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Accidental Deaths, Suicides, and Crime**

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Abstract

It is frequently assumed that safe storage gun laws reduce accidental gun deaths and total suicides, while the possible impact on crime rates are ignored. However, given existing work on the adverse impact of other safety laws, such as safety caps for storing medicine, even the very plausible assumption of reduced accidental gun deaths cannot be taken for granted. Our paper analyzes both state and county data spanning nearly twenty years, and we find no support that safe storage laws reduce either juvenile accidental gun deaths or suicides. Instead, these storage requirements appear to impair people's ability to use guns defensively. Because accidental shooters also tend to be the ones most likely to violate the new law, safe storage laws increase violent and property crimes against low risk citizens with no observable offsetting benefit in terms of reduced accidents or suicides. During the first five full years after the passage of the safe storage laws, the group of fifteen states that adopted these laws faced an annual average increase of over 300 more murders, 3,860 more rapes, 24,650 more robberies, and over 25,000 more aggravated assaults. On average, the annual costs borne by victims averaged over \$2.6 billion as a result of lost productivity, out-of-pocket expenses, medical bills, and property losses.

I. Introduction

The benefits of safe storage gun laws seem undeniable. This is an issue that most Congressional Republicans and Democrats agree on. If new gun control laws are passed during the 1999-2000 legislative session, one component of the bill probably will involve mandating trigger locks to be included with any gun sales. Similar views are expressed by presidential candidates of both parties, and the Clinton administration has made it a major issue.¹ Just this year, numerous states considered laws mandating safe storage of guns. Illinois passed a law mandating that guns be kept locked or otherwise securely placed when a child under 14 may have access to it, and New Jersey and California passed new laws requiring guns be sold with locks.²

Concerns over accidental gun deaths and suicides are important in this debate. In 1996, 42 children under age 10 died from accidental gun deaths. In cases where the weapon involved could be identified, eight of these deaths involved handguns. Only one suicide with a gun is reported in this age group. When all children under age 15 are examined, the total number of accidental gun deaths totals 136, of which 21 were identified as involving handguns. The number of gun suicides is much higher than for younger ages, 162.³

A study by the General Accounting Office claims that mechanical locks -- like those that fit over a trigger or in a barrel of a gun -- provide "reliable" protections only for children under age 7,⁴ so it is unclear what percentage of older children's deaths would have been prevented by the use of these locks. Nor would the locks even have been relevant in accidental gun deaths for cases where the gun cannot be realistically be locked up, such as hunting.

But gun locks are costly, too. There is not only the actual expense of the locks but even more potentially important is the reduced effectiveness of using the gun defensively. Locked guns may not be as readily

¹ David Ottway, "A Boon to Sales, or a Threat?" Washington Post, Thursday, May 20, 1999, p. A1; "John McCain Profile," The National Journal, November 6, 1999.

² Mark Schauerte, "Gov. Ryan Signs Bill that Requires Firearm Owners to Store Guns," St. Louis Post-Dispatch, June 8, 1999, p. A1; Editorial, "Trigger Locks," The Record (Bergen County, NJ), Thursday, October 14, 1999, p. L10; and Rene Sanchez, "The Battle for California," Washington Post, Saturday, October 23, 1999, p. A1..

³ There is an issue of whether deaths are properly classified as accidental, but the bias frequently appears to be to err on the side of classifying deaths as accidental.

⁴ The study argued that the mechanical locks could be frequently pried off with a screwdriver or smashed with a hammer. United States General Accounting Office, "Accidental Shootings: many deaths and injuries caused by firearms could be prevented," United States General Accounting Office, March 1991.

accessible for defensive gun uses. If criminals are deterred from attacking victims because of the fear that people might be able to defend themselves, gun locks may in turn reduce the cost of criminals committing crime, and thus increase crime. This problem is exacerbated because many mechanical locks (such as barrel or trigger locks) also require that the gun be stored unloaded.⁵ Loading a gun then requires yet more time to respond to a criminal. The costs of locks and the fear of accidental gun deaths which is highly publicized when these laws pass should also reduce gun ownership, and may thus also further encourage crime.⁶

