

**EVALUATING THE IMPACT OF AMENITIES ON COUNTY CRIME RATES**

A Thesis  
submitted to the  
Graduate School of Arts & Sciences  
at Georgetown University  
in partial fulfillment of the requirements for the  
degree of  
Master of Public Policy

By

Naoya Oyaizu, LL.B.

Washington, DC

April 18, 2006

# EVALUATING THE IMPACT OF AMENITIES ON COUNTY CRIME RATES

Naoya Oyaizu, LL.B.

Thesis Advisor: Gregory Acs, Ph.D.

## ABSTRACT

This study assesses the effects of a set of amenities on a county crime rates. It demonstrates that higher county-level crime rates are correlated with certain county-level characteristics: parking lots, hospitals and day care centers, lower population density, lower median household income, the share of population that is black and the share of population under 20. The model indicates that an absence of natural surveillance, low income level, and the share of younger people are strong predictors of crime. This suggests that, Crime Prevention Through Environmental Design (CPTED) in the form of increased low cost natural surveillance in lower income neighborhoods with high concentrations of young people may be particularly effective in reducing crimes.

The research and writing of this thesis  
is dedicated to everyone who helped along the way.

Many thanks,  
Naoya Oyaizu

## TABLE OF CONTENTS

Chapter 1. Introduction.....	1
Chapter 2. Literature Review.....	4
Chapter 3. Methodology.....	9
Chapter 4. Modeling Strategy.....	13
Chapter 5. Descriptive Analysis.....	23
Chapter 6. Regression Results and Statistical Analysis.....	26
Chapter 7. Limitations of the Model.....	33
Chapter 8. Policy Implications.....	35
Chapter 9. Conclusion.....	38
References.....	40

## LIST OF TABLES

Table 1:	The four models to be tested in this study.....	22
Table 2:	Descriptive table.....	24
Table 3:	Mean values for each crime rate interval.....	25
Table 4:	Regression models: The effect of amenities and demographic measures on crime rates .....	27

## **Chapter 1. Introduction**

The direct cost of crime in the United States is estimated at approximately \$200 billion per year (Miller *et al.*, 1993). The indirect costs of crime are also substantial; government outlays on the criminal justice system totaled \$74 billion in 1990, including \$32 billion on police protection (Levitt, 1997). Different initiatives have been developed to combat crime. One of these has focused on the physical environment of neighborhoods. We know that numerous features of the physical environment, including those investigated as part of situational crime prevention are linked to crime and crime changes (Clarke and Cornish, 1985).

There is a widely held belief that improving the community environment will reduce crime. The “broken windows” theory (Wilson and Kelling, 1982) states that deterring petty crime and low-level anti-social behavior is an effective way to prevent major crime. Community development projects all over the country include plans to build new libraries or theaters. As well as enhancing culture, this type of programs is expected to reduce crime by spurring development and increasing respect for law in neighborhoods. The “broken windows” theory’s claim that further

low-level anti-social behaviors and major crimes will be deterred by improving the community environment support another crime prevention theory focusing on environment. Crime Prevention Through Environmental Design (CPTED) holds that promoting the proper design and effective use of the construction environment that can lead to a reduction in the fear and incidence of crime and an improvement in the quality of life. CPTED approaches include:

- architectural design of buildings;
- planning of the physical environment in parks and other public spaces;
- design of streets and neighborhoods;
- lighting techniques used in buildings and on streets;
- use of various formal methods of surveillance (cameras, security patrols, etc.) and informal surveillance (*e.g.*, placement of windows, removal of visual obstacles);
- creation of community crime prevention programs involving coordination between law enforcement authorities, neighborhood organizations, and individual property owners.

However, no statistical evidence has yet been found to support the hypothesis that cultural amenities reduce crime. Previous studies conclude that some characteristics of neighborhoods affect local crime rates (Cullen and Levitt, 1996). Demographic factors, such as population size and income level, have been the main characteristics of community in these studies, suggesting that higher economic status will reduce crime. But amenities in communities—e.g., retail stores, restaurants, bars or theaters—are not included in these models. Rather, they are treated as given factors which will not affect crime.

In contrast to earlier studies, this study maintains that the presence of amenities is correlated with crime rates. It examines the effects of a set of amenities, measured by certain types of businesses in a county, on county crime rates. The analysis takes into account differences in total population, population density, the poverty rate, the median household income, the share of population that is black, Hispanic, or other, and the share of population under 20 and over 65. It finds that an absence of natural surveillance, low income level, and the share of younger people are strong predictors of crime.

## **Chapter 2. Literature Review**

Amenities in towns are sometimes employed to explain urban development and population growth. In most prior studies, however, amenities often mean only “pure” public goods, like clean air and convention centers. Pure public goods are jointly shared, and potentially consumed by all for free because excluding people from them is costly. In addition, Clark (2003) defines “semi” private goods as amenities which may exclude persons by charging fees but which produce general benefits not just to paying users but to the entire community. He argues for example that restaurants can affect population because they are more than food on the plate for persons pondering where to live and work. He says the presence of distinct restaurants redefines the local neighborhood context, even for persons who do not eat in those restaurants.

