

Reduction
of
Observable Robbery and Larceny-Theft
in the
Twelve Largest Cities
in the
United States from 1980 to 2009
by

Andrew J. Costello

A dissertation submitted to the Graduate Faculty in Criminal Justice in
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Andrew Costello

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Approval Page

This manuscript has been read and accepted for the Graduate Faculty in Criminal Justice in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

Maria (Maki) Haberfeld

Date

Chair of Examining Committee

Joshua Freilich

Date

Executive Officer

Larry E. Sullivan

Jon Shane

THE CITY UNIVERSITY OF NEW YORK

Abstract

Reduction of Observable Robbery and Larceny-Theft in the
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by

Andrew J. Costello

Advisor: Professor Maria (Maki) Haberfeld

The reduction in crime rates that occurred in large cities across the United States (US) over the course of the past two decades has been the subject of much speculation and research. However, there have been no definitive empirical studies that conclusively determine the causes for this phenomenon. The goal of this study is to identify the impact of certain factors to the reduction of crime in large US cities that occurred over the past two decades by examining data over a thirty-year period (1980-2009). The identification of contributing factors may allow government officials, both on a local and national level, to focus their efforts on the implementation of policies that, based on empirical study, are likely to reduce crime.

This study focuses on *Observable Crime*, which is operationalized as robberies and larcenies reported in the Uniform Crime Report (UCR) Part II Offenses that were *likely to be visible to the police*. Those crimes likely to be visible police are determined to be all robberies that were not committed in residences and larcenies that were committed in public areas excluding stores. Law enforcement strategies that were examined in this study include Quality of Life (QOL) Enforcement and Police Presence, which is operationalized as arrests for drug offenses as reported in UCR Part II Arrests and Police Officers per 100,000 residents as reported

in the UCR, respectively. The findings of this research supports the hypothesis that Quality of Life Enforcement significant in reducing crime in the twelve largest US cities from 1980-2009.

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Preface, Foreword, and Acknowledgements

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I. Introduction

The crime rate across the US has decreased significantly since the mid-1990's, a shift from the upward trend that began in the 1960's. The 1990s had a dramatic reduction in crime in comparison to the late eighties and this trend continued. While many politicians, practitioners and academics have provided their theories regarding this historic decrease in criminal activity, few studies have critically examined this reduction with any statistical rigor. The increase in Police Presence, which is operationalized as the number of police officers per 100,000 residents, was considered a likely reason for the decrease. Quality of Life (QOL) Enforcement, as defined to be drug arrests, was another factor considered to be a possible cause to the crime reduction in the 1990s. This study analyzed the effect of Police Presence and Quality of Life (QOL) Enforcement on the reduction of Observable Crime, that is, robberies and larcenies that are in view of the police officers.

This study is unique in comparing cities over a time span of 30 years with local data. While researchers have focused on national and state data, there has been very little recent focus on city level analysis with the use of time series. Analysis of program effectiveness at the city level is important because programs are more easily executed at small municipal levels. Ultimately, national and state programs are executed at the local level. Using expectations of program effectiveness from national and state studies that gather data in aggregate will be problematic. Most national and state level effects appear to be inflated when compared to analyses conducted on more local units such as counties, suburb, or cities.

A review of the literature will demonstrate a lack of recent analyses of city level data. Additionally, previous studies of city level data lacked proper controls by utilizing methods of either interpolation of decennial data, or using the decennial value as a constant for years before

or after the decennial year. The assumption that these rates would either follow an even, linear direction between years, or that the values would remain fixed, was never tested or supported.

Aspects of deterrence and rational choice theory were supported in addition to a main principal of “Broken Windows”. Through QOL Enforcement, offenders were deterred from committing crimes in areas that were reclaimed. Celerity, a key component of deterrence, in the enforcement of minor offenses may have dissuaded would be perpetrators from committing Observable Crimes. QOL Enforcement likely prevented motivated offenders from committing Observable Crimes by being displaced from victims or seeing capable guardians in the vicinity of areas where Observable Crimes could be committed satisfying the removal of two components needed for a crime to occur under rational choice theory. The main tenet of “Broken Windows” is enforcement of low level offenses to create an environment of non-tolerance for disorder.

Through examination of Observable Crime of the twelve largest cities in the US, QOL Enforcement was determined to be a significant factor in the reduction of these “Observable Crimes”. A General Linear Model was created to test the effectiveness of Police Presence and QOL Enforcement to examine thirty years of quantitative data from the twelve largest US cities. The results show promising and feasible solution for the implementation of QOL Enforcement strategies. While the study has limitations, suggestions for new research are proposed as well as new measures to capture necessary elements of crime reduction.

II. Literature Review

A. Crime Reduction in General

Most explanations of the crime reduction of the 1990s seems to focus on single factors and do not bring together several factors simultaneously. Compendiums looking at several factors are extremely limited. First, works that look at several factors will be presented. Individual articles explaining the reduction of crime based off of a single factor will then follow. A discussion of the literature will follow showing the need for longitudinal study of cities.

Eck and Maguire (2000) examined several studies about changes in policing strategies and management focusing on community policing, quality of life enforcement, COMPSTAT, number of police officers, police expenditures, police by area, gun interdiction patrols, and retail drug enforcement throughout the nation. While they do not conclude any particular style or method from any particular study contributed to crime decline, they did not rule out that some of these methods must have had some effect. In particular, they did find that directed patrol to hot spots did reduce crime (Eck & Maguire, 2000).

Levitt (2004) explored the national trend in crime reduction in a more comprehensive manner by investigating innovative policing strategies, increased reliance on prisons, changes in crack/other drug markets, aging of the population, tougher gun control laws, strong economy, and increased number of police officers. He further determined four factors to be significant: increased incarceration, more police, the decline of crack and legalized abortion. Levitt examined several factors, analyzed separately; however, he did not look at the interaction of each variable collectively (Levitt S. , 2004).

Zimring (2007) examined the decline in crime, with a focus on imprisonment, demographic changes, economy, number of police, decline in use of crack cocaine, and access to abortion. While he determined that the decline in crime is real and not an anomaly, none of the factors played a dominant role. Zimring dedicated a chapter specifically to New York, attributing the additional decline above the national average to more aggressive policing and management changes in the NYPD amongst the other previously mentioned factors. However, as with Levitt, he did not look at the factors collectively with each other nor did he use any quantitative model to come to his conclusions (Zimring, 2007).

B. Crime Reduction by Subject

After reviewing the three major works on reduction of crime in the 1990s, most explanations in the reduction of crime fall into six subjects: police, prisons, guns, drugs, economics, and COMPSTAT. While several research articles reference more than one of the subject areas in their model design, this literature review will present a particular study in the section of the most dominant explanation of the study. For example, if a study involved guns and drugs and concluded that guns were a significant factor over drugs, the study would be placed in the guns section.

1. Police

The study of police effectiveness on crime has been ongoing since the 1970s. The studies vary in the use of police officers, police employees, and police expenditures as the independent variable and vary in method between cross-sectional, panel, and time series. The only consistency in the studies is the use of UCR Part I crimes as the dependent variable. Cross-sectional and panel studies will be presented first followed by time series studies.

a) Police Cross-sectional and Panel Studies

Studies from 1971 through 1974 focused on cross-sections of cities on police employees and police expenditures on violent crime with mixed results. Increases in violent crime related to increased police employees ((Morris & Tweeten, 1971); (Greenwood & Wadycki, 1973)) and decreases in violent crime associated with police expenditures were found (Swimmer, 1974a) (Swimmer, 1974b). Additionally, Wellford, in two separate cross sections, determined no effect on violent crime due to police expenditures (Wellford, 1974).

Levine also examined police employees and determined an increase in murder and robbery when conducting a cross-sectional analysis of 26 cities in 1961, but found the effects were negated when a panel study of the same cities was performed using change in police employees from 1961 and 1971 (Levine, 1975). Pogue studied 163 SMSAs in a cross-sectional analysis for the effect of police expenditures on violent crime in three separate years and had mixed results between years. The study, overall, showed no effect on murder, rape, robbery, and assault for 1962 and 1968, but found positive correlation for rape and robbery in 1967 (Pogue, 1975).

Mathieson and Passell conducted a study of 65 NYPD police precincts in 1971 and determined that uniformed patrolman had a negative effect on robbery (Mathieson & Passell, 1976). Hakim, Ovadia, and Weinblatt examined police expenditures in 61 Philadelphia suburbs in 1970 and determined that the expenditures were positively correlated to robberies per acre (Hakim, Ovadia, & Weinblatt, 1978). Fuji and Mak performed a cross-sectional study of 25 districts in Oahu examining the effect of police per acre and found that robberies and assaults were positively correlated (Fuji & Mak, 1980). Huff and Stahura examine 252 suburbs in the US

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for the effect of police employees on violent crime and found a positive correlation (Huff & Stahura, 1980).

Humphries and Wallace conducted a panel and cross-sectional study of 23 cities. The panel study found an increase in murder with an increase in change in police from 1950 to 1971. The cross-sectional study found no difference in robberies in 1971 based on 1970 police staffing (Humphries & Wallace, 1980). Greenberg and Kessler performed a panel study of 130 cities' police expenditures for 1960 and 1962 and found a positive effect on violent crime (Greenberg & Kessler, 1982).

Greenberg, Kessler, and Loftin conducted a panel study of 252 suburbs and 269 cities of police employees on violent crime and found no effect for the suburbs and a positive effect on violent crime for the cities (Greenberg, Kessler, & Loftin, 1983). Belknap examined 260 SMSAs for the effect of 1980 police expenditures on violent crime and found none (Belknap, 1986). Howsen and Jarrell examined 120 Kentucky Counties for the effect of police per square mile in 1981 and found a negative correlation to robberies (Howsen & Jarrell, 1987).

After the 1980s, analyses of police switch from cross-sectional analysis to time series. Niskansen performed a cross-sectional analysis of all 50 US states and Washington, DC for the effect of police employees on violent crime in 1991 and found no effect (Niskansen, 1994). This seems to be the last cross-sectional analysis involving Police Presence and crime. While cross-sectional analyses have their place, the results were confusing and in conflict with each other. Ultimately, the problem with cross-sectional analyses is establishing which is the causal factor: the police or crime. Arguments could be made that areas with more Police Presence have fewer crimes or that areas with high crimes demand a higher Police Presence.

b) Police Time Series

The first time series testing the effect of police on violent crime used US aggregate data from 1947-1972. Land and Felson found that police expenditures had a negative impact on violent crime (Land & Felson, 1976). Fuji and Mak conducted a time series study for the State of Hawaii from 1961 through 1975 that examined the effect of police on murder, rape, robbery, and assault and none were found (Fuji & Mak, 1980). Jacob and Rich examined a time series of nine cities from 1948-1978 on police expenditures and found a positive correlation to robbery (Jacob & Rich, 1980). Loftin and McDowall conducted a time series of Detroit from 1926-1977 of the effect of police employees on violent crime and found none (Loftin & McDowall, 1982).

Corman and Joyce conducted a time series for the effect of police officers on murder, rape robbery, and assault using monthly data from 1970-1986 for New York City. Controlling for unemployment and home relief, robbery was found to be negatively affected by the rate of police officers per 1,000 citizens over 16 years of age (Corman & Joyce, 1990).

Chamlin and Langworthy conducted a time series of police employees, patrol employees, and detective employees in Milwaukee from 1930-1987 on personal crime and robbery. No effect was found except for a positive relationship between the number of detective employees and robberies (Chamlin & Langworthy, 1996). Corman and Mocan examined economic and enforcement efforts on Part I crime in New York City from 1974-1999 and found that broken windows enforcement, as measured by misdemeanor arrests, had validity in reduction of robbery, grand larceny, and automobile theft (Corman & Mocan, 2005).

Marvell and Moody examined the effect of police rate on UCR Part I crimes in a pooled time series with data from 49 states from 1968 to 1993 and 65 cities from 1971 to 1992. The researchers controlled for age structure and African-American population from data obtained

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from the US Census decennial data at the state level and interpolated between years. Another control variable for poverty level was interpolated from studies of the US Census at the state level for 1969, 1975, and 1979-1993. Population, income, and employment data were also controlled for by data obtained from the Department of Commerce. Prison population at the state level by year was added as the last control. The researchers use a Granger causality test to determine that rising crime effects police levels, that is, hiring, and a larger police rate reduced crime in all Part I crimes at the city level (Marvell & Moody, 1996).

Levitt (1997) conducted a pooled time series-cross-sectional model of 59 US cities for data from 1970 through 1992 using UCR Part I crimes and sworn officers per 100,000 at the city level. Levitt controlled for percent black, percent female headed household, and percent age 15-24 by using decennial data and interpolated by year. Additionally, the controls for welfare and education spending were produced by combining state and local outlays per capita adjusted for inflation. The state unemployment rate was used as an additional control. Although the focus of the study was to determine if mayoral elections had an effect on hiring practices of police officers, Levitt did determine that police levels did have an impact on murder, robbery, aggravated assault, and auto theft (Levitt S. D., 1997).

Time series are a considerable improvement over cross-sectional studies and overall have demonstrated that the police have a negative effect on crime. Specifically, Land and Felson, Corman and Joyce, Corman and Mocan, Marvel and Moody, and Levitt reported a negative impact of Police Presence on crime when using either police employees or police officers. Jacob and Rich reported a positive effect of Police Presence on robbery using police expenditures. Fuji and Mak, and Loftin and McDowall did not show any effect when using police and police

employees respectively. All of the studies had difficulty finding reliable yearly data for social controls.

2. Prison Rate

Prison research became consistent in reporting in 1978 due to a report commissioned by the National Research Council summarizing the results of research in the 1970s. As a result of critiques from this report (Blumstein, Cohen, & Nagin, 1978), the concept of elasticity, that is the percentage change in crime resulting from a one percent change in prison population, was established as comparison method between studies.

Three studies using national data followed after this report. Devine, Sheley, and Smith conducted a national time series with data from 1948 to 1985 testing male unemployment, inflation, relief (public spending to aid families with dependent children), and prison rate. The relief variable was interpolated from data available for certain reporting years from the Bureau of Economic Analysis. The researchers discovered elasticities of -1.47 for homicide, -2.62 for robbery, and -1.90 for burglary (Devine, Sheley, & Smith, 1988). Cappell and Sykes conducted a national study using data from 1933-1985 and discovered an elasticity of 0.91 for the effect of prison rate on all index crimes (Cappell & Gresham, 1991).

While focusing on the effect of imprisonment on homicide, Marvel and Moody conducted a study of national data from 1930-1994 that produced an elasticity -1.31 for homicide. In addition, the researchers conducted an additional analysis of national data from 1948-1994 and found elasticities of -0.53 for assault and -2.57 for robbery. Marvel and Moody controlled for inflation, population 15-17, population 18-24, population 25-34, population 35-44, percent non-white, personal income, unemployment, and welfare using decennial US Census

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data. In addition, the researchers controlled for the effect of World War II and the crack epidemic (Marvell & Moody, 1997).

Spelman (2000) looked at incarceration studies as a factor in the reduction of crime in the 1990s and found it to be a significant factor. Using data from 1974 through 1997 and controlling for per capita income, unemployment, police per capita, and percentages of population that were black, ages 0-14, 15-17, 18-24, and 25-34, he estimated a prisoner elasticity between .34 to .48. While not entirely explaining the reduction in crime, he estimated that had the collective incarceration policies not existed, crime would have been 27% higher. Inversely, one fourth of crime reduction could be attributed to imprisonment (Spelman, 2000).

State level studies were also conducted. Marvell and Moody conducted a study of 49 states from 1971-1989 for the effect of imprisonment on index crimes and found elasticities of -0.113 for forcible rape, -0.26 for robbery, -0.253 for burglary, -0.138 for larceny, and -0.200 for auto theft. The researchers controlled for lagged crime and percent population in ages 15-17, 18-24 and 25-35. While the crime data came from the UCR and the prison data was obtained from BJS, the researchers did not indicate where the population data was obtained. Marvel and Moody ultimately conclude that each additional state prisoner averted 17 index crimes with the majority of these 17 being larcenies (Marvell & Moody, 1994).

Levitt conducted a study of 50 states and Washington, DC on imprisonment rates from 1971-1993 on violent, property, and total index crimes. Levitt controlled for police employees, GNP (contribution of each state), unemployment, percent black, percent living in metropolitan areas, and percent of age groups 0-14, 15-17, 18-24, and 25-34. While police employees, GNP, and unemployment were taken from yearly data, the rest of the controls were interpolated from

decennial US Census data. Levitt found elasticities of -0.38, -0.26, and -0.31 for violent, property and total index crimes respectively when additionally controlling for litigation status change resulting from court orders to reduce overcrowding (Levitt S. D., 1996).

Besci also conducted a study of 50 states and Washington, DC from 1971-1989 (using similar data as Levitt) for the effect of imprisonment on violent, property and total index crimes. Besci controlled for police employees, police expenditures, unemployment, per capita income, public welfare, primary and secondary education, the number of convicts, population density, percent population 15-19, and percent population 20-24. Besci found elasticities of -0.05, -0.09, and -0.09 for violent, property and total index crimes respectively (Besci, 1999). Besci's results are consistent with Marvell and Moody placing the elasticity of total index crime between -0.09 to -0.16 (Besci, 1999).

Comparing the results state analyses to national analyses reduces the elasticity by one tenth. For every 1 percent change in a state's prison population, the state could see a reduction in index crimes of 0.16% at best. Based on national elasticity estimates, increasing the prison population by 100% would effectively eliminate crime. The state elasticity figure would require a larger change in imprisonment. Also to be noted is that the analyses all had difficulty finding accurate yearly data for social controls and, in most cases, interpolated data from decennial US Census data.

3. Drugs

The nexus between drug abuse and crime was first suggested by Sutherland and Cressey in 1970 when they noticed that felons were over represented in the addict population (Sutherland & Cressey, 1970). Gandossy et. al. proposed that drug users engaged in income producing crime

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because addicts needed money to buy drugs (Gandossy, Williams, Cohen, & Harwood, 1980). Some scholars disagreed with this assumption and cited that many casual users existed and were not involved in crime (Robins, Davis, & Wish, 1980). While studies have shown that there are heavy drug users that commit no crimes outside of drug possession (Collins, Rachal, Hubbard, Cavanaugh, Craddock, & Kristiansen, 1982) and there are heavy criminal recidivists that are not involved in drug use (Chaiken & Chaiken, 1985), the drug use-crime connection has still remained the dominant viewpoint.

Johnson, Golub, and Dunlap (2000) examined the transition of the sub-culture of drug users in the City of New York and determined that the migration from crack cocaine to marijuana led to a reduction in violence. They suggested that drug abuse went through four distinct phases: heroin, cocaine powder, crack cocaine, and marijuana. As the culture progressed through heroin, cocaine, and crack, violence, specifically murders and robberies increased. The particular distribution methods for the earlier drugs, and specifically crack, led to street violence. A newer generation of drug abusers chose not to get involved in the violent transactions of crack cocaine and opted for marijuana. The transition to marijuana led to less street violence specifically in regards to robbery, assault, domestic violence, and handgun possession (Johnson, Golub, Andrew, & Dunlap, 2000).

Ousey and Augustine conducted an analysis of 109 cities in 1990 for the effect of concentrated disadvantage, racial inequality, and youth illicit drug market activity on firearm related homicides. The researchers used gun related homicide offender rates for whites and blacks ages 14 to 17 for the dependent variable. Concentrated disadvantage was measured by percent unemployed, percent below poverty line, percent that did not complete high school, percent female headed households, within race income dispersion, and concentration of

disadvantaged (the probability of drawing two poor people from the same from a given tract) derived from the 1990 US Census. Racial inequality was measured by the ratio of white to black per capita income, white to black college graduates, black to white unemployment, and black to white residential segregation derived from the 1990 US Census. Youth illicit drug market activity was measured by the juvenile arrest rate of for manufacturing, distributing, or selling cocaine or opiates for 1989 and 1990 from the Uniform Crime Report. The study controlled for divorced males, cities located in the South and the West, and a few specific cities. The researchers found partial support for concentrated disadvantage and juvenile drug market participation to gun related homicides for white juveniles only (Ousey & Augustine, 2001).

