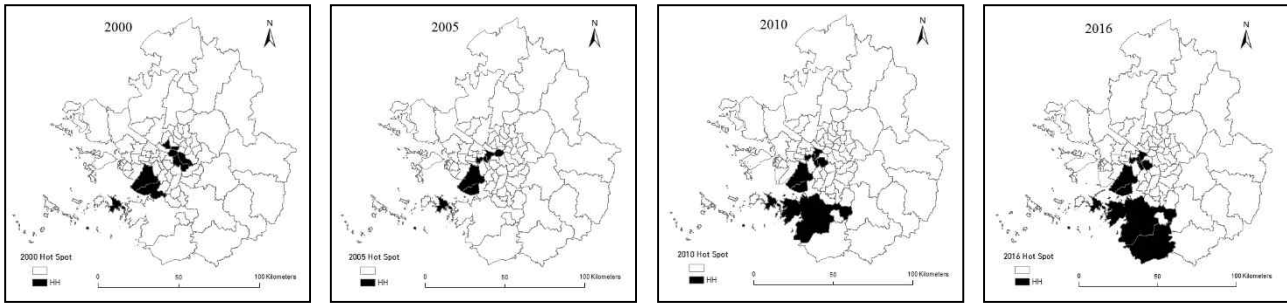
Figure 4. LISA analysis in Seoul metropolitan area (2000-2016)

Massey and Denton demonstrated the concept of hypersegregation to describe metropolitan areas in which African Americans were highly segregated on at least four of the five dimensions of segregation they had identified in an earlier analysis. This means that the minority groups are spatially uneven, isolated, concentrated, centralized, and clustered, so that at least four of the five dimensions of residential segregation are high. In Seoul metropolitan area, the dimension of centralization is not considered because it does not show the same pattern as the blacks residing near the center of U.S. metropolitan areas. Therefore, [Table 2] shows the areas of hypersegragation, which are included in the top 10 cities, counties, and districts of four dimensions excluding the centralization indicator. In this [Table 2], the frequency refers to the number of times that it was included in top 10 of each dimension of residential segregation excluding centralization index.

Table 2. Cities/Counties/Districts of hypersegregation (2016)

Frequency	City/County/District	Frequency	City/County/District
4	Danwon-gu, Ansan city, Gyeonggi	3	Hwaseong city, Gyeonggi
4	Siheung city, Gyeonggi	2	Gunpo city, Gyeonggi
4	Guro-gu, Seoul	2	Gimpo city, Gyeonggi
4	Yeongdeungpo-gu, Seoul	2	Geumcheon-gu, Seoul

Among the cities, counties, and districts showing the hypersegregation level, the four districts, namely Danwon-gu, Ansan city and Siheung city in Gyeonggi-do, Guro-gu and Yeongdeungpo-gu in Seoul are also included in the top 10 of the number and ratio of registered foreigners previously mentioned in the spatial distribution. These areas are representative residential areas of foreign immigrants with a high number and percentage of foreigners. As a result of the analysis, the hypersegregation was appeared in Siheung city, Ansan city, and Hwaseong city in southwestern part of Gyeonggi-do, and Yeongdeungpo-gu and Guro-gu in southwestern part of Seoul. Therefore, it can be said that there is a correlation between ethnic enclaves and residence segregation. It is possible to predict various socio-economic problems because foreigners are concentrated as well as segregated in these areas; meanwhile, it could be more opportunities available in each area, so that detailed qualitative research on respective area should be continued[9].

In the relevant studies so far, it was tried to understand the size and density of foreign immigrants with a demographic indicator of the number and percentage of foreigners in the spatial unit. However, it has a limitation that it is difficult to effectively examine the residential distribution of foreign immigrants. In addition, since the number and proportion of foreign immigrants do not necessarily coincide with the level of residential segregation of foreigners, it is necessary to measure the residential segregation indicators as the number of foreigners is continuously increasing.

4. Conclusion

This study focuses on analyzing the spatial distribution of immigrants in Seoul metropolitan area and quantitatively analyzing how residential segregation is appeared. Since the late 1990s, the number of immigrants has rapidly increased for the last 20 years, especially with the large proportion of non-professional immigrants, and thus urban areas experienced considerable social and spatial changes. As a result of immigrants' moving to work opportunities or focusing on urban areas where communities already exist, 60.8% of all registered foreigners live in Seoul metropolitan area including Seoul, Gyeonggi-do and Incheon. I limited Seoul metropolitan area to a spatial scope of study and examined the residential distribution of registered foreigners living in the area from the perspective of segregation.

In Seoul metropolitan area, 711,377 foreigners reside as of 2017, accounting for 2.8% of the total population of Seoul metropolitan area and 60.7% of the nation's registered foreigners. For the registered foreigners who were concentrated in Seoul metropolitan area, their residential segregation was quantitatively analyzed by using four indicators of Massey and Denton. In other words, evenness, exposure, concentration, and clustering were calculated by drawing the population and area data of 1,131 towns in Seoul metropolitan area, and the indices of 79 cities, counties, and districts were compared and mapped on time series.

