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IS THERE A CONNECTION BETWEEN SINGLE PARENT CHILDREN AND CRIME?

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Prior research indicates that the legalization of abortion through Roe v. Wade has had a significant impact on the decline of the crime rate beginning in the 1990s. It is widely assumed that the majority of women seeking abortions are extremely similar to single mothers. Most are uneducated, poor, and young. In this paper, I examine multiple variables, including the amount of children living in a single mother household, and their relationship to crime rates. I attempt to bridge the gap between aborted children and those living in single parent households and conclude whether or not the majority of these aborted children, had they not been aborted, would have a positive impact on the crime rate.

JEL classifications: K40, K42

Keywords: determinants of crime, abortion, single parent children, *Roe v. Wade*

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I. Introduction

Parents are undoubtedly among the most important people involved in shaping a child's life. However, what happens when a parent is not involved in that child's life? Does the child engage in more criminal behavior?

Previous research has linked the recent decline in crime in the United States to the legalization of abortion through *Roe v. Wade* in 1973. This literature argues that abortion is most utilized by the young, single, poor, and uneducated. Furthermore, the argument suggests that children growing up in these types of households are more likely to resort to crime. Consequently, when these individuals do have an abortion, the number of future criminals fall, thereby leading to less crime in the future. Donohue and Levitt (2001) argue that the legalization of abortion in 1973 accounts for as much as 50% of the decline in crime in the 1990s.

The implied, yet rarely tested, link in this argument is that children that are raised in single parent households are more likely to resort to crime in their older years. Thus, the abortion-crime hypothesis suggests that there should be a positive relationship between the number of children growing up in single parent households now and the amount of crime in the future. Using data from all 50 United States from 2000 to 2007, this paper empirically analyzes the impact of children living in a single parent home have on various crime rates years later. This paper considers all children raised in single parent households, children raised in single mother households, and children raised in single father households. The results suggest that there is very little evidence to support the link between children raised in single parent households and the amount of crime years later. This lends support to the argument that the abortion-crime hypothesis may not be as robust as previously thought, a conclusion drawn by several researchers.

II. Literature Review

Throughout the second half of the nineteenth century crime in the United States steadily rose until an unexpected, sharp decline began in the early 1990s. The drop occurred in all areas of crime as well as throughout the entire nation, this drop reduced crime rates to their lowest points since the 1950s. According to the Federal Bureau of Investigation Uniform Crime Report, during the 1991-2001 period the violent crime index fell 34 percent while the property crime index fell 29 percent. The Crime Report also cites a 43 percent decline in homicide over the 1991-2001 period and goes on to indicate that the declining pattern experienced by homicide is present for every major crime category. Existing literature has suggested many possible determinants of crime including conviction and imprisonment rates, the police force, alcohol and drug consumption, gun permits, economic conditions, the crack cocaine epidemic, and even abortion that could explain the trends that have been observed in crime rates over the years.

A. Conviction and Imprisonment

The economic analysis of the determinants of crime began with Becker's (1968) seminal paper on criminal behavior. In modeling criminal behavior, Becker (1968) argues that criminals make decisions based on the costs and benefits associated with committing a crime. Correspondingly, Becker (1968) states that criminal behavior depends dually on the probability of being convicted and the cost associated with being convicted. When the costs of punishment are high, as with imprisonment, criminals that continue to engage in criminal activity are the criminals are risk preferential, as such criminals could instead receive the same income through less risky activities. Becker (1968) also states that fines imposed upon criminals are a valuable

form of punishment, as fines both deter individuals from engaging in criminal acts and conserve resources and provide monetary gains for society as a whole.

Ehrlich (1972) agrees with Becker's (1968) analysis that criminals respond to the incentives available to them through illegal activities. Ehrlich (1972) argues that criminals behave no differently than the general public does in regards to noncriminal activity.

Levitt (1996) states that increase in imprisonment rates reduce criminal activity through two ways: first, by removing criminals from the general public they are unable to commit any more crimes. Second, prisons reduce crime is through deterrence. In agreement with Becker's (1968) theory, as the threat of punishment increases potential criminals will have more of an incentive to engage in activities that would not result in imprisonment. Levitt (1996) estimates the effect of prison populations on crime that is not affected by the presence of simultaneity. To avoid simultaneity Levitt (1996) uses prison overcrowding litigation. Prison overcrowding litigation has an impact only on the growth rate in state prisons and is unrelated to the crime rates. Using a panel data set consisting of annual, state level observations over the 1971-1993 period among the twelve states that have had their entire prison system under court order during the period Levitt (1996) finds that the impact of prison populations on crime is two-three times greater than previous estimates. Levitt (1996) obtains elasticities of -0.40 and -0.30 for violent and property crime, respectively. Levitt (1996) states that his estimates imply that each marginal prisoner released as a result of overcrowding litigation is associated with an increase of 15 crimes per year.

Levitt (2004) applies the imprisonment theory in an attempt to explain the decline in crime beginning in the 1990s. Levitt (2004) estimates the elasticity of crime with respect to punishment (through prison) of -.30 for violent crime and -.20 for property crime. Levitt (2004)

concludes that conviction and imprisonment over the 1990s accounts for a 12 percent reduction in violent crime and an 8 percent reduction in violent crime.

B. Police

In addition to the imprisonment effect on crime, Becker (1968) also argues that the optimal amount of law enforcement depends on the cost associated with apprehending and convicting criminals, the extent of punishments, and how criminals respond to changes in law enforcement. Following Becker's (1968) hypothesis, Becker and Stigler (1974) state that the performance of individual law enforcers depends upon their salaries. When enforcer's salaries are higher, they prevent more crime. Furthermore, Ehrlich (1972) states that the level of law enforcement determines the extent of an individual's involvement in illegal activities.

Levitt (2004) also examines the effect of police on the amount of crime. Throughout the 1990s the number of police officers per capita increased by 14%. Levitt (2004) concludes that this increase in police is responsible for a reduction of 5%-6% of total crime. Criticisms of the increased police force include those citing the increased costs associated with employing more officers. However, using a cost-benefit analysis Levitt (2004) demonstrates that the benefit associated with the reduction of crime as a result of increased policing is $20-25 billion.

Lin (2009), using a panel data set consisting of 51 U.S. states covering the period from 1970 to 2000, finds increased police presence results in decreased crime. In order to avoid endogeneity that arises from analyzing the impact of police Lin (2009) uses 1-year lagged state sales tax rates. Analyzing the impact of police using both ordinary least squares estimation and two stage least squares Lin (2009) finds that the two stage least squares (2SLS) model avoids the problem of simultaneity associated with crime and the upward bias associated with ordinary least

squares (OLS). Using 2SLS Lin first estimates the impact of state sales tax rate on local police employed. Through this approach Lin (2009) is able to avoid the problem of simultaneity associated with police and crime, areas with more crime would tend to hire more police. Lin (2009) argues that the state sales tax rate successfully captures changes in the local police force through state government revenues generated by state sales tax rates. State sales taxes can be transferred by state governments to local governments, Lin (2009) states that this will result in increases in the police force. Lin (2009), using the 2SLS finds that the estimated elasticity of the police force with respect to crime was -0.9 for property crime and -1.1 for violent crime. Furthermore, Lin (2009) states that the results using the 2SLS model were more negative than the OLS model, making it the better approach.

Marvell and Moody (1996) encounter the simultaneity problem as well. Analyzing police and crime data at both the city and state levels and using Granger causality tests Marvell and Moody (1996) find causations in both directions. Marvell and Moody (1996) find that rising crime rates increase police levels, but the magnitude is small and statistically significant. Marvell and Moody (1996) conclude that higher police levels do reduce most types of crime, most notably at the city level and the size of the impact is considerable.

Levitt (1997) takes a similar approach as Lin (2009) in avoiding the endogeneity between police and crime. Levitt (1997) uses electoral cycles estimate the relationship. Levitt (1997) explains that because crime is a central issue in all large cities mayoral elections police staffing becomes an ideal tool of incumbents to boost their support. Using a panel data set consisting of 59 large U.S. cities (population over 250,000) during the 1970-1992 period Levitt (1997) finds that additional police reduce crime. Levitt (1997) provides empirical evidence, stating that the

elasticity of violent crime with respect to sworn officers is approximately -1.0 and -0.3 for property crime.

