

THE EFFECT OF SHALL-ISSUE POLICY ON CRIME RATES

by

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## ABSTRACT

JOHN ADAM WHITE. The effect of shall-issue policy on crime rates. (Under the direction of DR. CRAIG A. DEPKEN II)

This study investigates the impact of shall-issue policy on crime rates at the state level in the United States. A formal analysis of the effect on crime rates is useful in supporting or refuting the claim that crime rates increase or decrease in states that have shall-issue policy intact. The methodology used in this research is ordinary least squares regression analysis. The variables of interest include crime rate totals such as property crime totals and violent crime totals. The evidence suggests that a shall-issue policy has little to no effect on crime rates. On the other hand, a no-issue and a may-issue policy both have a significant impact on crime rates. Therefore, policy makers might consider the less permissive policies when crime rates are the objective.

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## INTRODUCTION

Will implementing legislation that allows citizens of a state to carry and conceal firearms lower or increase violent crime rates? The FBI Uniform Crime Reporting Statistics reveal that in 2012, 69% of murders in the United States were via handgun (Reports, 2012). Will a state that implements a shall-issue policy enjoy lower or suffer higher violent crime rates? Does a specific policy deter criminals from potentially committing a crime?

There are differing opinions on shall-issue, its effect, and firearms in general. One side holds that there should be bans on weapons because guns are causal to shootings. Although some cities like Washington D.C. have a no-issue policy in place, meaning they do not issue handgun licenses, Washington D.C. itself suffers from very high murder rates via firearm. One hypothesis is that if a criminal knows that individual citizens cannot arm themselves, the criminal faces less opposition in the process of committing a crime, thus giving the criminal a greater incentive to engage in crime.

On the other hand, people argue that an increase in the number of citizens concealing firearms will deter crime; thereby potentially creating a positive externality for society. When a criminal has to ponder if the payoff of the crime is worth taking the risk, the criminal will account for the potential victim or witness being armed- which may create deterrence.

It is important to define shall-issue policy. Shall issue is legislation that requires a state to issue a handgun permit if the applicant meets certain criteria. The criteria vary from state to state, and are determined by the state's government. In the state of North Carolina, the county sheriff is the only official authorized to issue a North Carolina

resident a permit to receive or purchase a handgun. In order to receive a permit, the applicant must not be subject to the following:

- a) An applicant who is under an indictment, or information for, or has been convicted in any state, or in any court of the United States, of a felony;
- b) The applicant is a fugitive from justice;
- c) The applicant is an unlawful user of or addicted to marijuana, any depressant, stimulant, or narcotic drug;
- d) The applicant has been adjudicated incompetent or has been committed to any mental institution;
- e) The applicant is an alien illegally or unlawfully in the United States;
- f) The applicant has been discharged from the U.S. armed forces under dishonorable conditions;
- g) The applicant, having been a citizen of the United States, has renounced his/her citizenship.

These are the laws in the state of North Carolina to meet requirements via the State Attorney General Roy Cooper (Justice) and these rules prohibit an individual from acquiring a permit.

Protecting oneself is a natural right of every citizen, and the Constitution of the United States grants Americans the right to bear arms. In *District of Columbia v. Heller*, the Supreme Court ruled that the Second Amendment protects “the individual right to possess and carry weapons in case of confrontation” (NRA-ILA, 2015). In 2015, forty-two states are considered shall-issue states.

Prior research on this topic has been greatly debated, and has produced differing results. A previous study concluded that there is no credible statistical evidence that the adoption of shall-issue laws reduce crime (Ayres and Donohue, 2002). Another study concluded that allowing citizens to carry concealed weapons deters violent crimes and it appears to produce no increase in accidental deaths (Lott and Mustard, 1992). The paper written by Lott and Mustard is considered highly controversial and has been the only paper to the author's knowledge to endorse shall-issue policy for its positive effect on crime rates.

The purpose of this paper is to build upon prior research and determine whether shall-issue policy has more of a positive effect on crime rates compared to no-issue, may-issue policy or no permit required policy. Former studies mentioned have yet to reach an agreement on the conclusion and this paper will contribute to the debate. Americans are also concerned about the public safety of citizens across the United States, and want to determine how we as a society can better protect ourselves against criminal actions. The following analysis will provide insight at the state level about the relationship between crime rates and shall-issue, may-issue, and no-issue states. The findings of this research will contribute to policy making decisions as well as expanding the knowledge of citizens in hopes of future crime prevention.

## LITERATURE REVIEW

It is pertinent to explain this research's contributions and purpose before presenting prior research. This paper is intended to inform the public of the effects of shall-issue in the United States, as well as to expand the knowledge of policy makers that influence policy decisions. The effects of the policy per state on crime can be interpreted by the policy intact in a state respectively, as well as the crime rates associated within the state. An assortment of crime rates are employed in the examination of the relationship between carry-permit policy and crime.

When reviewing prior research a distinction should be made between ostensibly objective academic economists and analysts, and groups that are political and may be pushing a certain agenda. This paper will focus on the academic aspect which is assumed to be non-political or otherwise biased. In reviewing the literature, economists have differing conclusions on the effect of shall-issue policy on crime. It is important to define shall-issue, may-issue, and no-issue: Shall-issue policy requires authorities to provide a license to any applicant who meets specified criteria; May-issue policy allows authorities to issue licenses to carry concealed firearms to citizens who establish a compelling need for doing so; No-issue policy has no legislation in place that allows citizens to conceal a firearm.