The dimension of evenness is calculated with the dissimilarity index. The areas where the minority groups within the unit area have high dissimilarity are Siheung city, Gimpo city, Gunpo city, and Danwon-gu, Ansan city in Gyeonggi-do and Guro-gu in Seoul. Exposure can be identified through the isolation index of minority groups. In the areas such as Danwon-gu, Ansan city, Siheung city, and Gimpo city in Gyeonggi-do and Guro-gu and Yeongdeungpo-gu in Seoul, minority groups have less contact to the majority group and are isolated from them. The delta index used in the third dimension is to identify the level of concentration through the geographical scale of the area. It shows the high level of concentration in Sujeong-gu in Seongnam city, Gunpo city, Siheung city, Danwon-gu in Ansan city, Manan-gu in Anyang city and Gwangmyeong city in Gyeonggi-do, Yeongdeungpo-gu and Guro-gu in Seoul, and Jung-gu in Incheon.

The clustering index, which can overcome the limit of the dissimilarity index, can be interpreted as a spatial autocorrelation. The Global Moran's I Index showed a stronger spatial autocorrelation since 2000, and the Local Indicators of Spatial Association (LISA) index showed the clustering pattern (HH) in Danwon-gu in Ansan city, Hwaseong city, Siheung city, Pyeongtaek city, Gyeonggi-do, and Yeongdeungpo-gu, Guro-gu, Geumcheon-gu and Gwanak-gu in Seoul. Among the four indicators except for the centralization, all of the four indices showing hypersegregation in Danwon-gu in Ansan city and Siheung city in Gyeonggi-do, and Yeongdeungpo-go and Guro-gu in Seoul.

Based on the above results, it is concluded that the residential distribution of foreign immigrants has been concentrated around urban areas, and it has been more concentrated and segregated since 2000. Meanwhile, the residential distribution of different nationalities are spatially very close to each other or overlap with each other, so that the geographical proximity of the origin or the similarity of residential status also affects the residential distribution of foreign immigrants. Since the space once formed as an ethnic enclave of a specific nationality tends to be maintained over time and rather strengthened, special consideration should also be given to preventive measures against the fall of ethnic places that reproduce negative issues, such as the ghetto in overseas metropolitan areas.

This study has a limitation in differentiating the nationality or status of residence by considering foreign immigrants as one group of minority. In addition, I tried to analyze the population of registered foreigners who were concentrated in Seoul metropolitan area and their residential segregation. However, the limits of regional universality and generality can be pointed out in terms of not surveying the whole country.

However, it can be a credit that multidimensional residential segregation is attempted through various indices other than the dissimilarity index which has been mainly used in previous studies on residential segregation. It is necessary to analyze the cause and the characteristics of the areas that showed the high level of unevenness, isolation, concentration, and clustering in each segregation index by time series. For those cities, counties, and districts that show the hypersegregation, it is necessary to closely examine the proximity of the workplace to the residential areas by analyzing the industrial distribution and the employment status of foreign immigrants in the area.

Research on the residential segregation has long been conducted in North America and Europe. Although it is still lack of research on residential segregation of foreign immigrants in Korea, there is a growing interest in spatial segregation and concentration, recognizing the correlation between spatial differentiation and socioeconomic factors in recent years. The residential segregation in Seoul metropolitan area is considered to have been rapidly progressed over the relatively short period of migration compared with the U.S. metropolitan areas. Therefore, as the spatial segregation may extend to the socio-economic segregation, it is necessary to maintain interest and policies in the cities, counties and districts with hypersegregation. In addition, considering the cultural differences based on the type of foreign immigrants such as nationality and status of residence, differentiated understanding and interest should be accompanied for those areas with the high level of segregation.

References

[1] Hyejin Kim, *Spatial Distribution of Foreign Immigrants and Their Residential Segregation in Seoul Metropolitan Area*, Ph.D. Thesis. Sungshin Women's University, Seoul, South Korea, 2017.

[2] Korea Immigration Service Statistics 2017, http://www.immigration.go.kr.

[3] Seoul Statistics, http://stat.seoul.go.kr

[4] Gyeonggi Statistics, http://stat.gg.go.kr

[5] Incheon Statistics, http://www.incheon.go.kr/articles/180

[6] D. S. Massey and N. A. Denton, "The dimensions of residential segregation," *Social Forces*, Vol. 67, No. 2, pp. 281-315, December 1988.

[7] D. S. Massey and N. A. Denton, *American Apartheid: Segregation and the Making of the Underclass*, Harvard University Press, Cambridge, MA, pp. 83-114, 1993.

[8] L. Anselin and A. K. Bera, "Spatial Dependence in Linear Regression Models with an Introduction to Spatial Econometrics" in *Handbook of Applied Economic Statistics*, Marcel Dekker Inc., New York, pp. 237-289, 1998.

[9] Hyejin Kim and Jawon Lee, "Residential Distribution of Immigrants in Seoul Metropolitan Area," *Asia-pacific Journal of Multimedia Services Convergent with Art, Humanities, and Sociology*, Vol. 8, No. 1, pp. 527-538, January 2018.