Some previous studies discuss the relationships between crime rates and distinct social and physical characteristics of the city. Roncek (1981) investigates how the characteristics of residential areas in the city affect where crimes occur. With data for Cleveland and San Diego, his study shows that the concentration of former victims of abuse, the population of the block, and the concentration of

apartment housing have strong relations with higher crime rates, while population density is associated with lower crime rates. Roncek and Francik (1981) find that public housing projects in Cleveland are associated with a small but significant increase in crime.

Sherman *et al.* (1996) find that the effectiveness of Department of Justice funding depends heavily on whether it is directed to the urban neighborhoods where youth violence is highly concentrated. They argue that substantial reductions in national rates of serious crime can only be achieved by prevention in areas of concentrated poverty, where the majority of all homicides in the nation occur, and where homicide rates are 20 times the national average.

Cullen and Levitt (1996) conclude that rising crime rates in cities are correlated with city depopulation. Their analysis, using annual city-level panel data, suggests that each additional crime is associated with a one person decline in city population. In addition, they explain that mobility decisions of higher income people are more responsive than ones of lower income people to changes in crime. Rich people moving decreases demand for housing, causing declines in property values. This

increases fiscal stress on local governments.

Raphael and Winter-Ebmer (2001) find the unemployment rate is associated with higher property crime rates. Their estimates suggest that a substantial portion of the decline in property crime rates during the 1990s is attributable to the decline in the unemployment rate. The evidence for violent crime is considerably weaker. They note, however, that a closer analysis of the violent crime of rape yields some evidence that the employment prospects of males are weakly related to state rape rates.

Gould *et al.* (1998) examine the relationship between crime and labor market conditions using wages as the measure of conditions. Their results indicate that economic conditions are important determinants of crime. In their model, wage declines are associated with an increase in burglary, larceny, aggravated assault and robbery.

Crime is often situational and often is determined by the available opportunities at a particular place and time. Cohen and Felson (1979) state that all crimes have three elements in common: a likely offender, a suitable target, and the

absence of a capable guardian against crime. They consider how everyday life assembles these three elements in space and time. From this viewpoint, Felson (1987) aggregates crime frequency in Illinois by type of location, and finds very few property crimes are linked to retail stores' premises. He concludes that a street with a retail facility has a distinct crime prevention advantage over the average street: people are attracted to facilities, and that means natural surveillance keeping potential offenders from actually committing crimes. Felson also introduces several ideas and experiences in crime prevention planning: segregating schools from self-service stores; locating a youth hangout within view of an all-night taxi stand; letting the recreation center caretaker live on the premises; building crime-impact planning into early stages of building design; in a high-rise building for the elderly, placing the recreation room on the first floor with direct view of the doors; regulating flows of adolescents by placement of fast food establishments and electronic arcades.

CPTED is an approach to prevent crimes by deterrence. McCamley (2001) notes that natural surveillance can be achieved by creating effective sightlines

between public and private space; strategically positioning buildings, access ways and meeting places; matching lighting types with crime risk; and using attractive landscaping. Clark (1989) says that nature of crime is situational, and introduces the concept of CPTED, based on natural surveillance to address the problem. He concludes building design techniques including access control, target hardening, natural surveillance, defensible space are important.

As this review indicates, previous literature focusing on amenities finds a correlation between amenities and the attraction of people. Other studies examine an association between population and crime rate. Some studies introduce several examples of crime prevention planning or CPTED. But no previous study has included statistical analysis about the effect of amenities on crime rates. The basic concern underlying this research is the effect of amenities—e.g., restaurants, bars, parking lots—on crime rates. In addition to examining the statistical relationship between amenities and crime, this study also includes demographic factors in the model to take their effect on crime into account. This modeling strategy will minimize the omitted variable bias in the estimated effect of amenities on crime.

## Chapter 3. Methodology

### Conjectures about what affects the crime rate

The goal of this research is to determine what sort of amenities would affect the crime situation in a given area. Before testing the effects of amenities statistically, the study considers three ways that they work.

One way is, by bringing people together, to increase crime. If there is nobody in a given place, there cannot be any crimes against people there. Conversely, when people gather, they can be targeted by offenders.

Alternatively, people gathered by attracting amenities might reduce crime. Donnelly and Kimble (1997), studying the Five Oaks neighborhood of Dayton, Ohio, find that after changes were implemented in the layout of the streets to increase natural surveillance, violent crimes decreased by 40%, nonviolent offences decreased by 24%, and acts of vandalism declined by 21%. Donnelly and Kimble examine potential offenders' perceptions and evaluations of the risk of being observed, and note the effect of natural surveillance of people on crime.

Third and final conjecture is, certain kinds of amenities, especially cultural and

academic ones are particularly effective in reducing crime because they attract people for cultural or academic purposes, and not for reasons associated directly with committing crimes.

However, it is not yet clear which one of these possible conjectures is dominant in explaining how amenities affect crimes.

