Exploring the Reciprocal Relationship between Homeownership and Crime: The Cross-Sectional Study on U.S. Metropolitan Areas

Yoon-Hwan Park** · Dae-Hoon Kwak***

< Abstract >

This paper analyzes the effect of homeownership on crime in U.S. metropolitan areas. Homeownership is a mitigating factor for metropolitan crime because of positive social and economic benefits to residents or neighborhoods. On the other hand, many criminologists have argued that crime pushes homeowners to more attractive and safer neighborhoods. Therefore, crime may also cause low homeownership rates in metropolitan areas. Although several previous studies confirmed the negative association between homeownership and crime, prior research failed to discover the reciprocal relationship between homeownership and crime. The present study relies on U.S. Census data (2000), LEMAS (2000), Capital Punishment Statistics of Bureau of Justice, and the FBI’s Uniform Crime Report (2000) to identify the reciprocal relationship between homeownership and crime in U.S. metropolitan areas. To resolve endogeneity problems due to reciprocal relationship and successfully capture the causality between homeownership and crime, two-stage least squares models are estimated. The study failed to identify reciprocal relationship between homeownership and crime. However, the findings provide the empirical evidence that homeownership affect negatively violent crime after controlling for urban structural covariates.

Keyword: homeownership, crime rates, community condition, two-stage least squares (2SLS) model

* Portions of this paper were presented at the Annual Meeting of the American Society of Criminology, Atlanta, GA (2007).
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I. Introduction

During the last half century, many scholars have investigated the effects of neighborhood characteristics on violent and property crimes (e.g., Chicago School pioneered by Shaw and McKay (1942)). The majority of empirical research confirms that neighborhoods with lower socioeconomic status and lower residential stability experience more crime than those with higher socioeconomic status and higher residential stability (Sampson and Grove 1989). In particular, residential stability in communities mitigates crime rates by promoting social organization and higher levels of informal social control (i.e., social ties) among neighborhood residents (Haurin et al. 2003). Thus, homeownership is an important covariate of residential stability that plays a critical role in promoting social organization, informal social control, and in turn, results in lower levels of crimes within communities. On the other hand, some criminologists argue that the prevalence of crime (including social and physical disorders) within communities stimulates homeowners to move to more attractive and safer neighborhoods (Wilson and Kelling 1982). In other words, communities with less homeownership tend to have higher residential instability, lower level of social organization, and lower levels of informal social control, which are all associated with higher crime rates. Although several previous studies have attempted to explore the association between homeownership and crime, prior research has failed to discover the reciprocal relationship between homeownership and crime.

The purpose of the present study, therefore, is to address the reciprocal relationship between homeownership and crime. Using the official U.S. census and crime data for the metropolitan areas, we attempt to reveal whether there are evidences that (1) more homeownership affects decreases in crime, and (2) increases in crime affects less homeownership. To investigate two-way reciprocal relationship, we propose a method that resolves the potential bias due to simultaneity of reciprocal relationship. The rest of this paper is organized as follows. First, the next section reviews prior literature that had dealt with structural covariates associated with relationship between homeownership and crime rate. The methodology section covers data, variables, and analytical strategies. Then the next section reports the results of two stage least square regression models. Finally, conclusions and discussions are following at the end.
II. Prior Literature

The link between homeownership and crime has received significant scholarly attention. Nevertheless, the relationship is largely ambiguous not only because of indirect effects that can be observed among neighborhood indicators, but also due to the lack of a theoretical rationale (see Haurin et al. 2003).

1. The Effect of Homeownership on Crime

Social disorganization theory has emerged as the critical theoretical framework to explain the relationship between community characteristics and crime in urban areas (Shaw and McKay 1942, Sampson and Grove 1989, Sampson et al. 1997). According to the theory, unstable community conditions can lead to disorganization and lack of informal social control in communities and ultimately bring about higher neighborhood crime rates. Similar theoretical explanations can be found in the social network literatures (see Briggs 1998). The literature explains that since a homeowner usually lives in the same neighborhood longer than a renter, greater residential stability is likely to strengthen the neighborhood’s social network and produce positive outcomes in neighborhoods (for example, stronger social ties, and lower crimes). Moreover, homeownership could serve as a crime deterrent in that homeowners tend to be more responsible for the stability and security of their properties and communities, which encourages greater social interactions between residents and promotes voluntary community supervision (Perkins et al. 1996, Rohe and Basolo 1997, Glaeser and Sacerdote 2000, White 2001, Lauridsen et al. 2006).

Many researchers have confirmed that homeownership has a deterrent effect on violent crime (Krause 1976, Roncek 1981), property crime (Ross 1977, Roncek 1981), and the number and severity of other disturbances (Ford and Moore 1970). Ross (1977), for instance, found that property crime rates (especially, burglary, motor vehicle theft, and other theft) were substantially higher in areas with a higher concentration of rented apartments than owned housing units. He also found that homeownership increased feelings of attachment to the residential neighborhood,
and greater detection and reporting of suspicious activities. While these correlation studies provide some evidence as to the relationship between homeownership and crime, they have generally fallen short of demonstrating a casual relationship between homeownership and crime.