Messner et. al. examined the effect of cocaine prevalence and misdemeanor arrests on the homicide rates of New York City from 1990 to 1999. Data was obtained for 75 NYPD police precincts. Misdemeanor arrests for each precinct were collected by year and divided by the population of the precinct from the 1990 US Census. Cocaine prevalence was measured by the portion of accidental deaths that tested positive from post mortem toxicology analysis for cocaine. Controls for percent male, percent black, percent female headed household, percent of population under public assistance, percent under 200% poverty level, percent persons with less than high school education, and percent unemployed came from 1990 US Census figures. In addition, three additional controls for firearms availability based off of the percentage of suicides committed with a gun, manpower based on total police officers assigned to precinct uncorrected for population, and felony arrests per 100,000 were also included. The researchers found that change in misdemeanor arrests and cocaine prevalence had a significant, negative effect on homicides. None of the controls proved significant (Messner, et al., 2007).

The two quantitative studies involving drugs discussed above were performed at the county and within-city level. Analysis of the drug-crime effect at the local level is important and

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can provide valuable insight. Both researchers used 1990 US Census data. Messner used the 1990 US Census data across all years of the study as a fixed variant. Control variables in both studies did not provide any explanatory value.

4. Guns

The relationship of guns to crime has been a subject since the 1960s. Researchers focused gun studies predominantly on murder and robbery. The basic premise is that a gun gives the ability to rob or murder anyone despite differences in strength and size. Studies focus on the availability of guns affecting crime, the effect of gun legislation (both restricting and allowing handgun permits), and the analysis of law enforcement programs aimed at reducing gun violence.

Using data from 1976 and 1977 supplemental homicide reports submitted to the UCR, Cook determined that guns gave the ability to kill or rob relatively invulnerable victims. Invulnerability was based on the age difference between the victim and offender for murders and the victim gender/age and location (commercial, residence, street) for robbery (Cook, 1981).

McDowall, Loftin, and Wiersema examined the effect of “shall issue” laws on homicides in large metropolitan areas in Florida, Mississippi, and Oregon from 1973 to 1992. The time period provided for large time periods before and after the enactment of the new laws. The researchers discovered that, overall, homicides increase 26% across the areas (McDowall, Loftin, & Wiersema, 1995).

Wintemute conducted a study of guns and gun violence focusing specifically on murders in which he demonstrated that the peak in murders in 1993 directly correlated to the peak in pistol production in 1993. Wintemute discussed all aspects of the gun violence debate from

characteristics of victims and offenders, laws designed to reduce gun violence and distribution, to interventions performed in certain cities. He concluded that gun violence will decrease predominantly by focused law enforcement, increased sanctions for committing crime with guns, and more aggressive identification and prosecution procedures against dealers and manufacturers (Wintemute, 2000).

Markios and Pratt conducted a meta-analysis of several studies to determine the effectiveness of different programs to reduce gun violence. Specifically, the researchers divided the programs into three major categories: gun buy backs, gun laws, and law enforcement programs. Markios and Pratt found a moderate impact ($r=0.144$) of all programs collectively. Gun buy back programs did not have a significant impact. Gun laws that involved enhanced prison term, waiting periods, and gun bans were found to be significant. Safe storage laws did not. Law enforcement strategies that involved policing, probation, and community programs were found to have a small, but significant, impact. Prosecution strategies did not (Markarios & Pratt, 2012).

Braga and others reviewed 1999 ATF firearm trace data and determined that illegal firearms come from a variety of sources such as licensed dealers, unlicensed sellers, theft from residences, dealers, common carriers, and manufacturers. The researchers also determined that the typical criminal gun has a short time period from retail sale when comparing the average age of recovered firearms to the average age of firearms in the US. Due to several methods available for criminals to obtain guns, the researchers recommend expanding gun trafficking indicators beyond serial numbers (Braga, Wintemute, Pierce, Cook, & Ridgeway, 2012).

Gun studies demonstrate a connection between violence and guns, but applying an effective measure to determine availability of criminal guns is problematic. Unlike measures of police as measured in police per 100,000 or prison elasticity which gives a reduction of crimes for a 1% increase in prison population, a standard measure for criminal gun availability has not been established. This makes guns a difficult variable to include in a city level analysis.

5. Economy

Articles on economy and crime generally focus on the relationship between unemployment and other indicators. Researchers generally focus on murders and crimes that are related to monetary gain. Generally, UCR data was used as the estimate for crime, but some studies used youth survey data.

Parker and Horowitz conducted a study of the effect of unemployment on both crime and imprisonment using data from 1975-1980. Unemployment was obtained using national figures from the Bureau of Labor Statistics. Crime was obtained from the UCR and total prisoner population, admissions, and releases were obtained from the Department of Justice. They did not find any significance between unemployment and crime and unemployment and imprisonment (Parker & Horwitz, 1986).

Votey examined data collected by the Vera Institute of Justice for 152 Brooklyn arrestees in 1979 for the effect of employment on crime taking into account deterrence, age, and race. The survey involved two interviews to get employment and economic data from the arrestees: the time of arrest and a follow-up survey conducted a year later. Votey determined that previous contacts with the police led to desistance from crime, prior work experience and economic opportunity led to desistance from crime, and when controlled for these effects and educational attainment, there was no difference in recidivism between blacks and whites (Votey Jr., 1991).

Britt examined the effects of unemployment and age on crime using national age specific arrest rates for murder, rape, robbery, aggravated assault, burglary, larceny, and auto theft from 1958-1995 as reported in the UCR. Age groups 16-17, 18-19, 20-24, 25-34, and 35-44 were used. Age specific unemployment was obtained from the Department of Labor. Britt found that unemployment has a greater effect on property crimes with youth and young adults (ages 16-24) and the unemployment-crime relationship varied over time in a nonsystematic way (Britt, 1997).

Grogger (2000) created an economic labor-market model in an attempt to explain violence that occurred in the early 1990s. Basically, market wages factored into the utility decision youths made when deciding to engage in crime. He specifically linked it to the crack cocaine trade of the late 1980s and early 1990s. Using youth surveys, Grogger found a correlation between youth involvement in crime and hourly wages. As wages went up in 1993, fewer youth engaged in violent crime. Grogger also related the cost of violence in the utility decision and inferred that youths evaluated the potential risk of violence and the potential income together and most determined to look for alternative legitimate means to maximize their utility (Grogger, 2000).

Rosenfeld examined the effect of economic conditions on felony homicides, argument-related homicides, and acquisitive crimes from 1970-2006 for four regions of the US: Northeast, Midwest, South, and West. Felony homicides included murders associated with robbery, burglary, automobile theft, other serious felonies, gambling, drug, and commercialized vice offenses. Argument-related homicides included killings associated with alcohol and drug related fights and other arguments. Acquisitive crime included robbery, burglary, and auto theft. Economic conditions were measured by unemployment, GDP per capita, and the Index of Consumer Sentiment. Rosenfeld controlled for police officers per 100,000 from the UCR and

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state prisoners per 100,000 from BJS. Additionally, percent population between the ages of 15-24 and percent population black from the US Census were also controlled for, but the specific source of the data was not listed. Rosenfeld found a significant effect between economic conditions and acquisitive crime and a significant effect between acquisitive crime and felony related homicide (Rosenfeld R. , 2009).

Lauritsen and Heimer analyzed NCVS data from 1975 to 2005 for the effect of economic downturns on non-fatal violent victimization on Latino, non-Latino Black, and non-Latino White males. Non-fatal violent victimizations were robberies and aggravated assaults as self-reported by the victims in the NCVS. Economic conditions were measured by the Index of Consumer Sentiment maintained by the University of Michigan. The researchers found that rates of violence declined for all groups, Latinos and non-Latino Blacks experienced increased violence with downturns in the economy, and this increased violence was due to robberies and assaults from strangers (Lauritsen & Heimer, 2010).

With the exception of Parker and Horowitz, the studies found some effect of economic conditions on crime. Both violent crimes and property crimes were found to have some relationship to economic conditions. Most of the researchers struggled with population controls and made estimates on decennial data or neglected to mention the method of obtaining yearly data. Also, with the exception of Votey, all of the studies were performed on a national or regional level.

6. COMPSTAT

Since several references refer to reduction of crime through the implementation of COMPSTAT, a further literature review was conducted specifically on it. (COMPSTAT is an abbreviation for computer statistics.) After a brief introduction and review of literature,

COMPSTAT will be considered in the model as best indicated by QOL Enforcement. Most of the articles associate COMPSTAT with QOL Enforcement or consider COMPSTAT as QOL Enforcement.

In 1994, the New York City Police Department (NYPD) started rapid changes in its management style, culture, and methods for addressing crime through the use of a monitoring tool called COMPSTAT. Through this new implementation, crime trends were carefully examined and tactics were developed to reduce or stop poor (increasing) trends in crime. COMPSTAT identified crime prone locations and high risk offenders and created strategies on how to remove or reduce them. As Jack Maples suggested, one must “put cops on dots.” (Maple & Mitchell, 1999). Through this strategic placement, crime prone areas became low crime areas or were completely crime free.

COMPSTAT is a management model initially adopted by the NYPD to analyze crime, develop tactical and strategic solutions, and follow up with assessment of the tactics and how effectively personnel assigned to the tasks performed. Analysis of recent crime trends provide for a planned response of personnel and resources. The response is generally assigned to a Precinct Commander who is responsible for implementation and coordination of all resources. The response is assessed to determine effectiveness, continuation of the tactic, or abandonment (Weisburd, Mastrofski, McNally, Greenspan, & Willis, 2003). The COMPSTAT process is founded on four principles listed below: (see (McDonald, 2002), (Shane, 2007), (Godwon, 2009))

- Accurate and timely intelligence (i.e., “Know what is happening.” (Godwon, 2009))
- Effective tactics (i.e., “Have a plan.” (Godwon, 2009)).

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- Rapid deployment (i.e., “Do it quickly.” (Godwon, 2009)).
- Relentless follow-up and assessment (i.e., “If it works, do more. If not, do something else.” (Godwon, 2009))

This basis for the COMPSTAT model has continued in New York to present day and has been adopted by other cities.

Andrew Karmen (2000), in his book, *The New York Murder Mystery: The True Story about the Crime Crash of the 1990's*, suggests that COMPSTAT had little to do with the decreased crime rate of the 1990s and was related to a good economy and increased incarceration within New York State due to sentencing changes in the late 1980s. While the book made for strong arguments and looked at several factors such as number of police, Police Presence in public areas, response times, better clearance rates, Quality of Life enforcement, sentencing enhancements, changes in drug use behavior, demographics, and the economy, Karmen doesn't analyze the factors together in a model that allows for interactions and controls (Karmen, 2000).

Articles about COMPSTAT fall into three categories: surveys of police officers and executives about their feelings with regard to the application of COMPSTAT, comparisons of similar but different programs to COMPSTAT, and anti-COMPSTAT critiques. Vito et. al.'s (2005) *COMPSTAT: the Managers' Perspective* is a classic example of the first category. Literature about COMPSTAT and a survey were given to a group of police managers and the results were analyzed quantitatively and qualitatively. Conclusions were then made from very small sample sizes. In this case, 47 managers were surveyed giving mixed results of the effectiveness of the program (Vito, Walsh, & Kunselman, 2005).

The second category is best demonstrated by Rosenfeld, Fornago, and Baumer's (2005) comparison of the effectiveness of three different programs utilizing a Hierarchical General

Linear Model, using pre and post interventions to predict murders. The researchers used police per capita, prevalence of cocaine use, and state incarceration rate in the first step of their models. Population density and resource deprivation are introduced in their second step. They found no evidence to support that Ceasefire and COMPSTAT had any significant effect on the murder rate of their respective cities when the second step of the model was introduced. Only Richmond's Exile, a program that placed sentence enhancements for violent crimes with firearms through federal prosecution, was found to be effective. The researchers used a ten-year period with uneven pre-intervention and post-intervention times. For New York, the researchers use a pre-intervention period from 1992-1993 compared to the post-intervention period of 1994-2001. The two year to ten year period comparison was problematic (Rosenfeld, Fornago, & Baumer, 2005).

Eli Silverman (2006) argued in *COMPSTAT's Innovation* that COMPSTAT was effective in reducing crime through its inclusion of organizational change and management restructuring (Silverman, 2006). The article took a typical pro-COMPSTAT position. Equally supportive is Weisburd, Mastrofski, Willis & Greenspan (2006), in *Changing Everything So That Everything Can Remain The Same: COMPSTAT and American Policing*, who suggest that COMPSTAT is the old concept of problem oriented policing developed by Goldstein years earlier and properly deployed (Weisburg, Mastrofski, Willis, & Greenspan, 2006).

Kelling and Sousa (2001) used a Hierarchical General Linear Model to evaluate the effect of COMPSTAT in New York. The article used the NYPD's 76 police precincts as separate cases and tested for changes in unemployment, age composition, drug prevalence, and misdemeanor arrests on violent crime. COMPSTAT was measured by misdemeanor arrests (Kelling & Sousa, 2001). While not controlling for other aspects believed to be associated with crime, such as

poverty and immigration trends, this was the most robust study on Quality of Life Enforcement/"Broken Windows" Theory in practice.

The most important contribution from the Kelling and Sousa article is that they found an effective measure for the application of COMPSTAT in the use of misdemeanor arrests. The use of all misdemeanor arrests is not necessarily an effective measure for COMPSTAT application; however, a subset of misdemeanor arrests directly associated with QOL offenses would be a more accurate representation of COMPSTAT application – the delta/change in QOL offenses pre and post COMPSTAT may be the most accurate measure – although determining that number may be difficult. While the author does not agree on using all misdemeanor arrests for the effect of COMPSTAT, a subset of misdemeanor arrests that are directly associated with Quality of Life offenses should lead to an effective measure of COMPSTAT.

While this abbreviated review of literature addressed the central themes of books and articles about COMPSTAT, it is far from exhaustive. Writings from the Southern Police Institute and the National Institute of Justice alone are voluminous; however, only Kelling (2001) and Rosenfeld (2005) have directly addressed crime rates with empirically valid statistical models. The majority of work is anecdotal or rhetorical.

7. Summary of Literature

The literature review presented differing results for the impacts by police, imprisonment, drugs, guns, the economy, and COMPSTAT. Studies both supported and refuted these effects. The lack of adequate controls for economic indicators, incarceration, and demographics at the city level prevailed throughout all of the city level studies. Most studies were conducted at the national or state level. The studies involving cities had improper controls for demographic, economic, and imprisonment data based on the unit of analysis or time period. The lack of city

level studies demonstrates a need for analyses at this level. Only at the city level can effective policies be implemented and managed. Managing programs at state and national levels for criminal incidents that are local is difficult to impossible.

C. Theoretical Background

1. Deterrence

a) Classic Foundation of Deterrence Theory

The earliest concept of deterrence theory began with the early works of Cesare Beccaria with his 1764 work *On Crime and Punishment*, which critiqued the current administration of criminal law and laid out the principles of deterrence theory. The fundamental concept is that people are rational, their behavior is produced by free will, in which the goal is to seek pleasure and/or reduce pain. Therefore, laws should be created that specify the undesirable activity to be prevented and have an appropriate penalty that will likely prevent a rational person from committing the activity. This is the foundation of classical deterrence theory (Brown, Ensensen, & Gies, 2001).

Beccaria also expands the concept of deterrence by defining the three principles of punishment: *certainty*, *celerity*, and *severity*. Certainty refers to the probability of being caught by the authorities for committing a criminal act. Celerity is the speed in which an offender is punished. Severity is the application level of pain for the offense. Beccaria posited that severity was not nearly as important as certainty or celerity (Traub & Little, 1999).

Jeremy Bentham slightly adjusted the classical view by introducing utilitarian influences into the rationalization of punishment. Bentham proposed that punishment should not be motivated by retribution, but merely the desire to prevent crime. The utilitarianism thought also affected the concept of the definition of criminal laws. Under Bentham's *greater happiness*

principle, actions are evaluated on whether they contribute to the benefit of humankind.

Criminal acts are those behaviors that detract from the common benefit of humankind and, therefore, must be prevented. Since Bentham believed that people weigh the costs and benefits of their actions, legal systems can create appropriate laws and punishments for them that would deter criminal behavior (Walsh & Ellis, 2007).

b) Modifications to Deterrence Theory

Deterrence theory remained relatively unchanged throughout 19th century and started to have modifications and extensions in the latter half of the 20th century. Becker integrated economic and utility ideas in to the criminal decision making process (Becker, 1968). Andenaes discussed how sanction threats and sentences worked across different types of offenders and offenses (Andenaes, 1974). Cornish and Clark, placing aspects of rational choice perspective based on situations, focused on risk/reward decisions based on specific crimes at specific locations. Focusing on specific crimes was perceived by Cornish and Clark to be more amenable to action than a high level non-specific sanction plan (Cornish & Clark, 1986). Katz further modified deterrence theory with the inclusion of emotional and mental benefits that may be more difficult to deter through traditional sanctions (Katz J. , 1988). Stafford and Warr add the concept of personal and vicarious experiences in perceptions of punishment in calculating the decision to commit crime (Stafford & Warr, 1993). David Kennedy, in 2009, takes a fresh look at the old concept of deterrence and provides convincing arguments that deterrence works. He further explains, while the human calculus is complicated, sanctions are interpreted by most offenders and they do affect behavior (Kennedy, 2009). With slight modification, deterrence theory has remained stable since its start.

c) Modern Application of Deterrence Theory

Several studies have focused on the efficacy of arrest as a deterrent to future domestic violence incidents in the latter quarter of the 20th century. Initiated with the Minneapolis Domestic Violence Experiment, Sherman and Berk determined that arrests were more effective in preventing future domestic violence between domestic partners over mediation or separation of the offender (Sherman & Berk, 1984). Berk and Newton replicate the same finding in California (Berk & Newton, 1985). Hirschel and Hutchinson found no difference in arrests, issuance of a summons, or separation in Charlotte when they did follow up interviews of victims and review of police records (Hirschel & Hutchinson, 1992). Dunford, Huizinga, and Elliott came to the same conclusion in Omaha, Nebraska finding that arrests were not superior to citation or separation (Dunford, Huizinga, & Elliott, 1992). Sherman conducts another replication study in Milwaukee, Wisconsin demonstrating that arrest was more effective in preventing spouse assault recidivism than other police responses (Sherman, Schmidt, Rogan, Smith, & Gartin, 1992). Pate and Hamilton, in Dade County, Florida, found that arrests did have a deterrent effect on spouse abuse recidivism when offenders were employed, but produced worse results when offenders were unemployed (Pate & Hamilton, 1992). In summary, initial studies demonstrated benefit to arrest as an intervention to spouse abuse recidivism, but later studies determined that arrest as an intervention was only effective when the arrestee had some stake in the community where the threat of arrest would have some impact.

Researchers have also analyzed perceived sanction risks of offenders based on direct and vicarious experiences of high school students, college students, and convicts. Bridges and Stone, out of a sample of 550 federal convicts, found inexperienced offenders to have a greater risk perception from punishment, but no effect on veteran criminals (Bridges & Stone, 1986).

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Horney and Marshall performed a study on 1,000 convicted felons and found that convicts with greater arrest to self-reported incidents had higher risk perceptions in being caught (Horney & Marshall, 1992). Lochner, using National Youth Survey (NYS) data, determined that actual arrests increased the perception of likelihood of arrest (Lochner, 2003). Pogarsky, Piquero, and Paternoster examined a sample of high school students and found that students were more affected by the experiences of their peers than their own direct experiences (Pogarsky, Piquero, & Paternoster, 2004).

2. Expected Utility Theory

Expected utility theory is an expansion of rational choice theory to account for differences in decisions made by individuals in similar circumstances. Starting with a foundation of rational choice theory best explained by Cornish and Clark defining crime as a purposeful behavior of some individuals to gain commonplace needs such as money, sex, or status. These individuals make rational choices based on available information to determine the risk associated with being caught committing the crime versus the gain from committing it. To prevent crime, punishment severity, swiftness, and likelihood of apprehension need to be created to affect the individual's risk making decision (Cornish & Clark, 1986). Expected utility theory expands on rational choice theory by accounting for different utility for the same value and is influenced by economists.