#### Units of analysis and study time periods

This study takes as its units of analysis 192 counties (or county equivalents) with more than 300,000 in population in the United States in 2002.

Some people might argue that counties are too big for this analysis as amenities located at one end of a county may not affect crime at the other end. Yet, counties are still good areas to analyze. Counties are areas in which people live their daily lives. Additionally, smaller areas are too small to benefit fully from the effect of area culture on the crime rate. Finally, crime statistics are only available at the county level.

In addition, some might argue that county population size varies so widely that the differences in size may bias statistical estimations. The most populous county is

Los Angeles County, California with 9,763,844 people as of 2002, and the least populous county is Loving County, Texas with 66 people as of 2002. To find clear relations between characteristics of an area and crime, I analyze only counties with more than 300,000 in population. Additionally, since Los Angeles County and Cook County, Illinois with 5,364,160 people have especially large total populations, this study analyzes the correlation with and without these two counties. Finally, because the most recent reliable crime statistics aggregated to county level are for 2002, this paper focuses on statistics as of 2002.

### Data

This study tests the effects of area characteristics on crime occurrence, using data from three sources.

#### (A) Crime data

Crime statistics, an outcome of the model in this study, are obtained and aggregated to county level by the Geospatial and Statistical Data Center, University of Virginia Library. These data are originally collected by the Federal Bureau of Investigation as the Uniform Crime Reports (UCR). The UCR Program is a

voluntary city, county, state, tribal and federal law enforcement program that provides a nationwide view of crime based on the submission of statistics by law enforcement agencies throughout the country. This paper focuses on Modified Index Crime (MIC). The term MIC refers to the sum of reported incidents of homicide, rape, robbery, aggravated assault, burglary, auto theft, larceny and arson.

(B) Amenity measures

The core data in this study are a set of county amenities as measured by the types of business present in the county. These data are published in County Business Patterns (CBP) by the U.S. Census Bureau. CBP is an annual series that provides economic data by industry.

(C) Demographic measures

This study controls for factors shown to influence crime rates by including demographic measures in the model. Demographic statistics available at the county level from the Census Bureau include: the population, the density of population, the poverty rate, and the race and age distribution of population.

## Chapter 4. Modeling Strategy

This study includes crime, amenity, and demographic variables in the following final model:

$$\begin{aligned} \text{Crime rate} = & \beta_0 + \beta_1*(retails) + \beta_2*(amusements) + \beta_3*(accommodations) \\ & + \beta_4*(restaurants) + \beta_5*(bars) + \beta_6*(parking lots) + \beta_7*(hospitals and day care \\ & centers) + \beta_8*(elementary schools) + \beta_9*(colleges) + \beta_{10}*(theaters) + \beta_{11}*(religious \\ & organizations) + \beta_{12}*(population) + \beta_{13}*(population density) + \beta_{14}*(poverty rate) \\ & + \beta_{15}*(income) + \beta_{16}*(unemployment rate) + \beta_{17}*(black) + \beta_{18}*(Hispanic) \\ & + \beta_{19}*(other) + \beta_{20}*(under 20) + \beta_{21}*(over 65) + u \end{aligned}$$

The model is estimated using OLS.

### Dependent Variable

The dependent variable in this study is county crime rate *-i.e.*, the number of MIC incidents reported to the county police divided by the county's population.

### (A) Why Modified Index Crime?

Crime can be classified in many ways. However, in this study the dependent variable is all MIC incidents reported. Felson (1987) states that all types of crimes are alike in that certain minimal elements (*i.e.*, a likely offender, a suitable target, and the absence of effective deterrence) converge in space and time. Based on

Felson's argument, the effect of amenities for crime prevention would be the same regardless of type of crime. Hence, this study does not distinguish among types of crimes but focuses on MIC as the dependent variable. Additionally, as people commit and are victimized in crime incidents, the number of incidents is surely dependent on population. Therefore, this study calculates "crime rate" as MIC divided by population.

(B) Why reported incidents?

Additionally, this study counts a crime as an incident reported to the police rather than either calls for police service or arrest statistics. Reported crime data are potentially stronger than calls for service data because reported crimes do not completely rely on citizen complaints for action and unlike arrest data they do not require suspect apprehension (Morrow and Hutton, 2000). Some studies (*e.g.*, Quinet and Nunn, 1998) have touted the benefits of calls for service data in studies associated with public safety initiatives, the logic being that calls for service data offer a reasonable and effective measure of citizen's demand for police assistance. However, they do not measure actual crimes, but rather the effect of police

deployment. Arrest data are the end result of a process involving a call for service, an incident form being reported and completed, and then the final apprehension of a suspect by the police. Since arrest data are strongly influenced by police performance in that area rather than community's safety itself, such data cannot be employed to measure the effect of area's characteristics on crime.

### Independent Variables

This study uses two types of independent variables: amenity measures and demographic measures.

#### (A) Amenity measures

County Business Patterns covers most of the country's economic activity. Though CBP includes numbers of both employees and establishments by county, this study uses just the number of total establishments per capita in order to explore the characteristics of the neighborhood. This study also categorizes amenities into two groups, "Attractor amenities" and "Good community amenities" depending on what effect amenities are expected to have on crime rates.

