

# The Impact of Homeownership on Criminal Activity: Empirical Evidence from United States' County Level Data

Jinlan Ni

Christopher Decker

University of Nebraska at Omaha

**Abstract:** This paper utilizes county-level census data and Uniform Crime Reports for the United States to isolate the impact of homeownership on crime rates. After controlling for other influences, in particular income's impact on homeownership rates, we find that the homeownership itself has a strong and statistically significant negative effect on both violent and property crime rates. Moreover, we find that increases in homeownership rates reduce criminal activity over time. Our results suggest that federal, state, and local policies as well as other initiatives, such as Habitat for Humanity, that support homeownership, will have substantial positive spill-over effects on the social fabric of a given community.

**Keywords:** Homeownership Rates, Violent Crime, Property Crime, Income

## 1. Introduction

In the United States, as well as in many other countries, homeownership is heavily promoted. In the U.S. in particular, the income tax code greatly favors homeownership by allowing for the deductibility of mortgage interest as well as other tax-based incentives to buy homes. In addition, a number of public institutions (such as the Federal Home Loan Bank System and the Federal Housing Administrations) and more privately-

oriented organizations (such as Habitat for Humanity) have been developed to foster homeownership. As Coulson (2002) points out, these public expenditures and tax breaks can be quite costly, prompting the question: Do the benefits of homeownership meet or exceed these costs?

The search for an answer has led economists and other social scientists to search for social, or spill-over, benefits to homeownership. Dietz and Haurin (2003) have detailed the economic consequences

of homeownership. Germane to our study, it is interesting to note that Dietz and Haurin (2003) indicate that homeownership status for a household or individual reduces their likelihood of suffering a loss from criminal activity (Alba et al., 1994; Glaeser and Sacerdote, 1999; Zhao and Thurman, 2003).<sup>1</sup>

This paper examines the external effect of homeownership on crime, based on what social interaction models commonly employed in crime research refer to as a *neighborhood effect*. Social interaction models hypothesize that individual behavior depends not only on individual incentives but also on the behavior of peers and neighbors. Owning a home obviously gives an individual more to lose if prosecuted for committing a crime. It is also possible though that there is this *neighborhood effect* of homeownership on crime: An individual may be more likely to commit a crime if his or her peers do so as well (Glaeser et al., 1996; Calvó-Armengol and Zenou, 2004; Ballester et al., 2006). Empirically, Ludwig et al. (2001) and Kling et al. (2005) found that the behavior or characteristics of neighbors strongly influence juvenile criminal activity. This provides a rationale for the explanation that neighbors matter in explaining crime

behaviors. Several research studies suggest that homeowners are more attached to their communities and more active in community affairs (Rossi and Weber, 1996; DiPasquale and Glaeser, 1999; Blum and Kingston, 1984; Austin and Baba, 1990). Therefore, empirical analysis would seek evidence that higher homeownership rates may in fact lead to lower crime rates.

The goal of this study is two-fold. First and foremost, our desire is to evaluate the consequences of homeownership on crime rates using county-level data for the United States. When one considers, for instance, that some estimates put the total cost of criminal activity at over five percent of U.S. GDP (see Cooter and Ulen, 2000) – a substantial sum indeed, if in fact, homeownership mitigates criminal activity, it would seem advisable to pursue its promotion. Secondly, we test the hypothesis that homeownership rates are a function of predetermined (lagged) crime rates. As Dietz and Haurin (2003) point out, the theoretical connection between homeownership and crime are complicated. The households may be more likely to purchase homes located in safe neighborhoods. We find that, while (lagged) homeownership influences crime rates, the notion that homeownership is influenced by (lagged) crime rates is not strongly supported.

Our main finding is that the homeownership itself negatively influences criminal activity, irrespective of type. While some studies have looked at homeownership as a determinant of crime, they tend to treat it as an instrument proxying for income. Indeed, there is some empirical evidence linking higher homeownership rates with higher incomes (see, e.g. Onder, 2002). However, homeownership is by no means a perfect

---

<sup>1</sup> Alba et al. (1994) examine the incidence of property and violent crime in the suburbs of the metropolitan area of New York City. They report that homeownership status significantly reduces a household's incidence of crime. Glaeser and Sacerdote (1999) examine city crime rates using FBI data. Their analysis indicates that homeowners have significantly less risk of being subject to a violent assault. Zhao and Thurman (2003) also included homeownership as a control variable in determining crime rate but the role of homeownership on crime has not been the primary focus.

proxy for income as there are many programs in existence that successfully promote homeownership, particularly among low-income individuals. Many states have developed affordable housing programs and affordable housing trust fund programs to promote homeownership as well. For instance, the state of Missouri has a mortgage revenue bond program called "First Place Home Loans." This program provides below-market rate financing and four percent grant assistance to defray closing costs, support property tax payment, or aid with down-payment requirements. We take special care then to isolate the homeownership effect, while controlling for income in the process.

In this paper, we focus specifically on the relationship between crime and homeownership. To be sure, simple correlations highlighting the relationship between these two variables are insufficient to reveal any meaningful link since other variables have been found to influence crime rates in other studies. For instance, the factors that are found to increase the crime rates include the local unemployment rate (Freeman, 1983, 1999; Freeman and Rodgers, 1999; Papps and Winkleman, 2000; Gould et al., 2002; and Narayan, 2004), poverty rate (Fleisher, 1966; Ehrlich, 1973; Chiu and Madden, 1998; Soares, 2004), population density (Glaeser and Sacerdote, 1999; Levitt, 1998; Cullen and Levitt, 1999) and percentage of black population (Massey and Denton, 1993). Surprisingly, Gould, et. al. (2002) find income per capita to be positively related with crime (for example, Gould et al., 2002) possibly because it means more available wealth to be stolen. Hence, we control for these effects in our analysis below. It is also worth mentioning that other crime rate affecting factors exist that neither our

study, nor the others cited above capture. In many instances such information is neither quantifiable (such as psychological proclivities) nor available (such as an individual violator's criminal and family histories). As such, we are restricted to county-level geographic delineations in our analysis.