One of the most well-known and controversial studies on this topic is a paper by Lott and Mustard. Lott and Mustard published the paper in January 1997 at the University of Chicago's *Journal of Legal Studies*. They found that shall-issue licensing policy had a substitution effect on crime. The deterrence of violent crime, which the authors define as murder and manslaughter, aggravated assault, rape, and robbery

declined, yet they found an increase in property crimes such as auto theft and larceny. They surmised that the increase in property crimes resulted from a lower chance of an encounter between the criminal and victim. Lott and Mustard specifically estimate that if the states that did not have shall-issue would have had shall-issue, there would have been 1,750 fewer murders, 4,177 fewer rapes, and 60,000 fewer aggravated assaults in 1992.

Lott and Mustard used county-level data from 3,054 counties across the United States from 1977-1992. They employed data collected by the FBI's Uniform Crime Report, organized into four categories; murder, rape, robbery, and aggravated assault; also property crimes such as burglary, larceny, and motor theft. The authors also included demographic data such as population, age, gender, and race from the Census Bureau, as well as conviction rates that were provided from a few states. Their analysis used a two-stage regression to estimate the parameters of the multivariate model to explain the nine crime variables.

The results from Lott and Mustard's study did not go unchallenged. Many economists did not agree with the findings, such as Jens Ludwig. Ludwig produced a paper titled "Do Permissive Concealed Carry Laws Reduce Violent Crime?" (Ludwig, 1996) in which the author analyzed the ratios of adult homicides to juvenile homicides in the same state from 1982-1991. His findings conclude that there is no significant relationship between shall-issue states and adult murder rates. Ludwig points out that states that see an increase in crime are more likely to implement shall-issue policy, and that Lott and Mustard fail to factor this. Ludwig sees shall-issue laws are generally enacted during times of increasing crime and the reductions in crime which Lott and Mustard attribute to shall-issue policy may be due to other policies used to lower crime.

Ludwig does in fact accept the theory that an increase of legal firearms in public places could have a deterrent effect on crime, yet he claims there could be misuse of the firearms as well. In summation, Ludwig views Lott and Mustard's study as not offering compelling evidence for implementation of shall-issue policy.

Another study titled "Easing Concealed Firearms Laws: Effects on Homicide in Three States," (1995) by David McDowall, Colin Loftin, and Brian Wiersema researched homicides in large urban areas of Florida, Mississippi, and Oregon, both before and after a shall-issue policy was implemented. Three states is a small sample, and there may be a selection bias in the data. The study should have included additional states to make the findings more reliable. Nonetheless, the authors found no statistical significance of shall-issue policies reducing crime. In fact, the authors found an increase in murder after the adoption of such laws and advised policy makers to be careful about implementing a shall-issue policy.

With a state implementing shall-issue policy, there are three possible outcomes: an increase in crime, a decrease in crime, or no effect on crime. Supporters of shall-issue claim there is a decrease in crime due to deterrence by armed citizens. Many supporters of this theory bring up a 1986 survey, conducted by sociologists James Wright and Peter Rossi (Wright, et al., 1986), in which convicted felons reported they feared armed citizens more than police.

Critics of a shall-issue policy claim there will be an increase in crime if implemented. This theory is based on the expectation that easily available of guns will fall in to the hands of individuals intent on causing negative externalities. However illegal guns are already available to criminals although there is no accurate count on the

quantity. In addition, an increase in citizens carrying firearms could cause more firearm related incidences. This increase in legally carried firearms may incite criminals to also increase their carry habits. With more people carrying concealed handguns, the legal gun owner may take risks and enter into confrontations that he/she otherwise would abstain from.

The no-effect group advocates that there is no significant relationship between carrying firearms and crimes thus a state is not affected whether it has shall-issue in place or not.

It is important to note that prior studies have not agreed on a conclusion; however this does not indicate that shall-issue policy is either detrimental or beneficial to society. Dissimilar findings provide an incentive to further research this topic. Whether studies find that shall-issue has positive or negative externalities, none conclude that citizens should be stripped of their rights to bear arms. No opposing literature reviewed has mentioned this important constitutional right.

## MOTIVATION AND THEORY

This study examines whether a state which implements a shall-issue policy will have significantly lower crime rates compared to non shall-issue states. To support the research, the author has collected crime data from all fifty states. The shall-issue policy is denoted with a dummy variable, and will compare the results to states that are no-issue and may-issue. Citizens of the United States of America are given the right to bear arms under the Second Amendment of the Constitution, thus certain states have passed legislation allowing law-abiding citizens to purchase a handgun with intent to conceal. It is important to know how concealing a firearm is defined. Concealing a handgun is defined such that a person carries the handgun in a public place, either on the body or in close proximity hidden from the general view. This law does not affect everyone equally.

An individual seeking a permit is required to apply via their local law enforcement office, complete a background check, pay a fee, and wait for a decision by the local law enforcement authority. This process may be worth it to a person who values the opportunity to receive a concealed carry permit, over the time and money spent on the application, and places sufficient value in the safety of protecting oneself with the firearm. If an individual believes he or she may not pass these certain checks, or perhaps does not meet the requirements, they may simply forgo the permit process and purchase a firearm illegally. Criminals in possession of a firearm illegally may make the decision to take the risk, and conceal the weapon out of the sight of police officers and citizens. This creates a negative externality to society and possibly increases the likelihood of a crime being committed.