I add the numbers of each amenity and divide them by the total population in the

county. Thus, amenities per capita is the study's measure of amenities.

i) List of "Attractor amenities"

"Attractor amenities" include amenities which are expected to attract people to the area. These are:

- **Retails, rentals, and services**, including all kinds of retail stores and rental stores, as well as service business such as barber shops and beauty salons.
- **Amusements**, including gambling facilities, amusement parks, and arcades.
- **Accommodations**, including all sorts of hotels except casino hotels.
- **Restaurants**, including food services which customers visit. Caterers and drinking places are excluded.
- **Bars** refer to drinking places which serve alcoholic beverages. Beer, wine and liquor stores are not in this category, but in "Retails, rentals, and Service"
- **Parking**, including parking lots and garages.

ii) List of "Good community amenities"

"Good community amenities" include amenities that are expected to contribute

to a quiet and cultured local environment.

- **Hospitals and day care centers**, including offices of doctors and dentists, medical centers, blood and organ banks, hospitals, nursing care facilities, child and youth services, and other social services.
- **Elementary schools, junior colleges and other schools**, including all sorts of education facilities except colleges and universities.
- **College and universities** which constitute a different category than other schools because they are institutions of higher education and of research, which might influence the academic or cultural level of neighborhood.
- **Theaters, museums and sports facilities**, including facilities for the performing arts, spectator sports, museums, and historical sites and zoos.
- **Religious organizations**, including all sorts of religious organizations.

iii) Why these amenities, why not other amenities?

Many factors determine the physical environment in a neighborhood. But the main concern in this study is not to build a bigger or more comprehensive model, but to explore new variables, especially amenities, and how they affect crime

statistics. Hence, the amenities to be added are selected based on ideas below.

- This study includes in the definition of amenities only facilities where customers actually gather to have a service. Hence, retail and rental stores, and certain sorts of services such as barbers, restaurants, bars, and theaters are included in the statistical analysis, while facilities in industries such as mining, utilities, construction, manufacturing, wholesale trade, transportation and information are excluded. Facilities in the latter group usually have fewer people around, who might commit crimes, be the targets of crime, or act as natural surveillance to deter potential crime.
- Even among amenities that have customers coming there, this study considers only amenities where the general public gathers in everyday life to get a good or service or window shop, such as retail or rental stores, or amenities which have people around, such as hospitals, social services or accommodations. On the other hand, amenities which provide goods and services that most people do not need in daily life are not included (*e.g.*, funeral homes, real estate brokers, law offices, tax offices, or graphic design

offices).

- Some amenities are expected to have special effect on crime rates. For example, bars might increase fighting incidents. Parking lots might provide opportunities for car theft or rape.
- Amenities which are believed to improve the cultural level of neighborhoods are aggregated into one category of theater, museum and sports. Colleges and universities are combined based on the same idea. This is to test the hypothesis that a higher cultural or academic level in an area is associated with a lower crime rate.
- Some establishments counted as amenities are actually headquarters rather than field operations. Headquarters' operations may not marshal as many people in the place as field operations do. However, the CBP does not distinguish between these two kinds of establishments, and throughout this study, headquarters operations are included in the amenities totals. As a result, totals are slightly overstated.
- Wide variations in each of the amenity variables in regard to quality,

character, size or attraction of people, could influence overall effects on crime. However, I believe this data and my aggregations are the best available way to measure physical environment. Again, the main concern here is not to build a bigger or more comprehensive model, but to explore new variables, especially amenities, and how they affect crime statistics.

#### (B) Demographic measures

Demographic measures of a county are factored into this analysis because the characteristics of people in a community influence the crime rate. Kasarda and Janowitz (1974) assert that community characteristics such as economic disadvantage and isolation, ethnic heterogeneity, mobility, and family disruption can increase crimes by impeding the development and maintenance of a shared and articulated system of norms. Demographic variables in the model are:

- **The total Population**, the population measures the number of people in a county who could be offenders, targets, or natural surveillants over potential crime.
- **The population density** (*i.e.*, number of people in county per square mile.),

the population density is important because the closer people are, the more likely they are to come into conflict and more able they are to surveil others.

- **The poverty rate** (*i.e.*, percent of families below the poverty level)
- **The median household income**
- **The unemployment rate**
- **The share of population that is black , Hispanic, or other minority**
- **The share of population under 20 and 65 and more**, the share of population under 20 and over 65 is included in the model because crime is mostly committed by young people. However older people tend to be the section of the population most concerned about crime and most insistent on more law and order.

#### Four models to be tested

To estimate the effects of each of the attractor amenities and community amenities as well as of all amenities together, this study tests four models with certain categories of independent variables for each. Model I includes only attractor amenities. Model II includes only good community amenities. Model III includes

attractor amenities and good community amenities. And Model IV includes attractor amenities, good community amenities, and demographic measures.