The paper is arranged as follows. Section 2 introduces the data sources and variable statistics. Section 3 investigates the potential relationship between crime and homeownership rates, controlling the other variables via standard regression analysis. In section 4, we investigate the determinants of the change in crime rates over a decade, an exercise not commonly done in the literature, with particular attention paid to homeownership. In section 5, we present analysis highlighting statistical causality issues that necessarily arise from earlier analysis. Section 6 concludes our finding that homeownership lowers crime rates and thus generates a positive externality that reinforces certain federal, state, and local policy initiatives directed towards fostering homeownership.

## 2. Data and Variable Statistics

Following existing empirical literature, we conduct our analysis at the county level (see, e.g. Gould et. al., 2002, and Hull, 2000).<sup>2</sup> A number of different sources provide our data. Our county-level crime

---

<sup>2</sup> The potential draw-back to this level of geography is that in many instances crime rates can vary substantially within county delineations. Therefore, some effects measured in our model may be muted relative to a more geographically detailed analysis. That said, given the large number of US counties under investigation, we still observe a fair degree of variation across counties, suggesting that this, as well as other studies, have statistical validity.

data comes from the Uniform Crime Reports (UCR) published by the U.S. Federal Bureau of Investigation. The UCR provides periodic nationwide assessments of reported crimes, which are usually not available elsewhere in the criminal justice system. By 1998, there were over 18,500 law enforcement agencies contributing reports either directly or through their state reporting programs to UCR. The county-level UCR files were created by the National Archive of Criminal Justice Data (NACJD), which then imputes missing data and aggregates the data to the county-level. We use the data collection containing county-level counts of arrests and offenses for violent crime and property crime. Violent crime includes murder, rape, robbery and aggravated assault, and property crime includes burglary, larceny, auto theft and arson. The crime data are available annually over the 1990 to 2005 period. However, as discussed in more detail below, to better distinguish between correlation and potential causality of homeownership on crime, we examine the effect of homeownership in 1990 on the crime rates in 1991 and 1992, and the effect of homeownership in 2000 on the crime rates in 2001 and 2002.

The county demographic data comes from several sources. The homeownership data are derived from the 1990 and 2000 censuses collected by the U.S. Census (county-level data for the inter-meaning years are not available). Personal income, population and land area data are collected from the Regional Economic Information Service (REIS) for the required years 1990-1992 and 2000-2002. We measure the density of the county using the ratio of the county population to the county land area. The unemployment rate is from the Bureau of Labor Statistics, U.S. Department of

Labor. We define the poverty rate by calculating the ratio of the number of people categorized by the U.S. Census as being at or below a pre-determined income poverty level to the total number of residences in a particular county.<sup>3</sup> The black population data comes from the U.S. Census County and City Data Books, various editions.<sup>4</sup>

Table 1 summarizes the statistics of all variables. As we can see in Table 1, the means for both violent crime rates and property rates show that property crime rates are much higher than violent crime rates in the counties studied. The averages of homeownership rates in both years are more than 70 percent. Table 2 reports a correlation matrix for the main variables in the regression. As the table indicates, there is a negative relationship between the crime rates and homeownership rates.

The above correlations appear to illustrate that private property indeed matters. An increase in homeownership provides external or social benefits in the form of greater maintenance and neighborhood conditions, family stability, and better "civic" behavior. Of course, the above correlations are only illustrative of a potential relationship. Many other variables can influence crime rates. The next section studies in more detail the relationship between homeownership and crime in a set of relatively straightforward multivariate regression models.

---

<sup>3</sup>This data can be queried at the American Factfinder web site at the following web site:  
[http://factfinder.census.gov/home/saff/main.html?\\_lang=en](http://factfinder.census.gov/home/saff/main.html?_lang=en).

<sup>4</sup>This data is on line and can be easily obtained on line at  
<http://fisher.lib.virginia.edu/collections/stats/ccdb/>.

### 3. Regression Analysis and Results

The first estimation model is a cross-sectional, multivariate linear regression model of criminal activity to homeownership, controlling the other factors. Specifically, our specification model for a given county's crime count per capita in year  $t$ ,  $CR_{i,t}$  is:

$$\log(CR_{i,t+1}) = \alpha_0 + \beta_1 \log(\text{Homeownership}_{i,t}) + \beta_i \quad (1)$$

$$\log(CR_{i,t+2}) = \alpha_0 + \beta_1 \log(\text{Homeownership}_{i,t}) + \beta_i \quad (2)$$

We estimate equations (1) and (2) for both property crime and violent crime. Our key variable,  $\text{Homeownership}_{i,t}$ , as discussed before, is expected to have a negative impact on criminal activity.

It is worth noting at this point that one could easily hypothesize that the causal link between crime rates and homeownership could go the other way. That is, it might be that potential homebuyers, holding all else constant, would be ill inclined to buy a home in a region with a high degree of criminal activity. To mitigate this concern and better isolate the hypothesis we are considering in this paper, we undertake two estimation strategies. First, we adopt a relatively simple strategy common in empirical work whereby we model the crime rate on either one-year or two-year lagged homeownership values as stated in equations (1) and (2) above. A second means of mitigating the potential reverse causality issue would be to model homeownership as a function of the lagged values of crime rates. While our paper does not pretend to in any way measure the determinants of homeownership (as this is a vast and complex question), we nonetheless offer suggestive results as they

relate to criminal activity in section 6 of this paper.

In our first strategy, we draw from existing published empirical work and collect a number of "control" variables generally accepted to be determinants of crime rates. The variables defining  $X_{i,t}$  include income per capita, unemployment rates, poverty rates, population density and percentage of black population, all of which are delineated at the county level. Moreover, consistent with this existing work, we use a double-log specification in our estimation. We can thus interpret the resulting coefficients as constant elasticities.<sup>5</sup>

Following the existing work then, we expect a positive relation between crime rates and both the county unemployment rate and population density. As for income per capita, one might expect the effect to be positive since with higher income comes more valuable items that may entice criminal behavior. On the other hand, the effect could be negative since more affluent communities can afford better security systems. To control for any additional unobserved heterogeneity and characteristics of certain states, we also include state dummies ( $i=50$  dummies).

