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The Relationship between Residential Distribution of Immigrants and Crime in South Korea*

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Abstract

Purpose – This study aims to not only investigate spatial pattern of immigrants' residence and crime occurrences in South Korea, but shed light on how geographic distribution of immigrants and immigrant segregation affect crime rates.

Research design, data, and methodology – The unit of analysis is Si-Gun-Gu municipal level entities of South Korea. The crime data was obtained by Korea National Police Agency and two major types (violence and property) of crime were measured. Most demographic, social, and economic variables were derived from Korean Census Data in 2015. In order to examine spatial patterns of immigrants' distribution and crime rates in South Korea, the present study utilized GIS mapping technique and Exploratory Spatial Data Analysis (ESDA) tools. The causal linkage was investigated by a series of regression models using STATA.

Results – Spatial inequality between urban metropolitan vs rural areas was visualized by mapping. Assuming large Moran's I value, spatial autocorrelation appeared to be quite strong. Several neighborhood characteristics such as residential stability and economic prosperity were found to be important factors leading to crime rate change. Residential distribution and segregation for immigrants were negatively significant in the regression models.

Conclusions – Unlike the traditional arguments of social disorganization theory, immigrant segregation appeared to reduce violent crime rate and the high proportion of immigrants also turned out to be a crime prevention factor.

Keywords: Immigrant Segregation, Crime, Spatial Pattern, Exploratory Spatial Data Analysis (ESDA).

JEL Classifications: J11, J15, J18.

1. Introduction

As globalization intensifies the economic inequality between countries as well as the economic prosperity in developing countries, immigration is becoming more and more natural socioeconomic trend in many countries. The flow of immigrants has contributed to the economic growth and flexibility of labor market, so the immigration policy appears to be one of the most important domestic issues in a majority of western countries. Particularly, immigration in the United States has been playing a critical role in accelerating population growth and cultural change throughout most of the national history. The socioeconomic

and political dimensions of immigration have aroused controversy regarding residential patterns, upward social mobility, unemployment, poverty, and even crime. Meanwhile, in response to the internal and external demands and circumstances facilitating worldwide human flow, several East Asian countries such as South Korea have also encountered rapid increase of foreign born population over the past few decades. In particular, a majority of countries in southeast Asia have failed to emerge from extreme poverty for last couple of decades (Senadjki, Mohd, Bahari, & Hamat, 2017), so many poor people from Southeast Asia have headed primarily to East Asian countries in order to resolve economic hardship. As a result, the number of immigrants in Korea has risen more than 1.7 million people, so the percent of foreigners in South Korea is poised to rise by about 3.4% in 2016. A remarkable increase of immigrant population has substantially transformed traditional and homogeneous characteristics in South Korean society, so more vigorous policy responses are becoming necessary and urgent. This heterogeneous composition is also likely to

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aggravate social and economic uncertainty much more seriously because South Korea is one of the most densely populated countries in Asia (Jeon, 2018).

Once immigrants arrive in their unfamiliar destination countries, they are more likely to be living together with same ethnic members and separating spatially from the mainstream society. In fact, residential segregation for immigrants tends to be strongly associated with their low-income status, language barriers, and support networks in their ethnic enclaves. Although new immigrants are willing to settle in their homogeneous ethnic communities because of various disadvantageous circumstances, the level of residential segregation for immigrant groups are inclined to become lower as they gain socioeconomic status and move away from these communities, integrating with the native-born (Iceland & Scopilliti, 2008). The consequences of immigrant residential segregation have been widely discussed and studied by many well known urban scholars. Above all, crime seems to be perceived as one of the most deleterious and negative neighborhood effects caused by spatial isolation of immigrants (Bell & Machin, 2011). Therefore, since crime would be the most serious vice demanding enormously huge social and economic costs, the causal chain among immigration, residential segregation, and crime should be precisely investigated.

There is an unbalanced distribution of immigrant population by geographical regions in particularly urban metropolitan areas, so a series of empirical evidences have discovered that immigrant segregation has been rising significantly over the past few decades in the United States (For instance, Cutler, Glaeser, & Vigdor, 2008). Similarly, Bisin, Patacchini, Verdier, and Zenou (2008) pointed also out that some immigrant groups in Europe, such as muslims in the United Kingdom, tend to live in highly segregated neighborhoods as well. Recently, several studies found that the level of immigrant residential segregation appears to be remarkably serious in some metropolitan areas of Asian countries (Kong, Yoon, & Yu, 2010), so geographically uneven distribution of immigrant population in many countries seems to be universal and unavoidable. If immigrant residential segregation has been increasingly observed in some countries, the impact of immigrant segregation on crime should be necessarily investigated through reliable empirical research. Although the public opinion or common prediction about the immigration-crime link has been strongly influenced by racial prejudices or stereotypes magnifying negative contexts of immigration (Espenshade & Belanger, 1998), just few literature has dealt with the impact of immigrant segregation on crime and none of them shed light on the mysterious relationship between immigrant segregation and crime based upon Asian case.