Once a citizen has been granted by local law enforcement the opportunity to conceal carry, does society enjoy a positive externality? Is society better off with more law abiding citizens carrying firearms? Or simply do more firearms create more gun violence? Police officers, as heroic and helpful as they are, are not proactive- they are considered reactive. Generally, police officers respond to an emergency call, arriving to a crime scene ex-post. This is the argument used by “pro-gun” individuals; that they themselves are put in a detrimental situation if they are unauthorized to carry a firearm and potentially have to wait for police to respond after a crime has occurred and the criminal has fled.

It is also important to point out that an individual with a firearm is not always rational. As economists, we like to assume people act rationally and have rational expectations- although this is not always the case. A citizen may meet the requirements to purchase a firearm legally, yet this does not inherently mean this person will act according to the law. This person could suffer from moral hazard. An individual who has been granted permission to carry a firearm may have an incentive to get into altercations he/she otherwise may not; due to the fact they now have protection that they once did not have. This potentially creates a negative externality to society, as all parties are now worse off.

Crime is not exclusive to one person, gender, race, or demographic area. Many factors contribute to higher crime areas across certain parts of the country. Unemployment, poverty, single parent households, and higher teen population have been associated with higher crime rates.

There may be a relationship between states that have transitioned into a shall-issue state, meanwhile seeing a downward trend of crime; or the opposite may hold true. States that are not shall-issue may enjoy lower crime rates. In summation, this study will conduct an analysis on shall-issue, may-issue, and no-issue policy and compare the crime results to former studies. This research will contribute its findings to the state policymakers and expand the knowledge of the effects of policy to citizens of the United States.

## DATA DESCRIPTION

The variables of focus in this study are shall-issue, may-issue, no-issue, and no permit required policies for all fifty states and their effects on crime. The three states that do not require a permit to conceal carry a firearm are Vermont, Wyoming, and Arizona. To examine which policy a state had in place, the author contacted state attorneys general, state police, and reviewed state laws via state websites. Although not every state's information was public, further research and contact provided the policy in place and/or changes of policy per state over the sample period. The sample period in this study is a twenty four year period from 1988-2012. Choosing this long sample period gives a large pool of data creating better insight into how crime rates could change.

The crime data are public information provided by the FBI Uniform Crime report, published yearly after each state compiles and contributes their crime data to the FBI to help track crime across the United States. The crime rates are aggregated into categories and are reported per 100,000 people.

Crime in this study is separated into two categories: violent crime (murder and manslaughter, forcible rape, robbery, and aggravated assault) and property crime (burglary, larceny, and motor theft). Some of these variables will be represented as a dependent variable and regressed against shall-issue, may-issue, and no-issue policy indicator or dummy variables, along with the control variables in order to understand the impact of various concealed carry policies on specific crime variables.

Over the sample period, violent crime totals and property crime totals across the United States have been on a downward trend. (See Chart 1, 2, and 3 in Appendix A for a

graph of the violent crime rate, the property crime rate, and the murders and manslaughters from the FBI Uniform Crime Report for 1988-2012).

Including other variables that might increase or decrease crime rates is important. The unemployment rate and crime might have a positive correlation; thus the state's annualized unemployment rate is included. The unemployment rate is also included because other studies indicate that property crimes increase with the unemployment rate (Steven Raphael, 2001). The argument is that a higher unemployment rate creates incentive for people out of work to substitute crime for labor.

The Bureau of Justice Statistics reported that from 2008-2012, persons in poor households, at or below the poverty line, had more than double the rate of violent victimization as persons in high-income households. However those in poverty is typically a small percentage of a state's population. While poverty-stricken areas might have higher crimes which involve illegal firearms, these increases might be offset by decreases in higher-income areas; there may be net zero effect at the state level from a shall-issue policy. Following previous studies, the percentage of the state's population in poverty is included (Berzofsky, 2014).

Juveniles, defined as adolescents under the age of 17, have also been correlated with higher crime rates. The Office of Juvenile Justice and Delinquency reported that juveniles were involved in about 1 in 11, or nine percent, of arrests for murder in 2012. Juveniles were also reported to be involved with 1 in 7, or fourteen percent, of arrests for aggravated assault, and 1 in 4 arrests, or twenty five percent, for robbery (Puzzanchera, 2014). Clearly juveniles contribute to higher crime rates, thus the juvenile population per state is included.

Other variables that potentially increase crime are single parent households- which are now on the rise in America. In 2012, sixty-seven percent of black households were single parent, twenty-five percent of white households were single parent, and Hispanic households were forty-two percent single parent (Kids Count Data Center, 2015). Other studies show that single parent households are more likely to have a family member commit a crime than a dual parent household (Maginnis, 1997).

An additional variable that can help explain crime rates is the number of police officers. Annual data describing the number of active-duty law-enforcement officers employed in each state is included. The information was obtained from the FBI Uniform Crime report which tallies police information for all fifty states.

Table 1, describes the means and sums of the variation in the data between and within variation. The data was divided by 1,000 to scale the parameters for interpretation. Table 1, Appendix B, provides summary statistics of the data used in this study. The variable column states the variables examined while the description column identifies what the variable represents.