Levitt (2002) attempts to uncover the impact of police on crime using an instrumental variable that predicts changes in the size of the police force but is not related to crime. Levitt (2002) uses firefighters per capita as this instrument. Levitt (2002) uses a panel data set consisting of 122 cities that had at least 100,000 residents in 1973 over the 1973-1995 period. Using a two stage least squares estimation in which the relationship between police and firefighters is first estimated, then the relationship between crime and police, Levitt (2002) finds that police has a negative relationship to crime with elasticities of -0.435 for violent crime and -0.501 for property crime.

C. Alcohol and Drug Consumption

Research has also examined the effect of substance abuse and its effect on crime. Although Levitt (2001) concludes that beer consumption plays a limited role in violent and property crime rates, Levitt (2004) attributes part of the rise and decline of crime to the crack cocaine epidemic. Because of its high potency, easy transportation, and lucrative benefits, crack cocaine quickly became a high revenue product of gangs throughout the United States. Beginning in 1985, crack consumption began to significantly rise throughout the country, the same time when homicide rates among black males under 25 also began to increase. Levitt (2004) explains that the timing of both these trends suggests the emergence crack cocaine as playing a significant role in the rising homicide rate. Levitt (2004) estimates the impact of crack cocaine on homicide rates between 6% and 18%. Furthermore, Levitt (2004) states that the decline of the crack epidemic explains about 15% of the decrease in homicide rates.

Fryer, Heaton, Levitt, and Murphy (2005) find that the rise of crack cocaine contributed to the increasing homicide rate among black males beginning in the 1980s. Using a crack index constructed of cocaine arrests and cocaine-related emergency room visits, the frequency of crack cocaine mentions in the media, cocaine related deaths, the number of DEA drug seizures and undercover drug purchases involving cocaine over the panel data set consisting of 144 cities with a population greater than 100,000 in 1980 and all states over the 1980-2000 period Fryer, Heaton, Levitt, and Murphy (2005) find a strong link between crack and the increased homicide rate among Black males. Fryer, Heaton, Levitt, and Murphy (2005) state that the rise in crack between 1984-1989 is associated with a doubling of the homicide rate among Black males aged 14-17, a 30% increase for Black males aged 18-24, and a 10% increase for Black males 25 and over.

Analyzing the impact of crack cocaine among all demographic groups Grogger and Willis (2000) find that the introduction of crack cocaine is associated with an increase in violent crime, but shows little relationship with property crime. Using a panel data set consisting 27 metropolitan statistical areas annually from 1979-1991 Grogger and Willis (2000) hypothesize that violent crimes and property crimes play different roles in the crack cocaine market. Grogger and Willis (2000) state that because crack dealers lack the ability to turn to the police for assistance in crack trading constraints they must turn to violence. Grogger and Willis (2000) conclude that violent crimes may serve the purpose of enforcing trading agreements while property crimes lack the ability to do so.

According to Greenfeld (1998) The Bureau of Justice Statistics reports that over one third of convicted offenders in 1996 were under the influence of alcohol at the time of their arrest. Carpenter (2007) examines the effect of alcohol use on crime through the institution of zero

tolerance laws using arrest data of adult males by single year of age for police agencies in metropolitan statistical areas from 1988-1997.[1] Carpenter (2007) estimates reduced form models of the effect of zero tolerance laws on the proportion of adult male arrests attributable to 18-20 year olds and 22-24 year olds. Carpenter (2007) estimates that these laws reduced the fraction of property crimes attributed to 18-20 year olds by 3.4 percent relative to its mean prior to the institution of zero tolerance laws. Violent crimes remained unaffected by zero tolerance laws. Zero tolerance laws had no effect on property or violent crimes attributable to 22-24 year olds.

D. Gun Permits

Lott and Mustard (1997) use county-level data from 18 states between 1977 and 1992 to examine how criminals respond to changes in behavior of citizens. In particular, Lott and Mustard (1997) emphasize the effect of the gun permit laws on the number of criminal arrests. They conclude that allowing individual citizens to carry concealed weapons significantly decreases violent crime and does not result in more accidental deaths associated with these weapons. Lott and Mustard (1997) find that when a state adopted concealed handgun laws, murders decrease by about 8%, rapes decrease by about 5%, and aggravated assaults decrease by about 7%. However, Lott and Mustard (1997) also find that adopting concealed weapons laws is associated with *increases* in property crime. Lott and Mustard (1997) argue that concealed weapon laws increase the cost of violent crime so that criminals substitute property crimes (for violent crimes) because property crimes such as burglary, larceny, and motor vehicle theft typically involve minimal contact with victims.

[1] Aimed at reducing the amount of drunk drivers on the road, zero tolerance laws have been enacted by every state and stipulate that the blood alcohol content of drivers under the age of 21 cannot exceed 0.02. Failure to obey zero tolerance laws can result in the suspension or revoking of a driver's license and/or fines.

Ayers and Donohue (2003) reject Lott and Mustard's (1997) findings on grounds that the time period they used resulted in an overestimation of the effect right to carry laws have on crime reduction. Ayers and Donohue (2003) state that the time period used by Lott and Mustard (1997) captures the sharp rise in crime in the 1980s, but fails to capture the decline beginning in the early 1990s. The failure to capture the corresponding decline in crime results in the overestimation of the effect of right to carry laws. Ayers and Donohue (2009) conclude that right-to-carry laws have had no impact on the decline in crime beginning in the early 1990s.

McDowall, Loftin, and Wiersema (1995) analyze the relationship between shall issue laws[2] and homicide in five areas throughout Florida, Mississippi, and Oregon over the monthly 1973:1-1992:12 period. McDowall, Loftin, and Wiersema (1995) find that firearm homicides increased after the introduction of shall issue laws while homicides not involving guns remained steady. McDowall, Loftin, and Wiersema (1995) conclude that shall issue laws do not reduce homicides and that shall issue laws actually raise levels of firearms murders. Since a majority of murders involve firearms (68%), shall issue laws increase the amount of homicides.

Duggan (2001) also examines the relationship between guns and crime by analyzing the effect of *Guns & Ammo* magazine sales. Duggan (2001) explains that *Guns & Ammo* magazine is a valid variable to include because areas with high sales rates of gun magazines are significantly higher in counties with more average gun owners, there is approximately a one-for-one relationship between sales rates and the death rate from gun accidents, gun shows per capita is significantly positively related with both gun shows per capita and National Rifle Association membership, and that state-level estimates of gun ownership are significantly positively related to sales rates of gun magazines. Using annual, state level data from the 1982-1998 period, Duggan (2001) finds that a 10 percent increase in the rate of gun ownership is associate with

[2] Shall issue laws require a person to obtain a permit which enables one to carry a concealed weapon.

approximately a 2 percent increase in the homicide rate. Duggan (2001) states that his finding is consistent with the theory that increases in gun ownership lead to a rise in criminal activity as well as the hypothesis that increases in crime results in more individuals purchasing a gun for self-defense purposes. Duggan (2001) finds no evidence to support the theory that legislation enabling carrying of concealed weapons corresponds to a reduction in crime.

Marvel (2001) finds that banning the possession of handguns by persons under 18 years of age have very little or no impact on crime. Marvel (2001) goes on to state that the Federal Crime Control and Law Enforcement Act of 1994, which was aimed at controlling gun purchases by adults as well as juveniles, have no crime-reduction impact and there is slight evidence of increasing crime. Additionally, Marvel (2001) states that when the Federal Crime Control and Law Enforcement Act has an impact, it is almost always that crime increases, providing no evidence that gun control has achieved its desired effect.

E. Economic Conditions and Crime

The effect of economic conditions on crime has also been examined. Levitt (2004) argues that this hypothesis is likely to be related to crimes in which there is direct financial motivation such as burglary, robbery, larceny, and auto theft. However, Becker's (1968) model cites that improvements in labor opportunities make potential criminals more inclined to stray from all criminal activities, including violent crimes. Levitt (2004) goes on to state that if the economy has an impact on crime it is likely indirectly though increases in state and local government budgets that enable increased spending on police and prisons.