By focusing on three distinct approaches which have not been employed by prior literature, this study aims to unveil causal mechanism between immigrant segregation and crime

in Korean county-level (Si-Gun-Gu) localities. First of all, this paper primarily attempts to utilize a case of South Korea to investigate more precisely the relationship between immigrant segregation and crime, which has been consistently captured by entirely Western perspectives. Empirical findings derived from a case study might be able to contribute to generalizing the causal mechanism of population distribution, residential segregation, and crime for immigrant groups. Second, the analytical models of the present study intend to not only measure the level of population distribution for immigrant group by conceptually separating immigrant residential segregation and the ratio of immigrants to total population, but also compare the impacts of two closely related explanatory variables on crime. A large proportion of immigrant population does not necessarily result in a serious level of residential segregation for immigrants. Therefore, these two dimensions representing population distribution for immigrants need to be controlled simultaneously in the regression models, so it must be helpful to identify more precisely the effect of immigrants' residential pattern on crime. Lastly, this research also aims to examine the spatial patterns of immigrants' distribution and crime rates in South Korea. Specifically, geographic characteristics for major variables are visualized by mapping process of GIS technique. After mapping the data, a second stage of data exploration should be performed using the Exploratory Spatial Data Analysis (ESDA) tools.

To identify how both immigrant segregation and crime are related with each other and distributed geographically across regions in Korea, the present study uses census data and official crime report provided by Statistics Korea and Korea National Police Agency. This paper will address the following research questions. First, does a certain pattern of population distribution including larger proportion of immigrant population or high level of immigrant segregation lead to the changes in crime rates? Second, does the effect of population distribution for immigrant group vary by types of crime? The remainder of the paper is organized as follows. The next section briefly reviews prior research on theoretical approaches about socio-ecology related to residential pattern of immigrants and urban crime. The methodology section that follows covers analytical strategies and regression models. Then, the finding section investigates the spatial patterns through the visualization of GIS and the causality between immigrants segregation and crime by interpreting regression outputs. Finally, the paper ends with a discussion of findings and conclusions.

2. A Brief Review of Theoretical Background

Immigration, crime and their linkage have been one of the most controversial contemporary social issues in early 20th century western countries. In particular, discussion of this

relationship initially appeared a century ago in the United States because of enormous first wave of immigration from the European countries in the late 19th century. As several urban scholars such as Louis Wirth and Robert Park of Chicago School pointed out commonly, rapid urbanization and heterogeneous neighborhood structure appeared to not only intensify economic hardship and sociocultural distress among immigrants but ultimately result in a variety of urban problems such as discrimination, unemployment, residential instability, poverty and even crime.

However, scholarly attention about immigration and crime somewhat diminished in the middle of third of the 20th century because large segment of the first immigration wave (mostly European groups) has been assimilated into American society (Lane, 1997). The second wave of immigration (largely Latino and Asian) from 1970 has generated renewed interest in the impact of immigration on various socioeconomic pathological phenomenon. Interestingly, the arrival of immigrants coincided with the rise in crime rates in the United States. during the late 1960s and 1970s (Martinez & Lee, 2000), so some urban studies paid much attention to the relationship between these two critical urban issues. There are three major theoretical backgrounds that have guided explanations of the immigration-crime link: opportunity structure, cultural approaches, and social organization (Bankston, 1998). According to Galster and Kileen (1995), opportunity structure assumes that there are vast spatial disparities between metropolitan areas in employment opportunities, quality of public resources, community management systems, and information accessibility. In addition, perceptions of these disparities tend to strongly influence how people make various choices concerning employment, education, and even criminal act. Several previous studies indicated that unequal opportunity originated from immigration would be an important feature of the neighborhoods environment and are likely to be correlated with higher crime rates (Ellen & Turner, 1997; Briggs, 1997). Cultural approaches emphasized an argument that immigrants are subject to a different set of cultural forces than native populations, and that these forces seem to perpetuate a culture of violence or crime. This specific theoretical approach also claims that the norms and values of immigrants are bound to come into conflict with social norms and values of mainstream group (Martinez & Lee, 2000).