In a multivariate analysis of the city blocks in Cleveland and San Diego, Roncek (1981) investigated the relationship between environmental characteristics of residential areas and crime rates and found that multi-unit housing structures (e.g., apartments) had a positive effect on both property and violent crime rates. More recently, Alba and his colleagues (1994) found that homeownership status significantly reduces a household’s incidence of crime. In their analysis, homeownership proved to be the second most significant predictor of crime rates preceded only by income level.

Although prior literature confirmed that higher homeownership rates lead to lower crime rates in general, it was assumed that the effect might vary depending on the types of crime. Glaeser and his colleagues (1999), for example, found inconsistent results for different types of crime. Specifically, they found that homeowners were significantly less likely to be victims of violent assault. However, homeownership was not found to have a significant impact on other types of crime, such as rape or robbery.

2. The Effect of Crime on Homeownership

Wilson and Kelling (1982) argue that the prevalence of disorderly behaviors in a community, including crime and poor physical conditions (e.g., litter, graffiti, abandoned buildings, and abandoned vehicles), deteriorates informal social control mechanisms and promotes social disorganization in the community. To put it another way, crime and social disorder are recognized as symbolic indicators of deterioration in the civility and inhabitability of the communities, and generates fear of strangers and a general separation from participation in community life (Skogan 1990). This, in turn, emboldens motivated offenders, resulting in more crime and disorder in the community. As a consequence, homeowners become more fearful and move to more attractive and safer neighborhoods, thereby decreasing homeownership in the immediate community. Thus, it is in this manner that higher crime rates may prompt less
homeownership within certain communities.

Although there is a substantial body of literature documenting the effects of homeownership on crime, there has been relatively little empirical study testing the opposite direction (Katzman 1980, Sampson and Wooldredge 1986, Skogan 1990, Morenoff and Sampson 1997, Dugan 1999). Evidence from a relatively small number of studies suggests that crime and social disorders have a negative association with homeownership. For instance, the results from an analysis of eight U.S. cities revealed that high rates of crime and social disorder was associated with a higher level of fear, neighborhood dissatisfaction, and resident intention to move to other locations (Skogan 1990). Katzman (1980) also confirmed that high rates of property crime were associated with out-migration in Dallas neighborhoods. In a study of the fifty-five largest cities, Sampson and Wooldredge (1986) found that crime rates had a positive effect on population loss in central cities, especially for the nonwhite population. Recently, using the Chicago homicide dataset from 1970 to 1990, Morenoff and Sampson (1997) found that neighborhoods that were already overwhelmed by violent crimes experienced depopulation of all groups, although the population decline in response to violent crime was clearer among whites. Furthermore, using the National Crime Survey data from 22,375 households, Dugan (1999) examined the effect of crime victimization among household members on their moving decisions. He found that violent crime did not more strongly affect the probability of moving than did property crime, but overall crime rates had a positive effect on the moving decisions of residents.

While several empirical studies have tested either the effect of homeownership on crime or crime on homeownership, only one study examined the reciprocal relationship between homeownership and crime. Using national crime data and U.S. census dataset from Middle Atlantic City (a pseudonym), White (2001) attempted to examine the reciprocal relationship between homeownership and crime. In this study, he found that the relationship between crime and homeownership is stronger in cities and neighborhoods that are more affluent. In addition, his analysis confirmed that the influence of crime on homeownership rates is more statistically significant than the influence of homeownership on crime rates. Although this study analyzed the reciprocal relationship between crime and homeownership using a two-wave cross-lag model, it failed to consider the possible endogeneity problem which may lead to biased results in the
regression models. Therefore, the present study focuses on controlling for simultaneous bias in order to overcome the limitations of the previous study.

III. Methodology

1. Data

In terms of socio-economic and demographic aspects, neighborhood level geographic units such as census tracts and block groups within a specific city or county are more likely similar to each other than macro level geographic units such as metropolitan areas. For this reason, a case study may cause some limitations to take account of the general pattern covering all nationwide (for a more detail discussion; see Becker 2007). Thus, we decided to use metropolitan areas as the unit of analysis for this study to analyze overall trend of causal relationships between homeownership and crime in U.S.

Metropolitan crime rates were obtained from the Uniform Crime Reports (UCR) of the Federal Bureau of Investigation (FBI). UCR data is available at the agency-level and county-level. Although agency-level UCR data is more reliable than county-level data, county-level data is more beneficial in displaying nationwide variations in crime because the jurisdictions of police in U.S. tend to be inconsistent with general administrative jurisdictions. Since county-level crime data was used to calculate the overall crime rates (per 100,000 people) in metropolitan areas, the present study utilizes county-level data rather than agency-level data.

Most demographic, social, and economic variable, including homeownership rates, were mainly derived from U.S. Census data (2000). To solve the problem of simultaneous bias, the study employs eight instrumental variables obtained from Law Enforcement Management and Administration Statistics (LEMAS, 2000), Bureau of Justice Statistics Capital Punishment Statistics (1997-2003), and U.S. Census data (2000). LEMAS provides information on the activities of law enforcement agencies including state police, county police, municipal police, and sheriff’s departments across the nation. Capital Punishment Statistics reports characteristics
of death sentence such as States and dates executed.