Using a two-stage least squares approach to correct for the endogenous relationship between unemployment and crime, [3] Lin (2008) finds that a 1% increase in the unemployment rate increases property crimes 4%. Lin (2008) argues that the larger 2SLS effect explains 30 percent of the property crime change in the 1990s. Lin (2008) also finds that violent crimes are uninfluenced by the level of unemployment.

F. Abortion and Crime

Donohue and Levitt (2001) form a nontraditional (and subsequently highly controversial) explanation of potential factors contributing to crime and examine whether the legalization of abortion in 1973 through *Roe v. Wade* plays a role in crime. In the years following the legalization of abortion the number of documented abortions rose significantly from under 750,000 in 1973 (live births totaled 3.1 million) to more than 1.6 million in 1980 (live births totaled 3.6 million). Donohue and Levitt (2001) argue that legalized abortion results in reduced crime because the women that are most likely to have an abortion are those who are most likely to give birth to a child that would engage in criminal activity. Their argument is based on Levine, Staigler, Kane and Zimmerman, (1996) and Comanor and Phillips (1999). Levine, Staigler, Kane and Zimmerman (1996) states that teenagers, unmarried women, and financially disadvantaged are the most likely to have an abortion. Comanor and Phillips (1999) find that children born to mothers in any of these situations are more likely to engage in criminal activity during youth.

However, the effect of abortion on crime depends on a substantial amount of time passing. In particular, Donohue and Levitt (2001) argue that individuals are most likely to resort

[3] For instance, while individuals that become unemployed may resort to crime for income, areas that experiences increases in crime may see firms move out resulting in higher unemployment.

to crime when they are between the ages of 18 and 24. Consequently, the steep decline in crime that begins in 1992 corresponds precisely with time that potential criminals would be hitting their peak crime years had it not been for *Roe v. Wade* in 1973. Thus, Donohue and Levitt's (2001) analysis finds that higher rates of abortion in a state in the 1970s and early 1980s are associated with lower crime rates between 1985 and 1997. They also point out that the five states that legalized abortion in 1970 (California, New York, Hawaii, Washington, and Oregon) experienced reductions in crime before the other 45 states.

Donohue and Levitt (2001) indicate that an increase of 100 abortions per 1000 live births reduces a population group's crime by 10 percent. When accounting for the fertility declines of black women, teenagers, and unwed women resulting from abortion, the estimated impact on the homicide rate is a reduction of 12.5%. Furthermore, when adjusting for "unwantedness," legalized abortion decreases the homicide rate by 18.5%.

Lott (2007) offers additionally information in an attempt to downplay the impact of abortion legalization on the crime rate. Lott's (2007) argument follows that of Joyce's (2003) assumption that legalized abortion simply replaced illegal abortions. According to Lott (2007), in the 1970-1973 period when abortion was legal in only five states, abortion illegal states had similar or even higher rates of legal abortion than in the legalized states. Lott (2007) points out that the illegal abortion state Kansas had 277 abortions per 1,000 live births. During the 1970-1973 period Kansas had a higher amount of legal abortions in Alaska (160), Hawaii (261), and Washington (265). Lott (2007) states that because Donahue and Levitt mistakenly assume that no abortions took place before *Roe v. Wade* their analysis is flawed.

The robustness of Donohue and Levitt's (2001) "abortion reduces crime" argument has been called into question in multiple studies. Joyce (2003) specifically argues that Donohue and

Levitt's (2001) results suffer from an omitted variable problem. Joyce (2003) goes on to argue that this omitted variable may in fact be the effect of the crack cocaine epidemic. Joyce (2003) also questions the methodology employed by Donohue and Levitt (2001), arguing that his difference-in-difference method has advantages over Donohue and Levitt's (2001) use of the abortion-to-births ratio in analyzing unwanted births.[4] Joyce (2003) argues that his empirical approach has advantages over Donohue and Levitt (2001) because abortion is endogenous to sexual activity, contraception, and childbearing. Furthermore, Joyce (2003) states that because of Donohue and Levitt's (2001) methodology they may be observing a false relationship as a result of the crack cocaine epidemic.

Joyce (2003) estimates a reduced-form equation in which changes in arrest and homicide rates among specific demographic groups before and after exposure to legalized abortion are compared to changes among demographic groups that are not exposed to legalized abortion.

Joyce (2003) also questions the evidence and assumption that economically disadvantaged women are more likely to have an abortion than others. Joyce (2003) shows that in a study in Ventura, California between 1972 and 1974, pregnant teens with better grades, more completed schooling, and not on public assistance were much more likely to have an abortion than economically disadvantaged women with less education. This group is precisely the opposite of women that Donohue and Levitt (2001) predicted would be more inclined to have an abortion. Furthermore, Joyce (2003) argues that many legal abortions simply replaced illegal abortions so there is no significant effect of *Roe v. Wade*. Joyce (2003) concludes after finding

[4] Joyce (2003) structures his difference-in-difference analysis to compare changes in crime by birth groups before and after exposure to legalized abortion. Joyce (2003) structures another difference-in-difference analysis to compare changes in crime among demographic groups before and after exposure to legalized abortion to changes among the same, but older demographic groups who are close in age, but who were unexposed to legalized abortion.

little evidence to suggest otherwise, that the negative relationship between abortion and crime is false.

Donohue and Levitt (2003) respond to Joyce (2003) by claiming that none of his arguments offer a threat to their original findings. Donohue and Levitt's (2003) claim is derived from Joyce's choice to focus only on the small period in which the "crack epidemic" was at its peak. Consequently, Donohue and Levitt (2003) argue that Joyce's (2003) argument fails to examine the total impact of abortion on crime. Again focusing on the original time period, but using Joyce's (2003) difference-in-difference technique, Donohue and Levitt (2003) find that abortion rates once again display a negative relationship with crime rates.

Lott (2007) continues to argue against Donahue and Levitt's results through new incentives that arise with the legalization of abortion. Lott (2007) states that the option of aborting an unwanted child results in people being less concerned with contraceptives and more likely to engage in premarital sex. Lott (2007) continues that social mores will begin to adapt to the increase premarital sex and social pressure will encourage more women to engage in the behavior, including women who would not have an abortion. According to Lott (2007), the increase in unprotected sex will correspond to an increase in unwanted pregnancy. Lott (2007) states that this will result in an increasing number of women who are single, pregnant, and unwilling to abort their child.

Lott (2007) goes on to state that the legal abortion option resulted in increases in the number of men who chose to leave their pregnant partner. Lott (2007) argues that men are reluctant to stay with their pregnant partners because they were under the assumption that their partner would chose to abort a potential child. Furthermore, Lott (2007) states that because of this false assumption the mothers often end up raising the child on their own.

In accordance with Comanor and Phillips (1999), Lott (2007) states children raised out of wedlock tend to experience a higher rate of social problems and are more likely to grow up to commit crimes. Lott (2007) concludes that legalized abortion actually increased the crime rate.

In agreement with Comanor and Phillips (1999) and Lott (2007), Dawson (1991) states that children living with single mothers were more likely than those living with both biological parents to have repeated a grade of school, to have been expelled, to have been treated for emotional or behavioral problems and to have elevated scores of behavior problems. Dawson (1991) obtains these results after analyzing the data from the 1988 National Health Interview Survey on Child Health.

Foote and Goetz (2008) also examine Donohue and Levitt's (2001) claims concerning the impact of legalized abortion and its effect on crime. Foote and Goetz (2008) argue that Donohue and Levitt (2001) should have used within-state rather than cross-state comparisons. Furthermore, Foote and Goetz (2008) state that Donohue and Levitt (2001) do not capture the true effect of legalized abortion because they do not model arrests in per capita terms. Foote and Goetz (2008) state that when using a per capita arrest dependent variable the effect of abortion on crime disappears. Foote and Goetz (2008) also attribute Donohue and Levitt's (2001) findings to omitted variable bias, perhaps the crack epidemic, and the result of failing to include age-year effects. Foote and Goetz (2008) state that when using age-year effects the coefficients become more positive, providing no evidence that abortion has had an effect on crime.