Even though the relationship between immigration and crime could be explained by above two theories, the present research is more interested in social organization theory as the most important theoretical foundation to capture the relationship between immigrants segregation and crime. Basically, the social organization perspective tends to focus on a concern with the failure of social institutions that results from various social changes. According to Bursik's outstanding research (1988), socially disorganized areas are described by "inability to realize the common values of their

residents or solve commonly expressed problems." By contrast, in organized neighborhoods, local community institutions are likely to work together to realize community goals, protect values, and generally control the behavior of community members in ways that conform to these goals and values. Immigration may undermine established institutions via a process of population turnover, while it also makes agreement about common values more difficult. Thus, it implies that when social control is weakened in this manner, crime will flourish.

A bulk of urban studies have focused on interaction between immigration and crime, so there have been much literature that explores the consequences of neighborhoods on crime. For example, Glaeser and Sacerdote (1999) examined why crime is higher in big cities. Similarly, Glaeser et al. (1996) analyzed the social interaction that occur between individuals that lead to cross-neighborhood variances in crime rates. Kling and his colleagues (2005) also investigated the impact of neighborhood poverty levels on crime rates using a randomized experiment. Several studies based on social disorganization theory tried to shed light on the adverse impacts of immigration. Thus, they commonly argued that internal migration and ethnic heterogeneity are related to the capacity of communities to manage the behavior of their residents. In addition, they assumed that a significant numbers of urban communities are likely to suffer from adverse effect due to immigration and ethnic heterogeneity within the neighborhood (Bursik & Grasmick, 1993; Lee & Martinez, 2002).

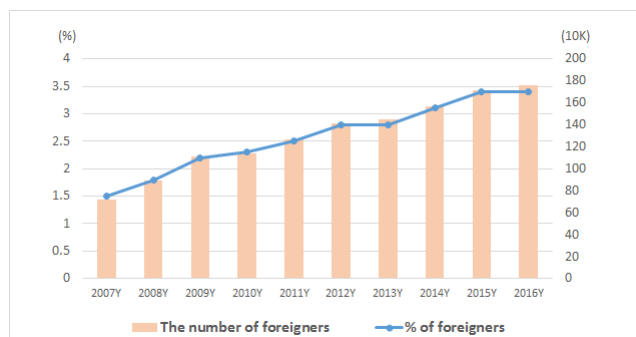
However, recent studies have found that immigration generally does not increase crime rates in areas where immigrants are highly concentrated (e.g., Martinez et al., 2006). They also suggested that current immigration trends do not entail the negative consequences expected by social disorganization theory. Although some prior literature dealt with the impact of immigration on community crime roughly, only one previous research simultaneously targeting the immigrant segregation and crime was Bell and Machin's study (2011) that investigates the effect of ethnic enclaves on crime rates in England. Unlike the traditional perspective about strong correlation between immigration and crime, they utilized instrumental regression model controlling for endogeneity and found that crime is substantially lower in those neighborhoods with sizable immigrant population shares. Despite their first empirical trial, this specific topic seems to be necessary to pin down precisely by the follow-up studies. Therefore, the present research will shed light on the relationship between immigrant segregation and crime by producing empirical evidences for South Korea. <Table 1> shows a brief summary of prior literature by categorizing scholarly trends.

<Table 1> Summary of prior literature

Scholarly trend	Main contents and features	Study
Traditional Chicago School perspectives	Deals with the impact of immigration on neighborhoods by focusing on high density, heterogeneity, and urbanization.	Wirth(1928), Park(1928)
Urban ecological debates	Develops theoretical background for explaining pathological urban problems due to immigration in terms of opportunity, culture, and social disorganization.	Bankston(1998), Galster & Kileen(1995), Ellen & Turner(1997), Briggs(1997), Martinez & Lee(2000)
Testing social disorganization theory	Explores the impact of urban structure and neighborhood characteristics(such as social interaction, poverty, and immigration) on crime.	Glaeser et al.(1996), Kling et al.(2005), Bursik & Grasmick(1993), Lee & Martinez(2002)
New ironic evidences about causal mechanism	Denies negative effects of immigration on community safety.	Martinez et al.(2000), Bell & Machin(2011)

Source: Author's own edited.

