How Does Immigration Relate to Different Measures of Crime in the United States?

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Introduction

There has been great debate about the role of immigrants in the United States, particularly with respect to criminal acts. America has always been seen as a melting pot of diversity; much of this comes from the idea that every American resident, except true Native Americans, are either are immigrants themselves or have ancestors that were immigrants to the United States. Despite this long standing history of diversity and acceptance of immigrants, recently there have been accusations of immigrants hurting the United States. Reports of immigrants taking jobs away from "hard-working Americans" and other negative narratives about immigrants have been running rampant in mainstream media. One of most debated discussions that has come to light has been the idea of immigration increasing crime.

This paper analyzes the correlations between crime rates and immigrant populations. The study found that after accounting for multiple time variant and invariant variables, there is a statistically significant negative correlation between immigrant populations and crime rates. Though this paper does not prove a causal relationship, it can be inferred that the popular narrative of immigrants being criminals and increasing crime rates needs to be examined more thoroughly and cannot be taken as a general truth in the United States.

Literature Review

There are numerous papers that look at the link between crime and immigration, however, they differ in the way they analyze the relationship and the results they have found. This section summarizes some of the forefront literature on the topic of immigration and crime. The results of these papers diverge from one another, but each is important to explore when looking at previous findings in this area.

Spenkuch (2010) investigated the impact of immigration on crime by taking county level decadal data in the United States between 1980 and 2000. The paper found that a link exists between immigrants and property crimes, but that violent crimes are virtually unaffected by immigrants (Spenkuch, 2010). Overall, a 10% increase in the share of immigrants would result in a 1.2% increase in the number of property crimes. Additionally, the paper concluded that the average immigrant commits roughly 2.5 times as many property crimes as the average American. This paper looks a lot into causality, but only using decadal data, as well as looking at county level data makes it relevant to compare the results of Spenkuch and this paper (Spenkuch, 2010).

Camarota and Vaughan (2009) examined the idea that immigrants are more likely to commit crimes than natives by looking at US incarceration rates. Though they did find that immigrants are more likely to be incarcerated than native-born residents, they could not find clear evidence that immigrants commit crimes at higher or lower rates than others (Camarota, 2009). By looking at incarceration rates, this paper put forth a very interesting idea of the connection between immigration and crime, however our paper will be looking at general measures of crime rather than incarceration rates.

Butcher and Piehl (1998) look at 1980s cross-city data to investigate the relationship between immigration and crime. They found that cities with high crime tend to

have higher numbers of immigrants, however when they controlled for the demographic characteristics of the cities, they found recent immigration to have no effect on crime rates (Butcher, 1998). Additionally, they found that youth born abroad are significantly less likely to be criminally active than native-born youth. The Butcher and Piehl paper looked at straight causality, but then accounted for the demographic characteristics of cities over time. This paper does something similar in that it analyzes correlations after accounting for time invariant effects on crime.

Reid, Weiss, Adelman and Jaret (2005) looked at how crime and immigration were linked by looking at US Metropolitan areas in 2000. They found that after controlling for demographic and economic characteristics that immigration does not increase crime rates and in some cases immigration lessens crime in metropolitan areas (Reid, 2005). Again, this paper shows the importance of controlling for certain demographic characteristics, the way that we do in this paper.

Ousey and Kubrin (2009) explore the connection between immigration and violent crime rates in US cities between 1980 and 2000. They explore not only the connection, but provide a framework on why their results may have occurred. They found that immigration decreases violent crime and found that their data supports the idea that immigration decreases crime rates because immigrants tend to promote two-parent family structures (Ousey, 2009). This paper differs from ours in that it delves into specific causality, but it is important background to have when analyzing the results of this paper.

Data

The data for this paper is panel data across the years 1990, 2000 and 2005-2012. The data is concentrated in more recent years because foreign born population data wasn't tracked annually before 2005. The data was collected at the state level and is taken from multiple governmental sources. State level data was chosen because state borders have remained constant over this time period and data for the measures used in this paper was readily available at the state level. There are a few missing observations in North Dakota and Utah because of lack of available data. Additionally, Ohio and Rhode Island were dropped from analysis, because their data had inconsistencies and major outliers that impacted our results.