**Table 1: The four models to be tested in this study**

Categories of Independent Variables	Models (dependent variable: Crime rate)			
	I	II	III	IV
Attractor Amenities	✓		✓	✓
Good Community Amenities		✓	✓	✓
Demographic Measures				✓

## Chapter 5. Descriptive Analysis

Summary statistics for the data are presented in Table 2. All the equations are estimated using 2002 data for 192 U.S. counties with populations greater than 300,000.

Table 2 shows mean values and standard deviations for the dependent variable and each independent variable for the 192 U.S. counties. For example, the mean numbers of facilities are 433.074 for retail stores, 5.22 for parking lots, and 253.55 for hospitals and day care centers, per 100,000 people respectively. The mean population is 835,256 and the average population density is 2,513 per square mile.

In Table 3, the 192 U.S. counties are divided into four groups of 48 counties each, depending on their crime rates (*i.e.*, highest to lowest), to compare the mean values of each independent variable. The ANOVA test which compares means by splitting the overall observed variance into different parts shows that there is a statistically significant difference between the mean values of the crime rates for each of the four groups of counties. Interestingly, the group of counties with the highest crime rate has the greatest mean number per population of 100,000 for all the amenities with the exception of Amusements. As for demographic measures, the

poverty rate is highest in the group with the highest crime rates, and median household income is highest in the group with the lowest crime rates.

**Table 2: Descriptive table**

Category	Variable Name	Mean	Std. Dev.
Dependent Variable	Crime rate (%)	4.437	2.036
Independent Variables ("Attractor amenities" per 100,000 people)	Retails, rentals, and services	433.074	96.127
	Amusements	1.520	1.540
	Accommodations	14.831	8.433
	Restaurants	148.788	36.693
	Bars	17.207	10.403
	Parking	5.220	9.008
Independent Variables ("Good community amenities" per 100,000 people)	Hospitals and day care centers	253.550	62.077
	Elementary schools and other schools	7.595	3.206
	Colleges, universities and junior colleges	1.702	1.074
	Theaters, museums and sports facilities	1.285	1.973
	Religious organizations	96.370	47.586
Independent Variables (Demographic measures)	Population (in 1000s)	835.256	914.398
	Population density (1000s/sq.mi.)	2.513	6.566
	Poverty rate (%)	10.763	5.006
	Median household income (\$1000s)	47.462	11.476
	Unemployment rate (%)	5.819	1.450
	The share of population that is black (%)	13.982	13.767
	The share of population that is other (%)	4.876	6.053
	The share of population that is Hispanic (%)	13.409	15.131
	The share of population under 20 (%)	27.700	4.718
The share of population 65 and more (%)	11.618	3.575	

Sample size =192. New York City is divided into five counties, Bronx County, Kings County, New York County, Queens County, and Richmond County. Lake County, Illinois is omitted from sample because it failed to report its crime statistics.

**Table3: Mean values for each crime rate interval**

		I (48 counties with highest crime rates)	II (48 counties with second highest crime rates)	III (48 counties with third highest crime rates)	IV (48 counties with lowest crime rates)
Category	Variable Name	Mean number per population of 100,000			
Dependent Variable	Crime rate (%)	7.12	4.94	3.60	2.09
Independent Variables ("Attractor amenities" per 100,000 people)	Retails, rentals, and services	446.17	436.16	427.94	422.02
	Amusements	1.62	2.10	1.16	1.20
	Accommodations	18.50	15.97	13.01	11.84
	Restaurants	161.61	147.41	146.01	140.12
	Bars	19.35	19.31	16.67	13.50
	Parking	10.68	4.21	4.55	1.44
Independent Variables ("Good community amenities" per 100,000 people)	Hospitals and day care centers	268.32	253.60	248.21	244.08
	Elementary schools and other schools	8.49	7.22	7.42	7.25
	Colleges, universities and junior colleges	2.20	1.71	1.42	1.48
	Theaters, museums and sports facilities	1.51	1.32	1.47	0.85
	Religious organizations	119.49	97.08	89.71	79.21
Independent Variables (Demographic measures)	Population (in 1000s)	868.09	677.36	1022.70	772.88
	Population density (1000s/sq.mi.)	1.82	1.57	4.66	2.00
	Poverty rate (%)	14.24	12.01	10.15	6.65
	Median household income (1000 dollar)	40.29	43.52	48.93	57.10
	Unemployment rate (%)	6.21	6.02	5.84	5.21
	The share of population that is black (%)	23.24	14.50	11.63	6.56
	The share of population that is other (%)	4.52	4.62	5.18	5.18
	The share of population that is Hispanic (%)	16.09	14.47	13.23	9.83
	The share of population under 20 (%)	28.82	28.05	28.23	25.70
The share of population 65 and more (%)	10.98	12.60	11.30	11.59	

## Chapter 6. Regression Results and Statistical Analysis

I estimate a variety of statistical models to try to answer the question: Is the presence of amenities correlated with neighborhood crime rates?

### Model I

I begin my analysis by specifying a simple reduced-form relationship between attractor amenities and crime rates.