2. Variables and Measurements

Since the present study investigates the reciprocal relationship between homeownership and crime, the rates of homeownership and crime serve as the main explanatory variables as well as the dependent variables. That is, both variables can be viewed as an endogenous variable in this study. Homeownership rates were defined as the percentage of occupied housing units that are occupied by home owners. Violent crime rates in metropolitan areas were calculated as the number of violent crimes per 100,000 resident populations. Property crime rates in those areas were also calculated based on the number of incidents per 100,000 residents. The violent crime rate includes the number of murders, rapes, robberies, and assaults that take place whereas the property crime rate is calculated as a sum of the burglary, larceny, and auto-theft rates. Finally, total crime rates in metropolitan areas were measured by the total number of violent and property crimes per 100,000 populations.

Several background variables representing social, economic, and demographic characteristics in communities should be included to control for the any potential intervening effect when examining causal relationships between homeownership and crime. It can be assumed that a certain amount of crime would be expected given a population residing in a metropolitan area of a given size, income level, and community conditions. Thus, the present study takes into account total population (log of the population), average income per household, and percent of black resident variables. Along with these basic socioeconomic and demographic variables, three neighborhood variables such as concentrated disadvantage, residential stability, and immigration concentration were also included in the regression models based on recommendations from prior research (see Sampson et al. 1997).

Sampson and his colleagues (1997) noted that a series of community condition variables from U.S. Census data are highly correlated to each other and might produce a multicollinearity problem. As such, the present study conducted an exploratory factor analysis of 2000 U.S. Census data based on maximum likelihood (ML) extraction with a direct oblimin (oblique)
rotation (see Table 1).\textsuperscript{1} For the measures of community conditions, Bartlett factor scores were calculated for each factor, and thus each factor had a mean score of 0 and a standard deviation of 1 (or close to 1). The three factors captured roughly 83 percent of the variance in the items. Consistent with Sampson et al. (1997), the result of the factor analysis produced three identified community conditions including concentrated disadvantage, immigrant concentration, and residential stability. However, the percent black variable was not loaded into the concentrated disadvantage factor. Thus, the percent black variable was separately included in the final model.\textsuperscript{2} Finally, the reliability coefficients (Cronbach’s $\alpha$) were calculated for each community condition scale, which resulted in a range from 0.70 to 0.93.

\begin{table}[h]
\centering
\begin{tabular}{lll}
\textbf{Factor} & \textbf{Items} & \textbf{Factor Loading} \\
\hline
Concentrated disadvantage & Percent unemployed & .90  \\
($\alpha = .70$) & Percent households on public assistance & .83  \\
& Percent people living in poverty & .86  \\
& Percent single parents households & .71  \\
Immigration concentration & Percent of Spanish speaking at home & .97  \\
($\alpha = .90$) & Percent Hispanic & .96  \\
& Percent of speaking English either not well or at all & .98  \\
& Percent foreign born & .89  \\
Residential Stability & Percent stayed in same area as in 1995 & .98  \\
($\alpha = .93$) & Percent stayed in same home as in 1995 & .96  \\
\hline
\end{tabular}
\caption{Composite Measures for Community Conditions}
\end{table}

Note: Maximum Likelihood factor analysis of extraction method and oblique rotated factor pattern with Kaiser Normalization

\textsuperscript{1} Fabrigar et al. (1999) argue that a factor analysis based on ML extraction with an oblique rotation method yields much better simple structure, more interpretable results, and more theoretically plausible representations of the data than a principal components analysis with a varimax rotation, the method traditionally used for creating scales in criminal justice publications.

\textsuperscript{2} To check for any possible multicollinearity problem among three identified factors and other variables, especially the percent black variable, variance inflation factors (VIF) were calculated. The results confirm that there is no serious multicollinearity problem among variables (VIF<4). Thus, the current study simultaneously included percent black, log of population, average income, concentrated disadvantage, immigration concentration and residential stability in the regression models.
3. Analytical Strategy

While we have argued that homeownership affects crime, a case could be made that crime affects homeownership. In other words, the relationship between homeownership and crime could be a two-way causal effect. If this is true, a standard regression analysis (OLS) is problematic due to inconsistency of OLS estimators. Thus, it is necessary to consider two equation models: (1) the effect of homeownership on crime, and (2) the effect of crime on homeownership. This conceptual understanding led to the introduction of simultaneous equation models (e.g., two-stage least-squares regression; 2SLS) in this study. Technically, this study employs instrumental variables regression model (IV regression) in order to obtain a consistent estimator of the unknown coefficients of the population regression function when the regressor, X, is correlated with the error term. To test endogeneity in the regressions, the Durbin-Wu-Hausman tests were conducted (Hausman 1978). The null hypothesis indicates that the tested regressors are exogenous. The results confirm that the null hypotheses were rejected at 0.05 level based on Durbin-Wu-Hausman $X^2$ statistics. That is, the endogenous regressors’ effects on the estimates are important, and the application of instrumental variables techniques is required.