The crime data are taken from the FBI Uniform crime reporting database. The UCR program collects data based on crimes reported to police throughout the United States. The crime rate variables included in this study include the rates of violent crime, murder, forcible rape, robberies, aggravated assault, property crime, burglary, larceny and motor vehicle theft. The crime data are reported in instances per 100,000 residents. The specific crime variable definitions are shown in Table 1 in the appendix.

This paper takes the Census Bureau definition of immigrants as those that are foreign-born. The data for state population and state foreign-born population came from the Census Bureau's American Community Survey (ACS). The ACS is an ongoing survey that provides information on a yearly basis as opposed to the decadal data of the US Census. The ACS takes microdata responses and aggregates them into 1-year estimates at county, state and nationwide levels. The specific variables used in this paper are defined in Table 1 in the appendix. The foreign born population is recorded in number of people, but for analysis

this paper uses the foreign born population as a percentage of total population in each state.

The education, income and unemployment datasets for this paper comes from the US Census Bureau and US Bureau of Labor Statistics' Current Population Survey (CPS). The CPS is a monthly survey of 60,000 US Households that is aggregated to get data at the state, county and national level. This data is then aggregated on an annual basis to get specific data for each year. There are two education measures used in this paper, the first shows the percentage of the population in each state over age 25 that completed high school and the other shows the percentage of the population over 25 that completed their bachelor's degree. The education data that was used for this paper stopped being collected at the state level in 2010, so the results that contain education data do not use any observations from 2011 or 2012. Median income is taken at the state level and presented as an annual income number, it was converted into 2000 US Dollars. The unemployment data is taken as a monthly average of unemployment in any given year and is presented in percentage form. Additionally, dummy variables were created for each year in order to separate time effects when analyzing partial correlations.

The data also is organized by region so that after the initial analysis we could do further analysis into specific regions of the United States. The data is divided into four regions, East, West, Midwest and South. The Census Bureau has official classifications of which states make up each region, so the regional analysis was conducted on the basis of those definitions

Summary Statistics for the data are presented in Table 2. For all the variables except education statistics there are 482 observations, for the education data there are 385

observations. Looking at the minimum and maximum "Percent Foreign" variable it is obvious that the amount of foreign-born residents varies greatly across state lines. There is also great variation in crime rates across state borders. Figures 3 and 4 show scatterplots of the foreign born population against Violent crime rate and property crime rate respectively. From these scatterplots it is difficult to determine a specific positive or negative relationship.

In this paper when analyzing statistical significance, we use a Bonferroni correction, to make sure that the significance results are not overstated. Because we are testing multiple variables, it is important to correct for possible type I errors that become increasingly likely as more variables are analyzed. In order to do this, the p-value that measures whether or not the results are statistical significant is divided by the number of variables that are being analyzed. In this case, we analyzed 9 different measures of crime, so the p-values are .011 for something significant at the 90 % level, .01 for significance at the 95 % level and .011 for significance at the 99 % level. These levels of significance are used to demonstrate statistical relationships throughout the rest of this paper. However, traditional p-values are used for regional analysis.

Results

A. Original Correlation Examination

To begin analyzing the data, the correlation was calculated between all of the different measures of crime and the percent of foreign born residents in each state. These results are presented in table 3. There was a positive significant correlation between foreign-born residents and the rates of violent crime, robberies, aggravated assaults and motor vehicle

theft. The correlations between immigrants and violent crime, robberies, aggravated assaults and motor vehicle theft were significant at the 99% level. The positive correlation means that higher percentages of foreign-born residents coincide with higher levels of these incidents.

Alternatively, the relationship between percent of foreign born residents and the forcible rape rate has a negative correlation that is significant at the 99% level. This means that higher percentages of foreign-born residents align with lower instances of rape. The other measures of crime, property crime, burglary and larceny were not shown to have a statistically significant correlation with immigration numbers.

These results are difficult to analyze because there is not a clear result. Additionally, there are a lot of factors that contribute to crime that are not shown in a straight correlation. In order to better analyze the direct correlation between immigration and crime we turn to a partial correlation.

B. Partial Correlations

There are many factors to consider that may contribute to crime rates and it is important to separate out certain variables from our analysis to get a clearer view of the correlation between immigration and crime. In order to control for other contributing effects, we looked at the partial correlation of percent of foreign population on different crime rates. Partial correlations describe the relationship of two variables while taking away the effects of another variable or variables. To do this, the time dummy variables and some other time variant variable (measures of education, income or unemployment) were regressed on both the crime statistics and the percent foreign variable individually. Then,

from these regressions, new variables were created that were the residuals of the models we predicted in the regressions. Finally, the correlation of the 2 predicted residual variables was calculated. This gives the correlation between the percentage of foreign born residents against different measures of crime after accounting for outside effects. Our results for these partial correlations are shown in table 4.