There is evidence that restrictions on people's ability to defend themselves encourages criminals to attack. The potential defensive nature of guns is indicated by the different rates of so-called "hot burglaries," where residents are at home when the criminals strike.⁷ 59 percent of the burglaries in Britain, which has tough gun control laws, are "hot burglaries." By contrast, the U.S., with laxer restrictions, has a "hot burglary" rate of only 13 percent. Consistent with this, surveys of convicted felons in America reveal that they are much more worried about armed victims than they are about running into the police. This fear of potentially armed victims causes American burglars to spend more time than their foreign counterparts "casing" a house to ensure that nobody is home. Felons frequently comment in these interviews that they avoid late-night burglaries because "that's the way to get shot."⁸

After Tasmania's horrible multiple victim public shooting in 1996, Australia outlawed defensive gun ownership, instituted strict locking requirements for guns, and banned many types of guns. But neither total crime nor total crime with guns declined in Australia. In the first two years after the law, armed robberies rose

⁵ Putting a lock on a loaded gun actually makes an accidental discharge possible (e.g., by dropping the gun) that wouldn't be possible if a loaded gun were not locked.

⁶ Data that we have from the National Opinion Research Center's General Social Survey does indicate a drop in state gun ownership rates coinciding with the passage with safe storage laws.

⁷ For example, Kleck (1997) and Kopel (1992 and 1999) provide international evidence on hot burglary rates.

⁸ Wright and Rossi (p. 151) interviewed felony prisoners in ten state correctional systems and found that 56 percent said that criminals would not attack a potential victim that was known to be armed. They also found evidence that criminals in those states with the highest levels of civilian gun ownership worried the most about armed victims.

Examples of stories where people successfully defend themselves from burglaries with guns are quite common (see Lott, 1998 and Waters, 1998). For example, see *Burglar Puts 92-year-old in the Gun Closet and is Shot*, New York Times, 7 September 1995, A16. George F. Will, "Are We 'a Nation of Cowards'?" Newsweek, 15 Nov. 1993 discusses more generally the benefits produced from an armed citizenry.

by 73 percent, unarmed robberies by 28 percent, assaults by 17 percent, and kidnappings by 38 percent.⁹ And although murders did decline by 9 percent, manslaughter rose by 32 percent.¹⁰

On the other hand, those supporting safe storage laws point to how locking up guns can reduce crime by discouraging or preventing burglars from obtaining guns through theft.¹¹ The effects in both directions seem plausible, but the question is the relative sizes of the effects and that is an empirical question.

Guns are not the first item with safe storage laws that economists have studied. Safety caps for medicines have been required for many years now and has been studied extensively. Surprisingly, Kip Viscusi (1984) found that safe storage rules in this area actually lead to more poisonings because of a “lulling effect.” Because of the safety caps, he argues, families no longer store medicines as far out of children’s reach as previously. Furthermore, some people who found the new caps troublesome to open apparently stored the medicine without the cap properly closed. This is part of a more general phenomenon. As Peltzman (1975) has pointed out in the context of automobile safety regulations, increasing safety restrictions can result in drivers offsetting these gains by taking more risks in how they drive. Indeed, recent studies indicate that drivers in cars equipped with air bags drove more recklessly and got into accidents at such sufficiently higher rates that it offset the life-saving effect of air bags for the driver and actually increased the total risk of death posed to others (Peterson, Hoffer, and Millner, 1995).

Despite the active policy debate on guns, there has been surprisingly little similar research on the safe storage of guns. Similar results to those for medicine safety caps or automobile safety regulations could be quite important for this debate. While a medical journal provides some preliminary evidence on safe storage laws and accidental gun deaths (Cummings, Grossman, Rivara, and Koepsell, 1997), no evidence exists on any of the other possible effects of these laws. No one has investigated the impact of these laws on suicides

⁹ The Australia Bureau of Statistics can be found at: www.abs.gov.au.

¹⁰ England also recently banned handguns and centerfire rifles and shotguns, yet it now leads the United States by a wide margin in robberies and aggravated assaults and although murder and rape is still higher in the United States, that difference has been shrinking. (Nicholas Rufford, “Official: more muggings in England than US,” *Sunday Times* (London), October 11, 1998.)