Among the six variables in model, accommodations, bars, and parking lots are significantly associated with higher crime rates, whereas restaurants are associated with lower crime rates. Magnitudes in percentage-point change in crime rates are 0.075 for accommodations, 0.027 for bars, and 0.113 for parking lots for each additional unit of amenities per population of 100,000. One more restaurant per population of 100,000 is associated with a 0.019 percentage-point decrease in the crime rate.

Accommodations are related to higher crime rates because they bring visitors who can be victimized to an area. Restaurants bring people who tend to go out as families compared to people in bars who would be younger and with more energy.

Table 4: Regression models: The effect of amenities and demographic measures on crime rates

		Models (dependent variable: Crime rate)			
		I	II	III	IV
Independent Variables ("Attractor variables" per 100,000 people)	Retails, rentals, and services	0.002 (0.002)	-	0.003 (0003)	-0.002 (0.002)
	Amusements	0.093 (0.090)	-	0.114 (0.089)	0.046 (0.063)
	Accommodations	0.075 (0.018)***	-	0.067 (0.018)***	0.010 (0.014)
	Restaurants	-0.019 (0.007)**	-	-0.015 (0.008)*	0.010 (0.007)
	Bars	0.027 (0.014)*	-	0.022 (0.014)	-0.015 (0.011)
	Parkings	0.113 (0.021)***	-	0.135 (0.031)***	0.057 (0.025)**
	Independent Variables ("Good community variables" per 100,000 people)	Hospitals and day care centers	-	-0.001 (0.003)	0.001 (0.004)
Elementary schools and other schools		-	-0.014 (0.058)	-0.026 (0.055)	-0.014 (0.40)
Colleges, universities and junior colleges		-	0.461 (0.200)**	0.154 (0.202)	0.011 (0.145)
Theaters, museums and sports facilities		-	-0.152 (0.084)*	-0.314 (0.096)***	0.085 (0.086)
Religious organizations		-	0.013 (0.004)***	0.001 (0.005)	-0.004 (0.004)
Independent Variables (Demographic measures)	Population (in 1000s)	-	-	-	-0.000 (0.000)
	Population density (1000s/sq.mi.)	-	-	-	-0.106 (0.022)***
	Poverty rate (%)	-	-	-	-0.018 (0.062)
	Median household income (\$1000s)	-	-	-	-0.110 (0.020)***
	Unemployment rate (%)	-	-	-	-0.046 (0.092)
	The share of population that is black (%)	-	-	-	0.048 (0.010)***
	The share of population that is other (%)	-	-	-	0.044 (0.019)**
	The share of population that is Hispanic (%)	-	-	-	-0.007 (0.011)
	The share of population under 20 (%)	-	-	-	0.142 (0.032)***
The share of population 65 and more (%)	-	-	-	-0.055 (0.035)	
R-squared		0.2860	0.1740	0.3340	0.6969

Standard errors in parentheses

\*significant at 1%, \*\*significant at 5%, \*\*\*significant at 10%

The regression without two largest counties in population, Los Angeles County, California and Cook County, Illinois, does not show results with notable differences from the analysis with all original 192 counties.

One would expect that people living in households who go to restaurants for family dinners would not commit crimes. Conversely, one would expect people who like to

drink and go to bars to be more likely to commit crimes or be the victims of crimes.

The regression model supports these expectations, with a statistically significant correlation of restaurants with lower crime rates, and a correlation of bars with higher crime rates. The presence of parking lots is also related to a higher crime rate. This may be because parking lots are not an amenity where people gather to stay, and there is no natural surveillance to stop potential offenders. Findings of all from models estimated in this study are included in Table 4.

### Model II

The second analysis, using a simple model, attempts to determine the effect of good community amenities on crime rates.

Among good community amenities which are expected to reduce crime, colleges and religious organizations are associated with higher crime rates. On the other hand, theaters, museums and sports facilities are associated with lower crime rates. Percentage point changes in crime rates are 0.461 for colleges, -0.152 for theaters, and 0.013 for religious organizations for each additional unit of amenities per population of 100,000.

Colleges' associations with higher crime rates can be explained by the fact that, in general, younger people are more likely than older people to be involved in criminal activities. One reason for the associations between theaters and lower crime rates may be that theaters attract people who are wealthy enough to spend money on the arts and unlikely to commit MIC-type crimes. Although wealthier people can be targeted by offenders, it is dominant to effect crime rates that they are not likely to commit crimes, at least for economic need. The presence of religious organizations is also correlated with higher crime rates. Though it is hard to understand why they would increase the crime rates directly, many religious organizations are located in relatively poorer areas, and this may result in their association with higher crime rates.

### Model III

The third regression seeks to answer the question of whether the entire set of amenities in this model, including both attractor amenities and good community amenities, has any affect on crime rates.

With the exception of the presence of bars, which turn out not to be significantly

related to crime rates, all the statistically significant relations of attractor amenities in Model I remain in Model III. On the other hand, all the good community amenities which are significantly associated with crime rates in Model II, except theaters, are not significantly related to crime rates in this model. However, theaters have a greater effect in this model than in Model II.