A valid IV regression model has to satisfy the certain condition that an instrumental variable must be correlated with the regressor, but not correlated with the error term. With respect to this condition, four instrumental variables for homeownership were employed and they are percent of family with no kids, percent of central city residents, property tax per $1000 of property value, and MSA physical size. In the same manner, four instrumental variables for crime including the number of police officers per 10,000 populations, police budget, the number of executed prisoners, and high school drop-out rate were also utilized in the regression models. The direction of homeownership to crime is addressed by the following equation models.

\[
C_{yi} = \alpha_{11} + \alpha_{12}H_i + \alpha_{13}CD_i + \alpha_{14}RS_i + \alpha_{15}IC_i + \alpha_{16}I_i + \alpha_{17}P_i + \alpha_{18}B_i + u_{1i} \quad (1.1)
\]

\[
C_{pi} = \alpha_{21} + \alpha_{22}H_i + \alpha_{23}CD_i + \alpha_{24}RS_i + \alpha_{25}IC_i + \alpha_{26}I_i + \alpha_{27}P_i + \alpha_{28}B_i + u_{2i} \quad (1.2)
\]
\[ Ct_i = \alpha_{31} + \alpha_{32} H_i + \alpha_{33} CD_i + \alpha_{34} RS_i + \alpha_{35} IC_i + \alpha_{36} I_i + \alpha_{37} P_i + \alpha_{38} B_i + u_{3i} \] (1.3)

Where
- \( Cv \) = Violent Crime Rate per 100,000 population
- \( Cp \) = Property Crime Rate per 100,000 population
- \( Ct \) = Total Crime Rate per 100,000 population
- \( H \) = Homeownership (%); \( CD \) = Concentrated disadvantage; \( RS \) = Residential stability
- \( IC \) = Immigration concentration; \( I \) = Average income; \( P \) = Log of population
- \( B \) = Black (%)

Equation (1.1), (1.2), and (1.3) address crime functions which control several social economic factors and homeownership. Thus, the effect of homeownership on violent and property crime rates is investigated through two different regression models which are OLS (Ordinary Least Square) and 2SLS (Two Stage Least Square) models. In particular, 2SLS model (IV regression model) employs four instruments that do not appear in the equation since it is assumed that these instruments (percent of family with no kids, percent of central city residents, property tax per $1000 of property value, and MSA physical size) should be correlated not with the error term of the crime functions, but with an explanatory variable, homeownership. Conversely, the following equations explain the opposite causality from crime to homeownership.

\[ H_i = \beta_{11} + \beta_{12} Cv_i + \beta_{13} CD_i + \beta_{14} RS_i + \beta_{15} IC_i + \beta_{16} I_i + \beta_{17} P_i + \alpha_{18} B_i + \epsilon_{1i} \] (2.1)

\[ H_i = \beta_{21} + \beta_{22} Cp_i + \beta_{23} CD_i + \beta_{24} RS_i + \beta_{25} IC_i + \beta_{26} I_i + \beta_{27} P_i + \alpha_{28} B_i + \epsilon_{2i} \] (2.2)

\[ H_i = \beta_{31} + \beta_{32} Ct_i + \beta_{33} CD_i + \beta_{34} RS_i + \beta_{35} IC_i + \beta_{36} I_i + \beta_{37} P_i + \alpha_{38} B_i + \epsilon_{3i} \] (2.3)

Where
- \( H \) = Homeownership (%)
- \( Cv \) = Violent Crime Rate per 100,000 population
- \( Cp \) = Property Crime Rate per 100,000 population
- \( Ct \) = Total Crime Rate per 100,000 population
- \( CD \) = Concentrated disadvantage; \( RS \) = Residential stability
- \( IC \) = Immigration concentration; \( I \) = Average income; \( P \) = Log of population
- \( B \) = Black (%)

These models switch the positions of homeownership and crime to capture the opposite causality. Like the above crime functions, the results of two instrumental regression models based on 2SLS are compared with those of OLS models. Four hidden instrumental variables (the number of police officers per 10,000 populations, police budget, the number of executed prisoners, and high school drop-out rate) are also considered to be correlated not with the error term of the homeownership functions, but rather with crime rates. All models are weighted by metropolitan population (Weighted Least Squares; WLS) to address the heteroskedasticity.

IV. Findings

1. Descriptive and Bivariate Statistics

Descriptive statistics are presented in <Table 2>. Average homeownership rate across metropolitan areas is roughly 67 percent, ranging from 35 to 84 percent. Crime rates vary significantly across metropolitan areas as well. For example, the minimum value of violent crime rate is 6.86 per 100,000 people while a high level of violent crime rate reaches up to 1449.96 per 100,000 people. Average violent, property, and total crime rates are approximately 440, 3,777 and 4,217 per 100,000 residents, respectively. As noted earlier, since community condition variables are Bartlett factor scores, the means and the standard deviations of concentrated disadvantage, immigration concentration, and residential stability are equal to 0 and 1, respectively.