In Model 2 we showed the impact of immigrants on crime while controlling for each individual state and the year to get a baseline of results. When controlling for these variables, every measure of crime was negatively correlated and significant at the 99% level except for the murder rate which was negative but not significant. The highest negative correlation was present in property crime with a correlation of -.3332 and forcible rape rate with a correlation of -.3279. Squaring these correlation results gives the percentage of crime that is explained statistically (not causally) by immigration. For this model, 10.75% of the variation in forcible rape rate can be explained statistically by immigrant numbers and 11.1% if the variation in property crime can be explained by the immigrant variable.

In Model 3 we showed the impact of immigrants on crime while controlling for median income. A lower median income is often correlated with higher rates of crime, so it is important to control look at the correlation when income is controlled for. When controlling for median income, every measure of crime was negatively correlated and significant at the 99% level except for the murder rate which was negative but not significant. The highest negative correlation was present in property crime with a correlation of -.335 and forcible rape rate with a correlation of -.3446. In this case 11.8% of

the variation in forcible rape rate can be explained statistically by immigrant numbers and 11.2% if the variation in property crime can be explained by the immigrant variable.

Model 4 analyzes the correlation of crime and immigration when controlling for both median income and unemployment. Again, every measure of crime was shown to be significantly negatively correlated at the 99% level except for the murder rate. The highest negative correlations were seen again in forcible rape rate with -.3182 and property crime with -.3123. With these variables, 10.1% of the variation in forcible rape rate can be explained statistically by immigrant numbers and 9.8% of the variation in property crime can be explained by the immigrant variable.

It was also important to control for education levels, as they are often correlated with crime rates. Model 5 controlled for all 4 of the time variant variables that we had data for: median income, bachelor's degree, high school degree and unemployment. Again, every crime rate statistic was significantly negatively correlated except for the murder rate. The strongest negative correlations were seen in the overall violent crime rate with -.2713, the overall property crime rate with -.2318 and the forcible rape rate with -.336. In this case 11.3% of the variation in forcible rape rate can be explained statistically by immigrant numbers 7.4% of the variation in violent crime being explained by immigration numbers and 5.4% of the variation in property crime can be explained by the immigrant variable. This model was then used for further analysis when looking at the specific regions of the United States.

C. Looking at Regions

The United States is a huge country, the culture and social norms vary greatly across regions, so as a next step in the analysis, it is logical to divide up the United States into four different regions and look at how crime rates and immigration relate at a more specific level. To divide up the states we used the census bureau definitions of which states belong in the East, West, Midwest and South region of the United States. From there we ran the model 5 correlation analysis that had income, education and unemployment variables individually for each of the four regions. The results for this section are presented in Table 5.

When looking at the Eastern region, violent crime, forcible rape, robbery, property crime, aggravated assault and motor vehicle theft rate were all negatively correlated and statistically significant at the 99% level. The larceny theft rate is negative and significant at the 90% level. The other variables were negatively correlated but not statistically significant. The eastern region had very strong negative correlations with motor vehicle theft rate, -.5016, aggravated assault, -.4382 and violent crime, -.3919. For this region, 25.2% of the variation in the motor vehicle theft rate can be explained statistically by immigrant numbers, 19.2% of the variation in aggravated assault can be explained by immigration numbers and 15.4% of the variation in violent crime can be explained by the immigrant variable.

The Western region results look much different. Only, forcible rape, larceny theft and motor vehicle theft rate were statistically significant. Forcible rape had a -.3579 correlation, larceny had a -.3018 correlation with immigration and the motor vehicle theft rate surprisingly had a positive correlation of .3353 with immigration. This is the first result after accounting for outside effects that showed a positive statistically significant

relationship between immigration and crime. For this region, 12.8% of the variation in the forcible rape rate can be explained statistically by immigrant numbers, 9.1% of the variation in larceny theft can be explained by immigration numbers and 11.2% of the variation in motor vehicle theft rate can be explained by the immigrant variable.