#### Model IV

The fourth model introduces demographic variables into the regression analysis. In order to isolate the correlation of amenities and neighborhood crime, this model includes demographic variables, which is an approach that earlier studies do not employ.

##### (A) Attractor amenities

In Model IV, among attractor amenities, only parking lots have a significant association with crime rates. On the other hand, accommodations and restaurants, which are significantly associated with crime rate in Model III, turn out not to have a significant effect.

Parking lots are associated with higher crime rates, and they are the only

attractor amenity variable which remains significantly related to crime rates throughout all models. Although the association has a smaller value (0.057) in this final model than in two of the previous models, Model I and III, the value still remains greater than zero. This result demonstrates that parking lots are associated with criminal behavior. While parking lots provide a great service by allowing everybody access to retail and office centers, they also create a substantial risk of crime.

(B) Good community amenities

“Hospitals and day care centers” are the only good community amenity variable with a statistically significant effect on crime. On the other hand, the effects of other good community amenities, including theaters which have some effect in the previous two models, are not statistically different from zero.

“Hospitals and day care centers” are associated with higher crime rates, which increase by 0.007 percentage points for each additional unit of “Hospitals and day care centers” per population of 100,000. Just as religious organizations in Model II, this result might occur because some hospitals are located in poorer areas.

Good community amenities are expected to create quiet and cultured local areas. Community development projects all over the country include plans to build new libraries or theaters. However, the present analysis yields no statistical evidence to support the hypothesis that cultural amenities reduce crime.

(C) Demographic measures

Population density is associated with lower crime rates (-0.106). This result suggests that gathered people might reduce crime through the effect of natural surveillance, which, based on Donnelly and Kimble (1997), is one of the conjectures this study makes in its “Methodology” section. This result is consistent with the conclusion of Roncek (1981) that population density is associated with lower crime rates. Higher median household income is also correlated with lower crime rates. This result is expected since economic need is one of the major reasons to commit crimes. The share of population under 20 is also associated with higher crime rates, a result that is consistent with the idea that younger people who are less socialized and more energetic increase crime. This finding is consistent with the correlation in Model II between colleges and higher crime rates.

## **Chapter 7. Limitations of the Model**

The statistical model in this study contains some limitations:

### **(A) Size of unit of analysis**

Crimes occur in a very small area, usually a street corner, address, building, or street segment. Individual criminal offenders might be under the influence of factors on a street or block, rather than the characteristics of the county as a whole. Counties might be too big for this analysis. However, this study focuses on counties in order to investigate correlations between neighborhood characteristics and crime rates.

### **(B) Endogeneity**

The statistical result shows that hospitals and day care centers are associated with higher crime rates. Yet this does not mean that hospitals and day care centers cause crimes. Rather, it may reflect the fact that facilities engaged in charity activities are located in poor area. On the other hand, business owner may well be reluctant to locate in the middle of a high crime area. Thus, there is endogeneity: the level of crime may affect the number of amenities in an area. This paper does not try to remedy this problem the correlation highlighted in

this model between crime and amenities should not be viewed as causal.

## Chapter 8. Policy Implications

Statistical results in this study indicate that natural surveillance, income level, and the share of younger people are stronger predictors of crime rates than the presence of amenities. This suggests that, CPTED in the form of increased low-cost natural surveillance in lower income neighborhoods with high concentrations of young people may be particularly effective at reducing crimes.

### Effectiveness of Natural Surveillance

The significant explanatory power of two independent variables, parking lots and the population density indicates that natural surveillance works effectively in preventing crimes. People passing by prevent crime, even without noticing. This supports the second conjecture I offer at the beginning of this study (*i.e.*, that people attracted by amenities may reduce crime).

These results support CPTED strategies focused on the ability to influence offender decisions preceding criminal acts. Seeking the proper design of property to increase natural surveillance (*i.e.*, architectural design of buildings, planning of the physical environment in parks and other public spaces, design of streets and

neighborhoods) would lower crime rates.

### CPTED for Areas with Poor and Young People

This study indicates that efforts to design property to facilitate natural surveillance should be concentrated in neighborhoods with lower income people and a higher share of young people.

However, as poor neighborhoods with high concentration of young people usually have only weak tax-bases, they might not be able to afford high-priced methods of surveillance (*i.e.*, cameras, appropriate lighting for streets). Hence, less costly CPTED methods should be applied in these neighborhoods. These include:

- Removing visual obstacles, trimming trees and bushes to keep a long distance view on streets that helps pedestrians orient themselves.
- Putting in benches to keep a place public and encourage people to gather.
- Cleaning off windows and eliminating posters and other obstructions, fixing locks, removing doors, and replacing light bulbs in public or private buildings.
- Creating community-based patrol programs for crime prevention involving

coordination between law enforcement authorities, neighborhood organizations, and individual property owners.