Meanwhile, it is also necessary to confirm distinctive trend and typology of immigration in South Korea. South Korea has been highly homogeneous country with a large majority of the people consisting of one ethnic group. However, as shown in <Figure 1>, the number of foreign residents in South Korea has steadily increased to double during the last decade. The most typical type of immigrants in South Korea are immigrant workers from mainly Southeast Asia and Central Asia. They tend to work and live particularly in the industrial suburbs of major metropolitan areas. Meanwhile, the number of international marriages (mainly between Korean men and foreigner women) has increased constantly in the same period as well, so the marriage immigrants group is also one huge segment of immigrants in South Korea. In the early years of this particular type of immigration, a majority of foreign brides from mainly China and Vietnam appeared to emigrate to rural farming communities in countryside. Since the 2000s, the trend has spread nationwide and ethnically diversified to include many women from other Southeast Asia and Post-Soviet states. This marriage immigrants are likely to live in some rural areas where marriage immigrants from same country are highly concentrated. The biggest ethnic group of foreigners in South Korea are Chinese group which is accounted for 52.8% of all foreigners in South Korea and Vietnamese group(12.6%) follows after.



Source: 2016 Foreign population statistics(Ministry of the Interior and Safety).

<Figure 1> The number of foreign residents in South Korea

3. Methodology

As discussed above, the primary goal of this analysis is to examine whether greater immigrant segregation leads to higher aggregate city-wide crime rates. Hence, the unit of analysis of this study is Si-Gun-Gu(basic administrative boundary unit) in South Korea. Si(city), Gun(county) and Gu(urban district) boundary units in South Korea are municipal level divisions, so they could be characterized by homogeneous settlement zone. Although the population mean of Si-Gun-Gu is larger than population size of neighborhood units such as US census tracts, utilizing this specific unit of analysis to analyze Korean case would be the most realistic and appropriate approach in terms of inevitable limitation for data collection.

The crime data for Si-Gun-Gu in Korea is provided by Korea National Police Agency(KNPA). The data reports the number of crime occurrences for 9 types of crime(murder, robbery, rape, assault, theft, embezzlement, fraud, and stolen goods). The crime counts for different types of crime will be categorized by violent and property crime and standardized by the population figure. Since the crime rates are generally calculated on a per capital basis(i.e., the number of offences per 100,000 people), dependent variables of this research are measured in the same way. Most demographic, social, and economic variables, along with geographic boundary data of the Si-Gun-Gu shapefile format for measuring spatial measure of immigrant segregation, were derived from Korean Census data.

Residential segregation has long been identified as one of the best indicators to measure racial inequality and economic disparity occurring on urban space(Williams & Collins, 2001). In the residential segregation studies, it is highly important to measuring how one group of the population is distinguished from the other group in terms of occupied residential area. Segregation can be interpreted of as the level to which members of different groups capture or enjoy their unique and different social environments (Reardon & Sullivan, 2004). Because segregation is associated with complicated social and spatial characteristics,

much literature has suggested various dimensions of segregation which shed light on the key features of segregation. In general, five conceptual distinctions suggested by Massey and Denton (1988) tend to be considered selectively among others. These dimensions are evenness, exposure, clustering, centralization, and concentration. Among them, the present study utilizes evenness which involves the differential distribution of the subject population, so it could identify the level of immigrant segregation without much consideration of pure spatial dimension. Evenness measures are also useful to compare the geographic distribution of different groups in urban areas. One of the most well-known evenness indices is dissimilarity index, introduced more than a half century ago. It can easily contrast the spatial distribution of one minority group ($k=1, 2, \dots, K$) with distributed pattern of the rest of the population in certain areal unit. The formulation is as follows:

$$ID = \frac{1}{2} \sum_{i=1}^n \left| \frac{x_i}{X} - \frac{y_i}{Y} \right|$$

where n is the number of units, x_i is the population of x group in spatial unit i , X is the total population of x group in the entire urban areas (for instance, the Si-Gun-Gu areas), y_i is the population of y group in the spatial unit i , and Y is the total population of y group in the entire urban areas. In this specific case, the spatial unit refers to sub-spatial neighborhood-level unit such as the Eup-Myeon-Dong unit in South Korea. In this specific index which ranges from 0 to 1, zero value means 'no segregation' and 1 means 'maximum segregation'. The value of index can be interpreted into the proportion of minority group members who must move their residential area in order to achieve an even distribution.

Even though dissimilarity index is the most fundamental and important index to capture level of segregation, this particular measure cannot avoid confronting various limitations mainly related to neglecting spatial aspects of segregation. Thus, a series of modified indices based on traditional dissimilarity index have been introduced to improve weaknesses that non-spatial measures may encounter. Among them, $D_{(w)}$ index developed by Wong (1993) is one of the most popular alternatives and has been widely accepted in academic domain because it has much strength which is relatively easy and concise to reflect spatial effect of interaction between groups. Thus, this measure assumes that boundary length of adjacent areal units tends to affect the level of interaction between major and minor groups and eventually calculate more accurately the level of residential segregation. The $D_{(w)}$ index of dissimilarity is defined as follows:

$$D_{(w)} = D - \frac{1}{2} \sum_i \sum_j w_{ij} |Z_i - Z_j|$$

$$\text{and } w_{ij} = \frac{d_{ij}}{\sum_j d_{ij}}$$

where D is dissimilarity index, Z_i and Z_j are the ratio of minority group in the spatial unit i and j . The most critical part of this particular index is w_{ij} which is the weighted matrix of the ratio of the length of the shared boundary of areal unit i and j among entire length of whole boundary of areal unit i and j . The present study employ this $D_{(w)}$ index as a main segregation measure in the following series of analyses.