The regression results for the crime data in 1991 and 1992 are reported in Table 3A. The dependent variables are property

<sup>5</sup> As a matter of future research, since nearly all empirical papers assume a double-log specification, it might be fruitful to investigate the veracity of this construction via a Box-Cox equation. Given our intent to extend existing work by focusing on the homeownership issue in particular, such an investigation is beyond the scope of this study. However, it turns out that were we to model our equations in linear fashion, our results are qualitatively similar to the ones presented here. These results are available upon request from the authors.

crime rates (first two columns) and violent crimes rates (last two columns), respectively, for the model (1) – (2). Our findings are as follows. First, note that our regressions explain 47 to 49 percent of the variation in crime rates, consistent with the existing literature. As for the individual point estimates, we see the effect that homeownership rates have on both types of property crime is consistently negative and statistically significant across all specifications. This result strongly suggests that homeownership does indeed have positive spillover effects in that it is associated with lower future crime rates. In terms of magnitude, our results indicate that a one percent increase in (lagged) homeownership leads to a 1.253 and 1.513 percent drop in the subsequent per capita property crime and a 1.043 and 1.123 percent drop in the subsequent per capita violent crime for the years 1991 and 1992, respectively. Table 3B shows the regression results for 2001 and 2002. We find again that higher homeownerships rates lead to lower property crime and violent crime rates.

In both Tables 3A and Table 3B, the control variables come through as expected. The higher income leads to higher crime rates (consistent with Hull, 2000, as well as many other studies) but crime rates increase at decreasing rates, which is consistent with Gould et al. (2002). While these results then appear to indicate that high income leads to more property and, thus, more theft, they may warrant additional attention. From our perspective, however, with income serving as a control variable here, the key is that our results appear in agreement with the literature. Consistent with other studies, higher unemployment rates, higher densities and higher percentages of black population are

associated with higher crime rates. The poverty rates are significantly correlated with violent crime rates, but not significantly with property crime in 1990s. This may be because a county with more people under the poverty line in 1990 has less property to steal and thus does not have significant higher property crime. However, the results indicate greater instances of violent crime in poor areas.

A potential problem with the above specification is the correlation between homeownership rates and income. Several studies have demonstrated that a key determinant of homeownership is per capita income (see, e.g. Quercia, McCarthy and Wachter, 2003; Onder, 2002). This indicates that, besides the direct effect of income on crime rates (as we show in Tables 3A and 3B), income may have an indirect effect on crime rates through homeownership rates. With respect to our statistical results, this potential collinearity, which tends to bias standard errors upwards, is somewhat less of a concern given that both income and homeownership are statistically significant. However, the resulting estimated coefficients, while still statistically unbiased, may not reflect the most refined measure of quantitative effect. Indeed, many homeownership programs intend aiding low to middle-income families in purchasing homes. When such difficulties arise, researchers often adopt a procedure that, in effect, constructs an instrument with the desired characteristics.

The procedure, which we adopt here, involves the following steps. First, we estimate an auxiliary OLS regression of homeownership on income per capita (the specific functional form and regression results are presented in an Appendix). Second, we capture the resulting residuals

from these auxiliary regressions and, due to the logarithmic construction of the regression, exponentiate them. What we construct, then, is a measure that captures the degree of homeownership not attributable to per capita income effects.<sup>6</sup> We then substitute the resulting series in our original regression models (1) – (2). Tables 4A and 4B report these results.

The results from Table 4A and 4B are consistent with what we found before in that homeownership does have a significant negative impact on both property and violent crime rates. Similar to the earlier results, the regressions explain from 37 to 51 percent of the variation in crime rates. The residuals of homeownership rates (purged of any income effects) are negatively, and significantly, correlated with both types of property crime. The magnitude of the effects is similar to previous results as well. Therefore, we can conclude that homeownership in and of itself lowers crime rates, and thus generates a positive externality to society and reinforces certain federal, state, and local policy initiatives directed towards fostering homeownership. For instance, the degree to which federal programs make obtaining mortgages less financially difficult would have the added benefit of potentially lowering crime rates.

#### 4. Change in Criminal Activity over Time and Monetary Estimates

To develop a richer understanding of the dynamics of criminal activity and to identify the long-term variation in the crime

<sup>6</sup> Wooldridge (2006, 3<sup>rd</sup> ed., p. 84) addresses an econometric procedure in line with this approach. For an example of the application of this procedure in the published literature, see Decker (2005).

and homeownership rates, we follow Hull (2000) and study the relationship between crimes and economic conditions using changes in these variables over a ten-year period (1990-2000 for homeownership, 1991-2001 and 1992-2002 for crime rates). Following standard practice, these specifications include changes in the various independent variables as regressors.<sup>7</sup> Moreover, we also include the initial (1990) value for the various variables defined in our model, consistent with much of the empirical economic growth literature (see, e.g. Goetz, Ready, and Stone, 1996; and Rey and Montouri, 1999).

Table 5A reports these OLS results. Note that the regressions explain 31 to 43 percent of the variation in crime rates. The first two columns indicate that an increase in home ownership significantly reduce property crime over a decade, considering the unobservable county specific effects. We do have peculiar results with the findings for violent crime, which require further future studies. The other control variables come with expected results, which

<sup>7</sup> There is an additional benefit to investigating a ten-year difference equation here. Our earlier regression results look at the impact that the level of homeownership has on the level of criminal activity is cross-sectional nature. Since we clearly do not have a panel data set with a sufficiently long and consistent time-series dimension since much of our data is generated from U.S. Census data, we can't effectively control for any time-invariant county characteristics that might somehow impact criminal activity via, say, a fixed effects model. That said, if the crime rate/homeownership relationship found in the levels equations is in fact true, one might reasonably expect that any growth in homeownership would slow the growth in criminal activity. By investigating results from the ten-year difference equation, we circumvent to a large degree the time invariant county characteristics that may influence crime rates and still be comfortable in testing the crime rate/homeownership hypothesis.

are consistent with the results in previous tables. Moreover, using a similar two-step procedure as delineated above, we construct and introduce a variable measuring change of the residual of homeownership, i.e. the amount of the change in homeownership not attributable to income changes, to measure the homeownership effect on the change in crime rates. Table 5B presents the OLS results for this specification. Similar to Table 5A, the results indicate that, over the 1990s decade, an increase in the homeownership rate not attributable to income changes significantly reduces the property crime.