¹¹ While I know of no empirical evidence that has been provided to back up this claim, it has been an issue that has been raised in legislative debates over safe storage laws. Legislative hearings on safe storage laws have raised this issue in both Hawaii (February 15, 2000) and Maryland (February 16, 2000).

or on the possible costs of these laws, in particular whether the laws make it difficult for people to quickly access a gun for self-defense.

II. The Existing Literature

Klein et. al (1977, p. 181) argued that accidental gun deaths and gun suicides are strongly linked to owning a gun for self defense. Studying all the fatal gun accidents involving persons under age 16 in Michigan from 1970 to 1975, they concluded that guns used in fatal accidents were nearly always kept for self-protection. While they didn't have direct evidence to prove this point, Klein et. al. claimed that "guns used for self-protection are more likely to be involved in accidental shootings because hunting or target guns are much less likely to be stored loaded or to be kept where they are readily accessible." In a later paper, Klein (1980, p. 277) found that predominately low-income urban families with child gunshot victims had "kept loaded guns within ready reach because they had no confidence that the police offered them protection against neighborhood crime."

If Klein and his co-authors are correct in that it is guns primarily stored for self defense that result in accidents and if gun owners are correct that guns help mitigate harm when an attack occurs, safe storage laws could reduce fatal gun accidents while simultaneously decreasing the ability for self-protection. This would thus lower the cost to criminals, and increase crime. The empirical question is then whether the reduction in accidental gun deaths or suicides outweighs any costs from increased crime. This test will provide some qualitatively different evidence on the ability of guns to deter criminals.¹²

Half of all fatal gun accidents are self-inflicted. In cases where the fatal injury is inflicted on somebody else, the person firing the gun is on average 6.6 years older than the victim. Shooters tend to be between the ages of 15 to 24 and from low income families. Data from 1980 indicates that the race of the victim and shooter were the same in 96.5 percent of the cases, while the sex was the same in 75 percent of the cases. Shooters also tend to demonstrate "poor aggression control, impulsiveness, alcoholism, willingness to take

¹² There is a large literature on this issue including: Ayres and Donohue, 2000; Bartley and Cohen, 1998; Black and Nagin, 1998; Bronars and Lott, 1998; Kleck, 1997; Lott, 1998; Lott and Mustard, 1997; Plassman and Tideman, 1999; Southwick, 1997; and Wright and Rossi, 1986.

risks, and sensation seeking” (Kleck, 1997, pp. 306-7). Others have found that accidental shooters were much more likely to have been arrested for violent acts and/or for alcohol related offenses, and a disproportionate number had been involved in automobile crashes and traffic citations (Waller and Whorton, 1973). They were also much more likely to have had their driver’s licenses suspended or revoked.

Passing safe storage laws that are largely unenforceable might make those who wish to consider themselves “law-abiding citizens” change their behavior. But, as just discussed, these are not likely to be the high-risk groups for accidental shootings. Because accidental shooters tend to be more likely to violate the laws anyway, it is possible that safe storage laws will raise the cost of deterring criminals where the benefit of reducing accidents is smallest.

The issue of suicide raises two questions: 1) whether safe storage or other gun control laws *prevent suicides* using guns and 2) whether these laws *reduce* total suicides or merely change the method OF suicide. However, the second question only becomes relevant if safe storage laws indeed have much of an effect on gun suicides. The few existing studies that test for the impact of gun control laws (but not safe storage laws) on total suicide rates use cross-sectional level data, and find no significant relationship (Geisel et al, 1969; Murray, 1975; DeZee, 1983; and Boor and Bair, 1990).¹³ Some other studies use proxies for gun ownership rates (e.g., the number of Federally licensed firearms dealers or subscriptions to gun magazines), and analyze whether they are correlated with suicides.¹⁴ Still other studies use surveys on individual suicide attempts, so as

¹³ Kleck (1997, p. 287) summarizes his take on this research by claiming that “On the whole, previous studies failed to make a solid case for the ability of gun controls to reduce the total suicide rate.” Geisel et al (1969, p. 676) find evidence of a reduction in suicide with respect to an index that they create on gun control, but they could find no significant or even meaningful results when they used dummy variables for the different laws.