As shown in <Table 3>, there is a negative correlation between homeownership and both types of crime and total crime which are statistically significant at the 0.01 level. To put it another way, as homeownership increases in metropolitan areas, violent, property, and total crime rates decrease \((r=-0.20, r=-0.20, \text{ and } r=-0.21, \text{ respectively})\). These correlations suggest initial support for a homeownership-crime relationship. Consistent with the prior research, concentrations of economic disadvantage and immigrant status are negatively correlated with homeownership, but homeownership is positively associated with residential stability among three
community conditions. With respect to three basic demographic elements, population is positively correlated with violent crime while it is negatively correlated with homeownership. As expected, income is negatively associated with both types of crime and total crime whereas Black population is positively associated with all types of crime. Interestingly, <Table 3> also reveals that homeownership is not negatively correlated with Black population with statistical significance, but it has negative correlation (r=-0.11) with income level which seems to be quite unexpected.

<Table 2> Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent/ Independent variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homeownership</td>
<td>320</td>
<td>67.00</td>
<td>6.06</td>
<td>34.70</td>
<td>83.70</td>
</tr>
<tr>
<td>Violent crime rate (per 100,000 population)</td>
<td>320</td>
<td>440.10</td>
<td>232.08</td>
<td>6.86</td>
<td>1,449.96</td>
</tr>
<tr>
<td>Property crime rate (per 100,000 population)</td>
<td>320</td>
<td>3,776.54</td>
<td>1,324.08</td>
<td>190.58</td>
<td>8,104.93</td>
</tr>
<tr>
<td>Total crime rate (per 100,000 population)</td>
<td>320</td>
<td>4,216.64</td>
<td>1,487.61</td>
<td>197.44</td>
<td>8,904.93</td>
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<tr>
<td><strong>Control variables</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Concentrated disadvantage*</td>
<td>320</td>
<td>0</td>
<td>1.00</td>
<td>-2.11</td>
<td>4.16</td>
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<tr>
<td>Immigration concentration*</td>
<td>320</td>
<td>0</td>
<td>1.00</td>
<td>-0.74</td>
<td>5.58</td>
</tr>
<tr>
<td>Residential stability*</td>
<td>320</td>
<td>0</td>
<td>1.00</td>
<td>-3.58</td>
<td>2.33</td>
</tr>
<tr>
<td>Average income (unit: $1,000)</td>
<td>320</td>
<td>41.36</td>
<td>8.42</td>
<td>25.87</td>
<td>78.39</td>
</tr>
<tr>
<td>Log of population</td>
<td>320</td>
<td>12.81</td>
<td>1.05</td>
<td>10.96</td>
<td>16.07</td>
</tr>
<tr>
<td>Percent Black</td>
<td>320</td>
<td>0.11</td>
<td>0.11</td>
<td>0.002</td>
<td>0.51</td>
</tr>
<tr>
<td><strong>Instrumental variables</strong></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent of family with no kids</td>
<td>320</td>
<td>0.51</td>
<td>0.04</td>
<td>0.38</td>
<td>0.74</td>
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<tr>
<td>Percent of central city residents</td>
<td>320</td>
<td>0.40</td>
<td>0.20</td>
<td>0.05</td>
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<td>Property tax per $1000 of property value</td>
<td>320</td>
<td>11.32</td>
<td>5.03</td>
<td>2.48</td>
<td>26.03</td>
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<td>MSA physical size (1000 square miles)</td>
<td>320</td>
<td>2.19</td>
<td>3.23</td>
<td>0.21</td>
<td>39.37</td>
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<tr>
<td>Number of officers (per 10,000 population)**</td>
<td>236</td>
<td>32.29</td>
<td>14.27</td>
<td>5.17</td>
<td>119.46</td>
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<td>Log of police budget**</td>
<td>236</td>
<td>16.93</td>
<td>1.22</td>
<td>14.08</td>
<td>21.89</td>
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<td>The number of executed prisoners***</td>
<td>320</td>
<td>25.07</td>
<td>56.27</td>
<td>0.00</td>
<td>206.00</td>
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<tr>
<td>High school drop-out rate</td>
<td>320</td>
<td>0.18</td>
<td>0.06</td>
<td>0.06</td>
<td>0.49</td>
</tr>
</tbody>
</table>

* Bartlett factor scores
** LEMAS data is not available for 88 Metropolitan areas.
*** The number of prisoners executed in state where MSA/PMSA is located from 1997 to 2003.
<Table 3> Correlations between the variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Homeownership</td>
<td>1</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>(2) Violent crime</td>
<td>-.20**</td>
<td>1</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(3) Property crime</td>
<td>-.20**</td>
<td>.66**</td>
<td>1</td>
<td></td>
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<tr>
<td>(4) Total crime</td>
<td>-.21**</td>
<td>.75**</td>
<td>.99**</td>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td>(5) Concentrated disadvantage</td>
<td>-.38**</td>
<td>.43**</td>
<td>.42**</td>
<td>.44**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6) Residential stability</td>
<td>.48**</td>
<td>-.09</td>
<td>-.26**</td>
<td>-.25**</td>
<td>,07</td>
<td>1</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>(7) Immigration concentration</td>
<td>-.35**</td>
<td>.24**</td>
<td>.17**</td>
<td>,19**</td>
<td>,49**</td>
<td>-.10*</td>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td>(8) Average income</td>
<td>-.11**</td>
<td>-.10*</td>
<td>,25**</td>
<td>,24**</td>
<td>-.46**</td>
<td>-.08</td>
<td>.16</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(9) Log of population</td>
<td>-.17**</td>
<td>.27**</td>
<td>.03</td>
<td>.07</td>
<td>-.02</td>
<td>.14**</td>
<td>.31**</td>
<td>.55**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>(10) Percent Black</td>
<td>-.08</td>
<td>,52**</td>
<td>,40**</td>
<td>,44**</td>
<td>,32**</td>
<td>.05</td>
<td>-.21**</td>
<td>-.18**</td>
<td>.12**</td>
<td>1</td>
</tr>
</tbody>
</table>