Since the results generally support the hypothesis that there are positive externalities to homeownership in the form of lower crime rates, as a matter of application our empirical estimates can be utilized to estimate a *numerical* social benefit of homeownership as it pertains to reducing crime rates. In doing this, we adopt Cohen's (1988) results that estimated monetary costs of individual crime by examining the pain, suffering and fear endured by crime victims. Though dated, these figures are quite detailed in their construction and we are aware of no similar data for a more current time period. Specifically, Cohen (1988) estimated the aggregated annual cost of crime to victims of all personal and household crimes to be \$146.3 billion. Of this number, \$124.98 billion is for violent crime and the remaining \$21.33 billion is for property crime. As Cohen (1988) reminds us, if one were to add the estimated aggregate cost to victims of \$146.3 billion to estimates of the other components of the social cost of crime such as out-of-pocket costs, plus victim costs for arson, kidnappings and bombings, the total tab to society would certainly exceed \$316 billion a year in the United States.

According to our results, the social costs of crime can be reduced through increasing homeownership. As stated above, the elasticity between crime and homeownership is 1.045 (the lowest for all property models) for property crime and 0.768 (the lowest for all violent crime models) for violent crime rate. Using the annual cost of crime to victims of all personal and household crimes (\$124.98 billion for violent crime and \$21.33 billion for property crime), we find that a one percent increase in homeownership will reduce the annual cost of property crime to victims by \$222.9 million ( $1.045\% \times \$21.33$  billion). Similarly, a one percent increase in homeownership will reduce the annual cost of violent crime to victims by \$959.8 million ( $0.768\% \times \$124.98$  billion).<sup>8</sup> Of course, whether or not these monetary figures are justified given the costs of supporting homeownership that Coulson (2002) alludes to would require a more complete benefit/cost analysis. However, given the potential cost savings associated with crime reductions, it would certainly be of interest to public policy makers.

## 5. Is Crime a Determinant of Homeownership?

The results presented above are suggestive that higher (lagged) homeownership rates reduce crime rates. While the lag structure helps to mitigate the concern that the causal link could go the other way, it may be worth testing the hypothesis that homeownership rates are a function of predetermined (lagged) crime

<sup>8</sup>Notice we convert the dollar amounts from 1988 dollars into 2007 dollars. The actual annual costs to victims in all likelihood are higher than Cohen's (1988) figures since he did not include murder and arson in his estimation.

rates. However, there are many other variables likely to influence homeownership. Indeed, as we have already demonstrated above, the major determinant is income. To refine our query here, then, we undertake an econometric estimation of homeownership not explained by income as a function of a number of additional variables including lagged crime rates.

As stated above, an investigation of the determinants of homeownership is a complex study. There are many papers on this subject and they investigate many different dependent variables. While it is well beyond the scope of this paper to replicate such analysis, it is clear that the literature consistently finds a few key dependent variables to be significant. Hence, in what follows we adopt these key variables only and then add our crime rate variables. Specifically, remembering that we have previously accounted for income, we consider the following determinants of homeownership rates for the year 2000. First, we include the county violent crime rate and the county property crime rate in 1999, respectively, hypothesizing a negative effect on homeownership rates as potential homebuyers may be ill inclined to buy a home in an area with higher crime rates. Studies by Onder (2002), and Quercia, McCarthy and Wachter (2003) suggest that demographic and local employment characteristics influence homeownership rates. To this end we include the percentage of a county's population aged 18 to 25 in 2000. This cohort tends to be more mobile with fewer financial resources necessary to purchase a home. Therefore, we would hypothesize a negative impact on homeownership rates.

Secondly, we include the average county unemployment rate between 1990

and 2000. Higher average unemployment levels would seem to suggest fewer stable employment opportunities in a county thus lessening the potential for high degrees of homeownership. In addition, we also consider fiscal determinants of homeownership. We include the percent of county government accounted for by property tax collections revenues for the years 1996-97. The effect, we suggest, could go either way. On the one hand, higher property tax revenues could signal higher tax rates that may deter home buying. On the other hand, more local tax revenues could signal a greater degree, or higher quality of, public infrastructure (i.e. better roads and schools) which may support home buying.<sup>9</sup>

Since it is quite likely that there are other determinants of homeownership, we include state-level dummies to account for any state-specific programs that may promote home ownership. Finally, there may be some other characteristics of particular counties that support homeownership. It is rather unfortunate that we do not have sufficient data in a time-series dimension to include a set of county-level dummies characteristic of a fixed effects model (recall we only have homeownership data for 1990 and 2000). However, following suggestions by Wooldridge (2006, 3<sup>rd</sup> ed., p.315), we include the homeownership rate for 1990 in our specification in an attempt to account for certain time invariant characteristics of a county that promotes homeownership.

---

<sup>9</sup> The additional data used to estimate our homeownership equation came from the U.S. Census Bureau's County and City Data Book, 2000. This data can be queried on line at the University of Virginia Library web site <http://www2.lib.virginia.edu/geostat/index.html>.