¹⁴ There is a debate within criminology and the medical literature over whether the accessibility of guns leads to higher suicide rates, but this literature does not address the impact of safe storage laws, and the evidence is fairly primitive. For example, a recent medical journal study compared the rate of gun suicides during the first week after people buy a gun with the suicide rate during any given week for people who do not own guns. It concluded that the rate for people who just bought the gun was 57 times higher (Wintemute, Parham, Beaumont, Wright, 1999). The authors took this as strong evidence that suicides could be prevented if guns had not been purchased. However, the research in criminology is more mixed. (For an extensive survey, see Kleck, 1997, pp. 265-288), it often has to rely on rather imprecise variables, such as the number of federally licensed firearms dealers in a county to proxy for gun ownership (Huff-Corzine, Weaver, and Corzine, 1999).

to describe various individual characteristics (such as impulsiveness) and examine whether suicides are more likely when guns are available (Kleck, 1997, pp. 269-275).

III. The Raw Data

The enactment dates for the safe-storage laws are shown in Table 1. For the implementation dates of safe storage laws, I relied primarily on an article published in the *Journal of the American Medical Association*,¹⁵ though this only contained laws passed up through the end of 1993. The web site for Handgun Control provided information on the three states passing laws after this date, and confirmed the information found in the medical journal for the earlier dates.¹⁶ The laws share certain common features, such as making it a crime to store firearms in a way that a reasonable person would know that a child could gain use of a weapon. The primary differences involve exactly what penalties are imposed and the age at which a child's access becomes allowed. While Connecticut, California, and Florida classify such violations as felonies, other states classify them as misdemeanors. The age at which children's access is permitted also varies across states, ranging from 12 in Virginia to 18 in North Carolina, Texas, and Delaware. Most state rules protect owners from liability only if firearms are stored in a locked box, secured with a trigger lock, or obtained through unlawful entry.

The data examined in this study ranges from 1977 to 1996 for the crime rates and from 1979 to 1996 for the accidental death and suicide rates. Most of the analysis is conducted at the state level because only a tiny fraction of one percent of the counties will experience an accidental gun death or gun suicide by children under age 15 in any given year (see Table 2 for the 1996 data).¹⁷ We have examined the county level data from 1977 to 1994 used in Lott (1998), but could not find a relationship between safe storage laws and total accidental gun deaths or suicides. Because of obvious objections to using these aggregate numbers, since only a small share of accidental deaths or suicides involve juveniles, we will focus on the state level data. The safe

¹⁵ Peter Cummings, David C. Grossman, Frederick P. Rivara, Thomas D. Koepsell, "State gun Safe Storage Laws and Child Mortality Due to Firearms," *Journal of the American Medical Association*, October 1, 1997, pp. 1084-1086.

¹⁶ www.handguncontrol.org.

¹⁷ More precisely, the data excludes accidental gun deaths for children under age 1, though it is our understanding that the number of accidental gun deaths in that category are exceedingly rare relative to even the small number of accidental gun deaths in the 1 to 4 year old range.

storage laws are also statewide laws, though county level data could be useful in differentiating the impact of these laws on different population groups.

As Table 1 shows, three of the fifteen states adopting the safe storage laws kept the laws in effect for only one full year, ten states for four full years, six states for five full years, and three states for six or more years. Because the different states have such different crime, accidental death, and suicide rates the before-and-after rates need to be made comparable. Therefore, the simple graphs presented here will primarily compare the before-and-after rates for only the ten states that kept their law in effect for at least four full years, though the other groupings of states produce similar results. We will also indicate how the raw data changed during the sample for the 36 states which did not adopt safe storage laws.