* P ≤ .05; ** P ≤ .01

2. Multivariate Analysis

The impact of homeownership differs depending on the type of crime. First, <Table 4> presents the results of OLS model and two-stage least squares model for violent crime to capture the effect of homeownership on violent crime. As a whole, both OLS and IV regression models for violent crime provide quite consistent results with traditional arguments. For example, log of population and percent Black are positively associated with violent crime while income has a negative effect on violent crime which is statistically significant at α = 0.01 level. Residential stability and immigration concentration are statistically significant at α = 0.01 as well with negative and positive signs for the parameter estimates, respectively. Concentrated disadvantage is barely significant at α = 0.05 with positive sign in OLS model, but it is not statistically significant in IV regression model. Given the traditional argument that homeownership could deter crime (Roncck 1981, Glaeser et al. 1999), while simple OLS model fails to support it, IV regression model succeeds to provide the empirical evidence that homeownership leads to lower crime rate (b=-7.19, p<0.01). Thus, IV regression model for violent crime appears to support the claim that homeownership is the crime deterrent.
<Table 4> The Results of Regression Models for Crime Rate

<table>
<thead>
<tr>
<th></th>
<th>DV = Violent Crime</th>
<th>DV = Property Crime</th>
<th>DV = Total Crime</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLS</td>
<td>IV Reg.</td>
<td>OLS</td>
</tr>
<tr>
<td>b</td>
<td>S.E</td>
<td>b</td>
<td>S.E</td>
</tr>
<tr>
<td>Homeownership</td>
<td>.79</td>
<td>1.51</td>
<td>-7.19”</td>
</tr>
<tr>
<td>Average Income</td>
<td>-7.18”</td>
<td>1.51</td>
<td>-9.00”</td>
</tr>
<tr>
<td>Log of Population</td>
<td>67.20”</td>
<td>10.91</td>
<td>53.47”</td>
</tr>
<tr>
<td>Percent Black</td>
<td>918.9”</td>
<td>115.8</td>
<td>975.86”</td>
</tr>
<tr>
<td>Concentrated Dis.</td>
<td>39.84”</td>
<td>19.16</td>
<td>-9.66</td>
</tr>
<tr>
<td>Residential Stab.</td>
<td>-51.94”</td>
<td>11.56</td>
<td>-33.32”</td>
</tr>
<tr>
<td>Immigration Con.</td>
<td>57.03”</td>
<td>13.70</td>
<td>56.62”</td>
</tr>
<tr>
<td>R2 Adjusted</td>
<td>.58</td>
<td>.54</td>
<td>.44</td>
</tr>
<tr>
<td>F</td>
<td>63.82”</td>
<td>59.57”</td>
<td>37.49”</td>
</tr>
<tr>
<td>N</td>
<td>320</td>
<td>320</td>
<td>320</td>
</tr>
</tbody>
</table>

* P ≤ .05;  ** P ≤ .01

The IV regression model employs four instruments; percent of family with no kids, percent of central city residents, property tax, and MSA physical size.

<Table 4> also reports the regression results of OLS and 2SLS for property crime and total crime. Compared to the results for violent crime, some control variables are not statistically significant in both models for property and total crime. For instance, log of population and immigration concentration are not statistically significant for property crime and total crime while they are significant for violent crime. Interestingly, homeownership has a positive effect on property crime (b=44.47, p<0.01) and total crime (b=45.26, p<0.01) in OLS models which are somewhat inconsistent with prior research. However, the results from 2SLS model confirm that homeownership is not statistically significant predictor for property and total crime.

Unlike the results for violent crime, <Table 4> reveals that homeownership does not seem to be an important factor to discourage property crime and total crime. The independent variables in OLS and IV regression models explain variations of violent crime by 58 percent and 54 percent, respectively whereas they explain only 44 percent and 40 percent of variations of property crime. Similarly, the explained variances of OLS and IV regression for total crime are 46 percent and 40 percent.
Regarding the opposite direction, <Table 5> estimates the effects of violent crime, property crime, and total crime on homeownership, respectively by comparing OLS and 2SLS models. Consistent with expected directions, log of population and concentrated disadvantage are negatively associated with homeownership which is statistically significant at $\alpha=0.01$ level for all models. However, a few control variables in both OLS and 2SLS models for homeownership show inconsistent patterns. For instance, percent Black is not statistically significant predictor and income is statistically significant with negative sign, implying that higher income causes less homeownership. In addition, residential stability is statistically significant only in OLS models with the expected sign.