Expected utility theory starts on a foundation from Daniel Bernoulli in which he defines price versus utility. Price was defined by Bernoulli as being the intrinsic value of an object. Utility is dependent on the circumstances of the individual. For example, an item that is a \$1,000 will have the same price for both a poor person and a rich person. The item will have a greater utility for a poor person than a rich person (Bernoulli, 1954). The poor man, seeing greater

utility in the \$1,000 item might take greater risk to take the object than a rich man who will have less utility for the item. Utility is a greater factor in risk decisions than price.

Neumann and Morgenstein further expand the concept of risk and utility in the introduction of their game theory. Within their game theory, they developed an expected utility function. Although applied to lotteries, the expected utility function provides excellent rationale on decision making. The expected utility function has five preference axioms: completeness, transitivity, continuity, monotonicity, and substitution. Completeness specifies that an individual, when presented with two outcomes, either prefers one outcome over another or is indifferent to either outcome. Transitivity means that if an individual prefers outcome one to outcome two and outcome two to outcome three, this individual prefers outcome one to outcome three. Continuity means that the upper and lower outcomes for a preference set are closed. Monotonicity stipulates that an individual will prefer an outcome with a better probability of success over an outcome with a poorer probability of success. Substitution specifies that if an individual is indifferent to two outcomes, then preferences with the same probability can be switched. Individuals will choose an action based on which outcome will produce the greatest expected utility (Von Neumann & Morgenstern, 1953).

Arrow and Pratt expand expected utility theory to determine a measure of risk aversion. Risk aversion takes into account separate behaviors of decision makers when deciding on preferences for outcomes. Decision makers fall into six groups of behavior that fall into two main categories: absolute and relative. Absolute Risk Aversion (ARA) is based on absolute value of assets and describes three behaviors: those who hold fewer dollars in risk as wealth increases, those who hold the same dollar amount in risk as wealth increases, and those place more dollars in risk as wealth increases. Relative Risk Aversion is similar to ARA, but is a

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relative percentage of wealth describing three behaviors: those who hold smaller percentage in risk as wealth increases, those who hold the same percentage in risk as wealth increases, and those hold greater percentage in risk as wealth increases (Arrow, 1965) (Pratt, 1964).

Kahneman and Tversky further expand expected utility theory with their prospect theory. Through experiment, Kahneman and Tversky determined that people underweight outcomes that are merely probable to certain outcomes and overweight outcomes that have low probabilities. For example, most individuals would choose receiving a definite \$450 than having a 50% chance of receiving \$1000. A logical individual who knows he will be exposed to several of these same decisions should opt for the gamble, for in the long run, the collective gambles will return \$500 times the number of gambles. When the probability for success is low, the risk decision behavior changed. Individuals were more likely to decide to take a risk of winning \$6,000 with a probability of 0.001 versus \$3,000 with a probability of 0.002 (Kahneman & Tversky, 1979).

Expected utility theory is a considerable improvement on rational choice theory and explains differences in individuals in their decision making process. While the primary focus of expected utility theory was decision making of financial preferences, its application to criminology is useful. Expected utility theory better explains what some scholars feel are shortcomings in rational choice theory by explaining what may appear to be irrational. Individuals not only take the gain of committing a crime into account when making the risk decision, but also the probability of getting caught. The explanations of three different actors on deciding to steal a cell phone can be explained under expected utility theory. Assuming the probability of getting caught is the same for all actors, a poor person might see greater utility in the \$300 resale of the phone, one rich person may have never changed his risk level for theft, and

another rich person does not see the same utility in the gain of \$300 when he was when he was poorer.

Expected utility theory is affected by both Police Presence and QOL Enforcement. Police Presence, with its increase in likelihood of apprehension, decreases the probability of successfully committing a crime, thus lowering the expected utility of the outcome. QOL Enforcement should also affect probability of success by placing enforcement efforts in crime prone locations. Areas where individuals would go to have a greater probability of success in committing crimes would be disrupted by QOL Enforcement. Also, the probability of successfully committing lower level crimes would decrease under QOL Enforcement lowering the expected utility.

3. Routine Activity

a) Foundation of Routine Activity Theory

Cohen and Felson introduced Routine Activity Theory in 1979. Its primary tenants state that in order for a crime to occur, there must be a motivated *offender*, a *target* must be available, and there is a lack of capable *guardian*. If any of the three factors are missing, a crime will not occur. A motivated offender is self-explanatory. Targets are defined to be people or objects. Capable guardians are considered to be police, people, or technology such as closed circuit televisions (Cohen & Felson, 1979).

Cohen and Felson further expand the theory into sub-components for the target using the terms: *value*, *inertia*, *visibility*, and *accessibility*. The target must have some value as perceived by the offender. Inertia refers to the size of the target and its potential to be easily removed if the target is an object. Visibility refers to the ability for the offender to see the target. Accessibility

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refers to the ability of the offender to not only access the target, but be able to retreat or escape (Cohen & Felson, 1979). Cohen, Kluegel, and Land expand the theory to include five mediating roles: exposure, guardianship, proximity to potential offenders, attractiveness of potential targets, and definitional properties of specific crimes. Definitional properties of specific crimes were defined as aspects of certain crimes that make target attractiveness less apparent. For example, a burglar does not have specific knowledge of the contents of a house as easily as a petty thief directly seeing an object and taking it. These new factors placed a new emphasis on victim behavior (Cohen, Kluegel, & Land, 1981).

b) Modifications to Routine Activity Theory

Osgood and others presented a routine activity theory of general deviance to explain a broader range of deviance than direct personal crimes. They present a concept that social contact within groups unsupervised by a competent guardian is the major contributor to general deviance. For example, unsupervised youth groups may experiment with drugs or conspire to rob somebody. The authors test the theory using a five wave longitudinal study of 18 to 26 year olds. Based on self-reports of the study group, criminal behavior, as observed by drug abuse, alcohol abuse, and dangerous driving, was associated with going to parties, informal gatherings with peers, unsupervised car rides, and unsupervised evening recreational activities (Osgood, Wilson, O'Malley, Bachman, & Johnston, 1996).

Clarke, in 1999, reinterprets Routine Activity Theory by modifying Value, Inertia, Visibility and Accessibility subcomponents (VIVA) of the target and expanding it to CRAVED. This is an acronym for Concealable, Removable, Available, Valuable, Enjoyable, and Disposable. Clarke believed that this expansion removes the previous limitations of Routine

Activity Theory by accounting for all targets of predatory crime, specific motives of theft, and ease of certain targets that are more concealable and disposable (Clarke, 1999).

c) Modern Application of Routine Activity Theory

Routine activities theory has been tested on aggregate crime rates, property victimization, personal victimization, and violent crimes. When Clarke et. al. expanded routine activity theory in 1981, they conducted a study using data from the LEAA National Crime Survey and determined that income, race, and age that are indicative of proximity, guardianship, and exposure are related to incidents of assault, burglary, and personal larceny (Cohen, Kluegel, & Land, 1981). Miethe, Stafford, and Long found that males, low income persons, the unmarried, and the young were more likely to have violent crime experiences and households headed by persons who are male, black, unmarried, young, and have relatively high income are more likely to be victims of property crimes. These groups were more likely to be either targets of crime, lack guardianship, and had greater exposure to criminals than others (Miethe, Stafford, & Long, 1987). Stahura and Sloan analyzed 676 US suburbs for the effect of criminal motivation, criminal opportunity, and guardianship on personal and property crimes and found significant direct and indirect results for all effects (Stahura & Sloan, 1988). Fisher, Sloan, Cullen, and Chenmeng examined victimization rates of 3,472 students and determined that property victimization was increased by proximity to crime, target attractiveness, exposure, and lack of guardianship. Personal victimization of the students was associated to high levels of partying (at night) and recreational drug use (Fisher, Sloan, Cullen, & Lu, 1998).

4. “Broken Windows” – A Construct

a) The Emergence of “Broken Windows”

Published in the March 1982 Atlantic Monthly by George L. Kelling and James Q. Wilson, the article “Broken Windows” re-introduced an old concept of directed foot patrol in troublesome areas to establish order. The concept of “Broken Windows” is that disorder starts with one broken window in a building. If the broken window is not repaired, other windows will soon be broken resulting in all of the windows in a building being destroyed. This disorder fosters a level of acceptance of deviant behavior for people living in the community including those that are normally law abiding citizens. Once smaller deviant behavior is tolerated, people will feel comfortable committing more serious criminal acts (Kelling & Wilson, 1982).

To prevent or stop the downward spiral of social decay in the form of criminality, efforts should be placed to remove areas where people feel comfortable or are tolerant of crime. The preferred method of the authors to change these areas into orderly environments is QOL Enforcement. QOL Enforcement focuses on acts that are committed in public view such as disorderly conduct, drunkenness, prostitution, street gambling, street drug dealing, vagrancy, and loitering (Kelling & Wilson, 1982).

“Broken Windows” directly explains the need to analyze QOL Enforcement in the reduction of crime. In particular, the New York City Police Department actively engaged in quality of life enforcement as a result of the article with the intent to reduce the “seven major” crimes. (The “seven majors” are similar to Part I Index Crimes under the Uniform Crime Report (UCR). Specifically, they are murder, rape, robbery, felonious assault, burglary, grand larceny, and grand larceny of automobile. It is the major measurement tool used to evaluate precinct

commander performance.) “Broken Windows” indirectly implies a need for Police Presence which can be related to increased number of police officers (Bratton & Knobler, 1998).

b) Modern Application of “Broken Windows”

The most recent empirical study in New York City for the effect of broken windows was written by Corman and Mocan. Corman and Mocan examine economic and enforcement efforts on Part I crime in New York City from 1974-1999 and found that broken windows enforcement, as measured by misdemeanor arrests, had validity in reduction of robbery, grand larceny, and automobile theft (Corman & Mocan, 2005).

Several studies have been conducted on broken windows enforcement outside of New York City. Katz, Webb, and Schaefer reviewed the QOL initiative in Chandler, Arizona for effect on a variety of calls for service and found significant effects in reducing calls for public morals and physical disorder (Katz, Webb, & Schaefer, 2001). Jang, Hoover, and Lawton reviewed 35 Texas cities for the effect of broken windows enforcement on Part I clearance rates and found a significant increase for burglary clearances, a marginal increase on automobile theft clearance, and decrease in larceny clearances associated with broken windows enforcement (Jang, Hoover, & Lawton, Effect of broken windows enforcement on clearance rates, 2008). Jang, Hoover, and Joo looked at broken windows policing in Fort Worth, Texas and found significant decreases in property and total index crime rates when controlling for other rival factors, but no association with violent crime rates (Jang, Hoover, & Joo, 2010).

This brief review of deterrence theory, rational choice theory, and broken windows is limited, but highlights the major parts of the theories and studies that have affirmed them. This is not to suggest that there are studies that do not validate the theories. Deterrence theory, with

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its focus on certainty, celerity, and severity, focuses on punishment and the likelihood of apprehension. Routine activities theory, with its primary tenets of a motivated offender, a target, and lack of a capable guardian focuses more on prevention than punishment or apprehension. Broken windows combines aspects of both deterrence theory and rational choice theory. The certainty, celerity, and severity of QOL Enforcement must be strongly administered by capable guardians to prevent motivated offenders from considering preying on targets and prevent targets from engaging in behavior that places them more at risk.

III. Hypotheses

The focus of this study is the effect of policing on observable crime. The study will test the effect of Police Presence and QOL Enforcement on observable crime. Therefore the hypotheses presented will directly test their effect and if there is an interactive effect. The null hypothesis is presented first. With hypothesis testing, the null hypothesis must be disproven.

RH_0 : Police Presence and QOL Enforcement did not contribute to the reduction of observable crime from 1980-2009.

H_1 : Police Presence had a significant impact on the reduction of observable crime from 1980-2009.

A preferred answer by most politicians, this hypothesis assumes that there is a negative correlation between the number of crimes and the number of police officers.

Applicable Theories:

Deterrence - By placing more officers, the likelihood of apprehension should increase.

Routine Activity - The more police officers that exists, the more capable guardians are present to prevent crime.

Expected Utility – Increases in police staffing will increase the possibility of apprehension and decrease the probability of success, therefore lowering the expected utility.

Broken Windows – Larger Police Presence will allow for greater placement of police officers in more disorderly areas therefor disrupting crime prone areas.

H_2 : QOL Enforcement had a significant impact on the reduction of observable crime from 1980-2009.

Another preferred answer by some law enforcement practitioners, the enforcement of low level crimes set a tone to offenders that more serious crimes would not be tolerated. Assuming violations, infractions, and misdemeanors are enforced, fewer felonies should occur. This explanation also involves the application of COMPSTAT. COMPSTAT and drug enforcement can be measured by the enforcement of QOL offenses.

Applicable Theories:

Deterrence - By enforcing low level crimes, offenders may fear a greater likelihood of capture.

Expected Utility – Decreasing the probability of success of low level crimes and observable crimes by police presence in high crime areas will reduce the expected utility of these acts.

Broken Windows - By enforcing low level crimes, people will feel uncomfortable or become intolerant of serious crime.

IV. Methodology

A. Population and Sampling

Prior to analysis, an a priori strength analysis was performed to determine the sample size needed to provide an anticipated effect size of 0.15 with a desired power level of 0.95 and to a significance probability level of 0.05 for 2 variables. This analysis determined a minimum sample size of 106 would be necessary. This would require a sample of 4 cities for a period of 30 years to obtain the necessary minimum sample size. The cities with the largest populations in 2009 were New York, Los Angeles, Chicago, and Houston respectively. To be more inclusive and provide for greater reliability of power, effect size, and probability, the sample was expanded to all cities with a population greater than 950,000 as reported to the UCR as the populations of the police agencies' jurisdiction were selected with the intent to collect data spanning for 30 years. These twelve cities are listed below:

- Phoenix, Arizona
- Los Angeles, California
- San Diego, California
- San Jose, California
- Honolulu, Hawaii
- Chicago, Illinois
- New York, New York
- Las Vegas, Nevada
- Philadelphia, Pennsylvania
- Dallas, Texas
- Houston, Texas

- San Antonio, Texas

With a target of 360 data points, the dataset was large enough to prevent potential problems with strength and validity. These cities were also large enough to have data available at local levels and more likely to have consistent reporting due to larger bureaucratic structures that smaller cities might not have. Larger cities have larger crime numbers and their yearly rates are not as easily swayed by spikes in crime as smaller cities. In 1991, the largest recorded year for crime, this convenience sample of 12 cities accounted for 15% of national Part I crimes in 1991.

B. The Dependent Variable – Observable Crime

To determine the observable crime, an index was created with a subset of the Uniform Crime Report (UCR) Part I crimes that were likely to be observable to the police and likely to be affected by QOL Enforcement. Mainly, the crimes were committed in public view. Murders were excluded from the observable crime index after reviewing expanded homicide data and determining that strangers accounted for 12% of all murders. Forcible Rape was also removed under the same reasoning when it was determined that strangers accounted for 16%. Robbery was included but modified when determined that 66% of robberies were in public view. Aggravated assaults were excluded from the observable crime index when determined that the majority of aggravated assaults were committed by acquaintances and intimates. Larceny Theft was modified to include the 41% of larcenies that were potentially observable and preventable by the police. Auto theft was excluded because no determination of the portion of what was observable or preventable could be determined (Federal Bureau of Investigations, 2012).

The observable crime index was created multiplying the yearly reported robbery crimes of each city by 66% and the yearly reported larceny-theft crimes by 41%. The two crimes were then summed and divided by the population of the city for the specific year as reported by the police agency of the city. The index was then multiplied by 100,000 to produce a standard comparable rate of crimes per 100,000 residents. All crime data and population data was obtained from the Uniform Crime Report for reporting years 1980-2009.

UCR data was chosen over data from the National Incident based reporting System (NIBRS) and the National Crime Victimization Survey (NCVS) due to limitations in both datasets. While there are criticisms of both UCR and NCVS data, since this focus is in police, UCR data is superior (Jacob, 1984, p. 22). None of the cities in the sample participate in NIBRS

(Bureau of Justice Statistics, 2011). While the NCVS produces a valid national figure for incidents of crime, the NVCS does not collect enough data within cities to produce city level figures with any reliability (Bureau of justice Statistics, 2012). Even if the entire NCVS sample was conducted in New York City, the sample would only represent 1.2% of the population of the City of New York.

C. Independent Variables

1. Police Presence

Deterrence theory, routine activities theory and “Broken Windows” benefit from Police Presence. Police Presence fits into deterrence theory by providing a recognizable force whose mission is to deter crime by uniformed patrol and investigation. Police Presence, through apprehension efforts, should provide certainty of prosecution. The appearance of a uniformed patrol officer should deter crimes in the immediate area and give some celerity of apprehension in the same immediate area. Police Presence is also the capable guardian of Routine Activities Theory. The uniformed presence of a police officer should discourage the motivated offender and police officer may harden targets that appear to be soft. Focusing on violations needed for “Broken Windows” needs police officers. Police Presence is helpful for all three theories.

The four predominate methods of measuring Police Presence are total number of sworn officers, police officers per capita, total personnel within police agency, and total police expenditures. The NYPD has an additional measurement called Daily on Patrol Strength. Each has their strengths and shortcomings. After a brief discussion of each method, justification for the police officer per capita will be presented as the best measurement for Police Presence due to the need of having a consistent measure for the entire time frame being examined.

Each year on October 31, for those agencies that participate in the Uniform Crime Report, a snapshot of the total number of sworn personnel is taken. While there are fluctuations in the number of sworn personnel within an agency due to hiring and attrition through retirements and other terminations, most agencies have relatively stable hiring practices within any given year. A given snapshot on October 31 should be reflective of average headcount of police officers in the same year. Sworn officers also reflect the direct law enforcement presence in the city.

Police officer per capita is another common measure of Police Presence. This measure balances disparities of using pure headcount by taking into account population. The UCR publishes police officers per capita data and displays the figure by number of police officers per 100,000 residents. This measure is effective when comparing across cities of different populations and is also effective of demonstrating increased or decreased presence in cities with changing populations. Unfortunately, this measure relies on population estimates provided by the reporting agency. It does not adequately reflect cities that may have difficulty estimating populations due to large fluctuations between census surveys, considerable illegal immigrant populations, or large commuter populations. All of which can vary between years based on economic conditions. This places some concern in the use of police officers per capita comparison.

Total number of personnel, both sworn and not sworn, is another measure of law enforcement effort. This concept takes into account the extremely valuable contributions that “civilian” staff, such as radio dispatchers, telephone operators, laboratory personnel, administrative staff, staff attorneys, and analysts, contribute to police deployment and crime reduction. Total staffing is probably the best measure of true law enforcement effort because it

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takes into account “uniformed” presence that is “not sworn.” Specifically, for the City of New York, Traffic Enforcement Agents and School Safety Agents are a large portion of the NYPD staff that are visible, in uniform, have a deterrent effect on crime, and are not counted in the sworn officer count. Unfortunately, the merging of both Traffic Enforcement Agents and School Safety Agents into the NYPD occurred in 1996 and 1998 respectively, making the use of this measure impractical for the City of New York within the period. Also, this influx makes total sworn personnel difficult to compare with other cities.

Total police expenditures is another measure of law enforcement effort that attempts to take into account other incidentals that some agencies have provided while not necessarily providing staff that would not be evident in a headcount. For example, some agencies might contract with private crime laboratories for forensic analysis at considerable costs to lead to better prosecution and convictions of their arrested offenders. Other agencies suggest that the more they pay for an officer leads to a better quality applicant and more effective police officer. The measure is effective when comparing total police resources between two municipalities that have similar economic conditions and costs of living. However, it is not particularly effective when comparing an extremely affluent city to a poor city. This particular measurement is not superior to any other measure when conducting a longitudinal study across different cities.