When looking at the Southern region, violent crime, property crime and burglary rates were all negatively correlated and statistically significant at the 99% level. Additionally, the larceny theft rate and the motor vehicle theft rate were significant at the 95% level and the forcible rape rate and robbery rate were significant at the 90% level. The other variables were negatively correlated but not statistically significant. The southern region had very strong negative correlations with property crime, -.3312 and violent crime, -.3286. For this region, 10.96% of the variation in the property rate can be explained statistically by immigrant numbers and 10.8% of the variation in violent crime can be explained by immigration population.

The Midwest region showed a statistically significant negative correlation between immigrant population and all measures of crime except larceny, which was negatively correlated, but not statistically significant. The Midwest region had very strong negative correlations with robber rate, -.6085, aggravated assault, -.5922, burglary, -.4845, motor vehicle theft rate, -.4798 and violent crime, -.4664. For this region, 37.02% of the variation in the robber rate, 35.1% of the variation in aggravated assaults, 23.5% of the variation in the burglary rate, 23.02% of the variation in motor vehicle theft rate and 21.8% of the variation in the violent crime rate can be explained by the immigrant variable.

This regional analysis shows that a lot of the statistical significance in negative relationships between crime and immigration come from the Eastern and Midwestern

region. From these results, it is clear that there are definitive differences in what impacts the relationship between crime and immigration. In future studies, further analysis could be done to figure out what drives these differences, where it is cultural or something more numerically measurable.

Conclusion

Overall, after accounting for different combinations of time variant and invariant effects, immigrant rates are always negatively correlated with the crime rate statistics in this paper. Additionally, all of these negative correlations are significant at the 99% level except for that of the murder rates. This is an important step forward to show areas with immigrants are not automatically more prone to crime when looking just at the impact of immigrants, the way certain critics of immigration believe. However, it is important to stress the idea that correlation does not mean causation. There are many interpretations of the results analyzed in this paper. It is possible for example, that immigrants move to places where the crime rate is reasonably lower. In order to make a causal statement, greater analysis would have to be placed on the predictive power of immigration in regards to crime rate. The results in this paper support the intuition that immigration does not increase crime, but further analysis is needed to say that immigration actually reduces crime.

This paper is a jumping off point for future research into how crime rates and immigration are related. From our results, regional differences are shown to be an important aspect of the crime-immigration relationship. In order to prove a causal relationship, trends over time should be analyzed. There are cases like the Mariel boatlift

where a before and after look at immigration could be analyzed with its impact to crime. Additionally, a more microeconomic study could be done to determine more direct impacts of crime and immigration.

The results presented in this paper show that the cut and dry idea of immigrants increasing crime does not necessarily hold true. Though a causal relationship wasn't proven, all of the national results after accounting for time invariant and variant variables showed a negative relationship between immigration in crime. Further research is needed to prove a causal relationship, but this paper is an important step in showing that the 'all immigrants are criminals' narratives of certain groups and politicians are not accurate. Immigrants have always been an important aspect of American culture and to say that they raise crime rates within our country goes against the principles that the United States was founded on. By showing this negative relationship between immigrant populations and crime, people will be able to look at the immigrant issues within the United States with a view that is a little bit clearer.

Appendix

Table 1: Definitions of Variables

Variable	Definition	Measure
State	The State that the observation comes from	State Name
Year	The Year that the observation takes place	Year
Population	The number of people living in the State	Number of People
Violent Crime Rate	Aggregate Measure of all Violent Crime in a state including Murder and nonnegligent manslaughter rate, Forcible Rape Rate, Robber Rate and Aggravated Assault Rate	Instances per 100,000 residents
Murder and Nonnegligent Manslaughter Rate	The willful (nonnegligent) killing of one human being by another	Instances per 100,000 residents
Forcible Rape Rate	Rapes by force and attempts or assaults to rape, regardless of the age of the victim, are included	Instances per 100,000 residents
Robber Rate	The taking or attempting to take anything of value from the care, custody, or control of a person or persons by force or threat of force or violence and/or by putting the victim in fear	Instances per 100,000 residents
Aggravated Assault Rate	An unlawful attack by one person upon another for the purpose of inflicting severe or aggravated bodily injury	Instances per 100,000 residents
Property Crime Rate	Aggregate Measure of all Property Crime in a state including Murder and Nonnegligent Manslaughter Rate, Forcible Rape Rate, Robber Rate and Aggravated Assault Rate	Instances per 100,000 residents
Burglary Rate	The unlawful entry of a structure to commit a felony or a theft. Attempted forcible entry is included.	Instances per 100,000 residents
Larceny-Theft Rate	The unlawful taking, carrying, leading, or riding away of property from the possession or constructive possession of another.	Instances per 100,000 residents
Motor Vehicle Theft Rate	The theft or attempted theft of a motor vehicle	Instances per 100,000 residents
Total Number of Foreign Born Citizens	The number of state residents that are Foreign-Born	Number of People
Median Income	The median income of adult state residents	Income
Unemployment	The percentage of unemployed state residents	Percentage
High School	Percentage of People over 25 that have graduated from High School	Percentage
Bachelor's Degree	Percentage of State Residents that have a Bachelor's Degree	Percentage
Percent Foreign	The number of State Residents that are Foreign-Born divided by total state population.	Percentage