The average unemployment rate over the sample period for the fifty states was 5.56 percent, with a standard deviation of 1.87 from the mean. The unemployment average had a minimum of 2.3 percent and a maximum of 13.78 percent. Poverty percentage had a mean of 12.8 percent, with a standard deviation of 12.8 from its mean. The minimum was 2.9 percent and had a maximum of 27.2 percent. Teenage population had an average of 638,905 with a standard deviation of 721,118. Teenage population had a minimum of 50,377 and a maximum of 4,926,890. The violent crime infraction average was 30,621 with a standard deviation of 44,371. It had a minimum of 392 and a

maximum of 345,624. Murders and manslaughters had an average of 364 with a standard deviation of 504 from its mean. It had a minimum of 1 and a maximum of 4,096. Forcible rapes had an average of 1,887 with a standard deviation of 2,081. It had a minimum of 74 and a maximum of 12,896. Robberies had an average of 9,573 and a standard deviation of 16,221. It had a minimum of 41 and a maximum of 130,897. Property crime infractions had an average of 215,845 with a standard deviation of 256,052. It had a minimum of 12,010 and a maximum of 1,726,391.

### Methodology and Models

The study employs the use of fixed-effects regression analysis to isolate the impact of certain policies on the crime rates of focus. According to a Hausman test, a fixed effects model is more effective than a random effects model.

Before estimating the fixed effects model, it is informative to inspect the correlation between the variables included in the analysis. The author will test the correlation between the variables *SHALL*, *MAYISSUE*, *NOISSUE*, *UNEMPL* (unemployment rate), *TEENPOP* (teenager population), *FORCERAPE* (forcible rape), *MURMANS* (murder and manslaughter), *ROB* (robbery), *PRTYCRMTL* (property crime total), and *VLTCRMTL* (violent crime total). The results reported in Table 2 indicate a negative correlation between the variable *SHALL* with *FORCERAPE*, *MURMANS*, *ROB*, and *TEENPOP*. The negative correlation implies that those variables decrease when there is shall-issue policy. Using regression analysis will further validate this.

The results differ when we test the variables *MAYISSUE* and *NOISSUE*. We see a positive correlation indicating that crimes increase compared to shall-issue. Although the results report a weak correlation, the data still support a negative correlation for *SHALL*,

and a positive correlation with *MAYISSUE* and *NOISSUE*. The regression analysis performed later in the study seeks to unravel this correlation.

Our sample period is from 1988-2012; and is considered panel data, which is defined as data in which the behavior of the same economic units is observed over time. In the case of this research, the author is conducting analysis of crime rates at the state level, and policy in place per year respectively. Employing the fixed effects model is effective in measuring the impact of variables over time. The fixed effects model explains relationships between a predictor and the dependent variable within a state and time frame.

Various models will include the variables police, shall-issue, no-issue, and may-issue as independent variables and measure the impact of them on certain crime rates. In Equation (1) the analysis begins with the property crime total as the dependent variable:

$$\begin{aligned}
 PRTYCRMTL_{it} = & \alpha_i + \gamma_t + B_1POLICE_{it} + B_2SHALL_{it} + B_3NOISSUE_{it} + \\
 & B_4MAYISSUE_{it} + B_5UNEMPL_{it} + B_6POVPRCNT_{it} + B_7TEENPOP_{it} + u_{it} \quad (1)
 \end{aligned}$$

Where the  $\alpha_i$  are state fixed effects,  $\gamma_t$  are year fixed effects,  $B$ 's are parameters to be estimated, and  $u_{it}$  is a zero-mean error term. The estimation results are reported in the first column of Table 3 and provide insight to how the various concealed-carry policies effect property crime totals. Analyzing the regression results, the model has an adjusted  $R^2$  of sixty-nine percent and two statistically significant variables. The variable *POLICE* is statistically significant at the ninety-five percent confidence interval, and the estimated parameter suggests that for every additional police officer added to a state, overall property crime total will reduce by .004 infractions per 100,000 people, on average. The results suggest that the presence of an additional police officer on patrol through an area

creates a positive externality to society. Police officers presence creates a deterrent to potential criminal actions.

The variable *NOISSUE*, which indicates states that do not issue concealed handgun permits, is statistically significant at the ninety-five percent confidence interval. The results suggest that in each no-issue state, overall property crime decreases by 3.97 infractions per 100,000 people. [This may indicate a relationship between property crime and firearms, where one can expect an intruder in a home invasion to be armed with an illegal firearm] However, in this example an intruder may realize that while the victim is not legally authorized to conceal a firearm, it is legal for the homeowner to be in possession of a shotgun or long gun on private property. Thus intruders may account for the possibility of the homeowner or property owner being armed inside which creates deterrence. Criminals looking to break into cars may do so in a parking lot or parking garage which can be altered by the aforementioned police officer presence on patrol.

The variable *SHALL*, which represents shall-issue states; is statistically insignificant at the ninety-five percent confidence level. The results do not show a substantial increase or decrease in the property crime totals. From the analysis on no-issue states in this equation, perhaps shall-issue states would be better off by altering their policy to no-issue. This change may not be popular, but state policy makers concerned with property crime rates should ponder the idea.