Assuming that crime would be a discouraging factor of homeownership, the regression results do not support the traditional argument since violent crime in both models is not statistically significant. In contrast, both property crime and total crime have positive effects on homeownership in OLS models ($b=0.002$ and $b=0.001$, respectively) which are not consistent with prior knowledge. However, the magnitude of the effect size is relatively small and furthermore, endogeneity issues may plague this result as well just like other results in simple OLS models addressed above. Finally, <Table 5> shows that both property crime and total crime appear to be statistically insignificant predictors on homeownership in IV regression models. After controlling basic demographic and community condition variables in the model, IV regression models from two-stage least square overcoming endogeneity problems due to reciprocal relationship between homeownership and crime provide somewhat different results with what OLS models yield. Overall, the results of the present study fail to confirm the two-way reciprocal relationship between homeownership and crime. However, the IV regression results support that homeownership causes a decrease of violent crime in U.S. metropolitan areas.
<Table 5> The Results of Regression Models for Homeownership

<table>
<thead>
<tr>
<th></th>
<th>OLS</th>
<th>IV Reg.</th>
<th>OLS</th>
<th>IV Reg.</th>
<th>OLS</th>
<th>IV Reg.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b</td>
<td>S.E</td>
<td>b</td>
<td>S.E</td>
<td>b</td>
<td>S.E</td>
</tr>
<tr>
<td>Violent Crime</td>
<td>.001</td>
<td></td>
<td></td>
<td>.00</td>
<td>-.02</td>
<td>.02</td>
</tr>
<tr>
<td>Property Crime</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.002**</td>
<td></td>
</tr>
<tr>
<td>Total Crime</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.001**</td>
</tr>
<tr>
<td>Average Income</td>
<td>-.22**</td>
<td>.06</td>
<td>-.38**</td>
<td>.13</td>
<td>-.15**</td>
<td>.06</td>
</tr>
<tr>
<td>Log of Population</td>
<td>-1.80**</td>
<td>.42</td>
<td>-1.80**</td>
<td>1.04</td>
<td>-1.67**</td>
<td>.38</td>
</tr>
<tr>
<td>Percent Black</td>
<td>6.12</td>
<td>4.74</td>
<td>22.03</td>
<td>13.01</td>
<td>1.38</td>
<td>4.33</td>
</tr>
<tr>
<td>Concentrated Dis.</td>
<td>-6.25**</td>
<td>.63</td>
<td>-6.02**</td>
<td>.98</td>
<td>-6.17**</td>
<td>.60</td>
</tr>
<tr>
<td>Residential Stab.</td>
<td>2.39**</td>
<td>.43</td>
<td>1.17</td>
<td>.86</td>
<td>3.41**</td>
<td>.46</td>
</tr>
<tr>
<td>Immigration Con.</td>
<td>-.11**</td>
<td>.53</td>
<td>.89</td>
<td>1.14</td>
<td>-.02</td>
<td>.05</td>
</tr>
<tr>
<td>R2 Adjusted</td>
<td>.58</td>
<td>.52</td>
<td>.61</td>
<td>.49</td>
<td>.61</td>
<td>.40</td>
</tr>
<tr>
<td>F</td>
<td>64.47**</td>
<td>44.51**</td>
<td>72.59**</td>
<td>42.06**</td>
<td>71.60**</td>
<td>34.54**</td>
</tr>
<tr>
<td>N</td>
<td>320</td>
<td>236</td>
<td>320</td>
<td>236</td>
<td>320</td>
<td>236</td>
</tr>
</tbody>
</table>

* P ≤ .05; ** P ≤ .01

The IV regression model employs four instruments the number of police officers, police budget, death penalty, and high school drop-out.

V. Discussion and Conclusion

The primary purpose of the present study was to explain the reciprocal relationship between homeownership and crime in metropolitan areas. After controlling for significant basic demographic and community condition variables, the reciprocal relationship between homeownership and crime rates (violent, property, and total crime) is not perfectly supported by this research. However, the findings from this study suggest that there is a bi-directional relationship between homeownership and violent crime rates. More specifically, this study confirms that homeownership negatively influence violent crime. That is, metropolitan areas with higher homeownership rates tend to have lower rates of metropolitan violent crime. Thus, the present study provides the empirical evidence that homeownership plays an important role to
deter violent crime. Both demographic and neighborhood characteristics also play a role in explaining high crime rates in metropolitan areas. The majority of sociologists and criminologists of Chicago school has continued to focus on ecological effects of neighborhood on crime. Thus, assuming that homeownership is one of critical ecological elements of community, the positive impact of homeownership on crime would be sufficiently addressed through social disorganization theory initially suggested by Shaw and McKay (1942).

This finding can be also explained based on routine activity theory developed by Cohen and Felson (1979). According to the theory, in order for a crime to occur, there must be a convergence in time and space of a suitable target, a motivated offender, and a lack of capable guardians. These three ingredients need to come together in time and space in order to create an opportunity for criminal offending. Homeownership is likely to reinforce social tie and social capital between communities and residents, so the convergence of three crime-prone elements does not appear easily, so crime rate for potential offenders to target communities with higher homeownership rates tends to go down.