Table 2: Summary Statistics					
Variable	N Observations	Mean	Standard Deviation	Minimum	Maximum
Year	482	2005.75	6.233022	1990	2012
Population	482	5871391	6620456	453588	38000000
Violent Crime Rate	482	434.182	243.8851	73.9	2458.2
Murder and Nonnegligent Manslaughter Rate	482	5.44855	5.299391	0.6	77.8
Forcible Rape Rate	482	33.5166	11.91294	11.1	88.1
Robber Rate	482	119.673	115.2296	7.8	1213.5
Aggravated Assault Rate	482	275.534	142.4433	45.8	1117
Property Crime Rate	482	3313.55	952.7911	1724.3	8316
Burglary Rate	482	726.146	283.4154	320.8	2170.6
Larceny-Theft Rate	482	2275.39	586.7602	1273	4996.9
Motor Vehicle Theft Rate	482	312.01	209.8065	69.5	1336.1
Total Number of Foreign Born Citizens	482	729543	1574552	7647	10300000
Median Income	482	46951.4	9860.213	20178	71836
Unemployment	482	6.07718	2.264775	2.3	13.7
Percent Foreign	482	0.08106	0.060289	0.007921	0.27424
High School	385	84.5922	5.326055	64.3	92.7
Bachelor's Degree	385	26.06	5.959923	12.3	50.1