Figures 1 and 2 illustrate the changing accidental death rates for children under age 15. The diagrams provide information on per capita accidental death rates from all causes, per capita accidental death rates from guns, and per capita accidental death rates from handguns. (Because accidental gun deaths account for less than four percent of all accidental deaths, the rate of non-gun accidental deaths is divided by 10, simply so that it could be made comparable on the same graph to the other measures of accidental deaths.) A surprisingly large share of gun deaths (about 56 percent) are unclassified as to the type of weapon, but this does not pose a major problem for the analysis, since the share of unclassified cases remains fairly constant over the period. Handguns are examined separately because much of the public debate has focused on the risks of having them in the home.¹⁸

Year zero in Figure 1 constitutes the year that the law was passed, and the average law went into effect in early July, so that the law was in effect, on average, for half a year during the year that it is adopted. A first glance at the raw data suggests that safe storage laws might have reduced the gun accident rate: after a slight continued rise during the year of adoption, accidental gun deaths decline by 40 percent. However, closer inspection reveals that two-thirds of the drop is due to two states (Florida and Iowa), and the decline is not large when compared to the variation before the law. Furthermore, there is no comparable decline for accidental handgun deaths, which actually rise after the law.

¹⁸ Indeed, the first agreement that President Clinton made with gun makers to voluntarily include locks was made with respect to handguns. See also for example, Amanda Ripley, "Ready. Aim. Enter Your Pin." *New York Times Magazine*, November 21, 1999, p. 82-3, which discusses the need for handgun locks.

For the ten states who had safe storage laws for at least four years, the average year of adoption was 1991. Figure 2 indicates that the observed drop might not be so unique. The 36 states that did not adopt safe storage laws experienced a 22 percent decline in accidental gun deaths for children under 15 from 1991 to 1995 and a 56 percent drop by 1996. Similarly, accidental handgun deaths had declined by 24 percent by 1994 and 66 percent by 1996.¹⁹

Now to suicide. The raw changes in suicide are shown in Figures 3 and 4. It is particularly difficult to observe any real impact of the law. Figure 3 indicates that the states changing their laws experienced very constant gun suicide rates, with them first rising and then falling. Suicides from *all* methods actually rose between year zero and year 4, but it was due to an increase suicides by non-gun methods. Figure 4 indicates that after a large run up in per capita suicide rates during the 1980s, there was little consistent net change during the 1990s. Whether one calculates an increase or decrease in suicide rates during the 1990s depends a lot on what years one compares. If a relationship between safe storage laws and suicides exists, it will have to be ferreted out by more sophisticated regression estimates, such as the ones presented in Section V.

Figures 5 and 6 examine the violent crime rate, and they provide the first indication that crime rates may have changed around the time that safe storage laws were enacted. For the 10 states that had their safe storage laws in effect for at least 4 years, the violent crime rate rose during the year the laws went into effect and rose further during the first full year that the laws were in effect. The violent crime rate for those 10 states remained very constant after this increase, while the 6 states that had their law in effect for at least 5 years experienced a larger initial increase and some decrease after that. Yet, in neither case do the crime rates return to their pre-law levels. By contrast, violent crime rose in the 36 states that did not change their law from the mid-1980s to 1993 and then began declining back to what it was back in 1989. The larger set of 10 states does not exhibit this up-and-down pattern that was evident for the nation.

¹⁹ If the base years had been made using year -1 in Figure 1 (the last full year before the safe storage was enacted) and 1990 in Figure 2, the differences in accidental handgun deaths for those under age 15 is truly dramatic. At the same time that accidental handgun deaths are exploding in safe storage states (increasing four fold by year 3 and still being 2.25 times higher in year 4), the accidental handgun death rate is plummeting in states without the law (declining by 56 percent in 1994 and 81 percent in 1996).

IV. Other Factors

While very large changes can sometimes be seen in the raw data, patterns often only emerge once other factors are taken into account. As with the preceding diagrams probably the most obvious variables to account for in explaining accidental gun deaths for children are the rates at which other non-gun accidental deaths occur as well as the rate at which other age groups in the population die from accidental gun shots. Since none of the safe storage restrictions apply to people older than 17, we will use the per capita accidental gun death rate for people over age 19. Accidental gun deaths for those outside the age group impacted by the safe storage law may also proxy for not only the availability of guns in the home since some of these deaths will involve parents or other adults, but also other risk factors that might vary by state. We have also run estimates where the accidental gun death information for those over age 19 is broken down into narrower age groupings under the assumption that those closest in age to the age group being studied would explain more of the variation. While there is some evidence for that hypothesis these narrower age groupings for people over age 19 help explain more of the variation in juvenile accidental gun deaths, none of the results for the safe storage laws were effected.