Donohue and Levitt (2008) correct for cross-state comparisons by measuring abortion in terms of the state in which it was performed rather than the state of residence of the woman receiving the abortion. Also, Donohue and Levitt (2008) construct a two year window to capture all individuals within the arrest data. Depending on the date of birth, an arrested individual could

be born as early as January or as late as December of a specific year. This ensures that no arrested individuals will be excluded from the analysis.

Also, Donohue and Levitt (2008) respond to Foote and Goetz's (2008) omitted variable claims by expanding the data set and adopting the per capita recommendations. The results indicate that the impact of abortion on crime rates remains statistically significant. Furthermore, Donohue and Levitt (2008) claim that Foote and Goetz's (2008) results depend largely on the inclusion of the District of Columbia abortion rates (which is nearly four times the national average.) When excluding the District of Columbia, the results indicate that the effect of abortion on violent crime and murder rates is as large as in the original study. Finally, Donohue and Levitt (2008) state that Foote and Goetz's (2008) study is in fact influenced by omitted variable bias, evidenced by the extreme sensitivity of their results to minor specifications in their model.

The abortion-crime theory has also been applied internationally. Kahane, Patton, and Simmons (2007) examine the abortion crime relationship in England and Wales. They find no evidence of abortion leading to a decline in crime. Kahane, Patton, and Simmons (2007) find their coefficient n the abortion

Pop-Eleches (2006) examines the effect of the 1967 abortion ban in Romania. He finds that the lives among children born immediately after the ban improved. Specifically, educational achievement increased and high-skilled jobs employment among demographic groups exposed to the ban increased.

Although numerous studies have examined the relationship between abortion and crime few definitive answers have been obtained. Economists continue to reexamine Donohue and Levitt's (2001) findings, analyzing new model specifications and new data sets. Joyce (2009).

According to Joyce (2009), criminologists have since dismissed the notion of abortion reducing crime, but economists will continue to test the theory and its currently inconclusive arguments.

III. Methodology

A. Data

This model incorporates a panel data set on all 50 states. The time period for all variables begins in 2000, the final year included varies due to data availability. Table 1 and Table 2 lists the dependent and independent variables included in this analysis, the years included, and their source. Table 3 provides the summary statistics for all variables used in this analysis.

Table 1: Dependent Variables

Variable	Definition	Source	Time Period
Violent	Natural logarithm of the yearly amount of all violent crimes committed within a state. Consists of murder, rape, robbery, and assault. Per 1000 state residents.	U.S. Department of Justice	2000-2007
Murder	Natural logarithm of the yearly amount of all murders committed within a state. Per 1000 state residents.	U.S. Department of Justice	2000-2007
Property	Natural logarithm of the yearly amount of all property crimes committed within a state. Consists of burglary, larceny, and motor vehicle theft. Per 1000 state residents.	U.S. Department of Justice	2000-2007

Table 2: Independent Variables

Variable	Definition	Source	Time Period
Single Parent Children	Natural logarithm of the total amount of children 12-17 years of age living in a household headed by a male or female, but not both. Per 1000 state residents.	U.S. Census Bureau	2000-2007
Fatherless Children	Natural logarithm of the total amount of children 12-17 years of age living in a household headed by a female, but not both. Per 1000 state residents.	U.S. Census Bureau	2000-2007
Motherless Children	Natural logarithm of the total amount of children 12-17 years of age living in a household headed by a male, but not both. Per 1000 state residents.	U.S. Census Bureau	2000-2007
Unemployment	Unemployment rate.	Bureau of Labor Statistics	2000-2007
Prison	Natural logarithm of the yearly amount of prisoners per 1000 state residents.	U.S. Department of Justice	2000-2004
PCY	Percentage of males in the total population ages 15-24 years old.	U.S. Census Bureau	2000-2007
Over65	Percentage of males in the total population age 65 and older	U.S. Census Bureau	2000-2007
Justice	Total justice employed by state and local governments in a given year. Includes police, legal, and corrections personnel employed.	U.S. Department of Justice	2000-2005
Poverty	Poverty rate.	U.S. Census Bureau	2000-2007
Violent Caught Rate	Percentage of arrests made for violent crimes.	F.B.I. Uniform Crime Report	2000-2007
Property Caught Rate	Percentage of arrests made for property crimes.	F.B.I. Uniform Crime Report	2000-2007
Cocaine	Natural logarithm of the amount of people per 1000 people admitted to treatment centers for cocaine related problems.	Department of Health and Human Services	2000-2007
Carry	Permit required to carry a concealed firearm.	State Master	2000-2007

Table 3: Summary Statistics

Variable	Mean	Standard Deviation	Maximum	Minimum
Violent	1.21	0.78	8.28	-3.14
Murder	-3.30	0.83	-1.95	-7.95
Property	3.43	0.53	4.07	0.05
Single Parent Children	3.09	0.15	3.48	2.66
Fatherless Children	2.85	0.18	3.34	2.24
Motherless Children	1.52	0.21	2.65	0.57
Unemp	4.70%	1.20%	8.10%	2.30%
Prison	28.93	111.11	777.4	0.09
PCY	6.85%	0.63%	9.53%	5.34%
Over65	6.00%	1.13%	9.84%	2.83%
Justice	1.88	0.21	2.8	1.28
pov	11.84%	2.93%	20.34%	5.65%
viocaught	11.84%	12.56%	83.50%	0.58%
propcaught	13.17%	4.49%	25.79%	0.35%
lncoke	-0.43	0.87	1.24	-3.91
Carry	0.9	0.3	1	0

B. Econometric Model

This model analyzes the relationship between children living in single parent households as well as previously examined control variables. The majority of the variables effect the crime rates through changes. For example, a change in the amount of justice employed over a given year will increase, decrease, or render the crime rate unchanged. However, the model does incorporate a dummy variable addressing a given state's laws regarding the ability to carry concealed weapons.

I used a generalized least squares (GLS) model using an AR(1) process correlated for panel heteroskedasticity. State and year dummy variables are included in all regressions. The simplified empirical models estimated via GLS are shown as follows:

$$\ln(crime_{it}) = \alpha + \beta \cdot \ln(single_{i,t-r}) + \delta \cdot i + \gamma \cdot t + \varepsilon_{it} \quad \textbf{(1)}$$

$$\ln(crime_{it}) = \alpha + \beta \cdot \ln(dadless_{i,t-r}) + \delta \cdot i + \gamma \cdot t + \varepsilon_{it} \quad \textbf{(2)}$$

$$\ln(crime_{it}) = \alpha + \beta \cdot \ln(momless_{i,t-r}) + \delta \cdot i + \gamma \cdot t + \varepsilon_{it} \quad \textbf{(3)}$$

where $\varepsilon_{it} = \rho \cdot \varepsilon_{it-1} + \zeta_{it}$.

Crime represents the violent crime, property crime, and murder rates. All are analyzed separately.

The expanded empirical models estimated via GLS are shown as follows:

$$\ln(crime_{it}) = \alpha + \beta \cdot \ln(single_{i,t-r}) + Z \cdot \Omega + \delta \cdot i + \gamma \cdot t + \varepsilon_{it} \quad \textbf{(4)}$$

$$\ln(crime_{it}) = \alpha + \beta \cdot \ln(dadless_{i,t-r}) + Z \cdot \Omega + \delta \cdot i + \gamma \cdot t + \varepsilon_{it} \quad \textbf{(5)}$$

$$\ln(crime_{it}) = \alpha + \beta \cdot \ln(momless_{i,t-r}) + Z \cdot \Omega + \delta \cdot i + \gamma \cdot t + \varepsilon_{it} \quad \textbf{(6)}$$

Z is a vector of previously used control variables and again, where $\varepsilon_{it} = \rho \cdot \varepsilon_{it-1} + \zeta_{it}$.