This research assumes that there is an expected level of crime occurrences in the Si-Gun-Gu geographic unit based on its population size, demographic composition, age structure, and socio-economic elements. If immigrant segregation affects the incidence of crime in a causal way, immigrant segregation should predict crime at the city-wide level after controlling for these baseline characteristics. Furthermore, if the residential pattern of immigrants has causal effects on crime, these effects could vary by the specific type of crime committed, so it is necessary to distinguish violent crimes from property crimes in our analysis. The regression models for city-wide crime rates can be set up as follows:

$$i) \quad VC_i = \alpha_1 + \alpha_2 D_i + \alpha_3 O_i + \alpha_4 Y_i + \alpha_5 P_i + \alpha_6 F_i + \alpha_7 B_i + \alpha_8 R_i + \alpha_9 S_i + u_i$$

$$ii) \quad PC_i = \alpha_1 + \alpha_2 D_i + \alpha_3 O_i + \alpha_4 Y_i + \alpha_5 P_i + \alpha_6 F_i + \alpha_7 B_i + \alpha_8 R_i + \alpha_9 S_i + v_i$$

The dependent variables, VC_i and PC_i represent violent and property crime rates of city-wide area i , respectively. Crime rates in city-wide areas vary by demographics, socio-economic characteristics, residential environment. D_i is the population density, O_i is the percentage older than age 65, Y_i is the percentage of population that is 13 to 18 years old, P_i is poverty rate which is the percentage of Basic Livelihood Security Recipients, F_i is the percentage of foreign residents, B_i is the number of businesses per 1000 people, R_i is the percentage of rental housings, and S_i is immigrant residential segregation. Lastly, u_i and v_i are disturbance terms.

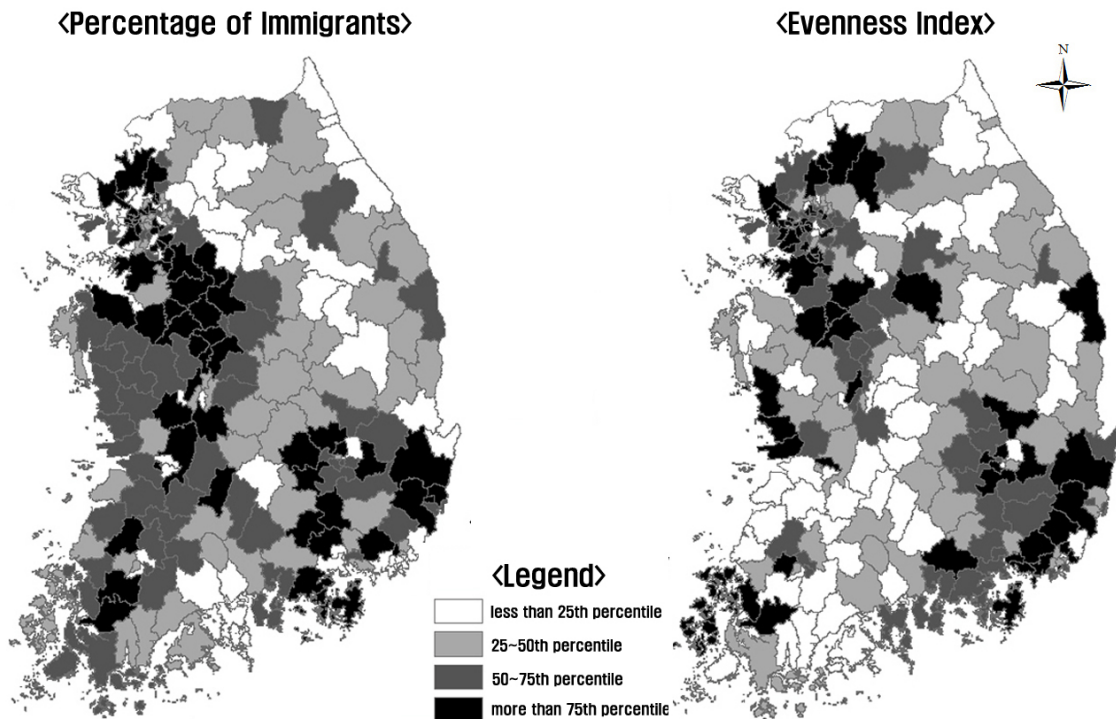
4. Findings

In order to explore a spatial pattern of immigrants segregation and crime rates, the present study utilizes GIS mapping technique and visualizes spatial distributions of