Figure 1

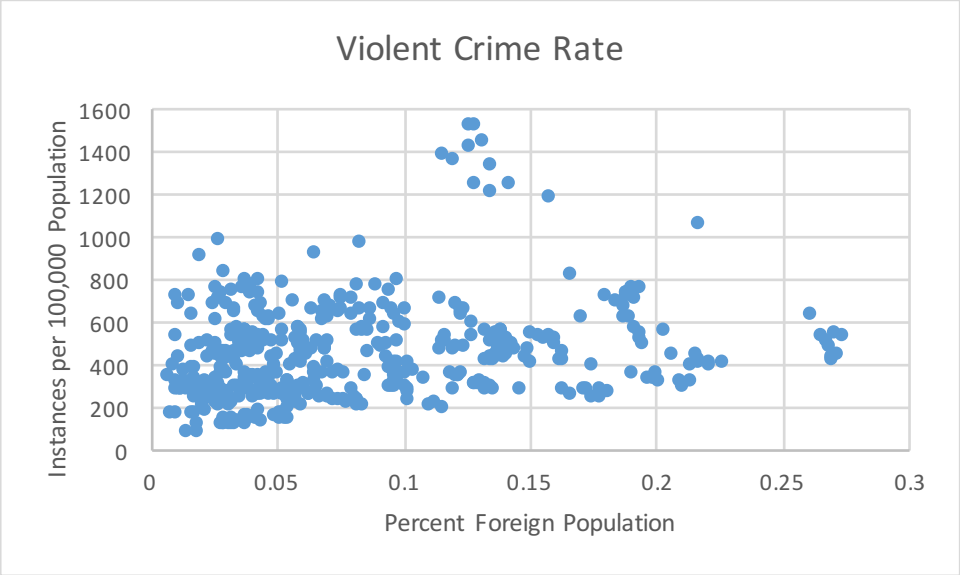

Figure 2

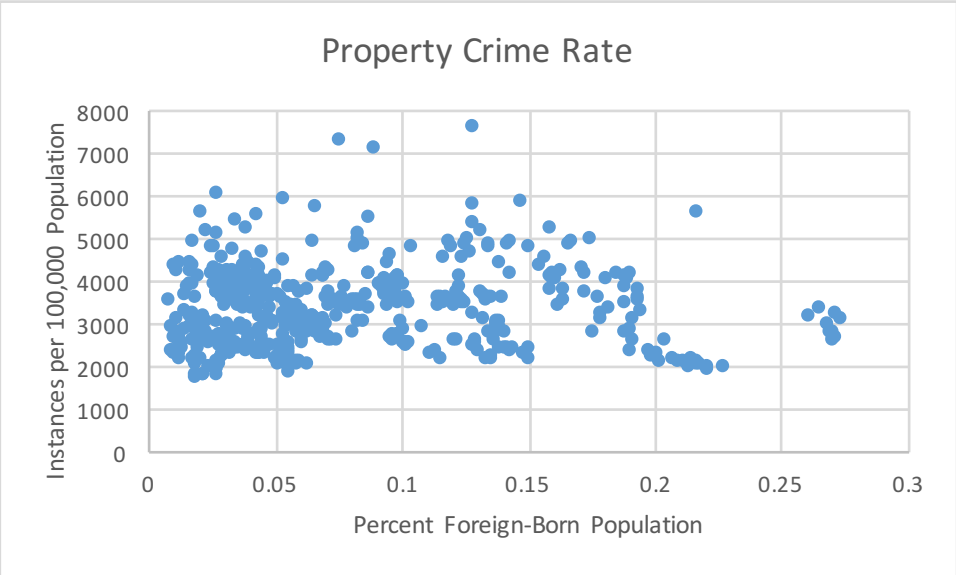

Table 3: Simple Correlation Results	
Model	1
Independent Variable	Simple Pairwise Correlation
Violent Crime	0.2443***
Murder and Nonnegligent Manslaughter	0.088
Forcible Rape Rate	-0.2216***
Robber Rate	0.3464***
Property Crime Rate	0.038
Aggravated Assault Rate	0.1533***
Burglary rate	-0.0186
Larceny Theft Rate	-0.0557
Motor Vehicle Theft Rate	0.3535***
Number of Observations	482

** indicates p<.011*
*** indicates p<.0056*
**** indicates p<.0011*

Table 4: Controlling for Effects Correlation Results				
Model	2	3	4	5
Independent Variable	Year and State	Median Income	Median Income and Unemployment	Education, Income and Unemployment
Violent Crime	-.2718***	-0.282***	-0.2473***	-0.2713***
Murder and Nonnegligent Manslaughter	-0.0313	-0.0488	-0.0151	-0.041
Forcible Rape Rate	-.3279***	-0.3446***	-0.3182***	-0.336***
Robber Rate	-.2449***	-0.2546***	-0.2244***	-0.222***
Property Crime Rate	-.3332***	-0.335***	-0.3123***	-0.2318***
Aggravated Assault Rate	-.2248***	-0.2328***	-0.1989***	-0.2262***
Burglary rate	-.2871***	-0.2858***	-0.2672***	-0.2097***
Larceny Theft Rate	-.2954***	-0.2975***	-.2872***	-0.1923***
Motor Vehicle Theft Rate	-.2026***	-0.2052***	-0.1622***	-0.15**
Number of Observations	482	482	482	385

** indicates p<.011*
*** indicates p<.0056*
**** indicates p<.0011*

Table 5: Controlling for Effects by Region Correlation Results				
Model	6	7	8	9
Independent Variable	East Region	West Region	South Region	Midwest
Violent Crime	-0.3919***	-0.1435	-0.3286***	-0.4664***
Murder and Nonnegligent Manslaughter	0.0259	0.1533	-0.1736	-0.3934***
Forcible Rape Rate	-0.3365***	-0.3579***	-0.1792*	-0.2861***
Robber Rate	-0.3179***	0.0549	-0.1881*	-0.6085***
Property Crime Rate	-0.3368***	-0.1092	-0.3312***	-0.2872*
Aggravated Assault Rate	-0.4382***	-0.0405	-0.098	-0.5922***
Burglary rate	-0.1326	-0.0845	-0.2844***	-0.4845***
Larceny Theft Rate	-0.1727*	-0.3018**	-0.3177**	-0.0705
Motor Vehicle Theft Rate	-0.5016***	0.3353***	-0.2384**	-0.4798***
Number of Observations	112	103	86	84

** indicates p<.10*
*** indicates p<.05*
**** indicates p<.01*

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