I expect all single parent rates to be consistent and follow one of the aforementioned abortion relationships with regard to the crime rates. I also expect the right to carry to follow one of the aforementioned relationships with regard to the crime rates. I expect to find a negative relationship between all three crime rates analyzed and the following variables: prisoners, justice employed, and the percentage of males over sixty-five, *ceteris paribus*. I expect to find a positive relationship between all three crime rates analyzed and the following variables: percentage of males in their peak crime years (15-24), the unemployment rate, the poverty rate, and the amount of people admitted to treatment centers for cocaine, *ceteris paribus*. When analyzing the violent and murder crime rates I expect to find violent arrest rates to have a negative relationship while property crime rates experience a positive relationship as a result of the substitution effect among criminals, *ceteris paribus.* When analyzing property crime rates I expect to find that property arrests experience a negative relationship while violent crime arrests have a positive relationship, again because of the substitution effect, *ceteris paribus.*

The data used in my analyses' contained issues that would result in an inability to correctly estimate the relationships. The first issue was serial correlation. To correct for this I

employed an AR(1) term, effectively solving for first-order correlation. The next issue was heteroskedasticity. This problem was corrected by using GLS.

IV. Results

The results of GLS Regressions of equations (1), (2), and (3) are shown in Table 4, Table 5, and Table 6 respectively. Each regression includes an AR(1) error term and standard errors are corrected for panel-specific heteroskedasticity. Coefficient estimates with standard errors are reported. Each regression also includes unreported state and year dummies to control for state and year specific fixed effects. Table 4, Table 5, and Table 6 reports results where the natural log of the violent crime rate, the property crime rate, and the murder rate is regressed on various measures of the amount of children in single parent households with various time lags.

Again, if the abortion-crime hypothesis is correct, then the sign on the independent variables in these regressions should be positive, such that an increase in the number of children in single parent households at time *t-x* is associated with an increase in the amount of crime observed in state *i* at time *t*. Single parents at time period *t-5* best represent the abortion-crime hypothesis. At this point single parent children now represent the 17-22 age group, these years are in the middle of the high crime year range and should experience a positive and statistically significant relationship if the abortion-crime hypothesis is correct.

When considering the number of children in single parent households (without regard for whether the single parent is a mother or a father), a positive and significant sign is only observed in 5 out of 15 regressions. Furthermore, a negative and significant sign is also observed in 4 out of 15 regressions. Correspondingly, in 6 out of 15 regressions, the coefficient is not statistically different from zero.

Table 4: Panel Regression Results GLS- Dependent Variable: *Violent Crime Rate*

lnviolent	*t*-1	*t*-2	*t*-3	*t*-4	*t*-5	*t*-1	*t*-2	*t*-3	*t*-4	*t*-5	*t*-1	*t*-2	*t*-3	*t*-4	*t*-5
ln(Single Parent	0.02	-0.10***	0.01**	-0.12***	-0.05**	-	-	-	-	-	-	-	-	-	-
Children)	(0.03)	(0.03)	(0.04)	(0.03)	(0.02)	-	-	-	-	-	-	-	-	-	-
ln(Fatherless	-	-	-	-	-	-0.01	-0.09***	0.05**	-0.10***	-0.02	-	-	-	-	-
Children)	-	-	-	-	-	(0.03)	(0.02)	(0.03)	(0.03)	(0.017)	-	-	-	-	-
ln(Motherless	-	-	-	-	-	-	-	-	-	-	0.02*	-0.02	-0.02	0.01	-0.03**
Children)	-	-	-	-	-	-	-	-	-	-	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)
Observations	350	300	250	200	150	350	300	250	200	150	350	300	250	200	150

Table 5: Panel Regression Results GLS- Dependent Variable: *Property Crime Rate*

lnproperty	*t*-1	*t*-2	*t*-3	*t*-4	*t*-5	*t*-1	*t*-2	*t*-3	*t*-4	*t*-5	*t*-1	*t*-2	*t*-3	*t*-4	*t*-5
ln(Single Parent	0.01	0.04	0.01	0.05**	0.04**	-	-	-	-	-	-	-	-	-	-
Children)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	-	-	-	-	-	-	-	-	-	-
ln(Fatherless	-	-	-	-	-	-0.01	0.03	-0.01	-0.01	0.07***	-	-	-	-	-
Children)	-	-	-	-	-	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	-	-	-	-	-
ln(Motherless	-	-	-	-	-	-	-	-	-	-	0.02	0.01	0.01	0.04***	-0.03***
Children)	-	-	-	-	-	-	-	-	-	-	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	350	300	250	200	150	350	300	250	200	150	350	300	250	200	150

Table 6: Panel Regression Results GLS- Dependent Variable: *Murder Rate*

lnmurder	*t*-1	*t*-2	*t*-3	*t*-4	*t*-5	*t*-1	*t*-2	*t*-3	*t*-4	*t*-5	*t*-1	*t*-2	*t*-3	*t*-4	*t*-5
ln(Single Parent	0.30***	0.1	-0.11	-0.26***	0.20***	-	-	-	-	-	-	-	-	-	-
Children)	(0.09)	(0.09)	(0.08)	(0.07)	(0.07)	-	-	-	-	-	-	-	-	-	-
ln(Fatherless	-	-	-	-	-	0.20***	0.13**	-0.16**	-0.13**	0.20***	-	-	-	-	-
Children)	-	-	-	-	-	(0.07)	(0.07)	(0.06)	(0.06)	(0.06)	-	-	-	-	-
ln(Motherless	-	-	-	-	-	-	-	-	-	-	0.09**	-0.05	0.04	0.04	0.07***
Children)	-	-	-	-	-	-	-	-	-	-	(0.04)	(0.04)	(0.04)	(0.04)	(0.02)
Observations	350	300	250	200	150	350	300	250	200	150	350	300	250	200	150

Thus, there appears to be little evidence of a consistent positive relationship between the number of children growing up in a single parent household and the crime rate. However, it may be better to consider the relationship between the number of children growing up in a household without a father, as this is more consistent with the abortion-crime hypothesis. Table 4, Table 5, and Table 6 also display results to disregard the abortion-crime hypothesis. A positive and significant is observed in only 5 out of 15 regressions, providing further evidence to disprove the abortion-crime hypothesis.

In addition, the relationship between children growing up in a household without a mother and the crime rate provides no evidence that children in living in a household headed by only a father are more or less likely to engage in criminal activity. Tables 4, 5, and 6 reveal that only 4 out of 15 regressions display a positive relationship between crime and single father households.

The data above suggests that children's living in a single parent home, regardless of which parent it is, is consistently unrelated to the violent crime rate, the property crime rate, and the murder rate. Although certain specifications result in positive coefficients and statistical significance the majority of the estimations coupled with the inconsistency of coefficient signs conveys insignificance and provides evidence to reject the abortion-crime hypothesis.

The results of the GLS Regressions of equations (4), (5), and (6) are shown in Table 7, Table 8, and Table 9 respectively. Each regression includes an AR(1) error term and standard errors are corrected for panel-specific heteroskedasticity. Coefficient estimates with standard errors are reported. Each regression also includes unreported state and year dummies to control for state and year specific fixed effects.