The data allows the accidental death data to be disaggregated by age (from 1 to 5 years of age, from 5 to 9 years of age, from 10 to 14 years of age, and from 15 to 19, see Appendix for the descriptive statistics of these variables). Everything else equal, one would expect that if safe storage laws prevent access to guns, they would have their biggest impact for the youngest children. Indeed, as noted earlier, the General Accounting Office reported in 1991 that mechanical safety locks are unreliable in preventing children over six years of age from using a gun,²⁰ and there is probably little that can prevent an older teenager from doing what he wants. Yet, even if the benefits are smaller for older children, it is possible that children who are even older than the ages for which the restrictions apply could experience a drop in accidental gun deaths.

A similar approach will be used to explain how suicides by youngsters vary. We will include information on suicides for people in that age group committed by means other than guns along with suicide rates for

²⁰ United States General Accounting Office, "Accidental Shootings: many deaths and injuries caused by firearms could be prevented," United States General Accounting Office, March 1991.

people older than 19 years of age. Whatever might cause youngsters to attempt to commit suicide by means other than guns might also help explain the rate at which they try to commit suicides with guns. In addition, factors that determine the general suicide rate for those over age 19 might also be relevant for explaining the gun suicide rate for those under that age.

It is simply not possible to use the same level of disaggregation by age for suicides as was used for accidental deaths. For example, there was only one suicide using a gun for children under age 10 in 1996. State and year fixed effects would easily explain all the variation even using state level data. The categories thus have a somewhat broader age range: one category with children under age 15, and one with adolescents from 15 to 19.

To try to account for differences other than safe storage laws, in addition to the normal fixed state and year effects, we incorporate an extensive data set on state level variables. This includes 36 demographic variables, by the percentage of the population that belongs to a certain sex and race (black, white, and other) by ten-year age groupings (10 to 19 years of age, 20 to 29 years of age). It also includes: real per capita income, poverty rates, median education, unemployment, percent of families with only one parent present, state population and state population squared (to account for population density), as well as information on per capita unemployment insurance payments, income maintenance payments, and government retirement payments to those over age 64.

While much of the focus of other gun laws is on the crime rate, gun laws also control the accessibility and availability of guns, and hence might affect accidental gun deaths and suicides. Therefore, we will also account for right-to-carry laws, one-gun-a-month purchase rules, states that border one-gun-a-month states, waiting periods, and mandatory prison penalties for using guns in the commission of a crime. While one of the authors has previously examined the impact of right-to-carry laws on county level accident and suicide rates and found no evidence of any significant impact, it is still possible that some specific age groups might be placed at greater risk. For instance, waiting periods might impact an adult's ability to obtain a gun to commit suicide, while it is less plausible that this would apply to suicides by younger people under 18.²¹

²¹ Recent editorials in medical journals have called for research on whether waiting periods impact suicides (Rosenberg, Mercy, and Potter, 1999).

V. The Results

A. Accidental Gun Deaths

The first set of estimates use a simple dummy variable that is set equal to the portion of the first year that the safe storage law is in effect and then equal to one for all subsequent years. Table 3 accounts for the state and year fixed effects as well as all the other variables discussed in the preceding section with the exception of the other gun control laws. The estimates are broken down in two ways, by age category (from 1 to 5, from 5 to 9, from 10 to 14, and from 15 to 19) and by whether the rate of non-gun accidental death rate for people in that age group or whether the accidental gun death rate for people over 19 years of age are accounted for.