immigration population as well as crime rates. <Figure 2> displays spatial aspect of both the percentage of immigrants and immigrant segregation (evenness index) across the country by providing quartile maps. Both maps display severe spatial disparity of the ratio of immigrants and immigrant segregation in South Korea based on urban areas (mainly Northwestern Seoul Metropolitan area and Southeastern Pusan Metropolitan area) and the other rural spatial regimes. Compared to the spatial distribution of areas with higher percentage of immigrants, evenness index appears to be more clear distinction of the pattern showing much higher level of immigrant segregation in the Seoul and Pusan Metropolitan areas. Moreover, most of areal units (Si-gun-gu) seem to take on similar values of segregation measure like their neighboring areal units, so both variables tend to have high degree of spatial dependency which is the propensity for nearby locations to influence each other and to possess similar attributes (Goodchild, 1992). This strong spatial autocorrelation can be accurately examined with global Moran's I which is characterized by a geographical correlation among nearby locations in space. By using GeoDa software, the present study calculated univariate Moran's I for both the percentage of immigrants and immigrant segregation. Basically, given a

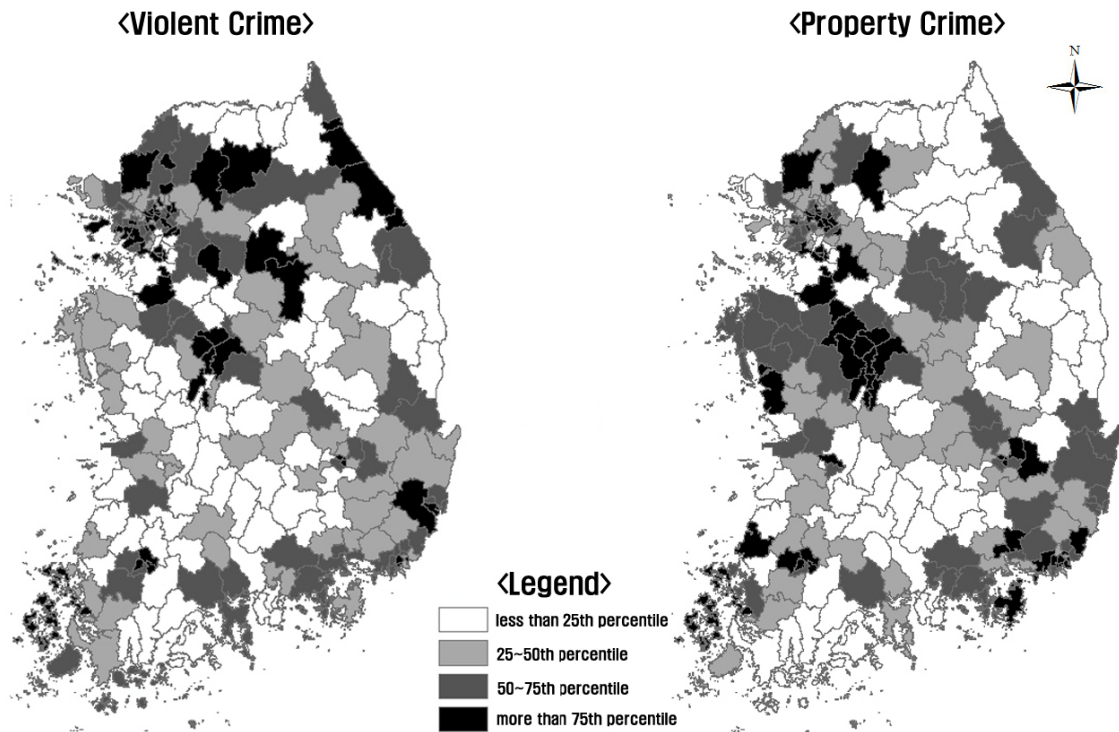
value range between -1 and 1 approximately, a global Moran's I value close to 1 implies the existence of positive spatial autocorrelation, whereas a value close to -1 shows negative spatial autocorrelation. Moran's I values for immigrant population ratio and evenness index are 0.1835 and 0.1976, respectively. In addition, those measures appeared to be statistically significant at 0.01 level.