Continuing the analysis into other variables, the next model relates violent crime totals to the same independent variables in Equation (1). The new model, Equation (2), is as follows:

$$VLTCRMTL_{it} = \alpha_i + \gamma_t + \delta_1 POLICE_{it} + \delta_2 SHALL_{it} + \delta_3 NOISSUE_{it} + \delta_4 MAYISSUE_{it} + \delta_5 UNEMPL_{it} + \delta_6 POVPRCNT_{it} + \delta_7 TEENPOP_{it} + u_{it} \quad (2)$$

Where the  $\alpha_i$  are state fixed effects,  $\gamma_t$  are year fixed effects,  $\delta$ 's are parameters to be estimated, and  $u_{it}$  is a zero-mean error term. Equation (2) facilitates interpretation of the impact of the independent variables on states violent crime total per 100,000 people. Results are reported in the second column of Table 3. Analyzing the regression results, the model has an adjusted  $R^2$  of fifty-nine percent with four statistically significant variables. The first variable *POLICE*, can be interpreted similarly to Equation (1). For each additional police officer employed in a state, the state can expect a decrease in violent crime total per 100,000. Intuitively this result makes sense if each additional police officer on patrol acts as a deterrent to criminal activity. When states hire and put additional police officers on the beat, violent offenders may be more reluctant to carry out potential crimes.

The variable *NOISSUE* is statistically significant at the ninety-five percent confidence level and the results suggest that in a no-issue state the overall violent crime total decreases by .14 infractions compared to states that do not require a permit to conceal carry. Violent crime totals are not solely dependent on firearms, as a variety of weapons can be used in a violent crime. However, the results suggest that fewer legal concealed handguns result in less crime. The shall-issue policy was insignificant in this equation.

The variable *MAYISSUE*, which denotes may-issue states, is statistically significant in Equation (2) and suggest that a may-issue state experiences overall violent crime rate that is lower by .01 infractions compared to no permit required states. May-

issue states restrict individuals from being issued a concealed permit even if the individual qualifies for the permit. May-issue states may vet their applicants thoroughly compared to shall-issue states. State policy makers currently in shall-issue states but who desire lower violent crime totals may consider switching to may-issue rather than the more drastic policy change to no-issue. If a shall-issue state's constituents value their ability to purchase and conceal handguns, the .01 infraction decrease in violent crime may not outweigh the value of being able to conceal a handgun.

The teenage population in a state, *TEENPOP* is statistically significant at the ninety-five percent confidence interval. The regression results suggest that for each additional percentage point increase in teenage population in a state, the overall violent crime rate per 100,000 people will increase by .09 infractions. Juveniles may be prone to committing crime due to factors such as gangs and immaturity or may commit more violent crime due to their lack of knowledge and consequences of their actions.

Shall-issue policy was statistically insignificant at the ninety-five confidence level in this model. The results do not express that shall-issue has substantial effects on violent crime rates per 100,000 people at the state level. Lott and Mustard found the policy to have positive a positive impact on crime at the county level, however the results in this study do not show the same significant effect.

To further the analysis of crime rates and carry permit policies, Equation (3), uses the variable *murmans* (murder and manslaughters) as the dependent variable.

$$MURMANS_{it} = \alpha_i + \gamma_t + \theta_1 POLICE_{it} + \theta_2 SHALL_{it} + \theta_3 NOISSUE_{it} + \theta_4 MAYISSUE_{it} + \theta_5 UNEMPL_{it} + \theta_6 POVPRCNT_{it} + \theta_7 TEENPOP_{it} + u_{it} \quad (3)$$

Where the  $\alpha_i$  are state fixed effects,  $\gamma_t$  are year fixed effects,  $\theta$ 's are parameters to be estimated, and  $u_{it}$  is a zero-mean error term. The results are reported in the third column of Table 3. Analyzing the regression results, the model has an adjusted  $R^2$  of sixty-eight percent and three statistically significant variables. The variable *POLICE* is again statistically significant at the ninety-five percent confidence interval. The impact of police on crime rates is robust and has a significant impact on murders and manslaughters. To interpret the results, each additional police officer a state employs, the state can expect a decrease in murders and manslaughters by .013 infractions.

The no-issue policy is statistically significant at the ninety-five percent confidence interval. In a no-issue state, murders and manslaughters can expect to decrease by .12 infractions compared to no permit required states.

The variable *MAYISSUE* is statistically significant, and the results suggest that in a may-issue state murders and manslaughters will decrease by .11 infractions compared to no permit required states. These results are very similar to the no-issue policy. Murders may be committed a variety of ways, yet this research is interested in analyzing the impact of concealed carry policies on murders and manslaughters.

The shall-issue policy is statistically insignificant in Equation (3). There is no credible evidence from the analysis that murders and manslaughters increase or decrease in states that are shall-issue. Groups that claim there is “no-change” in crime rates due to a shall-issue carry permit policy are supported by these results. Lott and Mustard’s study found that shall-issue policy had positive effects on murders and manslaughters at the county level, however the data in this study does not support their findings at the state level.

The variable for teenage population is statistically significant at the ninety-five percent confidence level. For each additional percentage increase in the teenage population in a state, murders and manslaughters are expected to increase by .12 infractions. One potential explanation is that teenagers involved in underage drinking may result in car accidents which are considered manslaughter, as well as teenagers involved in gang activity committing crimes.