Another measure of Police Presence which is unique to the City of New York is Daily On Patrol Strength (DOPS). This figure was collected on the third week of each month to determine how many uniformed officers are physically on patrol. All commands in the NYPD perform a headcount of how many personnel are in radio car and foot patrol. DOPS also accounts for police officers that are assigned for training, court, or other excusals and removes them as appropriate. DOPS is the best measure of uniformed street presence. Unfortunately, DOPS was

started in 1995 and discontinued in 2003. This measure does not span the examination period of 1980 through 2009. Other cities have no equivalent measure.

Since this study has a broad scope among several cities with varying populations and should reflect Police Presence for the entire time period being examined, police officers per capita will be used. DOPS is the best measure, but does not extend through the entire examination period and across all cities. Total sworn personnel, total staffing, and total police expenditures are not as reflective of Police Presence as police officers per capita. Total sworn personnel does not take into account differences in populations among cities or within different years within a city. Total staffing has difficulties due to the merging of traffic and school safety agents. Total police expenditures do not take into account rises due to inflation. Unfortunately, while imperfect, police officers per capita, as reflected in a rate of police officers per 100,000 residents, is the most consistent measure for Police Presence.

Data for staffing levels was obtained from the UCR, *Number of Full Time Law Enforcement Employees, Cities* table for each year. These figures were then divided by the corresponding population reported by the agency in *Number of Offenses Known to the Police, Cities and Towns 10,000 and over in Population* table. The Police Presence rate was standardized by multiplying this figure by 100,000 to obtain a rate of police officers per 100,000.

2. Quality of Life Enforcement

Quality of Life Enforcement is a part of deterrence theory, routine activities theory and “Broken Windows”. When police officers are engaged in QOL Enforcement, would be felons will see the police engaging people, and possibly themselves, and hopefully be deterred from committing a crime. QOL Enforcement, to a limited extent, affects the severity aspect of deterrence theory. With aggressive QOL Enforcement, repeat minor violators identified as

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recidivists are arrested more frequently and are likely placed in custody during arrest to arraignment processing. This interim custody is more severe than a fine and is similar to short periods of incarceration. Under routine activities theory, QOL Enforcement should remove motivated offenders from areas where they normally commit violations and also remove easy targets that may commit violations as well. The foundation of “Broken Windows” is enforcement of violations deemed to affect the quality of life of a neighborhood.

Quality of Life Enforcement, while having several definitions, focuses on low level offenses. Low level offenses have been generally interpreted to be violations and/or misdemeanors. Some of these offenses cited as QOL infractions are public urination, drinking alcoholic beverages in public, littering, trespassing, and loitering. QOL misdemeanors range from smoking marijuana, simple assault, vandalism, graffiti, and prostitution. While not exhaustive, the above activities cover what most people perceive as QOL.

Measuring quality of life enforcement becomes problematic since QOL Enforcement can lead to either an arrest or a summons. While misdemeanor arrests are regularly reported in the UCR, summons enforcement is not. It is highly likely that most QOL Enforcement would lead to the issuance of summonses and the measurement of criminal court summonses would be the best measure. Statistics for the issuance of summonses within the City of New York is available and reliable from 1995 onward. Unfortunately, these figures are not publicly available prior to 1995 or available in other cities.

If an agency is engaged in QOL Enforcement, the agency's misdemeanor arrest figures must increase to some degree. These increases are measurable and should show difference in effort prior to the QOL initiative. To accomplish the measurement of QOL Enforcement, the surrogate of arrests for certain Part II offenses related to QOL in the UCR was initially

considered. An index created by summing the total number of arrests for vandalism, weapons carrying, prostitution, drug abuse, gambling, drunkenness, disorderly conduct, vagrancy, and curfew laws is probably the best indicator of QOL Enforcement. This data is available from 1980 through 2001. Unfortunately, the NYPD has not reported Part II offenses to the UCR from 2002 until present.ⁱ

The introduction of the Rockefeller Drug Laws in 1973 mandated reporting of drug related arrests by each agency within the State of New York. This reporting is consistent and spans the time period from 1980 through 2009. This mandated reporting requires all controlled substance arrests as defined by section 220 of the NYS Penal Law (pertaining predominantly to cocaine and opiates) and certain offenses under section 221 of the NYS Penal Law (pertaining specifically to marijuana). Therefore, arrests for drug offenses by the NYPD can be measured for the entire 30 year period. These arrests are also the same arrests that are reported as Drug Abuse Violations in Part II Arrests of the UCR.

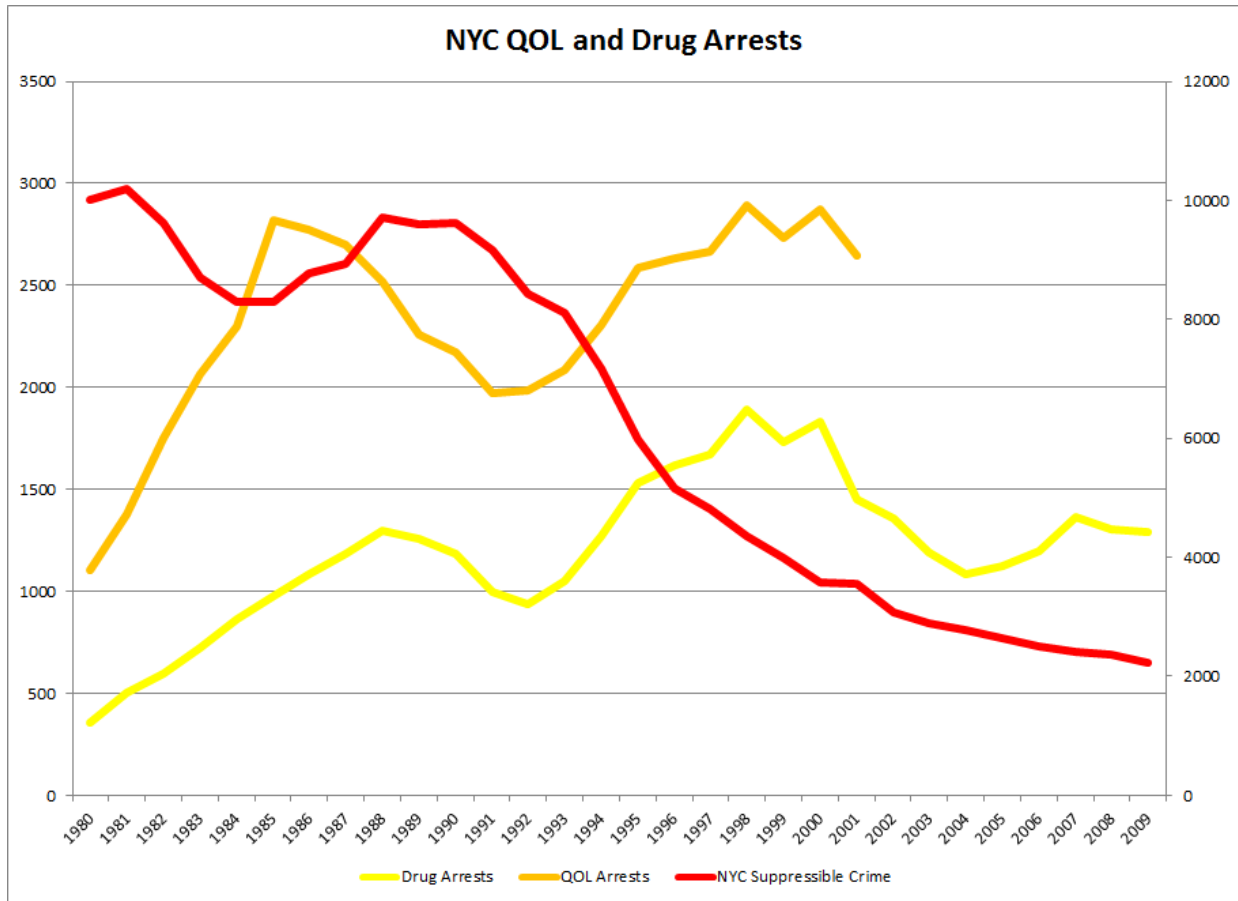


Figure 1 - NYC QOL and Drug Arrests

Examining the chart above shows how close drug arrests parallel QOL Enforcement from 1980 through 2001. Drug arrests are a suitable surrogate for all QOL Enforcement.

In order to compare between cities, drug arrests as reported in the UCR’s Part II Arrests by Race and Age for each city were selected. With the exception of the eight cases from 2002 through 2009 for New York City mentioned earlier replaced by figures reported to New York State’s Department of Criminal Justice Services, there were an additional 9 missing cases: Dallas 1980, Honolulu 1989, Houston 1980, 1981, and 1988, Las Vegas 1980 and 1997, San Antonio 1996, and San Jose 2004. The total drug arrests were then divided by corresponding population reported by the agency in *Number of Offenses Known to the Police, Cities and Towns 10,000 and*

over in Population table. This figure was multiplied by 100,000 to obtain a standardized figure of QOL Enforcement arrests per 100,000 residents.

3. Controls

While many studies controlled for demographics, the methods were questionable. The use of interpolation of years between decennial US Census data has concerns of validity and assumes that growth or loss of percentages would act in a linear fashion. There is no support for this assumption. It is possible that a large influx of people can enter a city in a single year and change the racial and age makeup of the city. This influx can remain in the city and establish the new proportions for the next census or can come and go between censuses. For example, Houston's population can vary greatly during periods of oil leaks from the refineries on the Gulf Coast bringing in young males between 21-30 years of age. Therefore, use of interpolated US Census data will not be used.

The most local level of economic indicators, specifically per capita income and unemployment, is available on a yearly basis at the county level. While county level data is extremely local, it does not directly capture the economic conditions of the cities within it. A poor city could exist in an affluent county where the per capita income of the residents in the suburbs is much higher than the city residents producing a county per capita income that is not reflective of the city. Unfortunately, there is no reliable indicator of the economy of cities on a yearly basis.

Prison data is predominantly captured at the state level. Most states track new commitments at the county level on a yearly basis as part of their annual reports. This accounting at the county level is based on the fact that county courts are responsible for the trial and sentencing of felons in most states and all of the states of the cities in the sample. Felons are

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not tried in city courts, so most state department of corrections do not track commitments for cities. For the sample cities, new commitments are available for New York, Philadelphia, Las Vegas, and Honolulu. These jurisdictions are comprised of whole counties. Unfortunately, prison population or commitments cannot be controlled for all 12 cities.

V. Analysis and Results

A. Missing Data

The dependent variable, Observable Crime, was missing one data point from Houston in 1981. The Quality of Life Index had 9 missing data points from the following cities: Dallas 1980, Honolulu 1989, Houston, 1980, 1981, and 1988, Las Vegas 1980 and 1987, San Antonio 1996, and San Jose 2004. Houston's missing observable crime data and QOL Index data coincided to the same year. A total of 9 cases had missing data out of a dataset of 360. Listwise deletion of 1 case was performed for the ANOVA of Observable Crime between cities. Listwise deletion of 9 cases for the model was performed reducing the dataset to 351 cases. This is 2.5% of the cases and within missing data guidelines for the use of listwise deletion.

B. Comparison of Means between Cities

An Analysis of Variance (ANOVA) was conducted to determine if there was any difference between observable crime rates between cities. The test was performed on 359 cases and excluded the 1981 Houston case with missing data. A difference in the means of observable crimes between cities was found $F(11,358)=26.186$, $MSe=218590.3$, $p<0.001$.

Table 1 - ANOVA of Crime Rates within Cities

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	62964540	11	5724049	26.186	0
Within Groups	75850821	347	218590.3		
Total	1.39E+08	358			

A Tukey HSD Post Hoc test was also performed to determine which particular cities were different from other cities.

Table 2 - Post Hoc Test of ANOVA for Differences between Cities

(I) City	(J) City	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Chicago	Dallas	-610.16391*	120.7174	0	-1007.3936	-212.9342
	Honolulu	381.94248	120.7174	0.072	-15.2872	779.1722
	Houston	189.63009	121.7536	0.923	-211.0094	590.2695
	Las Vegas	438.41015*	120.7174	0.017	41.1805	835.6398
	Los Angeles	458.59876*	120.7174	0.009	61.3691	855.8285
	New York	464.52007*	120.7174	0.008	67.2904	861.7498
	Philadelphia	557.22728*	120.7174	0	159.9976	954.457
	Phoenix	-43.43002	120.7174	1	-440.6597	353.7997
	San Antonio	-357.4812	120.7174	0.125	-754.7109	39.7485
	San Diego	676.08494*	120.7174	0	278.8553	1073.3146
	San Jose	897.80878*	120.7174	0	500.5791	1295.0385
Dallas	Chicago	610.16391*	120.7174	0	212.9342	1007.3936
	Honolulu	992.10638*	120.7174	0	594.8767	1389.3361
	Houston	799.79399*	121.7536	0	399.1545	1200.4334
	Las Vegas	1048.57405*	120.7174	0	651.3444	1445.8037
	Los Angeles	1068.76267*	120.7174	0	671.533	1465.9924
	New York	1074.68398*	120.7174	0	677.4543	1471.9137
	Philadelphia	1167.39118*	120.7174	0	770.1615	1564.6209
	Phoenix	566.73389*	120.7174	0	169.5042	963.9636
	San Antonio	252.6827	120.7174	0.628	-144.547	649.9124
	San Diego	1286.24885*	120.7174	0	889.0192	1683.4785
	San Jose	1507.97268*	120.7174	0	1110.743	1905.2024
Honolulu	Chicago	-381.94248	120.7174	0.072	-779.1722	15.2872
	Dallas	-992.10638*	120.7174	0	-1389.3361	-594.8767
	Houston	-192.31239	121.7536	0.915	-592.9518	208.3271
	Las Vegas	56.46767	120.7174	1	-340.762	453.6974
	Los Angeles	76.65629	120.7174	1	-320.5734	473.886
	New York	82.57759	120.7174	1	-314.6521	479.8073
	Philadelphia	175.2848	120.7174	0.952	-221.9449	572.5145
	Phoenix	-425.37249*	120.7174	0.024	-822.6022	-28.1428
	San Antonio	-739.42368*	120.7174	0	-1136.6534	-342.194
	San Diego	294.14246	120.7174	0.384	-103.0872	691.3722
	San Jose	515.86630*	120.7174	0.001	118.6366	913.096

Table 2 - Continued

(I) City	(J) City	Mean Difference (I- J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Houston	Chicago	-189.63009	121.7536	0.923	-590.2695	211.0094
	Dallas	-799.79399*	121.7536	0	-1200.4334	-399.1545
	Honolulu	192.31239	121.7536	0.915	-208.3271	592.9518
	Las Vegas	248.78006	121.7536	0.663	-151.8594	649.4195
	Los Angeles	268.96868	121.7536	0.544	-131.6708	669.6081
	New York	274.88999	121.7536	0.509	-125.7495	675.5294
	Philadelphia	367.59719	121.7536	0.107	-33.0423	768.2366
	Phoenix	-233.0601	121.7536	0.75	-633.6996	167.5793
	San Antonio	-547.11129*	121.7536	0.001	-947.7507	-146.4718
	San Diego	486.45486*	121.7536	0.004	85.8154	887.0943
	San Jose	708.17869*	121.7536	0	307.5392	1108.8181
Las Vegas	Chicago	-438.41015*	120.7174	0.017	-835.6398	-41.1805
	Dallas	-1048.57405*	120.7174	0	-1445.8037	-651.3444
	Honolulu	-56.46767	120.7174	1	-453.6974	340.762
	Houston	-248.78006	121.7536	0.663	-649.4195	151.8594
	Los Angeles	20.18862	120.7174	1	-377.0411	417.4183
	New York	26.10992	120.7174	1	-371.1198	423.3396
	Philadelphia	118.81713	120.7174	0.998	-278.4126	516.0468
	Phoenix	-481.84016*	120.7174	0.005	-879.0699	-84.6105
	San Antonio	-795.89135*	120.7174	0	-1193.121	-398.6617
	San Diego	237.6748	120.7174	0.714	-159.5549	634.9045
	San Jose	459.39863*	120.7174	0.009	62.1689	856.6283
Los Angeles	Chicago	-458.59876*	120.7174	0.009	-855.8285	-61.3691
	Dallas	-1068.76267*	120.7174	0	-1465.9924	-671.533
	Honolulu	-76.65629	120.7174	1	-473.886	320.5734
	Houston	-268.96868	121.7536	0.544	-669.6081	131.6708
	Las Vegas	-20.18862	120.7174	1	-417.4183	377.0411
	New York	5.92131	120.7174	1	-391.3084	403.151
	Philadelphia	98.62851	120.7174	1	-298.6012	495.8582
	Phoenix	-502.02878*	120.7174	0.002	-899.2585	-104.7991
	San Antonio	-816.07997*	120.7174	0	-1213.3097	-418.8503
	San Diego	217.48618	120.7174	0.816	-179.7435	614.7159
	San Jose	439.21001*	120.7174	0.016	41.9803	836.4397

Table 2 - Continued

(I) City	(J) City	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
New York	Chicago	-464.52007*	120.7174	0.008	-861.7498	-67.2904
	Dallas	-1074.68398*	120.7174	0	-1471.9137	-677.4543
	Honolulu	-82.57759	120.7174	1	-479.8073	314.6521
	Houston	-274.88999	121.7536	0.509	-675.5294	125.7495
	Las Vegas	-26.10992	120.7174	1	-423.3396	371.1198
	Los Angeles	-5.92131	120.7174	1	-403.151	391.3084
	Philadelphia	92.7072	120.7174	1	-304.5225	489.9369
	Phoenix	-507.95009*	120.7174	0.002	-905.1798	-110.7204
	San Antonio	-822.00127*	120.7174	0	-1219.231	-424.7716
	San Diego	211.56487	120.7174	0.842	-185.6648	608.7946
San Jose	433.28871*	120.7174	0.019	36.059	830.5184	
Philadelphia	Chicago	-557.22728*	120.7174	0	-954.457	-159.9976
	Dallas	-1167.39118*	120.7174	0	-1564.6209	-770.1615
	Honolulu	-175.2848	120.7174	0.952	-572.5145	221.9449
	Houston	-367.59719	121.7536	0.107	-768.2366	33.0423
	Las Vegas	-118.81713	120.7174	0.998	-516.0468	278.4126
	Los Angeles	-98.62851	120.7174	1	-495.8582	298.6012
	New York	-92.7072	120.7174	1	-489.9369	304.5225
	Phoenix	-600.65729*	120.7174	0	-997.887	-203.4276
	San Antonio	-914.70848*	120.7174	0	-1311.9382	-517.4788
	San Diego	118.85767	120.7174	0.998	-278.372	516.0874
San Jose	340.5815	120.7174	0.176	-56.6482	737.8112	
Phoenix	Chicago	43.43002	120.7174	1	-353.7997	440.6597
	Dallas	-566.73389*	120.7174	0	-963.9636	-169.5042
	Honolulu	425.37249*	120.7174	0.024	28.1428	822.6022
	Houston	233.0601	121.7536	0.75	-167.5793	633.6996
	Las Vegas	481.84016*	120.7174	0.005	84.6105	879.0699
	Los Angeles	502.02878*	120.7174	0.002	104.7991	899.2585
	New York	507.95009*	120.7174	0.002	110.7204	905.1798
	Philadelphia	600.65729*	120.7174	0	203.4276	997.887
	San Antonio	-314.05119	120.7174	0.283	-711.2809	83.1785
	San Diego	719.51496*	120.7174	0	322.2853	1116.7447
San Jose	941.23880*	120.7174	0	544.0091	1338.4685	

Table 2 - Continued

(I) City	(J) City	Mean Difference (I- J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
San Antonio	Chicago	357.4812	120.7174	0.125	-39.7485	754.7109
	Dallas	-252.6827	120.7174	0.628	-649.9124	144.547
	Honolulu	739.42368*	120.7174	0	342.194	1136.6534
	Houston	547.11129*	121.7536	0.001	146.4718	947.7507
	Las Vegas	795.89135*	120.7174	0	398.6617	1193.121
	Los Angeles	816.07997*	120.7174	0	418.8503	1213.3097
	New York	822.00127*	120.7174	0	424.7716	1219.231
	Philadelphia	914.70848*	120.7174	0	517.4788	1311.9382
	Phoenix	314.05119	120.7174	0.283	-83.1785	711.2809
	San Diego	1033.56615*	120.7174	0	636.3365	1430.7958
	San Jose	1255.28998*	120.7174	0	858.0603	1652.5197
San Diego	Chicago	-676.08494*	120.7174	0	-1073.3146	-278.8553
	Dallas	-1286.24885*	120.7174	0	-1683.4785	-889.0192
	Honolulu	-294.14246	120.7174	0.384	-691.3722	103.0872
	Houston	-486.45486*	121.7536	0.004	-887.0943	-85.8154
	Las Vegas	-237.6748	120.7174	0.714	-634.9045	159.5549
	Los Angeles	-217.48618	120.7174	0.816	-614.7159	179.7435
	New York	-211.56487	120.7174	0.842	-608.7946	185.6648
	Philadelphia	-118.85767	120.7174	0.998	-516.0874	278.372
	Phoenix	-719.51496*	120.7174	0	-1116.7447	-322.2853
	San Antonio	-1033.56615*	120.7174	0	-1430.7958	-636.3365
	San Jose	221.72384	120.7174	0.797	-175.5059	618.9535
San Jose	Chicago	-897.80878*	120.7174	0	-1295.0385	-500.5791
	Dallas	-1507.97268*	120.7174	0	-1905.2024	-1110.743
	Honolulu	-515.86630*	120.7174	0.001	-913.096	-118.6366
	Houston	-708.17869*	121.7536	0	-1108.8181	-307.5392
	Las Vegas	-459.39863*	120.7174	0.009	-856.6283	-62.1689
	Los Angeles	-439.21001*	120.7174	0.016	-836.4397	-41.9803
	New York	-433.28871*	120.7174	0.019	-830.5184	-36.059
	Philadelphia	-340.5815	120.7174	0.176	-737.8112	56.6482
	Phoenix	-941.23880*	120.7174	0	-1338.4685	-544.0091
	San Antonio	-1255.28998*	120.7174	0	-1652.5197	-858.0603
	San Diego	-221.72384	120.7174	0.797	-618.9535	175.5059

* The mean difference is significant at the 0.05 level.