<Figure 3> displays how violent and property crime rates are spatially differentiated across the country. Although these two maps visualize severe spatial disparity of crime rates in South Korea based on urban and rural spatial regimes, they illustrated that violent crime tends to have a relatively more vivid spatial pattern. For violent crime rate, the disparity of spatial distribution between the Seoul metropolitan area and the other regions of the country is clearly identified even though there is the high levels of violent crime at some parts of urban Metropolitan areas in South. Overall, violent crime rates are relatively higher in many northern urban areas mainly located in Seoul Metropolitan area, whereas most of southern rural areas appear to show significantly low violent crime rates. Spatial characteristics derived from an obvious contrast between North and South that are confirmed in the map may lead to strongly clustered patterns of violent crime.



Source: Author's own edited.

<Figure 2> The percentage of immigrants and immigrant segregation in South Korea in 2015



Source: Author's own edited.

<Figure 3> The distributions of violent and property crime rates in South Korea in 2015

<Table 2> Descriptive Statistics

Variable	Obs	Mean	SD	Min	Max
Violent Crime Rate	252	574.55	238.16	219.86	1891.01
Property Crime Rate	252	476.70	257.84	55.57	2345.15
Population Density	255	4257.96	6531.30	19.86	29027.84
Percentage of Old People	252	17.67	7.72	5.12	57.90
Percentage of Youth	252	7.70	1.70	4.044	15.10
Poverty Rate	255	3.71	1.95	0.21	10.22
Percentage of Foreign Residents	255	1.65	1.38	0.30	9.00
Immigrant Segregation	255	0.31	0.11	0.04	0.70
Businesses per 1000 People(#)	255	70.39	32.88	29.05	410.17
Percentage of Rental Housing	251	36.29	17.68	6.82	84.18

Source: Author's own edited.

Meanwhile, property crime does not present the extremely strong spatial clustering as violent crime does. Compared to violent crime rates, high property crime rates tend to be spatially more dispersed. This specific Korean case reconfirms that high property crime areas are likely to be more frequently observed across the entire study areas. Interestingly, the pattern of property crime appears to be also somewhat similar to the spatial pattern of immigrants' population distribution described previously. Thus, it may imply the existence of a certain level of association between immigrant segregation and crime rates in South Korea. To detect spatial dependency about two types of crime rates,

Moran's I values were measured and they are 0.2279 and 0.2291 with statistical significance at 0.01 level, respectively.

Descriptive statistics for all dependent and independent variables are displayed in <Table 2>. Crime rates vary significantly across Si-Gun-Gu areas. For example, for violent crime, the minimum value is 219.86 per 100,000 people, whereas the maximum level is 1891.01 per 100,000 people. Population density and the number of business per 1000 people also tend to have relatively larger variation from one area to another. <Table 3> shows the OLS regression results for Si-Gun-Gu violent and property crime rates. For violent crime, the number of business, the rate of

rental housings, and immigrant segregation are statistically significant while most demographic elements do not appear to be significant. More businesses and higher rental housing rate in the area are associated with higher violent crime rates. Interestingly, the coefficient of immigrant segregation is negative which means that severe immigrant segregation leads to reduce violent crime rate. This result seems to be quite controversial because prior research focusing on mainly Western cases has argued that immigrant segregation is likely to result in higher crime rate. For property crime, the number of business and the rate of rental housings are still positively significant and demographic characteristics are not significant either, so very similar results could be obtained like the violent crime model. However, immigrant segregation does not appear to be significant for property crime. Instead, the percentage of foreign residents shows negative significance for property crime, so higher percentage of foreigners leads to less property crime. This result also seems to be highly conflicting with respect to the traditional argument dealing with the relationship between immigrants segregation and crime rates in Western countries. Consequently, a series of results from regression analyses failed to provide the evidence of negative effects that immigrants segregation might cause to crime rate.

5. Conclusion and Implication

A variety of elements related to both demographic and spatial characteristics may play an important role in explaining high crime rates in certain local areas. As mentioned in the previous chapters, many well-known urban sociologists of Chicago School have long pointed out that heterogeneous and disadvantaged circumstances can cause

ecologically negative effects on neighborhoods. In particular, immigrant segregation would be one of the most critical social problems which might be considered as a key factor leading to higher crime rates. Despite popular commentary claiming a link between immigration and crime, empirical research exploring this relationship is sparse. As mentioned above in the first chapter, several East Asian countries have been experiencing rapid influx of foreign population and confronting various socio-economic problems due to severe social heterogeneity for the last couple of decades. Nevertheless, prior literature did not pay attention to analyzing the relationship between immigrant segregation and crime in terms of Non-Western perspective. This study aims to not only investigate spatial pattern of immigrant segregation and crime rates but also examine the effect of this specific residential segregation on regional crime rates by identifying empirical evidences in South Korea.