Recalling that our dependent variable is the log of homeownership not explained by income (called the Log of Homeownership Residual in Table 4B), the results of our regression are presented in Table 6.<sup>10</sup> All the variables in this regression appear to have coefficient signs that one would expect. The relationship between homeownership rates in 2000 and those of 1990 is positive, and higher general unemployment rates deter home buying. Moreover, the higher the local tax revenues, the higher the homeownership rates according to our analysis, suggesting potential home buyers may be positively influenced by better funded schools and road networks that such generated revenues would presumably offer. However, while a higher percentage of people aged 18 to 25 leads to lower homeownership rates, the effect appears to be statistically insignificant.

Interestingly, while the estimated coefficient on violent and property crime rates is negative as expected, in neither case are they statistically significant.<sup>11</sup> This result, in conjunction with our previous results presented in Tables 3, 4 and 5, suggests that while crime rates are influenced by (lagged) homeownership, the notion that homeownership is influenced by (lagged) crime rates is not strongly supported. There appear to be a number of alternative variables that tend to exert

greater pressure on homeownership than crime rates.<sup>12</sup>

## 6. Conclusion

In this paper we have studied the relationship between both property and violent crimes with specific attention paid to homeownership as a potential deterrent to such activity. Using the latest available county-level survey data in 1990 and 2000, we consistently found that homeownership significantly reduces criminal activity. Indeed, our results suggest that not only do higher homeownership rates lead to lower crime rates in a given time period, but also the rate of increase in criminal activity is significantly slower in areas with higher homeownership rates.

In addition to the many other social benefits associated with homeownership as surveyed by Coulson (2002), this positive external effect of lower crime rates as a direct consequence of homeownership strongly suggests that continued financial support for certain federal, state, and local policy initiatives that foster homeownership is socially desirable. For instance, state governments might well follow Missouri's lead in developing programs like "First Place Home Loans" (Sindt, Nielsen, and Decker, 2004).

Our main finding sheds light on some related research. For example, Cullen and Levitt (1999) found a strong relationship between rising city crime rates and urban flight. They found that households that leave the city because of crime are much more likely to remain within the standard

<sup>10</sup> Similarly, we conducted the same analysis using the log of homeownership and it yields the same conclusion.

<sup>11</sup> This result, in conjunction with the insignificance of the age group 18 to 25, may suggest some multicollinearity between these two variables. However, the correlation between violent (property) crime rates and this age cohort is relatively small (0.06). Moreover, when the age group 18 to 25 is dropped from our equation, the crime rate variables are still insignificant.

<sup>12</sup> Alternatively, these results could be suggesting that potential home buyers do not necessarily investigate crime rate statistics before buying a home.

metropolitan statistical area than those that leave the city for other reasons. They used homeownership as a control variable and found no significant effect on urban flight. Together with our county-level results, this may indicate that those leaving the city are more likely to be renters (not property owners). To know for sure, more research is necessary.

Further research extensions seem warranted along the following lines as well. Additional homeownership observations and/or estimates in the time-series dimension (currently not available at the county level) would facilitate panel data analysis, perhaps providing a more refined cross-country comparison that might be a beneficial robustness check on our results. Finally, it might be useful to investigate different types of homeownership promotion policies to ascertain if such institutional differences matter. We leave these exercises for future research.

## References

- Alba, R., J. Logan, P. Bellair. 1984. "Living with crime: The Implications of Racial/Ethnic Differences in Suburban Location," *Social Forces* 73: 395-434.
- Austin, Mark D., and Yoko Baba. 1990. "Social Determinants of Neighborhood Attachment." *Sociological Spectrum* 10: 59-78.
- Ballester, C., Calvó-Armengol, A. and Y. Zenou. 2006. "Who's Who in Crime Networks. Wanted: The Key Player," *Econometrica* 75: 1403-1418.
- Blum, Terry C., and Paul W. Kingston. 1984. "Homeownership and Social Attachment." *Sociological Perspectives*, 27: 159-80.
- Calvó-Armengol, A. and Y. Zenou. 2004. "Social Networks and Crime Decisions: The Role of Social Structure in Facilitating Delinquent Behavior," *International Economic Review*, 45: 935-954.
- Chiu, W. Henry and Paul Maden. 1998. "Burglary and Income Inequality", *Journal of Public Economics*, 69: 123-141.
- Cohen, Mark. 1988. "Pain, Suffering, and Jury Awards: A study of the Cost of Crime to Victims", *Law & Society Review*, 22: 537-556.
- Cooter, Robert, and Ulen, Thomas. 2000. *Law and Economics*, 3<sup>rd</sup> ed., Addison-Wesley Longman, Inc.
- Coulson, N. Edward. 2002. "Housing Policy and the Social Benefits of Homeownership," *Business Review*, Federal Reserve Bank of Philadelphia, Second Quarter, 7-14.
- Cullen, J. B. and Levitt, S. 1999. "Crime, Urban Flight, and the Consequences for Cities." *Review of Economics and Statistics*, 81: 159-169.
- Decker, Christopher S. 2005. "Do Regulators Respond to Voluntary Pollution Control Efforts? A Count Data Analysis", *Contemporary Economic Policy*, 23: 180-194.
- Dietz RD, Haurin DR. 2003. "The Social and Private Micro-level Consequences of Homeownership", *Journal of Urban Economics* 54: 401-450.
- DiPasquale, Denise, and Edward L. Glaeser. 1999. "Incentives and Social Capital: Are Homeowners Better Citizens?" *Journal of Urban Economics* 45: 354-84.
- Ehrlich, Isaac. 1973. "Participation in Illegitimate Activities: A Theoretical and Empirical Investigation." *Journal of Political Economy*, 81: 521-565.
- Fleisher, Belton. 1966. "The Effect of Income on Delinquency." *American Economic Review*, 56 (1/2): 118-137.
- Freeman, Richard B. 1983. "Crime and Unemployment", in *Crime and Public Policy*, James Q. Wilson (San Francisco: Institute for Contemporary Studies Press).
- Freeman, Richard B. 1999. "The Economics of Crime", *Handbook of Labor Economics*, Vol. 3, Ch. 52 in O. Ashenfelter and D. Card (Eds.), Elsevier Science.
- Freeman, Richard B., and William M. Rodgers, III. 1999. "Area Economic Conditions and the Labor Market Outcomes of Young Men in the 1990s Expansion". *NBER working paper* No. 7073.
- Glaeser, Edward L. and Bruce Sacerdote. 1999. "Why Is There More Crime in Cities?" *Journal of Political Economy*, 107: 225-258.