Table 7: Panel Regression Results GLS- Dependent Variable: *Violent Crime Rate*

lnviolent	*t* -1	*t* -2	*t* -3	*t* -4	*t* -5	*t* -1	*t* -2	*t* -3	*t* -4	*t* -5	*t* -1	*t* -2	*t* -3	*t* -4	*t* -5
ln(Single Parent Children)	-0.05	-0.10***	0.03***	-0.07**	-0.10	-	-	-	-	-	-	-	-	-	-
	(0.04)	(0.03)	(0.04)	(0.03)	(0.01)	-	-	-	-	-	-	-	-	-	-
ln(Fatherless Children)	-	-	-	-	-	-0.05**	-0.06**	0.03	-0.05*	-0.06***	-	-	-	-	-
	-	-	-	-	-	(0.03)	(0.03)	(0.03)	(0.03)	(0.01)	-	-	-	-	-
ln(Motherless Children)	-	-	-	-	-	-	-	-	-	-	0.01	-0.02	-0.01	0.01	-0.03
	-	-	-	-	-	-	-	-	-	-	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)
lnprison $_{t-1}$	-0.02	-0.03	-0.02	-	-	-0.02**	-0.03	0.02	-	-	0.01	-0.07	-0.03	-	-
	(0.05)	(0.06)	(0.05)	-	-	(0.05)	(0.06)	(0.05)	-	-	(0.05)	(0.05)	(0.05)	-	-
lnjustice $_{t-1}$	0.13**	0.20***	0.20***	0.10	-	0.14	0.20***	0.16***	0.09	-	0.13*	0.18**	0.16***	0.03	-
	(0.08)	(0.07)	(0.07)	(0.09)	-	(0.08)	(0.70)	0.06	(0.09)	-	(0.08)	(0.08)	(0.06)	0.08	-
PCY	-0.10	-0.20	-0.81	2.29**	1.83*	-0.40	-0.33	-1.07	1.70	1.32	-1.05	0.60	-0.57	2.89**	0.22
	(1.60)	(1.50)	(1.44)	(1.32)	(1.06)	(0.80)	(1.50)	(1.62)	(1.31)	(1.30)	(1.62)	(1.52)	(1.39)	(1.25)	(1.25)
Over65	1.54	0.35	1.72	0.73	2.29***	1.49	0.54	1.94***	0.45	2.30***	1.38	1.59*	1.89***	-0.24	0.94
	(1.11)	(0.96)	(0.79)	(0.92)	(0.82)	(1.14)	(0.93)	(0.67)	(0.89)	(0.84)	(1.06)	(0.97)	(0.73)	(0.92)	(0.92)
Unemployment	-0.99**	-0.11	-0.20	3.20***	-0.87	-0.99**	-0.22	-0.25	3.11***	-0.76*	-0.80*	0.01	(0.001)	3.01***	-1.62***
	(0.50)	(0.41)	(0.43)	(0.72)	(0.51)	(0.46)	(0.45)	(0.41)	(0.42)	(0.41)	(0.44)	(0.01)	(0.01)	(0.71)	(0.53)
Poverty	1.15***	1.2***	1.71***	0.10	-1.15**	1.10**	1.24***	1.67***	0.46	-1.13**	1.15***	1.30***	1.56***	0.60	-1.22**
	(0.44)	(0.43)	(0.30)	(0.46)	(0.55)	(0.45)	(0.43)	(0.31)	(0.53)	(0.52)	(0.44)	(0.42)	(0.29)	(0.51)	(0.61)
lncocaine	0.06***	0.05***	0.06***	0.01	0.08***	0.06***	0.05***	0.06***	0.01	0.08***	0.05***	0.04***	0.07***	0.02	0.09***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Property Caught Rate	0.05	0.15***	0.54***	0.62***	0.18***	0.05	0.12	0.56***	0.66***	0.19***	0.03	0.17***	0.56	0.60***	0.19***
	(0.08)	(0.05)	(0.07)	(0.14)	(0.03)	(0.09)	(0.05)**	(0.06)	(0.13)	(0.03)	(0.08)	(0.06)	(0.07)	(0.16)	(0.03)
Violent Caught Rate	-0.02**	-0.02*	-0.13***	-0.13***	-0.09***	-0.02***	-0.02**	-0.13***	-0.14***	-0.08***	-0.02**	-0.02*	-0.13***	-0.13***	-0.09***
	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.12)	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)
License to Carry	1.2***	1.07***	1.04***	1.17***	-0.02***	1.17***	1.10***	1.03***	1.15***	-0.03***	1.27***	0.91***	1.02***	1.14***	-0.02***
	(0.22)	(0.22)	-0.17	(0.04)	(0.01)	(0.21)	(0.23)	(0.18)	(0.04)	(0.01)	(0.21)	(0.21)	0.20	(0.04)	(0.01)
Observations	248	198	147	146	141	248	198	147	146	141	248	198	147	146	141

Table 8: Panel Regression Results GLS- Dependent Variable: *Property Crime Rate*

lnproperty	*t* -1	*t* -2	*t* -3	*t* -4	*t* -5	*t* -1	*t* -2	*t* -3	*t* -4	*t* -5	*t* -1	*t* -2	*t* -3	*t* -4	*t* -5
ln(Single Parent Children)	0.03	0.01	0.02	0.07***	0.02	-	-	-	-	-	-	-	-	-	-
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	-	-	-	-	-	-	-	-	-	-
ln(Fatherless Children)	-	-	-	-	-	-0.01	0.01	-0.03	0.05*	0.05*	-	-	-	-	-
	-	-	-	-	-	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	-	-	-	-	-
ln(Motherless Children)	-	-	-	-	-	-	-	-	-	-	0.001	0.01	-0.01**	0.04***	-0.03***
	-	-	-	-	-	-	-	-	-	-	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
lnprison $_{t-1}$	-0.01***	-0.01***	-0.01**	-	-	-0.02***	-0.01***	-0.01**	-	-	0.01	-0.07**	-0.11***	-	-
	(0.001)	(0.001)	(0.001)	-	-	(0.01)	(0.01)	(0.01)	-	-	(0.04)	(0.03)	(0.03)	-	-
lnjustice $_{t-1}$	0.32***	0.44***	0.41***	0.27***	-	0.31***	0.44***	0.42***	0.32***	-	0.04***	0.07***	0.08***	0.02***	-
	(0.05)	(0.04)	(0.03)	(0.05)	-	(0.05)	(0.04)	(0.03)	(0.04)	-	-0.01	(0.01)	(0.01)	(0.01)	-
PCY	0.53	2.64***	-0.93	-0.88	2.13***	-0.80	2.74***	0.14	0.36	1.65**	1.59	3.59***	-2.11**	0.28	1.36**
	(1.19)	(0.81)	(0.88)	(0.64)	(0.62)	(1.23)	(0.74)	(0.72)	(0.63)	(0.74)	(1.20)	(0.78)	(0.97)	(0.54)	(0.61)
Over65	-3.48***	-5.44***	-5.34***	0.47	3.77***	-3.03***	-5.48***	-5.17***	1.06**	3.89***	-3.07***	-5.14***	-5.45***	0.27	3.99***
	(0.88)	(0.72)	(0.38)	(0.55)	(0.77)	(0.90)	(0.69)	(0.32)	(0.53)	(0.93)	(0.90)	(0.71)	(0.39)	0.54	(0.01)
Unemployment	-0.03	-1.30***	-0.96***	2.33***	0.24	0.01	-1.23***	-1.20***	2.78***	0.46	-0.29	-1.37***	-1.15***	-0.03	0.35
	(0.42)	(0.36)	(0.29)	(0.36)	(0.01)	(0.01)	(0.01)	(0.29)	(0.29)	(0.48)	(0.46)	(0.40)	(0.30)	(0.01)	(0.01)
Poverty	1.06***	1.52***	0.66***	0.45*	1.23**	1.09***	1.47***	0.57***	0.15	1.02	1.17***	1.40***	0.17	0.58**	0.74
	(0.34)	(0.30)	(0.19)	(0.27)	(0.56)	(0.35)	(0.30)	(0.19)	(0.20)	(0.67)	(0.36)	(0.32)	(0.22)	(0.24)	(0.53)
lncocaine	-0.01**	0.01**	-0.03***	-0.01	-0.04***	-0.01**	0.01*	-0.02***	-0.01	-0.04***	-0.01**	0.02**	-0.02***	0.01	0.09***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.03)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.03)
Property Caught Rate	-0.08***	-0.06***	0.06**	0.77***	-0.04	-0.08***	-0.06**	0.07**	0.84***	-0.06*	-0.08***	-0.04	0.12***	0.70***	-0.11
	(0.02)	(0.02)	(0.03)	(0.09)	(0.03)	(0.02)	(0.02)	(0.03)	(0.07)	(0.03)	(0.02)	(0.03)	(0.03)	(0.08)	0.15
Violent Caught Rate	0.01***	0.01**	-0.02**	-0.09***	0.01	0.01***	0.01**	-0.02***	-0.10***	0.01	0.01***	0.01**	-0.03***	-0.08***	-0.06***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.002)	(0.01)	(0.01)	(0.01)	(0.02)
License to Carry	0.03	0.27***	0.30***	0.41***	0.05***	0.04***	0.27***	0.31***	0.37***	0.06***	0.40***	0.08	0.03	0.44***	0.98***
	(0.03)	(0.02)	(0.02)	(0.02)	(0.01)	(0.03)	(0.02)	(0.01)	(0.02)	(0.01)	(0.14)	(0.12)	(0.12)	(0.02)	(0.10)
Observations	248	198	147	146	141	248	198	147	146	141	248	198	147	146	141