Discussing the cities in descending order of uniqueness, that is, the cities that are the most dissimilar from the other cities, Dallas ranked first. Dallas is unique to all cities except for San Antonio and has the highest average observable crime rate. San Jose is similar only to Dallas and Philadelphia and has the lowest mean observable crime rate. San Antonio and Phoenix are unique to 8 cities and have the second and third highest observable mean crime rates respectively. Chicago is dissimilar from 7 other cities and interestingly is different from New York, Los Angeles, and Philadelphia. Houston, Las Vegas, Los Angeles, New York, and San Diego are dissimilar from 5 other cities making them common. Las Vegas, Los Angeles, New York, and San Diego were all dissimilar from Chicago, Dallas, Phoenix, San Antonio, and San Jose. Honolulu and Philadelphia are unique from 4 cities, but only share Phoenix and San Antonio as dissimilar cities.

Most of these differences can be explained by the overall trend of observable crime for certain cities. As can be observed in Figure 2, Las Vegas, Los Angeles, New York, and San Diego had similar observable crime rates and a similar trend of crime peaking between 1988 to 1991 and steadily decreasing to less than half the observable crime rate from the peak. This disproves the uniqueness of New York City that some have claimed (Bratton & Knobler, 1998), (Zimring, 2007).

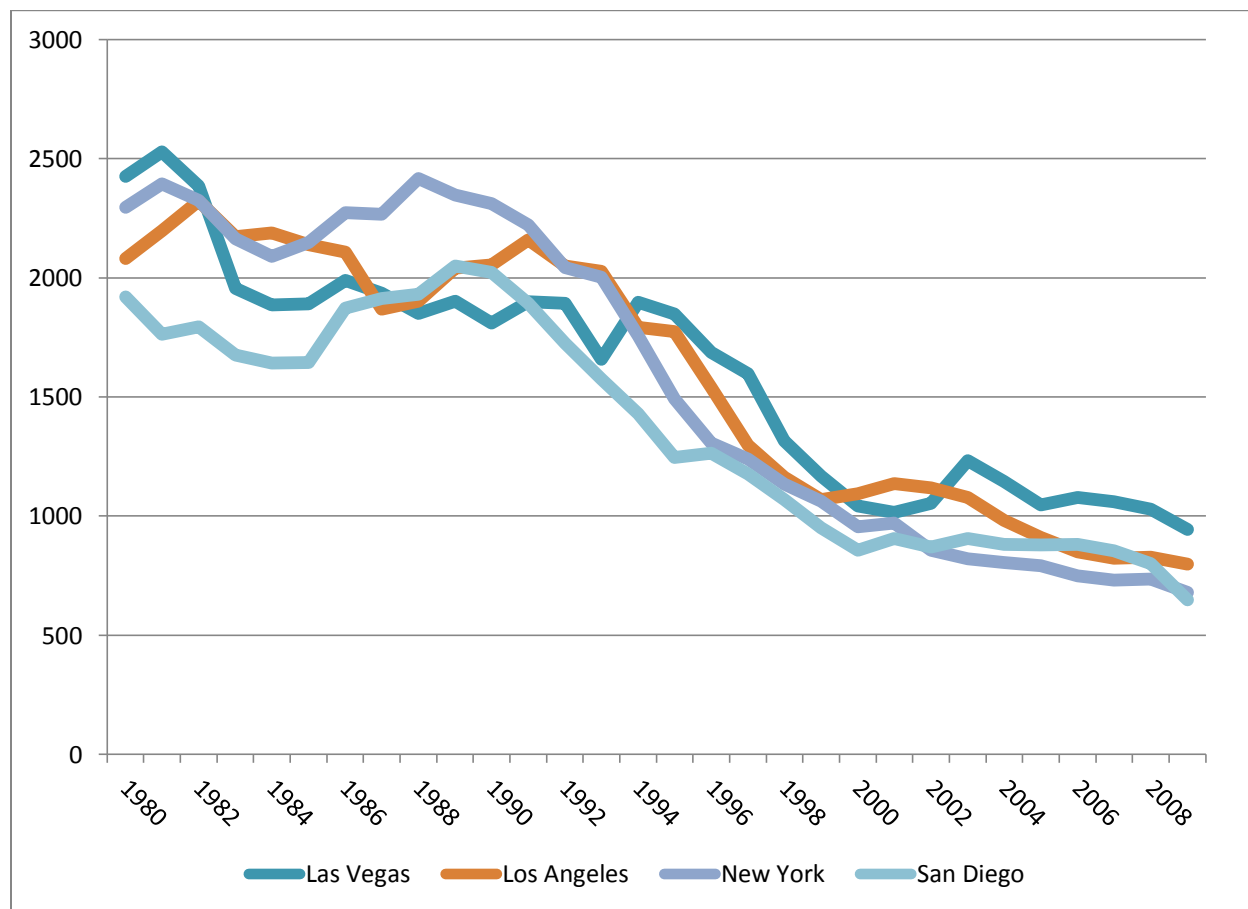


Figure 2 - Observable Crime for NYC, Los Angeles, Las Vegas, and San Diego 1980-2009

Las Vegas started at 2,427 Observable Crimes per 100,000, had a slight rise the following year then declined to a low of 1,886 observable crimes per 100,000 in 1984. Las Vegas maintained a bumpy, downward trend to 1,657 Observable Crimes per 100,000 in 1993,

followed by a quick rise to 1,987 the following year and starting a rapid seven year decline to 1,014 Observable Crimes per 100,000 in 2001. Peaking again in 2003 to 1,232 Observable Crimes per 100,000, Las Vegas declined to 944 Observable Crimes per 100,000 in 2009. Las Vegas had the most erratic police staffing year by year of all cities in the study fluctuating 151 to 240 police officers per 100,000. Las Vegas started with an aggressive QOL Enforcement effort in the beginning of the period to 1,021 QOL Arrests per 100,000 1989 starting from 509 QOL Arrests per 100,000 in 1981. After 1989, Las Vegas steadily reduced QOL Enforcement effort to 389 QOL Arrests per 100,000 in 2003 before being reinvigorated to 785 QOL Arrests per 100,000 in 2009.

Los Angeles started the period with 2,081 Observable Crimes per 100,000 in 1980, increased to a high of 2,323 Observable Crimes per 100,000 in 1982, then steadily declined to 1,913 Observable Crimes per 100,000 in 1987. After a four year increase to 2,160 Observable Crimes per 100,000 in 1991, Los Angeles had a steady decline to 1,069 Observable Crimes per 100,000 in 1999. Following a slight bump to 1,135 Observable Crimes per 100,000, Los Angeles finished the thirty year period decreasing to 799 Observable Crimes per 100,000 in 2009. Starting with 223 police officers per 100,000 in 1980, Los Angeles had a bumpy rise in Police Presence to 268 police officers per 100,000 in 1997 and has remained above 235 police officers per 100,000 throughout the rest of the 30 year period. Los Angeles started the period increasing its QOL Enforcement from 589 QOL Arrests per 100,000 in 1980 to 1,340 QOL Arrests per 100,000 in 1989. After 1989, Los Angeles had a bumpy decline in its QOL Enforcement efforts to 429 QOL Arrests per 100,000 in 2009.

Starting with 2,297 Observable Crimes per 100,000 in 1980, New York increased to 2,395 Observable Crimes per 100,000 before declining to 2,089 Observable Crimes per 100,000

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in 1984. New York increased in Observable Crimes to a peak of 2,417 Observable Crimes per 100,000 in 1988 and has steadily decreased, with a few bumps, to 680 Observable Crimes per 100,000. New York had a steady increase in Police Presence from 321 police officers per 100,000 in 1980 to 563 police officers per 100,000 in 1999 with a notable jump of 100 police officers per 100,000 between 1994 and 1995. After 1999, New York decreased its Police Presence gradually to 417 police officers per 100,000 in 2009. New York had a steady increase in QOL Enforcement from 354 QOL Arrests per 100,000 in 1980 to 1,299 QOL Arrests per 100,000 in 1989, experienced a three year dip in effort to 936 QOL Arrests per 100,000 in 1992, followed by a steady increase to its peak of 1,890 QOL Arrests per 100,000 in 1998. New York then decreased its QOL Enforcement efforts to 1,082 QOL Arrests per 100,000 in 2004 followed by an increase in effort to 1,293 QOL Arrests per 100,000 by 2009.

San Diego started the period with 1,919 Observable Crimes per 100,000 in 1980 to a four year bumpy decrease to 1,645 Observable Crimes per 100,000 in 1985. Following a four year increase to 2,051 Observable Crimes per 100,000 in 1989, San Diego had a consistent, but bumpy, decline in crime to 649 Observable Crimes per 100,000 in 2009. San Diego and New York had the closest Observable Crimes rate patterns which approached the same rate towards the end of the 30 year period. San Diego maintained a Police Presence between 150 to 172 police officers per 100,000 through the 30 year period. San Diego maintained aggressive QOL Enforcement throughout the 30 year period keeping above 1,000 QOL Arrests per 100,000 for all but seven years.

Los Angeles, New York, and San Diego have similar hiring practices for police officers, albeit, at different levels. In other words, while the police officer rates were different among the cities, all three cities shared a similar pattern of a gradual rise until 1992. After 1992, the three

cities aggressively hired police officers to a high point ranging between 1998 through 2000 and gradually decreased staffing to 2004. After the three cities experienced a stabilization of crime, staffing levels stabilized.

QOL Arrest rates for all four cities did not have any similarity. Las Vegas, Los Angeles, and San Diego peaked in QOL Arrests in 1989 and decreased its QOL Enforcement in the following years. New York steadily increased its QOL Enforcement through 1988, had a slight decline through 1992, and then had a rapid rise through 1998. The enforcement patterns showed no common thread.

Chicago, Dallas, Phoenix, and San Antonio had high observable crime rates that never dipped below 1500 observable crimes per 100,000. As can be seen in figure 3, all four cities had similar Observable Crime trends with different values from 1980 through 1994. In 1995 all four cities converge to Observable Crime rates between 2,100 to 2,500 Observable crimes per 100,000 in 2009. After 2000, Dallas and San Antonio decrease at a separate rate from Chicago and Phoenix. These cities that remained with high Observable Crime rates at the end of the 30 year period were analyzed separately below.

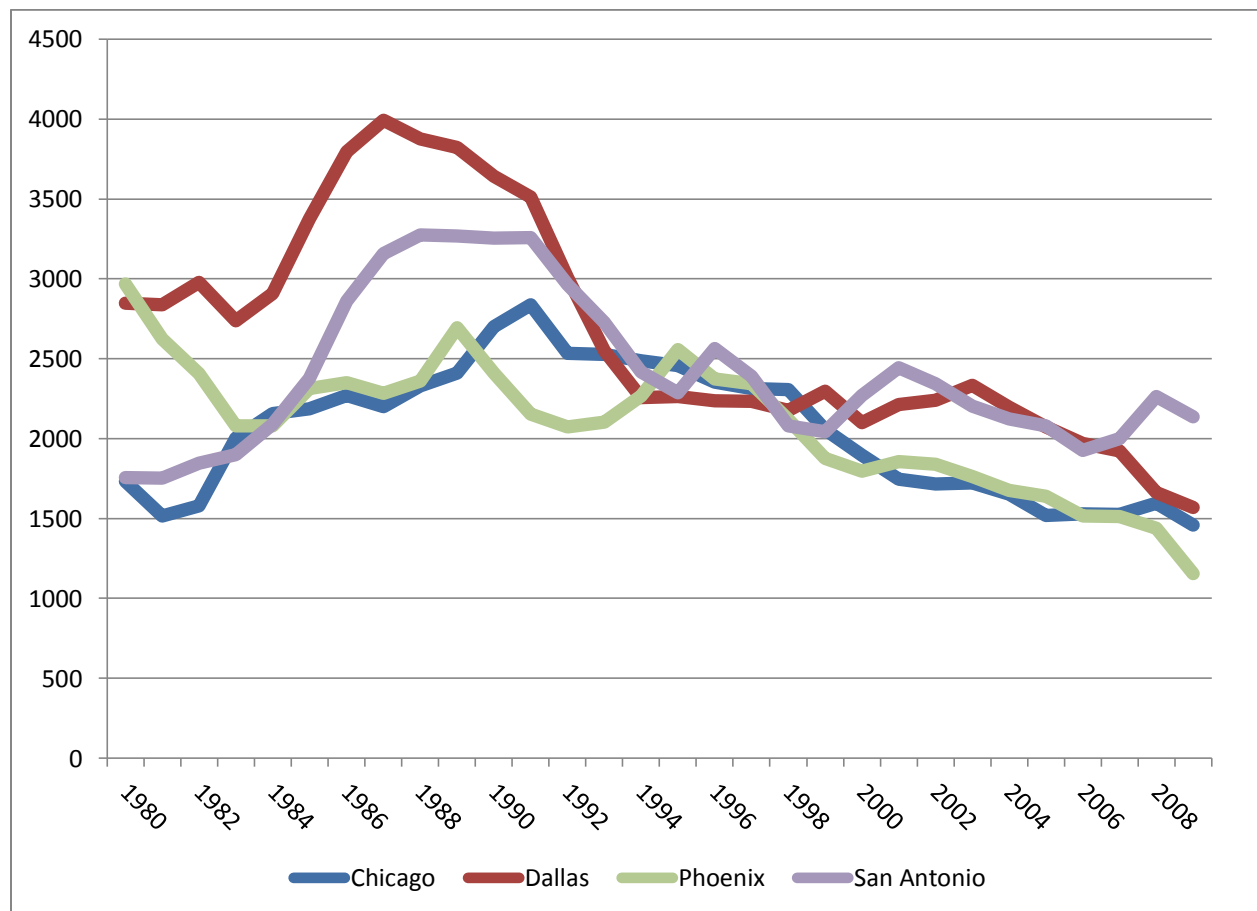


Figure 3 - Observable Crime Rates for Chicago, Dallas, Phoenix, and San Antonio 1980-2009

Chicago started the 30 year period with 1,734 Observable Crimes per 100,000 in 1980 and had a bumpy increase to 2,839 Observable Crimes per 100,000 in 1991. Following 1991,

Chicago had a steady and bumpy decrease to 1,458 Observable Crimes per 100,000. Chicago had a large Police Presence consistently over 400 police officers per 100,000 residents and ranked in the top two cities with the exception of 1999. Ranking first place in QOL Enforcement from 1995 onward, Chicago was in a class of its own with over 1,500 QOL arrests per 100,000 from 1995 through 2009. No other similarities can be seen between Chicago and the other cities.

Dallas had a large rise from 2,848 Observable Crimes per 100,000 in 1980 to 3,992 Observable Crimes per 100,000 in 1987. Dallas experienced a rapid crime decline to 2,255 Observable Crimes per 100,000 in 1994 and kept a steady and bumpy Observable Crime rate through 2001. With a slight rise to 2,333 Observable Crimes per 100,000 in 2003, Dallas steadily declined to 1,570 Observable Crimes per 100,000 in 2009. Dallas increased its Police Presence to 278 police officers per 100,000 in 1991 from 221 police officers per 100,000 in 1980. Dropping to 229 police officers per 100,000 in 2002, Dallas increased its staffing to 277 police officers per 100,000 in 2009. Dallas' QOL Enforcement steadily declined throughout the entire 30 year period.

Phoenix stated the 30 year period 2,969 Observable Crimes per 100,000 and quickly declined to 2,079 Observable Crimes per 100,000 in 1983 before rising to 2,659 Observable Crimes per 100,000 in 1989. After a three year decline to 2,072 Observable Crimes per 100,000 in 1992, Phoenix increased to 2,558 Observable Crimes per 100,000 in 1995 before steadily declining to 1,156 Observable Crimes per 100,000 in 2009. Phoenix had a stable Police Presence throughout the 30 year period hovering around 200 police officers per 100,000. Phoenix had a steady increase in QOL Enforcement to a peak of 614 QOL Arrests per 100,000 in 1998 before declining to 410 QOL Arrests per 100,000 at the end of the period.

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Starting with 1,755 Observable Crimes per 100,000 in 1980, San Antonio steadily increased crime to 3,275 Observable Crimes per 100,000 in 1988. Following a steady Observable Crime rate through 1991, San Antonio had a bumpy 8 year decline to 2,043 Observable Crimes per 100,000 in 1999. With a rise and fall, San Antonio finished the 30 year period with 2,135 Observable Crimes per 100,000 in 2009 and was the only city to have an increase in Observable Crimes from its 1980 rate. San Antonio had a low Police Presence throughout the 30 year period fluctuating between 132 to 182 police officers per 100,000. After 2002, San Antonio's QOL Enforcement started to aggressively pick up from 480 QOL Arrests per 100,000 to a high of 1,146 QOL Arrests per 100,000 in 2006.

Dallas, by far, had the highest Observable Crime rate for all of the cities and ranked in the top three cities for the entire period. San Antonio originally started in the lower half of cities in crime in the beginning of the 30 year period, then started gaining ranking to second place in 1985. Dallas and San Antonio have similar Observable Crimes rate trends. Phoenix also had similar Observable Crime rate trends with the exception of a spike that peaked in 1995. Outside of Dallas and San Antonio being part of Texas and all three cities being located in the southwest, the Police Presence and QOL Enforcement were dissimilar.

Honolulu, Houston, Philadelphia, and San Jose are four cities that do not fall into the previous two groups of cities in trend or rates of Observable Crime. Honolulu, Houston, and San Jose have similar values of Observable Crime rates in 1980. The three cities take separate paths. San Jose has a continuous decline with bumps through the entire 30 years. Houston peaks in 1990 and continues to fall until 1995, then stabilizes for the next 14 years. Honolulu has peaks and valleys throughout its 30 year period. Philadelphia's trend in observable crimes is unorthodox and incomparable to any other city. A more detailed analysis of each city follows below.