- Glaeser, E.L. Sacerdote, B. and J. Scheinkman. 1996. "Crime and Social Interactions," *Quarterly Journal of Economics*, 111: 508-548.
- Goetz, Stephan J., Ready, Richard C., and Stone, Brad. 1996. "US Economic Growth vs. Environmental Conditions," *Growth and Change*, 27: 97-110.
- Gould, Eric D., Bruce A. Weinberg and David B. Mustard. 2002. "Crime Rates and Local Labor Market Opportunities in the United States: 1979 - 1997", *The Review of Economics and Statistics*, 84: 45-61.
- Hull, Brooks B. 2000. "Religion Still Matters", *The Journal of Economics*, 26: 35-48.
- Kling, J.R., Ludwig, J. and L.F. Katz 2005, "Neighborhood Effects on Crime for Female and Male Youth: Evidence from a Randomized Housing Voucher Experiment," *Quarterly Journal of Economics*, 120: 87-130.
- Levitt, S.1998. "Juvenile Crime and Punishment," *Journal of Political Economy* 106: 1156-1185
- Ludwig, J., Duncan, G.J. and P. Hirschfield 2001, "Urban Poverty and Juvenile Crime: Evidence from a Randomized Housing-mobility Experiment," *Quarterly Journal of Economics*, 116: 655-679.
- Massey, N. and S. Denton. 1993. *American Apartheid*. Harvard University Press: Cambridge, MA.
- Narayan, Paresh Kumar. 2004. "Crime Rates, Male Youth Unemployment and Real Income in Australia: Evidence from Granger Causality Tests," *Applied Economics*. 36: 2079-96.
- Neumayer, Eric. 2005. "Inequality and Violent Crime: Evidence from Data on Robbery and Violent Theft." *Journal of Peace Research* 1: 101-12.
- Onder, Zeynep. 2002. "Homeownership and FHA: Mortgage Activity in Neighborhoods and Metropolitan Areas," *Journal of Housing Economics* 11: 152-181.
- Papps, Kerry, and Rainer Winkelmann. 2000. "Unemployment and Crime: New Evidence for an Old Question", *University of Canterbury working paper*.
- Quercia, Roberto G., McCarthy, George W., and Wachter, Susan M. 2003. "The Impacts of Affordable Lending Efforts on Homeownership Rates," *Journal of Housing Economics* 12: 29-59.
- Rey, Sergio J. and Montouri, Brett D. 1999. "US Regional Income Convergence: A Spatial Econometric Perspective," *Regional Studies*. 33: 143-156.
- Rossi, Peter H., and Eleanor Weber. 1996. "The Social Benefits of Homeownership: Empirical Evidence from National Surveys." *Housing Policy Debate*, 7: 1-35.
- Sindt, Roger P., Nielsen, Donald A, and Decker, Christopher S. 2004. "Affordable Lending Policies and Other Factors Affecting Homeownership in the Midwest," *Regional Business Review*, 23: 40-51.
- Soares, Rodrigo R. 2004. "Development, Crime and Punishment: Accounting for the International Differences in Crime Rates," *Journal of Development Economics*, 73: 155-184.
- Wooldridge, Jeffrey, *Introductory Econometrics: A Modern Approach*, 3/e, Southwestern, 2006.
- Zhao, Jihong and Quint Thurman. 2003. "Funding Community Policing to Reduce Crime: Have Cops Grants Made a Difference from 1994 to 2000," *Working Paper*, University of Nebraska at Omaha.

**Table 1: Description and Summary of Variables**

Variable	Obs	Mean	Std. Dev.	Min	Max
<b>Crime Data</b>					
Violent Crime Rate (% , county level, 1991)	3082	0.28	0.34	0.00	3.57
Property Crime Rate (% , county level, 1991)	3082	2.59	2.03	0.00	18.74
Violent Crime Rate (% , county level, 1992)	3081	0.30	0.35	0.00	3.41
Property Crime Rate (% , county level, 1992)	3081	2.57	1.93	0.00	16.87
<b>county demographics data (1990)</b>					
Total Population (county level)	3107	80,342	265,962	105	8,878,157
Homeownership Rate	3137	72.49	7.96	0.00	88.30
Personal Income per Capita	3107	15.34	3.58	5.48	50.23
Unemployment Rate	3135	6.13	2.92	0.40	40.80
Population Density	3080	208.56	1,586.00	0.06	64,655.35
Black Population Ratio	3080	8.38	14.22	0.00	86.40
Poverty Rate	3136	16.68	7.95	0.00	63.10
<b>Crime Data</b>					
Violent Crime Rate (% , county level, 2001)	3084	0.26	0.29	0.00	8.07
Property Crime Rate (% , county level, 2001)	3084	2.18	1.60	0.00	13.10
Violent Crime Rate (% , county level, 2002)	3085	0.25	0.26	0.00	2.47
Property Crime Rate (% , county level, 2002)	3085	2.19	1.57	0.00	12.48
<b>county demographics data (2000)</b>					
Total Population (county level)	3110	90,737	294,681	65	9,546,019
Homeownership Rate	3139	73.94	7.81	0.00	89.90
Personal Income per Capita	3110	23.11	5.84	7.46	85.83
Unemployment Rate	3137	4.32	1.70	1.30	17.50
Population Density	3083	227.04	1,669.64	0.04	66,937.30
Black Population Ratio	3081	8.60	14.42	0.00	86.65
Poverty Rate	3139	14.17	6.55	0.00	56.90