Table 9: Panel Regression Results GLS- Dependent Variable: *Murder Rate*

lnmurder	*t* -1	*t* -2	*t* -3	*t* -4	*t* -5	*t* -1	*t* -2	*t* -3	*t* -4	*t* -5	*t* -1	*t* -2	*t* -3	*t* -4	*t* -5
ln(Single Parent Children)	0.23***	0.12	0.01	-0.36***	0.15**	-	-	-	-	-	-	-	-	-	-
	(0.09)	(0.08)	(0.09)	(0.09)	(0.07)	-	-	-	-	-	-	-	-	-	-
ln(Fatherless Children)	-	-	-	-	-	0.11	0.13*	0.07	-0.17**	0.14***	-	-	-	-	-
	-	-	-	-	-	(0.07)	(0.07)	(0.08)	(0.08)	(0.05)	-	-	-	-	-
ln(Motherless Children)	-	-	-	-	-	-	-	-	-	-	0.12***	-0.01	-0.04	-0.09**	0.08***
	-	-	-	-	-	-	-	-	-	-	(0.04)	(0.05)	(0.04)	(0.04)	(0.03)
lnprison $_{t-1}$	0.01***	0.01***	0.02***	-	-	-0.39***	-0.09	-0.55***	-	-	-0.37***	-0.08	-0.61***	-	-
	(0.06)	(0.01)	(0.01)	-	-	(0.12)	(0.16)	(0.19)	-	-	(0.11)	(0.16)	(0.19)	-	-
lnjustice $_{t-1}$	-0.27	-0.26	-0.27	-0.48**	-	-0.10	-0.20	-0.31	-0.56***	-	-0.03	-0.19	-0.22	-0.36*	-
	(0.22)	(0.22)	(0.24)	(0.19)	-	(0.23)	(0.21)	(0.25)	(0.20)	-	(0.23)	(0.22)	(0.25)	(0.20)	-
PCY	15.04***	12.83***	-0.12	-5.52	-3.55*	15.45***	10.26**	-9.18**	-5.38***	-5.04*	14.4***	12.87***	-9.86***	-5.74**	-3.38**
	(3.95)	(3.65)	(4.57)	(2.52)	(2.03)	(4.04)	(4.10)	(3.79)	(2.46)	(1.99)	(3.76)	(4.06)	(3.65)	(2.72)	(1.66)
Over65	3.89	5.45***	-0.25	13.64***	7.16***	9.74***	7.84**	6.85**	12.82***	7.26***	9.48***	8.34**	7.46**	13.54***	7.52***
	(3.34)	(3.72)	(0.02)	(1.40)	(2.15)	(3.66)	(3.66)	(3.76)	(1.65)	(2.11)	(3.60)	(3.69)	(3.64)	(1.67)	(2.14)
Unemployment	-0.21	-1.78	-2.44	5.95***	5.95***	0.32	-0.93	0.28	5.69***	-5.44***	-1.12	-1.10	0.04	4.75***	-6.04***
	(1.10)	(1.26)	(0.02)	(1.11)	(1.11)	(1.27)	(1.39)	(1.49)	(1.36)	(1.11)	(0.01)	(1.09)	(0.02)	(1.14)	(1.43)
Poverty	-2.82***	-0.74	0.20	-0.40	-3.09**	-2.34**	-0.62	-0.81	-0.36	-3.30**	-2.11**	1.08	-1.27	-0.97	-1.44
	(0.92)	(0.94)	(1.14)	(0.74)	(1.52)	(1.04)	(1.04)	(1.01)	(0.82)	(1.45)	(1.03)	(1.03)	(0.97)	(0.87)	(1.71)
lncocaine	0.09***	0.11***	0.05	-0.27***	-0.01	0.14***	0.13***	0.12***	-0.25***	-0.01	0.14***	0.13***	0.12***	-0.27***	-0.01
	(0.03)	(0.03)	(0.04)	(0.03)	(0.20)	(0.03)	(0.03)	(0.42)	(0.03)	(0.02)	(0.03)	(0.03)	(0.41)	(0.03)	(0.02)
Property Caught Rate	-0.11	0.08	0.42**	0.80**	-0.81***	-0.17	-0.07	0.37*	0.57*	0.82***	-0.06	0.05	5	0.69**	0.83***
	(0.15)	(0.10)	(0.18)	(0.34)	(0.10)	(0.15)	(0.11)	(0.20)	(0.34)	(0.10)	(0.16)	(0.11)	(0.21)	(0.34)	(0.12)
Violent Caught Rate	-0.06***	-0.08***	-0.17***	-0.12**	0.10***	-0.06***	-0.08***	-0.17***	-0.08*	0.10***	-0.06***	-0.08***	-0.19***	-0.10**	0.10***
	(0.02)	(0.01)	(0.04)	(0.05)	(0.02)	(0.02)	(0.02)	(0.05)	(0.05)	(0.02)	(0.02)	(0.01)	(0.05)	(0.05)	(0.19)
License to Carry	0.98***	-0.11	-0.10	1.64***	-0.16	-0.11	-0.83	-0.83	1.63***	-0.15	-0.03	0.90	-1.04	1.62***	-0.20
	(0.10)	(0.10)	(0.11)	(0.12)	(0.13)	(0.47)	(0.63)	(0.74)	(0.12)	(0.14)	(0.45)	(0.63)	(0.73)	(0.12)	(0.13)
Observations	248	198	147	146	141	248	198	147	146	141	248	198	147	146	141

The results show that, even when controlling for other typical determinants of crime, there is still no evidence in favor of the hypothesis that children's living in a single parent household is associated with crime rates. These results could be considered to be evidence that the links in the abortion-crime hypothesis are not robust.

The above results regarding the control variables are consistent with the results obtained by previously mentioned studies. Variables *prison, justice, poverty, cocaine, property arrest rate, violent arrest rate, and license to carry* are statistically significant throughout a majority of the regressions. The coefficients of the included control variables are also consistent with previous research.

Prison showed that more people in prison results in a decrease in crime rates. This could stem from the rationality of criminals. As seen in tables 7, 8, and 9 *prison* is statistically significant in 16 out of the 27 regressions it was included in. Of those that were statistically significant 13 have a negative coefficient. This result provides further evidence to accept the deterrent and incapacitation effect prison has on potential prisoners. Property crime experiences the biggest negative relationship with *prison*. Of 9 regressions 8 were statistically significant, all with negative coefficients.

Justice was also consistently statistically significant throughout the analysis, but continued to switch coefficient signs depending on which crime rate was the dependent variable. This could be the result of the simultaneity previously examined by past research.

Poverty experienced statistical significance and positive coefficients throughout the violent and property crime rate analyses. In 45 regressions *poverty* was statistically significant in 28. However, when limiting the analysis to only violent and property crimes *poverty* was

statistically significant and positive in 20 out of 30 regressions. This could be the result that as more people become severely poor they turn to crime as a means to get survive.

Cocaine was included in the analysis to examine the role that drugs play in the current crime rates. As seen above, past research attributes a considerable portion of the past crime trends to the crack epidemic. The estimated outputs displayed that cocaine continues to be statistically significantly related to crime and experiences a positive relationship. This provides additional information that the crack cocaine epidemic most likely was partially responsible for the trends in crime experienced throughout the late 20th century.