## **Chapter 9. Conclusion**

There is a widely held belief that improving the community environment will decrease crime rates. Cultural amenities such as libraries, museums or theaters are expected to reduce crime by spurring development in neighborhoods. However, no statistical evidence has yet been found that indicates what kinds of neighborhood amenities affect local crime rates. Previous studies about relations between neighborhood characteristics and crime rates focus on demographic factors such as population size and income level, not on amenities.

This study presents statistical models that include a set of amenities, measured by certain types of businesses in the county, and estimates their effect on neighborhood crime. The models in this study suggest that parking lots and hospitals are the types of amenities that are related to higher crime rates, while other amenities such as retail stores, restaurants, bars, and schools do not have a significant effect on crime rates. However, the results also suggest that higher population density and higher median household income are correlated with lower crime rates, and that the share of population that is under 20 are associated with higher crime rates.

These statistical results imply that CPTED in the form of increased natural surveillance in lower income neighborhoods with high concentrations of young people may be particularly effective at reducing crimes. Compared with high-priced methods like surveillance cameras, CPTED approaches for poor areas with large number of young people would be low-cost, and include such measures as removing visual obstacles, trimming trees and bushes and putting in benches to keep places public.

## References

Clark, Terry Nicolas. 2003. "Urban Amenities: Lakes, Opera, and Juice Bars Do They Drive Development?" *The City as an Entertainment Machine, Research in Urban Policy*, Volume 9, pp. 103-140.

Clarke, Ronald V., 1989, "Theoretical Background to Crime Prevention Through Environmental Design (CPTED) and Situational Prevention" Paper presented at the Designing Out Crime: Crime Prevention Through Environmental Design (CPTED) convened by the Australian Institute of Criminology and NRMA Insurance and held at the Hilton Hotel, Sydney, 16 June 1989.

Clarke, Ronald V., and D.B. Cornish. 1985. "Modeling Offenders' Decisions: A Framework for Research and Policy." In *Crime and Justice: An Annual Review of Research* 6, ed. M. Tonry and N. Morris. Chicago: University of Chicago Press.

Cohen, Lawrence E., and Felson, Marcus, 1979, "Social Change and Crime Rate Trends: A Routine Activity Approach" *American Sociological Review*, 44, pp. 588-608.

Cullen, Julie B., and Levitt, Steven. D. 1996. "Crime, Urban Flight, and the Consequences for Cities" *Natural Bureau of Economic Research Working Paper Series*.

Donnelly, P.G., and Kimble, C.E. 1997. "Community Organizing, Environmental Change, and Neighborhood Crime" *Crime & Delinquency*, 43(4), pp. 493-511.

Felson, Marcus, 1983, "Ecology of Crime" *Encyclopedia of Crime and Justice*, New York: Macmillan.

Felson, Marcus, 1987, "Routine Activities and Crime Prevention in the Developing Metropolis", *Criminology*, 25(4), pp. 911-931.

Gould, Eric D.; Weinburg, Bruce A. and Mustard, David, 1998. "Crime Rates and Local Labor Market Opportunities in the United States: 1979-1995".

Kasarda, John D., and Morris Janowitz. 1974. "Community Attachment in Mass Society." *American Sociological Review*, 39, pp. 328-339.

Levitt, Steven D. 1997. "Using Electoral Cycles in Police Hiring to Estimate the Effect of Police on Crime." *The American Economic Review*, Vol. 87, No. 3 (Jun., 1997), pp. 270-290.

McCamley, Phil, 2001, "Crime, Design and Urban Planning: from Theory to Practice" *The Royal Australian Planning Institute magazine, New Planner*.

Miller, Ted; Cohen, Mark and Rossman, Shelli. 1993. "Victim Costs of Violent Crime and Resulting Injuries." *Health Affairs*, Winter 1993, 12(4), pp. 186-197.

Morrow, Erica N., and Hutton, Shawn A., 2000, "The Chicago Alley Lighting Project: Final Evaluation Report", Illinois Criminal Justice Information Authority.

Quinet, K. D. and Nunn, S., 1998. Illuminating crime: the impact of street lighting on calls for police service. *Evaluation Review*, 22(6), pp. 751-779.

Raphael, Steven and Winter-Ebmer, Rudolf, 2001. "Identifying the Effect of Unemployment on Crime" *Journal of Law and Economics*, vol. XLIV (April 2001), The University of Chicago.

Roncek, Dennis W, 1981. "Dangerous Places: Crime and Residential Environment" *Social Forces*, Vol. 60, No.1. (September 1981), pp. 74-96.

Roncek, Dennis W and J.M.A. Francik, 1981. "Housing Projects and Crime: Testing a Proximity Hypothesis." *Social Problems* 29:151-66.

Sherman, Lawrence W.; Gottfredson, Denise; MacKenzie, Doris; Eck, John; Reuter, Peter and Bushway, Shawn, 1996. "Preventing Crime: What Works, What Doesn't, What's Promising" A Report to the United States Congress, Department of Criminology and Criminal Justice, University of Maryland.

Wilson, James Q., George L. Kelling. 1982. "Broken Windows: The Police and Neighborhood Safety." *Atlantic Monthly* March, pp. 29-38.