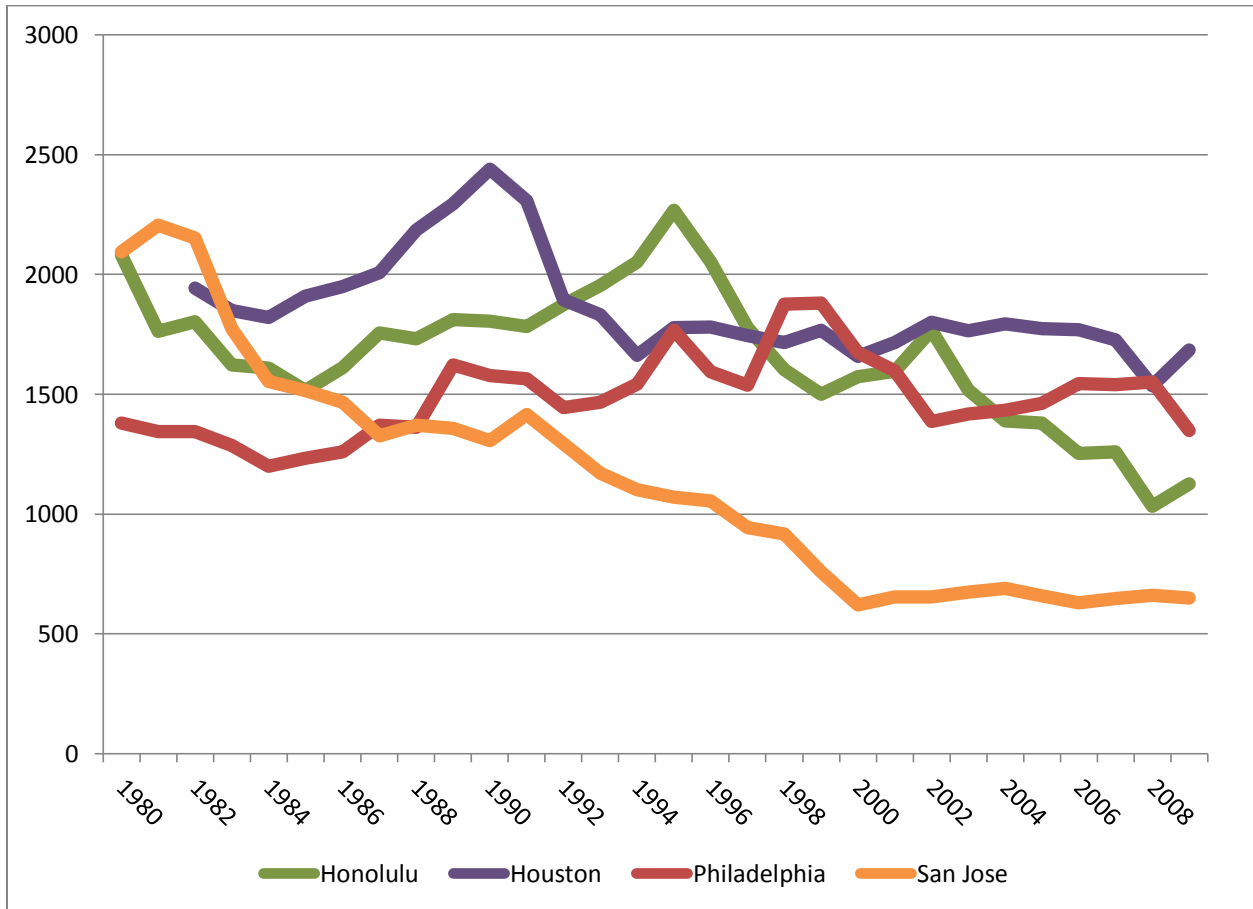


Figure 4 - Observable Crime Rates for Honolulu, Houston, Philadelphia, and San Jose 1980-2009

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Honolulu started the 30 year period with 2,081 Observable Crimes per 100,000 in 1980 and declined to 1,517 Observable Crimes per 100,000 by 1985 before rising to 2,267 Observable Crimes per 100,000 in 1995. After a four year decline to 1,500 Observable Crimes per 100,000 in 1999, Honolulu increased crime to 1,766 Observable Crimes per 100,000 in 2002 and finally declined in crime to 1,126 Observable Crimes per 100,000 in 2009. Honolulu had a police presence fluctuating between 157 to 235 police officers per 100,000 with no clearly observable pattern affecting its Observable Crime. With the exception of a peak to 476 QOL Arrests per 100,000 in 1984, Houston had a continuous decline in QOL Enforcement through the 30 year period,

Starting with 1,680 Observable Crimes per 100,000, Houston initially declined in crime to 1,821 Observable Crimes per 100,000 in 1984 and rose in crime to its peak of 2,439 Observable Crimes per 100,000 in 1990. After a four year decline to 1,663 Observable Crimes per 100,000 in 1994, Houston maintained a bumpy, but steady Observable Crime rate through the rest of the 30 year period ending with 1,684 Observable Crimes per 100,000 in 2009. Houston increased its Police Presence from 195 police officers per 100,000 in 1980 to 303 police officers per 100,000 in 1997. After 1997, Houston decreased its Police Presence to 236 police officers per 100,000 in 2009. While Houston had a QOL Enforcement effort in the 30 year period, it did not place great effort into QOL Enforcement until after 2005.

Philadelphia started the 30 year period with 1,380 Observable Crimes per 100,000 in 1980, declined in crime to a low of 1,199 Observable Crimes per 100,000 in 1984, and had a continuous, bumpy crime rise through 1999 to 1,881 Observable Crimes per 100,000. After a 3 year decline to 1,387 Observable Crimes per 100,000 in 2002, Philadelphia increased in crime to 1,551 Observable Crimes per 100,000 in 2008 prior to finishing with 1,350 Observable Crimes

per 100,000 in 2009. Philadelphia had a large police presence that remained in the top three rankings for the 30 year period maintaining a rate above 365 police officers per 100,000. While Philadelphia had some effort in QOL Enforcement through the 30 year period, it only started seriously picking up its QOL Enforcement after 1996. By 2000, Philadelphia increased its QOL Enforcement to 1,416 QOL Arrests per 100,000. This coincided with its modest crime decline in the same period. Outside of similarities in staffing with Chicago and New York, Philadelphia did not have any similarities with other cities.

San Jose had a unique experience in Observable Crime rates with a consistent decline throughout the entire period and maintained a low Observable Crime rate ranking in the lowest three cities. Starting with 2.094 Observable Crimes per 100,000, San Jose spiked to 2,205 Observable Crimes per 100,000 in 1981 prior to a steady decrease through 2000 to 622 Observable Crimes per 100,000. After 2000, San Jose maintained a steady crime rate and finished with 649 Observable Crimes per 100,000 in 2009. While San Jose did increase its Police Presence, it consistently had the lowest Police Presence throughout the entire period with the exception of three years and never broke more than 160 police officers per 100,000. San Jose was quick to start and increase QOL Enforcement breaking 1,200 QOL Arrests per 100,000 by 1986.

C. General Linear Model

Having determined a significant difference between cities, a preliminary analysis of the variables was performed to determine suitability of assumptions for inclusion in a General Linear Model. Analysis of the variables provided the following descriptive statistics and has been presented below:

Table 3 - Descriptive Statistics

	N	Mean	Std. Deviation
	Statistic	Statistic	Statistic
Observable Crime	359	1789.466	622.69768
Police Presence	360	258.9	108.8157132
QOL Enforcement	351	776.6549	427.6671662

In addition to the mean and standard deviations reported above, the variables were tested for skewness and kurtosis and all were found to be within acceptable levels with absolute values below 1.

A correlation analysis was performed to determine if any of the variables had potential correlation issues. Police Presence had a positive correlation to QOL Enforcement but well below the 0.80 threshold that would indicate concerns for collinearity.

Table 4 - Bivariate Correlations of Variables

Correlations		Observable Crime	Police Presence	QOL Enforcement
Observable Crime	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	359		
Police Presence	Pearson Correlation	-0.042	1	
	Sig. (2-tailed)	0.424		
	N	359	360	
QOL Enforcement	Pearson Correlation	-.154**	.529**	1
	Sig. (2-tailed)	0.004	0	
	N	351	351	351

** Correlation is significant at the 0.01 level (2-tailed).

Due to missing data, a GLM was run using 351 cases testing the effect of Police Presence and QOL Enforcement on Observable Crime. The model proved to be significant ($F(2,348)=4.591, p=0.011$) and explained 2.6% of the variance.

A review of the coefficients shows that QOL Enforcement ($B=-0.264, t=-2.915, p=0.004$) was a significant factor in reducing observable crime controlling for Police Presence. The 95% confidence interval for Police Presence has a large range from -0.399 to 0.99 across zero demonstrating that Police Presence was an unreliable estimate. QOL Enforcement had a 95% confidence interval between -0.442 and -0.086 making QOL Enforcement a reliable estimate.

Table 5 - Coefficients of Model

	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error				Lower Bound	Upper Bound
(Constant)	1913.358	87.418		21.887	0	1741.424	2085.293
Police Officer Presence	0.296	0.353	0.052	0.838	0.403	-0.399	0.99
QOL Enforcement	-0.264	0.091	-0.182	-2.915	0.004	-0.442	-0.086

For every increase in QOL Enforcement per 100,000 people, a reduction of 0.264 observable crimes per 100,000 can be expected. In a city with 1,000,000 residents, if the police made 100 arrests for QOL Enforcement, a decrease of 2.64 observable crimes could be expected.

D. Results of Test of Hypotheses

The results of the individual hypotheses are presented below.

RH_0 : The following variables did not contribute to the reduction of observable crime from 1980-2009 was disproved.

H_1 : Police Presence had a significant impact on the reduction of observable crime from 1980-2009 was not proven. While the primary null hypothesis was disproven, the GLM demonstrated no significant effect.

H_2 : QOL Enforcement had a significant impact on the reduction of observable crime from 1980-2009 was proven. Results of the GLM demonstrated a statistically significant effect of reducing 0.264 observable crimes per 100,000.

VI. Discussion

This study showed an effect of Quality of Life Enforcement on Observable Crime in the 12 largest cities in the US. Caution must be taken when discussing this result of due to the weak strength of the model. It is surprising that Police Presence did not have a significant impact. A prerequisite of QOL Enforcement is that the police staff is needed to perform the enforcement. Reduction of crime from QOL Enforcement is in agreement with Corman and Mocan (1995) and Kelling and Sousa (2001).

QOL Enforcement can have an impact on crime. Looking at the aggregate level of 260,246 QOL Arrests in all 12 cities in 2009 for a population of 27,734,277 people, a rate of 938 QOL Arrests per 100,000 was produced. To make a reduction of 264 Observable Crimes per 100,000 across all 12 cities in 2009, 1,000 QOL Arrests per 100,000 or, an additional 277,343 QOL Arrests would be needed. Each of the 87,452 police officers in the 12 cities would need to make an additional three QOL Arrests. While the additional three arrest figure must be used with caution, the point of this example is to demonstrate the Observable Crime reduction is feasible and does not take Herculean effort.

The lack of a significant finding for Police Presence is in agreement with Levine (1975), Humphries and Wallace (1980), Greenberg, Kessler, and Loftin (1983), Lofitn and McDowall (1982), and Chamlin and Langworthy (1996). All of these studies examined police staffing at the city level and did not find any effect on crime. Matthieson and Passell (1976), Huff and Stahura (1980), and Levitt (1995) did find effects of Police Presence on crime and are in disagreement this finding. Matthieson and Passell, and Huff and Stahura were cross-sectional studies of cities in one year. This may explain the difference in findings. While Levitt's study

was a time series with 32 years of data at the city level, his primary focus was on electoral cycles and his use of controls for demographics, welfare, and educational expenses was questionable.

Lack of controls for demographic, prison, and economic data is a concern for the study. As mentioned earlier, there were no reliable controls at the city level that could account for these measures. Previous research that used such controls from interpolation of decennial data or using the decennial data for all years of the study generally did not find a significant effect for the controls. City level controls must be developed.

VII. Conclusions

A. General Conclusions

1. QOL Enforcement Reduces Observable Crime

QOL Enforcement reduces crime and its effect can be realized by any large municipality that chooses to implement it. By starting a program of QOL Enforcement that and having police officers arrest 3 to 6 more people a year, a reduction in observable crimes can be realized. This is little effort for a modest return. Police agencies within cities should either create efforts to focus on QOL Enforcement or expand QOL Enforcement efforts by either placing more officers in assignments for QOL Enforcement or having police officers in existing patrol assignments engage in QOL Enforcement for some part of their tour.

COMPSTAT supporters are somewhat supported by the effect of QOL Enforcement on Observable Crime. Most implementations of COMPSTAT place great emphasis on QOL Enforcement. For those that equate COMPSTAT to QOL Enforcement, this study lends support to the implementation of COMPSTAT as a tool to reduce Observable Crime.

2. Police Presence, By Itself, Does Not Reduce Observable Crime

While QOL Enforcement reduces crime, simply increasing the number of police officers may not have the desired effect of reducing observable crime. The study determined that Police Presence did not have a significant effect on observable crime. It was the action the police officers were doing that was more important. Municipalities should consider the specific assignments of police officers when making staffing models and deployment decisions. Simply hiring new officers to be placed on patrol assignments may not be productive. Also, a better

indicator that can more accurately measure the number of police in an agency that are in a position to see observable crimes is needed.

3. Drug Enforcement, as Manifested through QOL Enforcement, Reduces Observable Crime

With QOL Enforcement focusing on drug arrests, the enforcement of drug laws did lead to a reduction in Observable Crime. Another method of crime reduction can be realized through drug enforcement as measured by drug arrests. This method of implementation may be easier for some municipalities and may be more likely disposed to external funding. Additionally, drug enforcement might be more politically viable than QOL Enforcement in some political environments. With Stop and Frisk actions generally associated with QOL Enforcement programs, drug enforcement programs may be more popular.

B. Limitations

As with all research, this study and the conclusions based on the model employed have some limitations to be discussed below. First, the model only applies to cities with populations of approximately 950,000 residents or more. The model limits the results to the top the twelve most populated cities. A further expansion of the model would have to be tested across medium and small size cities.

Second, the use of secondary data is problematic. Secondary data is only as accurate as the voluntary municipality records its crimes, arrests, and police staffing and transfers this information to the FBI for reporting in the UCR. There are reporting errors and inconsistencies. The author has contacted several agencies to correct data that appeared to be in error. The NYPD provided more accurate data for one reporting year on police staffing that was clearly in

error. The Chicago Police Department provided more accurate Part II arrest data for several years where reporting was either incomplete or missing. The Las Vegas Metropolitan Police Department affirmed its staffing figures to be as accurate, but the erratic changes in staffing levels between years still seems suspect. Other cities did not respond to requests for clarification.

Third, the data used to represent the factors may not be the best representation of the factors. Certain Part II arrests, and in this case drug arrests, may not be the best measure for QOL Enforcement. A larger subset of Part II arrests should be used for future research. The inclusion of summonses for violations would provide a better indicator of QOL contacts. Better measure may produce different results.

Fourth, the lack of control data available at the city level is problematic. While prison and income data is available at the state and county level, obtaining this data at the city level was impossible for the entire time series. Demographic data such as percent white, percent female headed households, and percentage of certain male age groups would have been useful, if available. The study's original concept was to include controls for demographics, income, and sentencing policies. Due to data limitations based on Units of analysis at the city level, this was not possible. For a more detailed explanation and information, see Appendix A.

Fifth, as demonstrated by Duhem and Quine, with hypothesis testing, it is impossible to test any hypothesis in isolation. Since the test of the hypothesis required assumptions, deriving predictions from the hypothesis requires that all background assumptions be correct (Gillies, 1998) (Van Orman Quine). In this case, the assumptions that police officers per 100,000 were accurate of Police Presence and drug arrests were accurate for QOL Enforcement. Additionally,

both of these measures were assumed to be consistent between cities as well as the measure for Observable Crime.

Lastly, the model also assumes that there are no spurious effects that are unknown. While it is never impossible to rule spurious results from any model, it is quite possible that there are unknown factors that coincided with the crime decrease and the included factors that were not determined. Caution was taken to consider several factors and many were excluded during preliminary analysis. This possibility still exists.

C. Future Direction for Research

1. Better QOL Enforcement Measure

The use of arrest data as a QOL Enforcement measure is problematic and may have led to its lack of significance as an explanatory factor. QOL Enforcement that includes summonses issued to violators of petty offenses and stops made by police to intercede prior to the commitment of a petty offense should provide a better measure. Currently, most municipalities do not publically record this data.

2. Expansion to More Cities

A benefit of this model is that it can be replicated down to most cities and counties as the data is publically available for all measures after 1980. Part I offenses and Part II arrests are available by most agencies from the Bureau of Justice Services. Further studies across additional cities are recommended. Specifically, a study focusing on cities that comprise whole counties should be performed and controls that area available at the county level should be included.

VIII. Appendix A – Limitations on Controls Related to Demographics and Economics

The original scope of this study looked to examine the effects of Police Presence and QOL and also included effect of sentencing policies, cellular phone proliferation, and economic conditions controlling for demographic conditions. Presented below are the original research questions and hypotheses for the initial scope upon completion of the literature review. (Please note that expected utility theory was added after the decision to remove the other variables.)

After reviewing the relevant theories and their association to reduction of crime in the 1990s, several hypotheses are proposed. Each hypothesis is briefly described.

RQ: Did the following variables contribute to the reduction of crime from 1980-2009?

- Police Presence
- Quality of Life (QOL) Enforcement
- Enhanced Sentencing and Penalties
- Proliferation of Cellular Phones
- Economy

RH₀: The following variables did not contribute to the reduction of crime from 1980-2009:

- Police Presence
- QOL Enforcement
- Enhanced Sentencing and Penalties
- Proliferation of Cellular Phones
- Economy

RH1: Does Police Presence, quality of life enforcement, Enhanced Sentencing and Penalties, Proliferation of Cellular Phones contribute to the reduction of crime?

- H₀: Police Presence, QOL Enforcement, Enhanced Sentencing and Penalties, Proliferation of Cellular Phones, and Economy did not contribute to the reduction of crime in the 1990s.

This is the null hypothesis and must be disproved with any hypothesis testing. This hypothesis supposes that the changes in crime are purely accidental and that at some time this reduced crime trend will return to the norm.

Applicable Theories: **None**

H₁: Police Presence had a significant impact on the reduction of crime from 1980-2009.

A preferred answer by most politicians, this hypothesis assumes that there is a negative correlation between the number of crimes and the number of police officers.

Applicable Theories:

Deterrence - By placing more officers, the likelihood of apprehension should increase.

Routine Activity - The more police officers that exists, the more capable guardians are present to prevent crime.

Broken Windows – Larger Police Presence will allow for greater placement of police officers in more disorderly areas therefor disrupting crime prone areas.

H₂: QOL Enforcement had a significant impact on the reduction of crime from 1980-2009.

Another preferred answer by some law enforcement practitioners, the enforcement of low level crimes set a tone to offenders that more serious crimes would not be tolerated. Assuming violations, infractions, and misdemeanors are enforced, fewer felonies should occur. This explanation also involves the application of COMPSTAT. COMPSTAT can be measured by the enforcement of QOL offenses.

Applicable Theories:

Deterrence - By enforcing low level crimes, offenders may fear a greater likelihood of capture.

Broken Windows - By enforcing low level crimes, people will feel uncomfortable or become intolerant of serious crime.

H₃: Enhanced Sentencing and Penalties had a significant impact on the reduction of crime from 1980-2009.

Another popular stance for most politicians, the hypothesis supposes that enhanced sentences will either prevent potential offenders from committing crimes or incapacitate offenders from committing crimes.

Applicable Theories:

Deterrence - Sentence severity should affect the decisions of the human calculator when choosing to commit a crime.

Routine Activity – Incapacitation through severe sentencing removes offenders.

H₄: Proliferation of Cellular Phones had a significant impact on the reduction of crime from 1980-2009.