In Equation (4) forcible rape is the dependent variable.

$$FORCERAPE_{it} = \alpha_i + \gamma_t + \vartheta_1 POLICE_{it} + \vartheta_2 SHALL_{it} + \vartheta_3 NOISSUE_{it} + \vartheta_4 MAYISSUE_{it} + \vartheta_5 UNEMPL_{it} + \vartheta_6 POVPRCNT_{it} + \vartheta_7 TEENPOP_{it} + u_{it} \quad (4)$$

Where the  $\alpha_i$  are state fixed effects,  $\gamma_t$  are year fixed effects,  $\vartheta$ 's are parameters to be estimated, and  $u_{it}$  is a zero-mean error term. The results are reported in the fourth column in Table 3. Analyzing the regression results, the equation has an adjusted  $R^2$  of forty-one percent with five statistically significant variables. The variable *POLICE* is again statistically significant at the ninety-five percent confidence interval. Each additional police officer decreases forcible rapes by .21 infractions per 100,000 people.

The variable *SHALL* is statistically significant at the ninety-five percent confidence interval. This is the first instance where shall-issue has been statistically significant in any equation tested. In a shall-issue state, forcible rapes will decrease by .59 infractions compared to no permit required states. One might assume that potential perpetrators hesitate committing forcible rapes in shall-issue states because the potential victim might be legally concealing a firearm. While this hypothesis could hold for any of

the crime variables, forcible rapes have been the only crime that has been significantly impacted by shall-issue policy.

The *NOISSUE* variable is statistically significant at the ninety-five percent confidence level in Equation (4). Thus far, no-issue states have seen overall lower crime rates. Shall-issue has seen no effect, yet no-issue has seen a positive impact perhaps due to the legislation that is in place. The results suggest that in a no-issue state, forcible rapes are lower by .75 infractions compared to no permit required states. From the regression results one can conclude that individuals in no-issue states face lower odds of being forcefully raped, therefore the citizens are better off.

The unemployment rate is statistically significant at the ninety-five percent confidence level. The regression output indicates that for each additional percentage increase in a state's unemployment rate that forcible rapes will decrease by .03 percent. The unemployment rate has been negatively correlated with each crime thus far.

The last crime variable investigated here is robbery. Robbery is considered a violent crime and from prior equations shall-issue is expected to be insignificant.

Equation (5) is as follows:

$$ROB_{it} = \alpha_i + \gamma_t + \rho_1 POLICE_{it} + \rho_2 SHALL_{it} + \rho_3 NOISSUE_{it} + \rho_4 MAYISSUE_{it} + \rho_5 UNEMPL_{it} + \rho_6 POVPRCNT_{it} + \rho_7 TEENPOP_{it} + u_{it} \quad (5)$$

Where the  $\alpha_i$  are state fixed effects,  $\gamma_t$  are year fixed effects,  $\rho$ 's are parameters to be estimated, and  $u_{it}$  is a zero-mean error term. The results are reported in the fifth column of Table 3. The regression output indicates that the model has an adjusted  $R^2$  of sixty-one percent with four statistically significant variables. The variable *POLICE* is statistically

significant at the ninety-five percent confidence interval, which is expected given the police's positive impact on crime category.

The variable *NOISSUE* is statistically significant at the ninety-five percent confidence level. A no-issue state can expect to see robberies decrease by .06 infractions. In the models tested thus far, no-issue states have had consistent reductions in crime rates.

The variable *MAYISSUE* is statistically significant at the ninety-five percent confidence level. The regression results indicate that in a may-issue state robberies expect to decrease on average. The regression interpretation follows suit to no-issue states. A may-issue policy seems to be the option for shall-issue states to adopt if policy makers want to grant concealed-carry authority to particular citizens.

The variable *TEENPOP* is statistically significant at the ninety-five percent confidence level. For each additional percent increase in teenage population in a state, the state can expect an increase in robberies by .007 infractions. The models estimated here provide substantial evidence that crime rates increase with a higher teen population.

Shall-issue policy is statistically insignificant at the ninety-five percent confidence level. The results of the regression analysis provide no substantial increase or decrease in robberies in shall-issue states. Policy makers in shall-issue states that are concerned with high robbery rates may consider hiring additional police officers or altering their current carry policy to may-issue.

## CONCLUSION

The purpose of this research was to explore the relationship between shall-issue, may-issue, and no-issue concealed-carry policies and to measure and analyze the impacts of the policies on crime rates in the various United States of America. The motivation to explore this particular topic is to provide information to policy makers and to expand the knowledge of the public. A formal analysis into the effect of these policies was necessary to evaluate any benefits of each policy. A thorough investigation into the crime rates over the twenty-four year period of 1988-2012 will either support or debunk the hypothesis that crime rates decrease in shall-issue states.

The methodology used in this research was ordinary linear panel estimator with states and year fixed effects. The dependent variable in this research measure various categories of crime including property crime total, violent crime total, murders and manslaughters, forcible rapes, and robbery. Each crime category was investigated as one of five different equations each including of police, may-issue, no-issue, shall-issue, teenage population, the unemployment rate, and the poverty rate per state as explanatory uses. The methodology began by identifying crime rates and factors that may contribute to higher or lower crime rates. After testing the significance of these relationships between the variables, the study explored the extent of how each policy impacts the specified variables.

The results from the research find that a shall-issue policy results in fewer forcible rapes. In every other crime category investigated, the shall-issue policy had no substantial effect on crime rates. This suggests that there is no noticeable changes in the crime variables in shall-issue states.