The arrest rates were consistent with my hypothesis that they would demonstrate both the deterrent and substitution effects. The arrest rates consistently demonstrated a negative relationship when analyzed against their corresponding crime rate, but switched coefficient signs when compared to their counterpart. The deterrent effect is clearly evident when analyzing the violent crime rate and the *violent caught rate*. The *violent caught rate* experiences a negative and statistically significant relationship in all of the regressions. The *violent caught rate* also provides a deterrence against criminals considering murder, in 12 of 15 regressions with murder as the dependent variable the violent arrest rate was negative and statistically significant. For both above instances as more arrests are made for violent crimes less violent crimes are reported, providing clear evidence of the deterrent effect. Furthermore, criminals also behave as rational individuals as a result of arrest rates. This is shown by the above relationship between the violent crime rate and the *property caught rate*. In 10 of 15 regressions *property caught rate* was estimated as positive and significant. As the *property caught rate* increases more and more criminals will choose to engage in violent crime, perhaps hoping that their acts will not result in arrests.

License to carry agrees with previous research through its consistently positive relationship with both the violent crime rate and property crime rate. When analyzing the relationship between violent crime and *license to carry* a positive and statistically significant relationship was found in 12 out of 15 regressions. Furthermore, out of 15 regressions in which property crime is the dependent variable and *license to carry* is again the independent variable, 12 were estimated as positive and statistically significant. Both of previously stated estimates provides evidence that right-to-carry laws increases crime rather than deter individuals to engage in criminal behavior.

V. Future Research

Future research for this analysis should examine the relationship between crime and single parent children beginning in the mid 1980s to the mid 1990s; the time period during which crime continued to rise steadily, but quickly and unexpectedly declined.

Additionally, future research should analyze the effect of a potential outside variable that could influence those used throughout this analysis. For instance, income could explain the relationship between single parent children and crime. Over the past quarter century median family income and single parent children have steadily risen while crime has experienced various trends, but continues to decline since the early 1990s. This increase in income could enable single parents to live on their own rather than depend on a spouse to provide for themselves and their children. Increases in income can also explain the decreases in crime. Criminals have less of an incentive to engage in criminal activity as the costs associated with it continue to rise. I suggest future research to include a two-stage least squares analysis in which factors contributing to single parents will first be estimated then the relationship between crime and single parents

will be analyzed. The inclusion of these suggestions could have a significant impact on crime analyses.

VI. Conclusion

The purpose of this paper is to analyze the relationship between children living in single parent homes and crime. Donohue and Levitt (2001) introduced the basis for this study through their analysis of the abortion-crime hypothesis, arguing that those individuals having an abortion are more likely to raise a criminal if they do not have an abortion. An implied link in the abortion-crime hypothesis is that children growing up in single parent households are more likely to become criminals in the future. This paper follows past research closely, but updates the time period and includes new variables. The models tested suggest that there is little evidence supporting a link between the number of single parent children and violent crime rates, property crimes rates, and murder crime rates in the following years. Throughout this paper, the coefficient estimates on the number of single parent children are inconsistent and typically statistically insignificant. In general, the evidence here lends support to the arguments that the abortion-crime hypothesis is not nearly as strong as previous research has indicated.

This paper also provides support for the previously theorized deterrent and incapacitation effects of law enforcement. The study also provides evidence of the rationality of criminals. Criminals choose to engage in activities that are less likely to result in arrests and punishment. Additionally, the study provides further evidence to reject the hypothesis that right-to-carry laws reduce crime. In conclusion, the most effective policies aimed at reducing crime appear to be those employed by law enforcement officials.

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Appendix I: Wooldridge Test for Autocorrelation in Panel Data

The null and alternative hypotheses for a Wooldridge test for autocorrelation are:

H_0: No first-order autocorrelation
H_A: First-order autocorrelation exists

The F-statistic and p-value for this test corresponding to the regression in column (1) of Table 4 are respectively: $F(1,49) = 34.601$; $Prob > F = 0.00$, suggesting that the null hypothesis of no first-order autocorrelation should be rejected. The results for other regressions are similar.

Consequently, an AR(1) error term is assumed in each regression. This is also consistent with the methodology used by Donohue and Levitt (2001).

Appendix II: Panel Heteroskedasticity Test

The null and alternative hypotheses for a Breusch-Pagan/Cook-Weisberg test for heteroskedasticity are:

H_0: Constant error terms (Homoskedastic error terms)
H_A: Non-constant error terms (Heteroskedastic error terms)

The chi-squared and p-value for this test corresponding to the regression in column (1) of Table 4 are respectively: chi2(1) = 18.18; Prob > chi2 = 0.000, suggesting that the null hypothesis of homoskedastic error terms should be rejected. The results for other regressions are similar.

Consequently, each regression includes a correction for panel-specific heteroskedasticity.

Appendix III: Correlation Matrix

This correlation matrix shows the correlation between all independent variables used in this analysis with the exception of the dummy variable *license to carry.* Any correlations greater than 0.3 or less than -0.3 are italicized.

	Cocaine	*Dadless*	*Justice*	*Momless*	*Over65*	*PCY*	*Poverty*	*Prison*	*Property Caught Rate*	*Single Parent Children*	*Unemployment*	*Violent Caught Rate*
Cocaine	1.00	*0.50*	*0.40*	-0.28	-0.17	*-0.36*	-0.04	*-0.31*	0.04	*0.41*	0.18	0.07
Dadless	0.50	1.00	*0.41*	-0.10	-0.01	-0.15	*0.49*	-0.26	0.04	*0.95*	*0.38*	0.05
Justice	*0.40*	*0.41*	1.00	-0.11	-0.12	-0.13	0.23	*-0.31*	0.04	*0.37*	0.22	0.04
Momless	-0.28	-0.10	-0.11	1.00	0.10	0.31	0.07	0.12	0.07	0.21	0.12	0.05
Over65	-0.17	-0.01	-0.12	0.10	1.00	*-0.34*	0.13	0.11	0.00	0.02	0.03	-0.01
PCY	*-0.36*	-0.15	-0.13	*0.31*	*-0.34*	1.00	0.25	0.22	-0.03	-0.04	0.09	-0.06
Poverty	-0.04	*0.49*	0.23	0.07	0.13	0.25	1.00	-0.04	-0.09	0.51	0.43	-0.07
Prison	-0.31	-0.26	*-0.31*	0.12	0.11	0.22	-0.04	1.00	*-0.31*	-0.21	-0.27	*-0.32*
Property Caught Rate	0.04	0.04	0.04	0.07	0.00	-0.03	-0.09	*-0.31*	1.00	0.06	0.04	0.94
Single Parent Children	*0.41*	*0.95*	*0.37*	0.21	0.02	-0.04	0.51	-0.21	0.06	1.00	*0.40*	0.06
Unemployment	0.18	*0.38*	0.22	0.12	0.03	0.09	0.43	-0.27	0.04	0.40	1.00	0.02
Violent Caught Rate	0.07	0.05	0.04	0.05	-0.01	-0.06	-0.07	*-0.32*	*0.94*	0.06	0.02	1.00

Appendix IV: Stationarity Tests

Variable	Im, Pesaran and Shin W-Stat	ADF - Fisher Chi-Square	PP Fisher Chi-Square
Violent	-8.69*	258.56*	217.47*
Murder	-14.16*	350.53*	461.87*
Property	-6.01*	219.73*	261.63*
Single Parent Children	-7.83*	260.90*	414.46*
Fatherless Children	-9.87*	292.57*	398.63*
Motherless Children	-14.16*	350.53*	461.87*
Unemployment	-6.93*	217.35*	139.65*
Prison	-351.96*	179.584*	204.36*
PCY	-8.11*	268.07*	317.35*
Over65	-7.84*	259.06*	3.08
Justice	-8.48*	189.30*	222.59*
Poverty	-8.25*	243.60*	220.59*
Violent Caught Rate	-9.81*	294.85*	403.04*
Property Caught Rate	-5.84*	229.92*	366.78*
Cocaine	-8.30*	236.06*	281.08*

* singificant at the 0.01 level

The Im, Pearson and Shin W-stat, the Augmented Dickey Fuller – Fisher Chi-square, and the Phillips-Perron Fisher Chi-square assume individual unit root processes under the null of a unit root. Each test includes an individual intercept, but no trend.

Notice that all variables reject the null of a unit root assuming individual unit root processes, so the underlying time series are stationary. (Note: *Over65* fails to reject the null hypothesis in the PP Fisher Chi-Square test, however since *Over65* is a percentage bounded between 0 and 100%, this is of little concern.)