While never claimed by mainstream criminologists or practitioners, the reduction in crime in the 1990s did coincide with the emergence of this new technology. If cellular phone subscriptions coincide with crime reduction, this hypothesis may have merit.

Applicable Theories:

Deterrence – Cellular phones may increase the probability of detection of criminal acts, giving more surety of apprehension of offenders.

Routine Activity – Cellular phones may be a tool that transfers anybody into a more capable guardian. This increase in guardians should reduce crime.

H₅: Economy had a significant impact on the reduction of crime from 1980-2009.

Assuming many crimes are committed out of desperation, good economic times should lead to less desperation and less crime. A negative correlation between economic conditions and crime should be evident if this hypothesis is true.

Applicable Theories:

Deterrence – Better economic times should produce more licit opportunities. Therefore, individuals should rationally choose the licit direction as opposed to the illicit direction.

Routine Activity – increased availability and affordability of consumer goods should reduce the need of offenders to obtain targets.

Consideration for the use of Enhanced Sentencing and Penalties, Proliferation of cellular Phones, and the Economy were considered. The theoretical basis for the use of these variables are presented below along with their reasons for rejection. Enhanced Sentencing and Penalties and the Economy were rejected based on units of analysis being inconsistent with cities. Proliferation of cellular phones was rejected due to strong concerns that the relationship could be spurious without an adequate foundation of it being linked to 911 calls.

1. Enhanced Sentencing and Penalties

The 1990s had several forms of sentence severity. “Three strikes and you’re out” laws, the concept of giving a harsher sentence when a person was convicted of their third felony, were popular and enacted in several states (Dickey & Hollenhorst, 1999). Other states chose enhanced sentence lengths that would place longer incarceration periods for certain crimes or for special circumstances. The death penalty was enacted in a few states. Although execution proves to be problematic due to several legal restraints, the practical result is a person kept in custody indefinitely. All three forms of Enhanced Sentencing and Penalties translate in prisoners spending more time in correctional facilities.

Incarceration can be measured by jail admissions, jail populations, prison admissions, and prison populations. Both jail admissions and jail populations are problematic in that jail admissions count entry of inmates and not their sentence length and jail populations are snapshots taken midyear of inmates with incarceration periods of hours to a year. While prison admissions include inmates that have been convicted of sentences over one year, it is not indicative of sentence severity. Prison populations are indicative of sentence severity because the longer, the more inclusive, and harsher the sentencing program, the more years the inmates will be incarcerated. As more prisoners get harsher sentences, they will serve more years in prison, and the overall prison population will reflect the increase.

Therefore, the best aggregate measure for sentencing programs is state prison population. This figure obtained from the Bureau of Justice Statistics Prisoner Section (BJSPS) is collected every year on December 31. This measure is consistent among states and is reliable over the entire time period. To account for differences between state populations, each state prison population will be divided by the state population as reported to BJSPS in the same year and

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multiplied by 100,000 to provide a prisoner rate. This uniform measure would be indicative of changes in sentencing practices between states and is reliable whatever specific policy was enacted.

The selected cities encompass eight states: Arizona, California, Hawaii, Illinois, Nevada, New York, Pennsylvania, and Texas. The state prison rate will be used as the measure for Enhanced Sentencing and Penalties for each city within a state despite the number of selected cities within the state. More specifically, California has the three selected cities of Los Angeles, San Diego, and San Jose. Texas has three selected cities of Dallas, Houston, and San Antonio. Prison policies are determined at the state level by state legislative branches and in principal should be the same for each city within the state. There was no missing data for state prison populations or state population estimates.

Below is a chart of state prison rates for the eight states of the twelve selected cities. The overall trend in prison rates has been a steady increase since 1980. Notable exceptions are Nevada and New York. Both states have decreased their prison rates starting in 1997 and 1999 respectively.

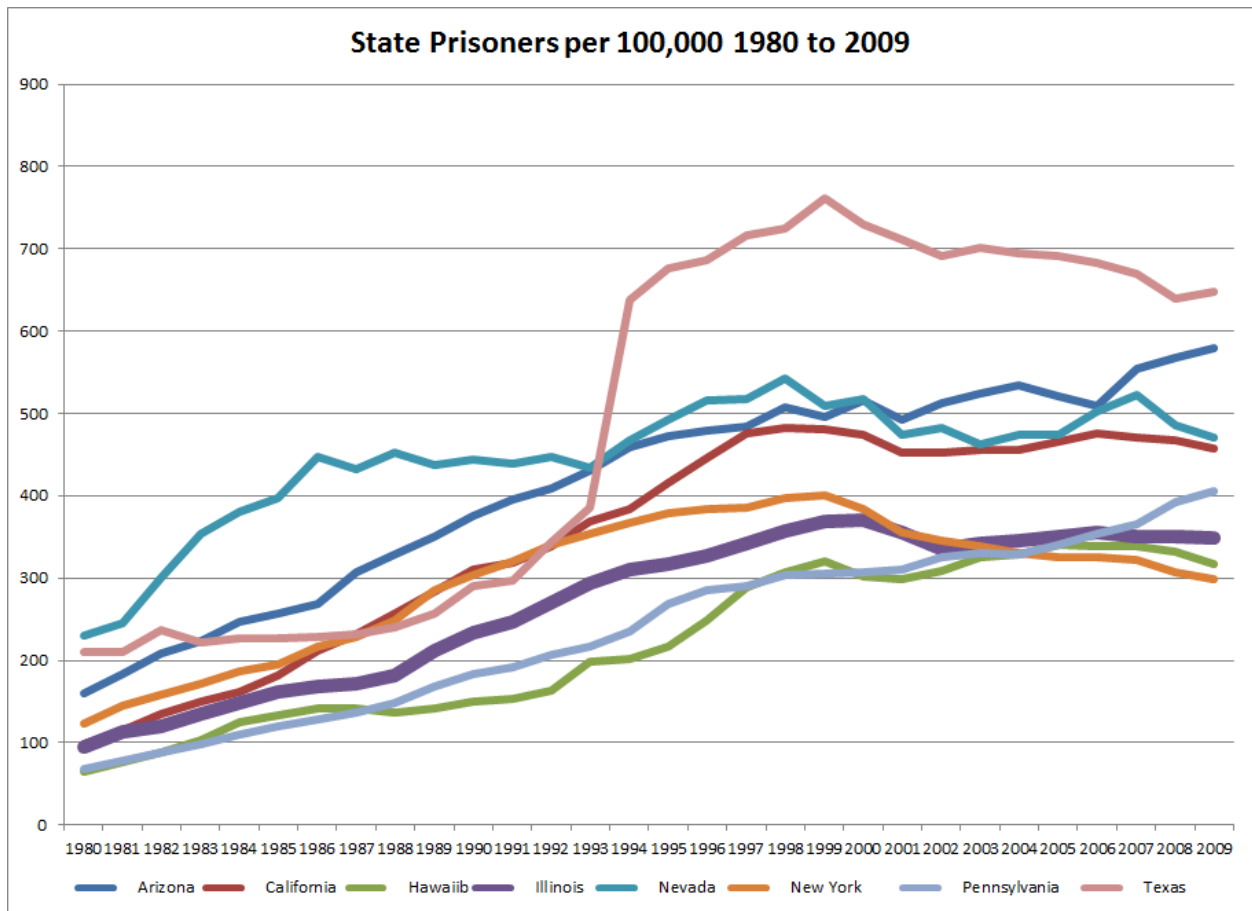


Figure 5 - State Prison Rates for Selected Cities

The increase in prison rates for most states appears to be significant graphically and will be examined in greater detail. Using San Jose as an example, the chart below shows California's prison rate versus Suppressible Crime. As California's incarceration rate rose, San Jose's Suppressible Crime decreases. Even the slopes between the two curves are reflections of each other. This chart shows an inverse relationship between Suppressible Crime and Enhanced Sentencing and Penalties.

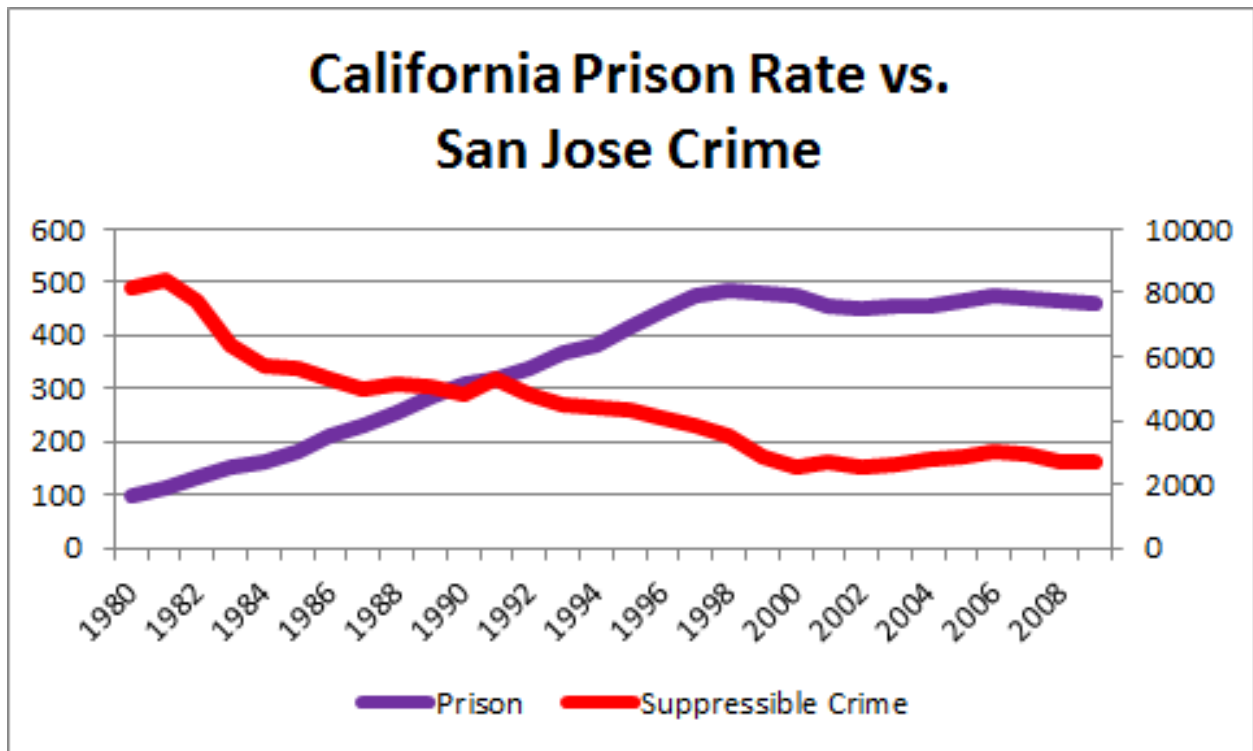


Figure 6 - California Prison Rate vs. San Jose Crime

Unfortunately, while state prison rates may reflect the sentencing policies of cities within the states, it is not conclusively the sentencing policy of the city within the particular state. The units of analysis between the state and the city cannot be resolved. Also, the number of commitments from each city being held by state prisons by year was considered as an appropriate control to for sentencing policies of the particular cities. After speaking with several

staff members from six different states, it was apparent that the states collected extremely reliable new commitment, current commitment, and releases by county. All of the states had the same structure of felonies being tried and committed at the county level within their states. This also involved their billing structures to the counties (Devoe, 2013) (Lanes, 2013). Ultimately, both measures were rejected and no suitable substitute was found.

2. Proliferation of Cellular Phones

Cellular telephones were first introduced in 1973. The Proliferation of Cellular Phones has taken off dramatically since its inception. Below is a chart of cell phone subscribers for the nation from 1985 to 2010 based on data collected by the Cellular International Telephone Association (CITA). This trade organization collects national data from participating cell phone companies annually on a volunteer basis. Although argued, its voluntary membership in the United States is believed to be representative of 95% of all cellular phone service (CITA, 2012).

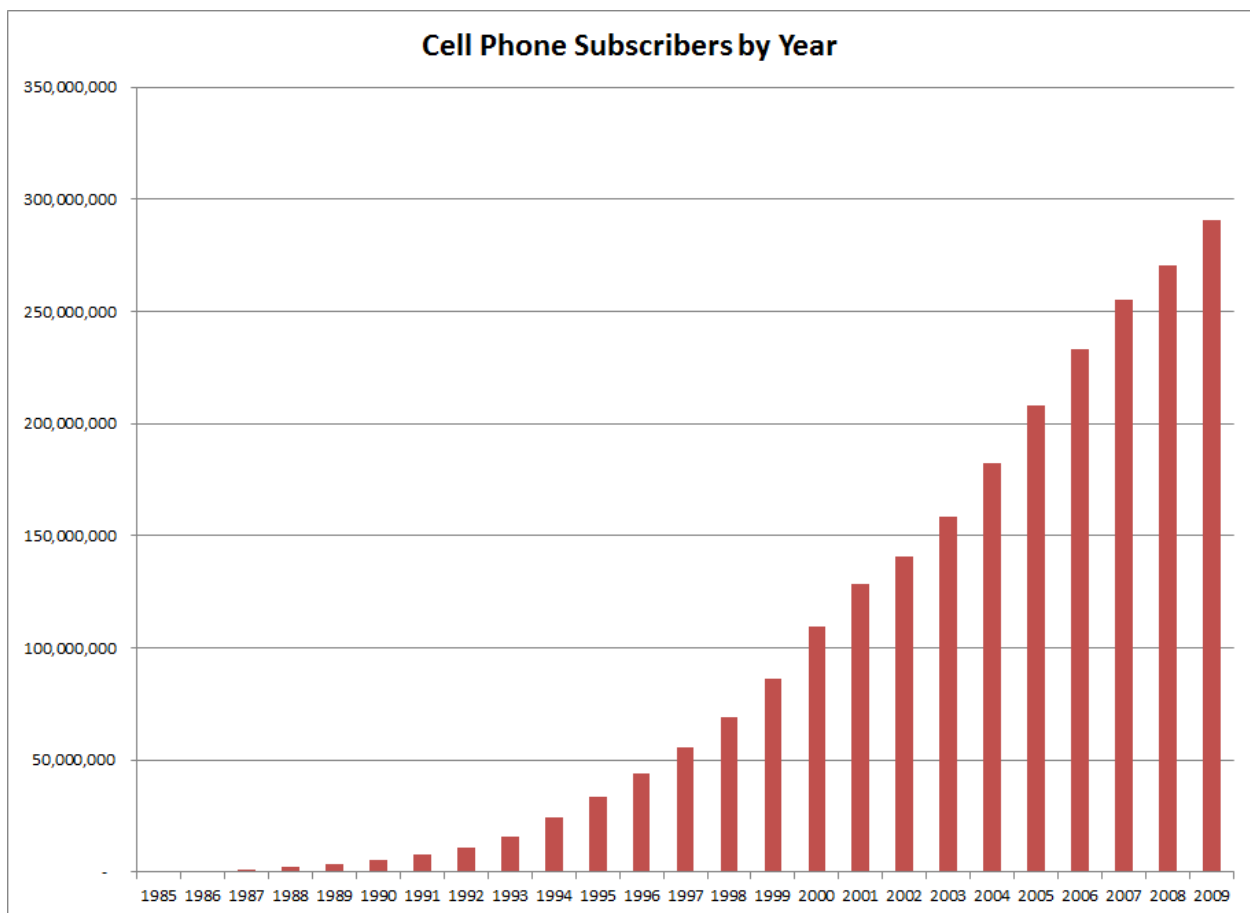


Figure 7 - Cell Phone Subscribers by Year

Having determined the increase in cell phone usage, attempts were made to obtain data in reference to the number of 911 calls made by cell phones. While the NYPD collects the (ANI-

ALI) of every 911 call, the system is not fully reliable to capture every return call number. This problem is more evident with what is believed to be cell phones versus land lines. Also, the NYPD will not disclose such data. Similar requests have been made to other agencies with no success.

Having failed in determining the number of 911 calls made by cell phones, a diligent search was made to find the number of cell phone subscribers within a particular city. Determining cell phone subscribers at a local level (such as a city) is also problematic. CITA collects data nationally and does not collect data at any local level. The Federal Communications Commission, which has oversight over cellular phone carriers, does not have publically available data at local levels. Requests were made to cell phone carriers, but none responded with any information.

To capture the number of potential cell phones in a particular city, data was obtained from Area-Codes.com. This company, among others, captures data about phone exchanges for commercial purposes. The data is based on the North American Pooling Administration (NAPA) established by the ATT and Bell Laboratories in 1947 under the North American Numbering Plan. This administration was originally in charge of providing exchange pools to Competitive Local Exchange Carriers (CLEC) that were providing land line service prior to the existence of wireless technology (NNPA, 2012).

A pool would consist of an area code, known as an NPA, and an exchange, known as an NXX. The area code was geographically based to assist in routing calls with switches with the first digit between 2 and 9 and a middle digit that was either 0 or 1. Based on rotary dial service, the larger the city (in population) covered by an area code, the lower the area code. New York City was originally 212. Upstate New York, that is just north of New York City, which at the

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time was rural, was originally 914. The exchange was based upon the location of a Central Office, that is, the local switching room for the phone lines in an area. Originally, the first two numbers of the exchange were supposed to correspond to letters that spelled the beginning of the area where the Central Office was located. For example, Lakeland, a hamlet in Yorktown, New York, had an exchange of 528. This corresponded to Lakeland 8, or LA8. So, a pool consists of an area code, such as 212, and an exchange, such as 237, and consists of a range of 10,000 phone numbers, such as 212-237-0000 through 212-237-9999.

With the emergence of wireless technology, specifically the pager, the NAPA adjusted its policy to create exchanges that were solely for wireless communication. In other words, an exchange would be dedicated to either land line use or wireless use. While land line exchanges were, and are still, geographically based on a hard lined Central Office, wireless exchanges were not based on a Central Office. Wireless exchanges are still area code based and should correspond to the city that the cell phone subscriber lived in when the subscriber purchased the phone. While initially designed for all wireless devices, pagers have lost popularity. Most of the devices on a wireless exchange are cell phones.

Additionally, the NAPA set a policy that wireless carriers could register for new phone pools after a certain saturation level of their existing pools was reached. In other words, after a cell phone company reached 50% of the numbers utilized within a pool, the wireless carrier would have to make a reasonable estimate of the date for the 80% saturation rate. This date would be used as a projected date for the assignment of a new pool to the carrier. Although a wireless carrier will keep a certain reserve within a pool, the number of cell phones (not subscribers) can be inferred by the number of wireless pools within an area code.

The area code database collects information about the type of use for each exchange for all area codes in the United States. The database includes information such as the city of coverage and the date of introduction into their database. This date of introduction is within six months of the date of assignment from NAPA. The area code database did not collect introduction dates until 1994. While unfortunate that this information is not available prior to 1994, the data is still useful. Second Generation (2G) technology started to emerge in 1990, but did not start effectively marketing until 1994. Prior to 1994, the number of cell phones in a particular city will be estimated based on the national trend from 1985 to 1994 (NNPA, 2012).

Wireless exchanges for the selected cities were extracted from the area code database and the pools were assigned year of introduction based upon the date of introduction. These area codes and exchanges were then tallied by year for the area codes that correspond to each city. A cumulative total was then made for each city by year from 1994 onward to determine the number of potential cell phones available to the city. To control for variations in population, these figures were then divided by corresponding population reported by the agency in *Number of Offenses Known to the Police, Cities and Towns 10,000 and over in Population* table and multiplied by 100,000 to create a rate of cell phone exchanges per 100,000 residents. The denominator was selected to be consistent with rates of other variables. Once again, the Houston population for 1981 was estimated by taking the average of the populations from 1980 and 1982.

Below is a chart of the total number of wireless exchanges per 100,000 for each of the selected cities from 1994 through 2009. Note the rapid growth of exchanges in all cities from 1994 through 2000. All of the cities seem to level off after 2005. Also, the older cities (New York, Los Angeles, Honolulu, and Philadelphia) with established landline communications structures and hilly environments have lower Proliferation of Cellular Phones than the Western cities (Dallas, Houston, Las Vegas, Phoenix, and San Antonio) that have flat geography.