A no-issue policy has negative effects on property crime total, violent crime total, murders and manslaughter, forcible rapes, and robberies. This suggests that in the case of crime no-issue states are better off than shall-issue. This is a possible remedy to reduce crime rates. None of these policies will affect the illegal gun owner and a criminal will act regardless of what policy is declared by state policy makers; these policy decisions only affect the law abiding citizen attempting to purchase and conceal a handgun.

The results provided in this study support no-issue and may-issue policies. The author suggests that policy makers concerned with the crime variables tested may enforce stricter policy from shall-issue to may-issue. Overall this study concludes that shall-issue policy has no impact on the crime variables tested. No-issue policy has statistically significantly lower crime compared to other state policies. If policy makers want to reduce the crime variables investigated in this study, the evidence suggests that states might do well to conduct an analysis to determine the efficient amount of police officers to hire.

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APPENDIX A: CHARTS

Chart 1: violent crime total in the United States from 1988-2012.

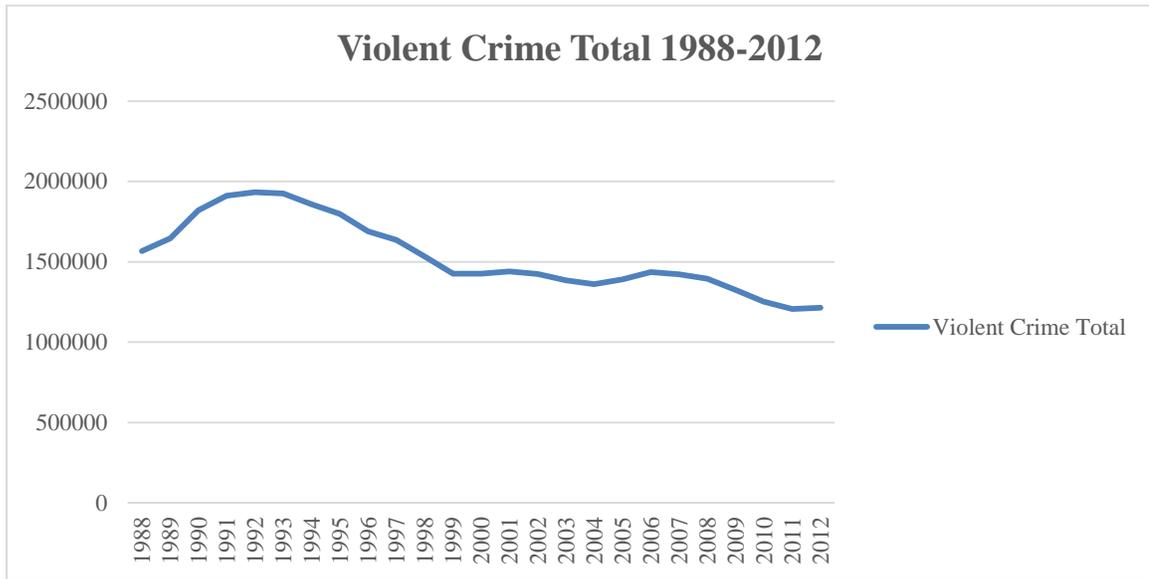


Chart 2: property crime total in the United States from 1988-2012.