**Table 2: Correlation Table (using data both 1990 and 2000)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Violent Crime	1.00							
(2) Property Crime	0.70	1.00						
(3) Homeownership Rate	-0.39	-0.50	1.00					
(4) Personal Income per Capita	0.06	0.12	-0.12	1.00				
(5) Unemployment Rate	0.09	0.04	-0.01	-0.50	1.00			
(6) Population Density	0.27	0.16	-0.34	0.22	-0.01	1.00		
(7) Poverty Rate	0.10	-0.09	-0.11	-0.56	0.53	-0.01	1.00	
(8) Black Population Ratio	0.36	0.17	-0.13	-0.11	0.16	0.09	0.41	1

**Table 3B: Impact of House Ownership on Crime Rates**

	Property Crime		Violent Crime	
	2001	2002	2001	2002
Log of Homeownership Rate (2000)	-1.193 (0.160)***	-1.045 (0.153)***	-0.795 (0.168)***	-0.768 (0.162)***
Log of the Unemployment Rate	0.233 (0.067)***	0.242 (0.063)***	0.187 (0.071)***	0.313 (0.067)***
Log of the Population Density	0.190 (0.014)***	0.183 (0.014)***	0.150 (0.015)***	0.149 (0.015)***
Log of the Personal Income per Capita	10.159 (1.048)***	10.540 (1.024)***	5.819 (1.091)***	6.335 (1.078)***
Log of the Personal Income Square	-1.502 (0.159)***	-1.532 (0.156)***	-0.822 (0.165)***	-0.882 (0.164)***
Log of the Poverty Rate	0.144 (0.061)**	0.219 (0.059)***	0.549 (0.065)***	0.575 (0.063)***
log of the Percentage of Black Population	0.058 (0.011)***	0.059 (0.011)***	0.110 (0.012)***	0.119 (0.012)***
Constant	-12.596 (1.921)***	-14.135 (1.867)***	-9.765 (2.008)***	-11.383 (1.973)***
Observations	2742	2753	2681	2697
R-squared	0.37	0.39	0.48	0.51
F-stat	F( 56, 2685) = 28.60		F( 56, 2696) = 30.70	
Prob > F	0.0000		0.0000	
			F( 56, 2624) = 43.52	
			F( 56, 2640) = 48.97	
			0.0000	
			0.0000	

Standard errors in parentheses; \* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%.

**Table 4A: Impact of House Ownership Residual on Crime**

	Property Crime		Violent Crime	
	1991	1992	1991	1992
Log of HomeOwnership Residual (1990)	-1.253 (0.140)***	-1.516 (0.144)***	-1.041 (0.166)***	-1.127 (0.175)***
Log of the Unemployment Rate	0.320 (0.039)***	0.315 (0.040)***	0.311 (0.048)***	0.191 (0.050)***
Log of the Population Density	0.195 (0.014)***	0.177 (0.014)***	0.161 (0.017)***	0.171 (0.017)***
Log of the Personal Income per Capita	8.568 (0.929)***	8.504 (0.991)***	3.462 (1.113)***	3.810 (1.201)***
Log of the Personal Income Square	-1.383 (0.164)***	-1.359 (0.170)***	-0.422 (0.196)**	-0.511 (0.206)**
Log of the Poverty Rate	-0.004 (0.052)	-0.034 (0.053)	0.393 (0.063)***	0.419 (0.065)***
log of the Percentage of Black Population	0.047 (0.009)***	0.050 (0.009)***	0.127 (0.011)***	0.143 (0.011)***
Constant	-12.529 (1.382)***	-12.436 (1.510)***	-8.786 (1.655)***	-8.737 (1.835)***
Observations	2718	2798	2642	2729
R-squared	0.48	0.47	0.52	0.52
F-stat	43.28	43.02	49.31	50.46
Prob > F	0.0000	0.0000	0.0000	0.0000

Standard errors in parentheses; \* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%.

**Table 4B: Impact of House Ownership Residual on Crime**

	Property Crime		Violent Crime	
	2001	2002	2001	2002
Log of HomeOwnership Residual (2000)	-1.191 (0.159)***	-1.049 (0.153)***	-0.792 (0.168)***	-0.769 (0.162)***
Log of the Unemployment Rate	0.232 (0.067)***	0.241 (0.063)***	0.187 (0.071)***	0.312 (0.067)***
Log of the Population Density	0.190 (0.014)***	0.183 (0.014)***	0.150 (0.015)***	0.149 (0.015)***
Log of the Personal Income per Capita	9.743 (1.047)***	10.155 (1.023)***	5.542 (1.091)***	6.054 (1.077)***
Log of the Personal Income Square	-1.430 (0.159)***	-1.466 (0.155)***	-0.773 (0.165)***	-0.833 (0.163)***
Log of the Poverty Rate	0.143 (0.061)**	0.217 (0.059)***	0.549 (0.065)***	0.574 (0.063)***
log of the Percentage of Black Population	0.058 (0.011)***	0.058 (0.011)***	0.110 (0.012)***	0.119 (0.012)***
Constant	-16.859 (1.802)***	-17.831 (1.753)***	-12.609 (1.880)***	-14.103 (1.850)***
Observations	2742	2753	2681	2697
R-squared	0.37	0.39	0.48	0.51
F-stat	F( 56, 2685) = 28.60	F( 56, 2696) = 30.72	F( 56, 2624) = 43.51	F( 56, 2640) = 48.98
Prob > F	0.0000	0.0000	0.0000	0.0000

Standard errors in parentheses; \* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%.