Meanwhile, the findings of the present study about the effect of crime on homeownership do not support the traditional arguments of previous research that crime stimulates inhabitability of the areas, which causes residents to move to safer neighborhoods, thereby decreasing homeownership (see Katzman 1980, Wilson and Kelling 1982, Skogan 1990, White 2001, Lauridsen et al. 2006). However, apparent failure to identify the negative effect of crime on homeownership may be attributed to public recognition and perception of crime intensity. For example, unlike the traditional argument, residents in high crime rate areas could be less concerned about crime occurrences (Dugan 1999) and furthermore, even after experiencing a certain level of high crime in their neighborhoods, residents may perceive too low a risk to warrant a move, or believe that effective prevention measures are available and preferable to moving (Warr and Stafford 1983).

The present study has three major limitations that are related to the data available for analysis. First, measures of informal social control, fear of crime, and risk are absent from the data, which restricts the ability to fully capture the impact of homeownership and crime in analytical models. Second, in spite of the benefits associated with using metropolitan geographic
units to drive more generalized arguments, the present study cannot avoid weakness associated with the unit of analysis. Both homeownership and crime are not independent units but are instead highly related to multiple neighborhood characteristics. In other words, the pattern of homeownership and crime depends on neighborhood composition and structure. Thus, relying on metropolitan level data as the unit of analysis may have limitations in that neighborhood factors are not taken into account. However, it is usually difficult to obtain neighborhood level data including demographic, residential, and criminal characteristics simultaneously. Thus, if feasible in using MSA data, measuring disparity between local entities within MSA would be helpful to consider variation of different patterns across suburbs and central city, so future research using MSA as unit of analysis will need to employ this specific index into the analytical models.

The models presented in this research are likely to suffer from left out variable bias. To control a variety of different regional factors of metropolitan areas, future research should incorporate the fixed effect model which is widely used for panel data analysis. In fact, both homeownership and crime are highly time-variant concepts and cannot be well addressed by cross-sectional cutting point. By controlling for periodical dimension, the causal relationship between homeownership and crime could be more specified because the period of time analyzed could affect the pattern or level of homeownership and crime. The fixed effect model for panel analysis would be also beneficial to control for regional factors to explain variations in homeownership and crime pattern by metropolitan area. As previously mentioned, focusing on small geographic units such as census tract or block-group would be advantageous to specifically capture the relationship based on neighborhood dynamics. Spatial analysis would also be a promising methodological approach since homeownership and crime might be strongly affected by spatial dependence commonly observed in most adjacent small geographic units.

Although a series of empirical evidences in this research are compiled based on the U.S. data, they might be able to provide precious policy implications to Korean society. One of problematic issues of Korean housing market must be a severe unbalance between housing supply and homeownership. The housing supply ratio of Korea has steadily increased over the last decade and recorded 105.8% in 2005 according to Housing and Population Census (Korea National Statistical Office 2005) whereas homeownership rate was only 55.6% in the same
period. This biased trend is likely to also cause a sort of chronic housing poverty stimulating crime-prone environments. Thus, given the assumption that the homeownership may lead to low crime rate in Korea as the result of the present study suggested, a variety of tactics encouraging homeownership should be reflected in housing policy.

참고문헌


3) Particularly, homeownership rate of Seoul appears only 44.6% which is even significantly less than the national average.


국문요약

주택소유와 범죄율간의 상호관계에 관한 연구
- 미국 광역도시권을 중심으로 한 횡단적 분석:

주거안정성은 지역사회 구성원들의 비형식적 통제기능을 강화시켜 지역사회의 범죄율을 완화시키고 범죄활동을 억제시키는 중요한 요인으로 인식되어 왔다. 또한, 범죄의 증가는 주택소유자들로 하여금 보다 안전한 근린 지역으로의 이동을 촉진시키는 역할을 함으로써 주택소유에 부정적 영향을 미치게 된다고 보고되었다. 즉, 실증적 연구와 이론적 배경에 따르면, 주택소유와 범죄간의 상호적 인과관계가 성립한다. 그럼에도 불구하고 기존의 주택소유와 범죄의 관계를 규명한 경험적 연구들은 이러한 상호관계를 간과한 채 일방향의 인과관계만 조점을 맞추어 왔다. 이에 본 연구는 미국 대도시의 공식통계자료를 이용하여 주택소유율과 범죄율 간의 상호관계를 규명하는데 그 의의가 있다. 특히, 변수간의 상호관계를 규명함에 있어서 통계적으로 발생할 수 있는 내생성의 문제를 해결하고 보다 정확한 주택소유와 범죄간의 인과관계를 도출하기 위해서 이단계 최소 제곱모형을 적용하였다. 분석결과에 따르면, 주택소유와 범죄는 도시 구조적 상관변수들을 통제하였을 때 상호적 인과관계를 성립하는 것을 확인함으로써 주택소유가 폭력범죄 증가를 억제한다는 사실을 경험적으로 증명하였다.