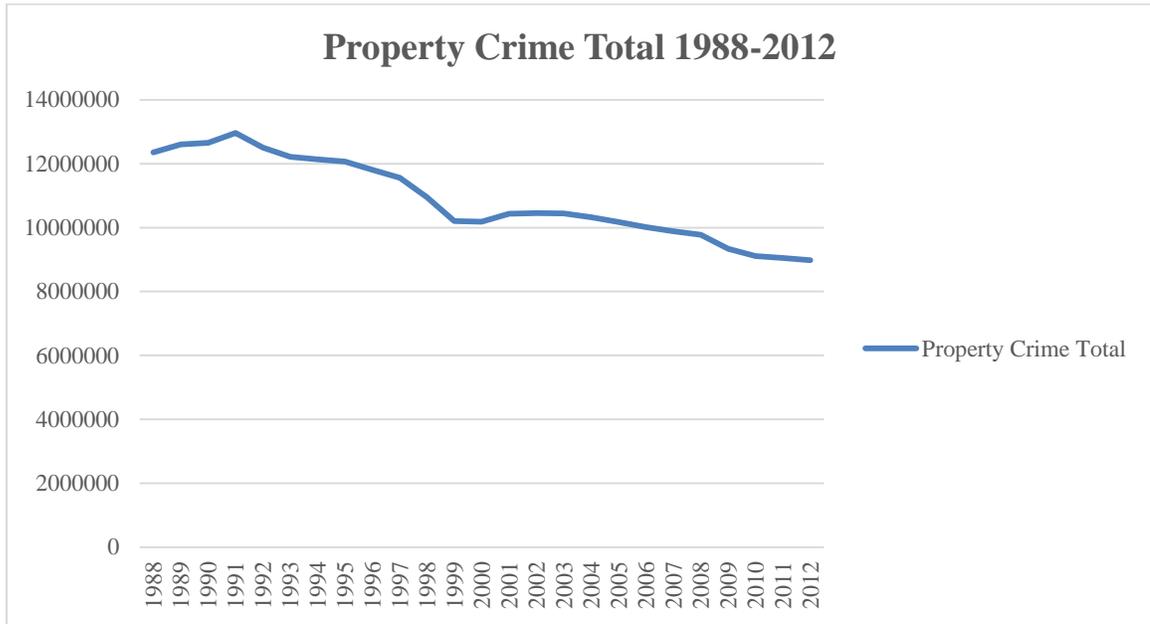
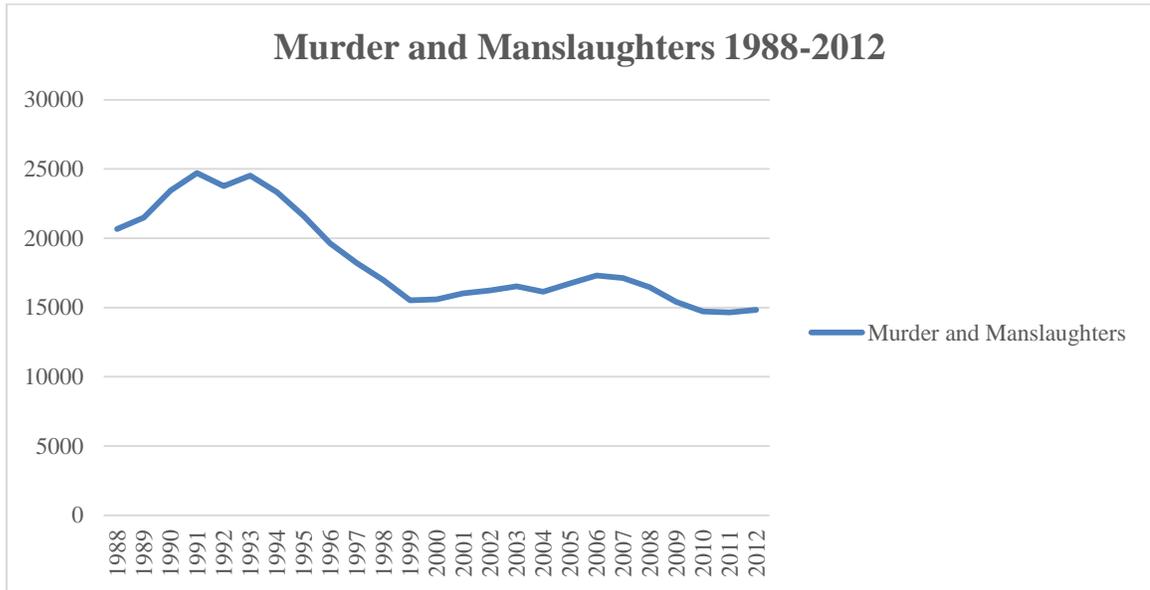


Chart 3: Murders and Manslaughters in the United States from 1988-2012.



## APPENDIX B: TABLES

Table 1: Data description.

Variable	Description	Obs	Mean	Std. Dev.	Min	Max
			5.56580	1.87106		13.7833
UNEMPL	Unemployment rate	1248	8	5	2.3	3
			12.8608	3.72063		
POVPRCNT	Poverty percentage rate	1250	8	7	2.9	27.2
				721118.		
TEENPOP	Teenage population	1150	638905	1	50377	4926890
				44371.0		
VLTCRMTL	Violent crime rate	1250	30621.9	5	392	345624
	Murders and		364.678	504.817		
MURMANS	manslaughters	1250	4	9	1	4096
FORCERAP			1887.24	2081.80		
E	Forcible rape	1250	2	2	74	12896
			9573.54	16221.2		
ROB	Robbery	1250	9	1	41	130897
PRTYCRMT			215845.	256052.		
L	Property crime rate	1250	1	1	12010	1726391



Table 3: Summary statistics

VARIABLES	Property Crime Total	Violent Crime Total	Murders and Manslaughters	Forcible Rape	Robbery
police	-3.976*** (-37.520)	-0.930*** (-35.654)	-0.013*** (-42.651)	-0.020*** (-21.643)	-0.493*** (-39.610)
shall	-5.203 (-0.345)	-6.406* (-1.725)	-0.083* (-1.891)	-0.589*** (-4.453)	-2.704 (-1.527)
noissue	-40.913*** (-2.615)	-14.593*** (-3.788)	-0.116** (-2.543)	-0.750*** (-5.465)	-6.527*** (-3.553)
mayissue	-8.593 (-0.546)	-9.511** (-2.453)	-0.087* (-1.908)	-0.567*** (-4.106)	-3.821** (-2.066)
unempl	964.288 (0.876)	-307.842 (-1.136)	-1.401 (-0.438)	-28.667*** (-2.969)	146.138 (1.131)
povprcnt	-709.560 (-1.139)	166.380 (1.085)	0.794 (0.438)	4.811 (0.880)	-14.402 (-0.197)
teenpop	-0.006 (-1.326)	0.009*** (7.717)	0.000*** (9.434)	0.000 (0.210)	0.007*** (12.074)
Constant	265.979*** (15.272)	40.818*** (9.518)	0.499*** (9.859)	2.534*** (16.586)	14.425*** (7.053)
Observations	1,250	1,250	1,250	1,250	1,250
Number of state	50	50	50	50	50
Adjusted R-squared	0.698	0.603	0.687	0.416	0.625

t-statistics in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \*

p&lt;0.1