**Table 5A: Impact of House Ownership on Crime over 10 Years**

	Property Crime		Violent Crime	
	1991-2001	1992-2002	1991-2001	1992-2002
Change of Homeownership Rate (1990-2000)	-1.005 (0.469)**	-1.406 (0.472)***	1.333 (0.554)**	-0.028 (0.562)
Change of Unemployment Rate	0.073 (0.058)	0.060 (0.057)	-0.050 (0.068)	0.028 (0.067)
Change of Personal Income	-0.137 (0.156)	0.222 (0.159)	0.095 (0.189)	0.296 (0.195)
Change of Population Density	0.415 (0.098)***	0.424 (0.098)***	0.477 (0.116)***	0.599 (0.116)***
Change of Poverty Rate	0.140 (0.085)	0.182 (0.082)**	0.764 (0.101)***	0.695 (0.098)***
Change of Black Population Ratio	-0.015 (0.022)	0.005 (0.021)	0.066 (0.026)**	0.056 (0.026)**
Crime 1990	-0.505 (0.017)***	-0.534 (0.016)***	-0.621 (0.017)***	-0.653 (0.016)***
Personal Income per Capita 1990	0.029 (0.111)	0.073 (0.113)	0.424 (0.132)***	0.418 (0.134)***
Homeownership 1990	-0.439 (0.135)***	-0.457 (0.136)***	-0.190 (0.157)	-0.361 (0.158)**
Unemployment Rate 1990	0.074 (0.046)	0.102 (0.045)**	0.047 (0.055)	0.141 (0.054)***
Poverty Rate 1990	0.148 (0.054)***	0.171 (0.054)***	0.588 (0.065)***	0.556 (0.065)***
Population Density 1990	0.053 (0.011)***	0.061 (0.011)***	0.032 (0.013)**	0.044 (0.014)***
Black Population Ratio 1990	0.027 (0.008)***	0.026 (0.008)***	0.057 (0.010)***	0.052 (0.010)***
Constant	1.436 (0.845)*	1.163 (0.855)	-3.181 (0.993)***	-2.667 (1.009)***
Observations	2464	2551	2387	2474
R-squared	0.31	0.33	0.39	0.43
F-stat	84.29	97.24	118.27	141.07
Prob > F	0.0000	0.0000	0.0000	0.0000

Standard errors in parentheses; \* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%.

**Table 5B: Impact of House Ownership on Crime over 10 Years**

	Property Crime		Violent Crime	
	1991-2001	1992-2002	1991-2001	1992-2002
Change of Homeownership Residual Rate (1990-2000)	-1.440 (0.464)***	-1.825 (0.467)***	1.003 (0.550)*	-0.281 (0.557)
Change of Unemployment Rate	0.114 (0.058)*	0.099 (0.057)*	-0.029 (0.069)	0.054 (0.068)
Change of Personal Income	-0.044 (0.157)	0.301 (0.161)*	0.075 (0.191)	0.321 (0.197)
Change of Population Density	0.475 (0.099)***	0.489 (0.099)***	0.500 (0.118)***	0.634 (0.117)***
Change of Poverty Rate	0.146 (0.082)*	0.187 (0.079)**	0.765 (0.098)***	0.710 (0.095)***
Change of Black Population	-0.020 (0.022)	-0.001 (0.021)	0.062 (0.026)**	0.052 (0.026)**
Crime 1990	-0.509 (0.017)***	-0.538 (0.016)***	-0.620 (0.017)***	-0.652 (0.016)***
Personal Income per Capita 1990	0.107 (0.110)	0.179 (0.113)	0.373 (0.130)***	0.455 (0.134)***
Homeownership 1990	0.109 (0.047)**	0.134 (0.046)***	0.065 (0.056)	0.161 (0.055)***
Unemployment Rate 1990	0.108 (0.054)**	0.137 (0.054)**	0.567 (0.064)***	0.543 (0.065)***
Poverty Rate 1990	0.041 (0.012)***	0.049 (0.012)***	0.025 (0.014)*	0.038 (0.014)***
Population Density 1990	-0.724 (0.144)***	-0.709 (0.145)***	-0.329 (0.166)**	-0.469 (0.168)***
Black Population Ratio 1990	0.028 (0.008)***	0.027 (0.008)***	0.057 (0.010)***	0.052 (0.010)***
Constant	-0.584 (0.417)	-1.017 (0.426)**	-3.795 (0.505)***	-4.284 (0.517)***
Observations	2464	2551	2387	2474
R-squared	0.31	0.34	0.39	0.43
F-stat	85.97	98.86	118.35	141.35
Prob > F	0.0000	0.0000	0.0000	0.0000

Standard errors in parentheses; \* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%.

**Table 6: Impact of Criminal activity on the Homeownership residual 2000**

Log of homeownership in 1999	0.8567 *** (0.0190)	0.8554 *** (0.0191)
Log of percent of population aged 18 to 25	-0.0008 (0.0024)	-0.0008 (0.0024)
Log of the average unemployment rate 1990 to 2000	-0.0336 *** (0.0031)	-0.0338 *** (0.0031)
Log of percent of property tax revenue	0.0060 *** (0.0016)	0.0060 *** (0.0015)
Log of violent crime per capita in 1999	-0.0007 (0.0008)	----- -----
Log of property crime per capita in 1999	----- -----	-0.0013 (0.0009)
Constant	0.3109 *** (0.0140)	0.3080 *** (0.0140)
R-squared	0.8963	0.8964
F-stat	483.7300	483.2900 ***
Prob. > F	0.0000	0.0000

Standard errors in parentheses, \* significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%  
 Note: estimated using White's Heteroskedasticity-Consistent Standard Errors & Covariance

## Appendix

To obtain our measure of homeownership not explained by income, we reviewed both the existing literature and, in deference to that literature as well as our one analysis of our data, experimented with a few specifications. We ultimately estimated the following specification using both our 1990 and 2000 data:

$$\ln(\text{Homeownership}_i) = \alpha + \beta_1 \ln(\text{INC}_i) + \beta_2 (\ln(\text{INC}_i))^2, \quad (\text{A1})$$

where INC is per capital personal income. The results of this estimation are as follows (note that standard errors are reported in parenthesis):

$$\ln(\text{Homeownership}_i) = \underset{(1.34)}{-30.77} + \underset{(.90)}{15.44} * \ln(\text{INC}_i) - \underset{(.15)}{1.59} * (\ln(\text{INC}_i))^2 \quad (\text{A2})$$

$N = 6163; \text{Adj } R^2 = 0.54$

These results indicate that homeownership is increasing in per capita income but at a decreasing rate. From these specifications we extract the resulting residuals and employ them when estimating equation (1).