Regarding spatial pattern of immigrants' residential distribution and crime rates, the large Moran's I values indicate relatively clear positive spatial autocorrelation for both immigrant segregation and crime rates. By mapping population rate and residential segregation for immigrants, the spatial inequality between West region and some East region has been revealed even though there exists some spatial disparity simultaneously between Metropolitan urban areas and rural areas. Likewise, both property and violent crime in South Korea get into similar situations in which extreme distinction of a spatial pattern has been produced. Strong spatial association for both types of crime occurrences was identified by large Moran's I. Two crime maps also provide evidence for spatial gap between Metropolitan urban areas and rural areas. In particular, violent crime has spatially more clustered patterning than does property crime.

<Table 3> Ordinary Least Squares Regression Models for Crime Rates

Variable	Violent Crime Model		Property Crime Model	
	Coefficient(SE)	β	Coefficient(SE)	β
Population Density	0.002(0.002)	0.06	-0.001(0.002)	-0.04
Old People(%)	-4.19(3.74)	-0.11	-7.30(4.03)	-0.17
Youth(%)	10.62(8.76)	0.08	-0.28(9.45)	-0.00
Poverty Rate	1.32(9.14)	0.01	7.37(9.87)	0.05
Foreign Residents(%)	2.56(8.18)	0.02	-25.75(8.83)**	-0.19
Immigrant Segregation	-240.56(106.92)*	-0.13	-138.30(115.41)	-0.07
Businesses per 1000 People	4.71(0.38)**	0.63	5.00(0.41)**	0.63
Rental Housing(%)	3.28(1.06)**	0.24	5.13(1.14)**	0.35
$Adj R^2$	0.4793		0.4522	
F	27.50		26.49	
N	248		248	

Source: Author's own edited. ** significant at $\alpha=0.01$ level, * significant at $\alpha=0.05$ level

Regression analyses present the significant association of community effects to level of crime occurrences in South Korea. As a whole, a series of analytic results demonstrate that some urban features related with neighborhood effects tend to be highly connected to certain variation in crime. For violent crime, some of ecological and structural elements of community (such as residential instability, immigration, and regional economy revitalization) appear to be important factors in explaining crime variations. Regardless of the types of crime, the present study provides the empirical evidence that residential instability (percentage of rental homes) is positively related to crime rate. This result may support the argument that higher home ownership rate could improve social cohesion of communities and ultimately play an important role as a crime-deterrent. Interestingly, regional economic growth (the number of businesses per 1000 people) is negatively associated with crime rate in the regression analyses. Since regional economic growth can provide crime-prone environment due to mainly urbanization or contribute to affluent and safer community, the result seems to support that the growth of businesses may lead to complex urbanization and higher crime rates.

Most importantly, this paper confirms statistically significant evidences that residential distribution and segregation for immigrants groups are related to crime rates. After controlling for a host of rich demographic and economic characteristics, immigrant segregation appears to have a negative effect on violent crime rate and the percentage of immigrant population also turns out to be deterrent of crime occurrences. Unlike conventional belief in negative effects of immigration, some prior literature has ironically argued that crime rates tend to be lower in areas with sizeable immigrant population share (e.g., Reid et al., 2005; Bell & Machin, 2011). As a result, the evidence presented here study supports an argument that more concentrated and segregated ethnic enclaves might be able to play a role as a mitigator in order to reduce crime rates.

The regression models presented here might be considered preliminary and are likely to suffer from left-out variable bias. For example, land use is likely to be related to opportunities for crime, so urban land use planning could be controlled in the models addressing the determinants of crime (Stucky & Ottensmann, 2009). In addition, a sort of criminal discount factors and crime deterrence such as social capital or police enforcement need to be considered together along with crime-prone environmental factors in the future research.

In the light of increasing public concern about urban pathological phenomena including crime, a rapid influx of foreigners should be manipulated properly and efficiently by urban policy making authorities. Since immigrants are likely to suffer from social exclusion and discrimination, the experience of exclusion may lead to antisocial behavior such as typically criminal acts (Oh & Jung, 2018). Besides, the social support on various economic activities from immigrants

will become increasingly important in terms of community solidarity in South Korea (Kim, 2017). Given the argument that a high level of immigrant segregation due to uneven spatial distribution of immigrants does not undermine community safety, the findings of the current study suggest that all stakeholder of immigrant communities including municipalities, local police departments, and NGOs should make various efforts to improve quality of life, residential environments, and community integration for immigrants struggling with residential segregation.

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