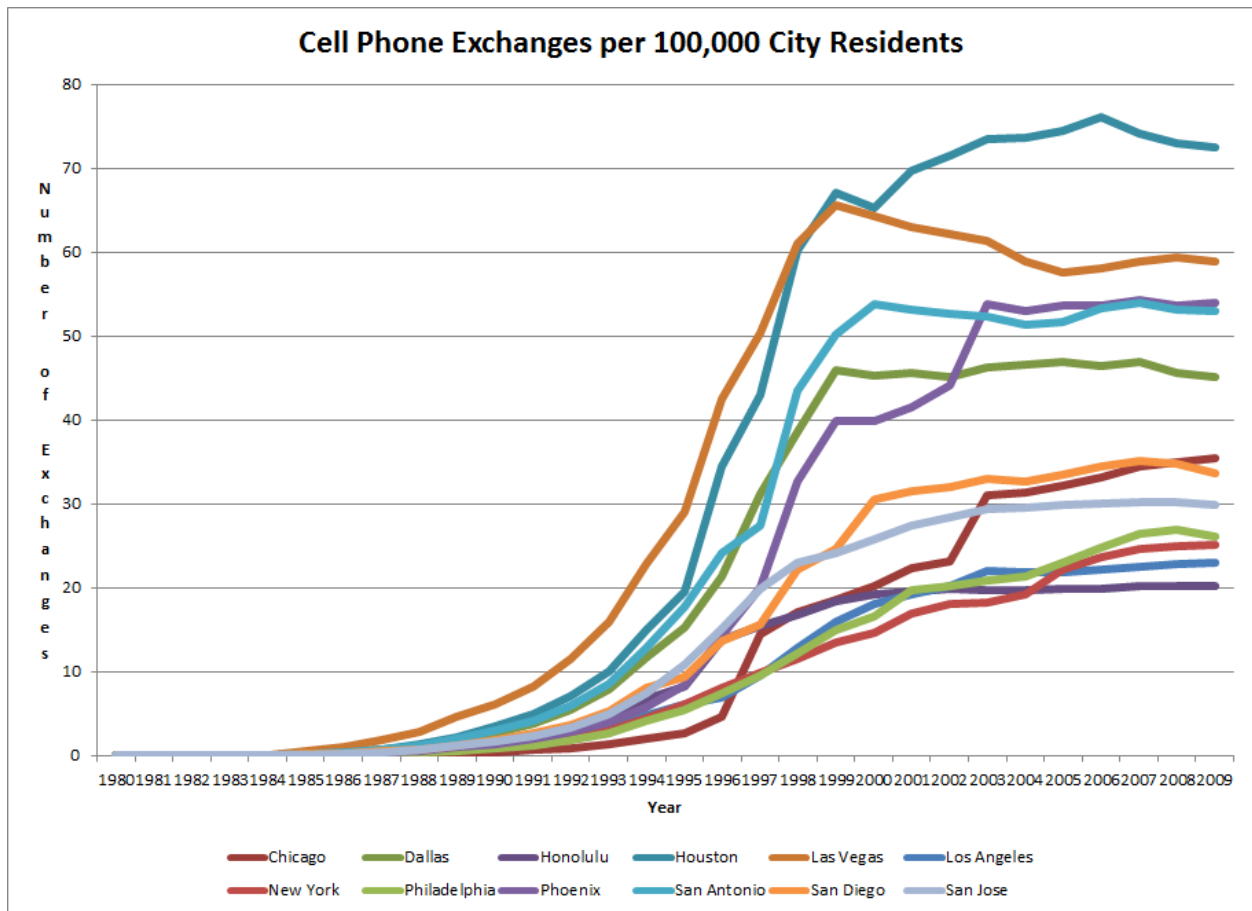


Figure 8 - Cell Phone Exchanges per 100,000 for Twelve Cities

Los Angeles best demonstrated the effect of Proliferation of Cellular Phones on crime. The chart below shows Suppressible Crime versus Proliferation of Cellular Phones. While the data is incomplete prior to 1985, it appears as if the increase and stabilization of cell phones in California is inversely proportional to the decrease in Suppressible Crime in Los Angeles.

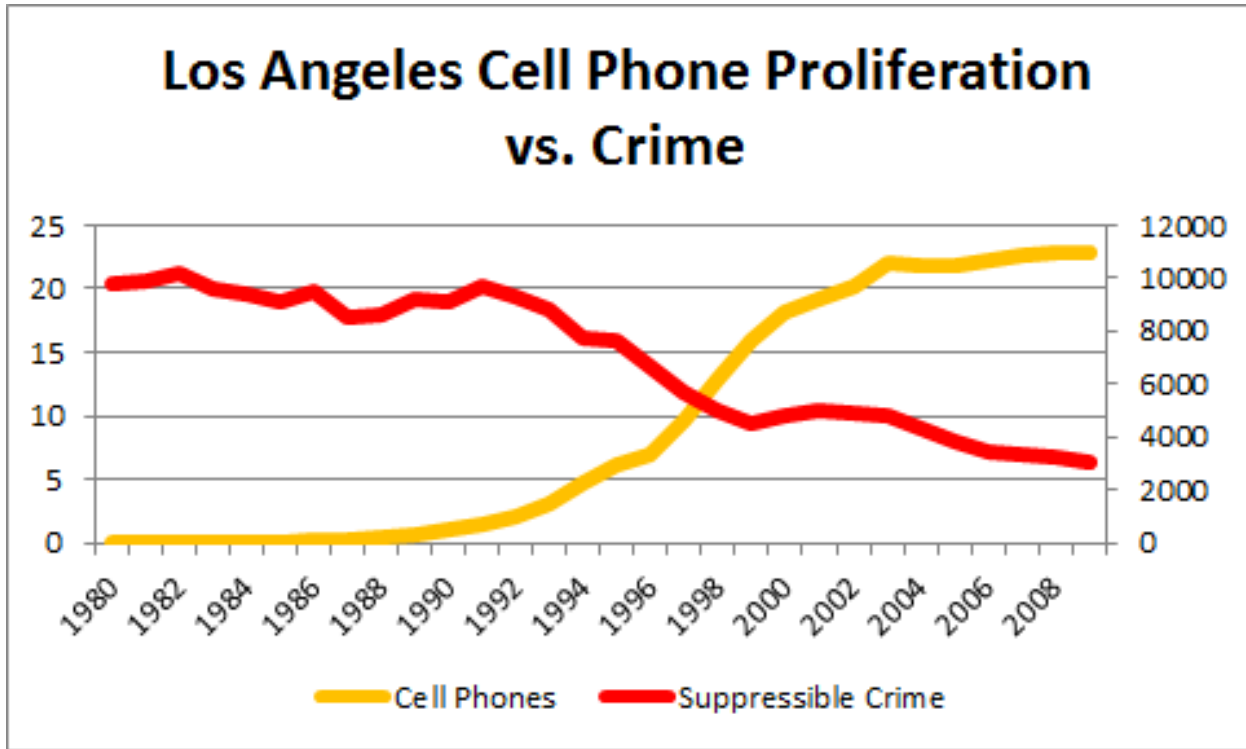


Figure 9 - Los Angeles Cell Phone Proliferation vs. Crime

Unfortunately, while cell phone proliferation provides a good surrogate for how many cell phones are in a particular city, it does not indicate the cell phones direct use as a crime reduction tool. Unless a foundation can be established to determine 911 cell phone use associated to overall cell phone proliferation, this measure is ineffective, for it cannot rule out legitimate arguments of a spurious effect. The measure was rejected and no suitable measure was found to capture the effect of cell phones on crime reduction.

3. Economy

While there is no shortage of economic indicators, income seems to be the only economic indicator that is easy to gather reliably. Logically, at least at the surface, it would seem desperate people without enough income might be swayed to commit criminal acts. While the literature supports and refutes associations of income with crime, the measure will be used. Income is complicated. There are three measures of central tendency for income: average, median and mode. The variance of income by extreme outliers makes the use of average income problematic. The mode simply indicates what most common. With annual salaries varying by pennies, this is not particularly useful. Median household income would be the most ideal. Unfortunately, it is not collected at local levels for all of the selected cities reliably.

The Bureau of Economic Analysis collects per capita income annually for each county in the US. The data, obtained from income tax returns, is reliable and consistent. For the selected cities, the per capita income of the county which encompasses the city was used. For the City of New York, the five counties comprising the city were used. These incomes were corrected for inflation through the use of the Bureau of Labor Statistics Consumer Price Index (CPI) corrected to 1980 to 1982 dollars. The most local CPI was used for the corresponding city. In only 4 cities, a regional CPI was used.

The chart below shows per capita income for the corresponding selected cities from 1980 through 2009. While the chart shows a gradual increase in real income for most cities, the increases are not as dramatic when controlling for inflation. Also, while there is some crossover of lines, the cities have predominantly kept their rank order in affluence through the 30 years.

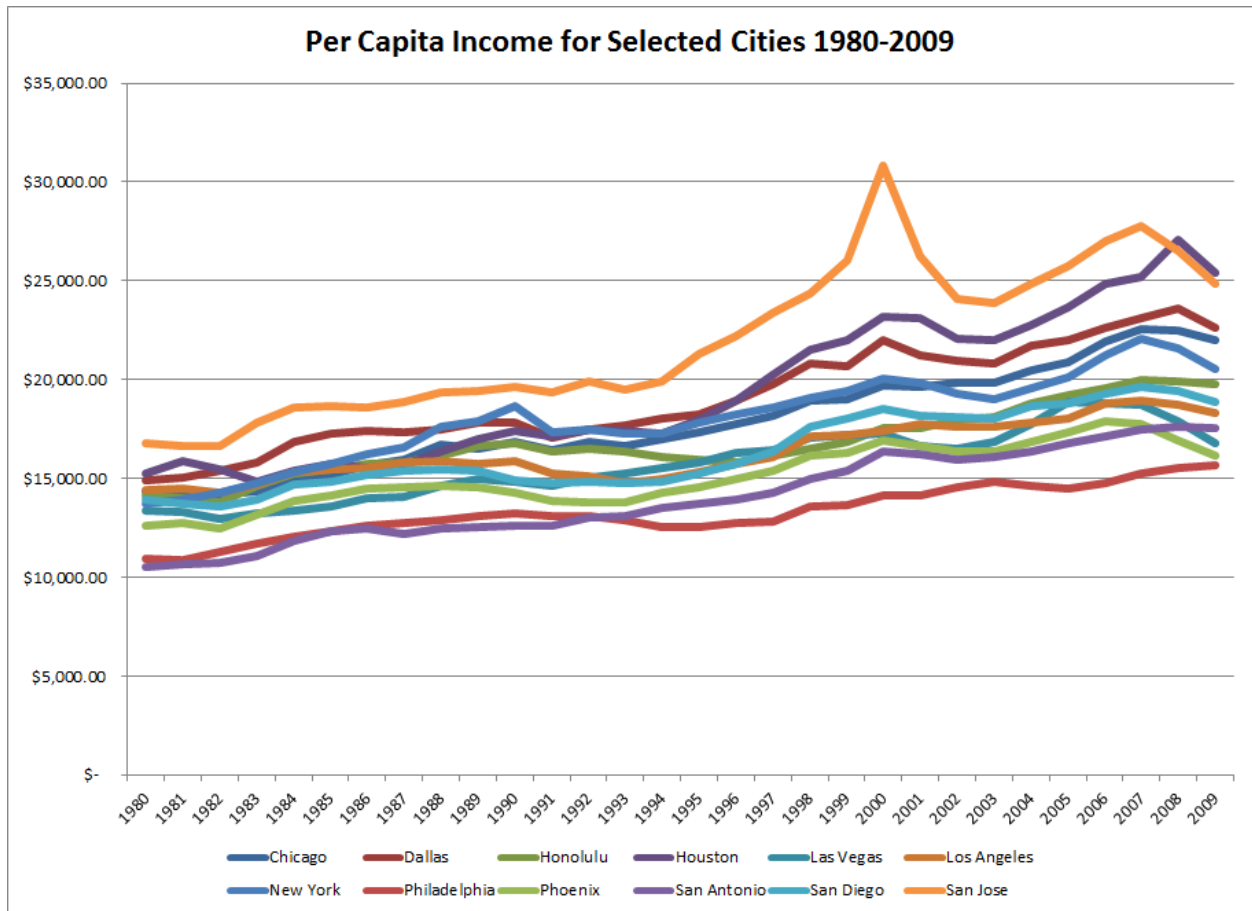


Figure 10 - Per Capita Income of Selected Cities

For per capita income, Las Vegas demonstrated the best effect. Below is a chart of per capita income in Clark County versus Suppressible Crime in Las Vegas. The chart shows an overall increase in per capita income in Clark County with a decrease in Suppressible Crime in Las Vegas. While imperfect at certain points, the overall relationship between Economy and Suppressible Crime can be seen.

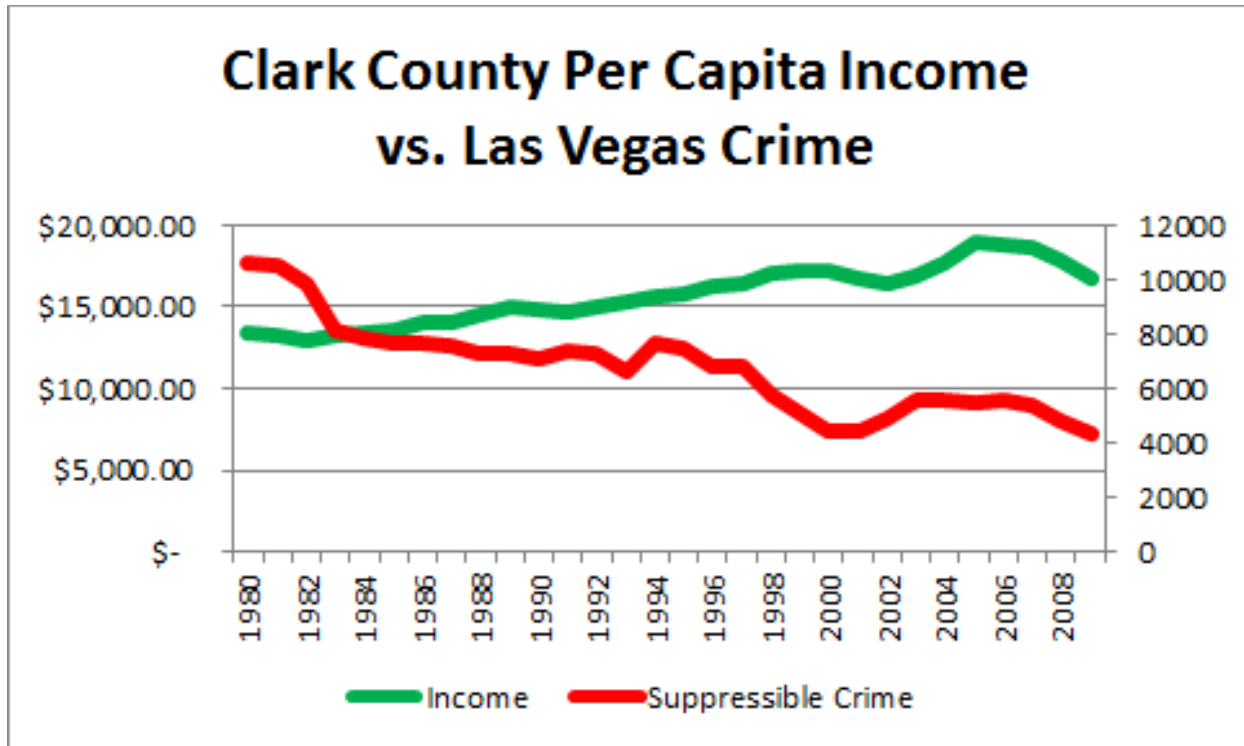


Figure 11 - Clark County Per Capita Income vs. Las Vegas Crime

The Bureau of Labor Statistics (BLS) maintains records on employment, unemployment, hourly wages, and inflation on a yearly basis and may have data available at the county level. The data is collected from a variety of sources, but mostly state and county level. Unfortunately, the BLS redefines industry classifications and has no method of reconciling older data. This makes the use of BLS data with the exception of the Consumer Price Index impractical for time series analysis (Fayer, 2011).

The Bureau of Economic Analysis (BEA) has the most reliable time series data of any national agency and has accurate data for Per Capita Income from 1962 onward by county for every county in the US. The data is systemically collected yearly from state and national sources and is compared to data from the Internal Revenue Service for validity. In the event that political boundaries such as a county line is changed or altered, BEA will readjust its older data to best fit the new political boundary. This is the only data that was designed for time series analysis. Unfortunately, the BEA does not have yearly data by city (Dale, 2013). There was no other suitable data available.

4. Demographic Controls

Previous studies have controlled for such variables using either decennial data or units of analysis that were either at the national or state level for demographic controls. Unfortunately, to maintain the integrity of proper units of analysis at the city level, these controls had to be discarded.

The US Census has a wealth of information on several demographic variables that may pertain to crime. Specifically, percent female headed households, percent population black, percent population male and within certain ages, percent below poverty level, and percent receiving public assistance. This data is collected down to the census tract for decennial censuses. None of this data is available historically prior to 1990 and what data is available is limited to state level estimates (Ellis, 2013).

Realizing this problem, the US Census developed the American Community Survey (ACS) in 2006 to gather more local data about the above mentioned variables among many more items of statistical data. The survey is robust enough to use at a national level on a yearly level, but state level and large Metropolitan Statistical Areas (MSA) need to use a three year sample to

have any validity. The US Census does not have any reliable yearly data on the demographic controls sought for US cities (Ellis, 2013).

Being unable to obtain data at the city level and finding no appropriate method of using county level data as a surrogate for demographic data with any reliability, the decision was made to remove these variables in order to reduce potential error or provide results whose reliability that may be artificially inflated. This was an unfortunate decision, but has definitely opened an avenue to county level analyses with more controls for future research.

5. Need for Municipalities to Address Limitations

Having discovered a gap in social and economic indicators available for research at the city level, cities with large populations should provide or start to collect this data and make it available for external and internal research. It is incumbent on municipalities with populations of a million or more to collect data on income, social conditions, age and gender distribution, and economic conditions. Assuming these cities are collecting taxes, providing welfare and other social assistance, and administering schools, this data should be available.

Cities that collect taxes can determine the overall economic status of their city as well as areas within cities. While not all cities collect income tax, sales tax is collected by the 12 cities in this sample. Income tax would probably be a better indicator of wealth of a city and determine the economic duress of individuals and families. With listings of dependents, household status can be determined to a certain extent. Sales tax is a good measure of consumption of consumer goods and will reflect the disposable cash available to people. While imperfect, sales tax can be an effective consistent measure of the health of a city.

Several welfare and social programs exist and are awarded to recipients based on their socio-economic status. For example, the Women, Infants, and Children program (WIC) administered at the local level, could be used as a substitute measure the number of female headed households. People receiving benefits should have some correlation to unemployment. Drug abuse treatment programs can provide an estimate of the number of substance abuse addicts that may be in the population.

The administration of schools can provide gender and age distributions at a local level. Through direct administration of class sizes, very accurate estimates of gender breakdowns by age can be made and, to a certain extent projected for a few years after high school to some degree of reliability. Cities that document the spoken language within household can also provide ethnic information of the student population. Also, school subsidized lunch programs can be another economic indicator.

Information is available at the local level for most cities, it is incumbent on city and police planning departments to understand the importance of this data and obtain it. This is not to suggest that records of individuals should be directly handed over to law enforcement agencies, but summary data that may be helpful in planning current and future resource allocation should be collected. This data should be collected and archived to provide historical perspectives and future research.

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ⁱ According to Deputy Inspector Raymond Martinez of the NYPD's Crime Analysis, Programs, and Planning Section, Part II offenses have not been reported since 2002 due to an ongoing contractual dispute with IBM. IBM was contracted to provide the reports and have not produced the reports to this date.