Despite these different combinations, it is difficult to observe any evidence of reduced accidental gun deaths from the safe storage law. Half the 12 coefficients are negative and half are positive, with the only statistically significant estimate implying that safe storage laws increase accidental gun deaths. Some of the point estimates do imply a large percentage impact for the two youngest age groups, but the net effect on all four age groups added together is actually very small -- resulting in four more accidental deaths (6 lives saved for those from 1 to 5 years of age, 12 more lives lost for those from 5 to 9, 12 lives saved for those from 10 to 14, and 10 more lives lost for those from 15 to 19). The differential pattern age for groups also seems inconsistent with what would be predicted from safe storage laws.

While increases in the accidental death rate from non-gun methods for people in an age group is almost always positive, it is never statistically significant. The coefficients also indicate that increasing the per capita number of non-gun accidental deaths by one increases the number of accidental deaths by guns by at most .01. Perhaps not surprisingly, the accidental gun death rate for people over age 19 does a much better job of explaining the accidental gun death rate for juveniles that are relatively closer in age -- increasing accidental gun deaths over age 19 by 1 per 1,000 people increases the per capita number of accidental gun deaths for 15 to 19 year olds by .64 per 1,000 people. The results for the other control variables are presented for some of these specifications in the appendix, but most variables are not statistically significant.²²

²² Another approach is to include the lagged values of the endogenous variable as an explanatory variable. Doing so transforms the interpretation of the safe storage dummy into a variable which is measuring whether

Table 4 accounts for the various other gun control laws as well as year fixed effects by region (Northeast, South, Midwest, Rocky Mountains, and Pacific Rim).²³ This new set of estimates would allow not only for whether the accidental gun death rates in safe storage states is changing relative to the national accidental gun death rate but now also whether it is changing relative to the accidental gun death rates in their specific region. (We have also tried the simple fixed effects used in Table 3 and the results are very similar). Overall, it is difficult to observe any type of gun law impacting accidental gun deaths by juveniles. The pattern and importance of the safe storage laws are very similar to those just discussed, and only two of the coefficients for other gun laws are ever statistically significant. Both the significant coefficients imply that one-gun-a-month rules have some adverse effect on accidental gun deaths, and the impact of one-gun-a-month rules on accidental gun deaths involving 10 to 14 year olds implies 94 more deaths a year. Whether homes that are threatened with attack leave their guns more accessible when they are restricted in quickly obtaining another gun is not immediately obvious, but a detailed discussion of this law is beyond the scope of this paper.

To further investigate whether the impact of these laws vary by the age for which access is restricted, Table 5 presents two alternative approaches: 1) replacing the simple dummy variable with the age for which access is not restricted and 2) using four separate dummy variables for the four different age restriction categories (under 12, under 14, under 16, and under 18 years of age) to explain the accidental death rate for those under 20 years of age. Again the estimates in Section A of Table 5 show the same patterns as before: with insignificant benefits for those from 1 to 5 and from 10 to 14 years of age and sometimes significant costs for ages 5 to 9 and 15 to 19. Section B of the table indicates that the different categories of age restrictions

the law alters the rate of change of the accidental gun death rate. It also converts the state fixed effects into measuring the average change in accidental gun deaths for each state. In any case, doing this approach increases the significance level but leaves the general pattern of the results unchanged. The coefficients and t-statistics for the results that correspond to those shown in columns 3, 6, 9, and 12 of Table 3 are: for 1 to 4 year olds it is $-1.36e-6$ (t-statistic = 1.265); for 5 to 9, $1.78e-6$ (t-statistic = 1.595); for 10 to 14, $-1.46e-6$ (t-statistic = 1.106); and for 15 to 19, $4.53e-7$ (t-statistic = 0.276).

²³ The Northeast includes Connecticut, Delaware, DC, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont; South includes Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia; Midwest includes Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Nebraska, North Dakota, Ohio, South Dakota, West Virginia, and Wisconsin; Rocky Mountains includes Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming; and Pacific states includes Alaska, California, Hawaii, Oregon, Washington.

are generally unrelated to the accidental gun death rate for people under age 20. All but one of the coefficients are positive, but only one coefficient is statistically significant (access restricted to those under age 14 when the other gun control laws are accounted for). The magnitudes of these effects also remain similar to those shown earlier.

Finally, Table 6 disaggregates the results in Table 3 by creating a separate dummy variable for each of the states that passed the safe storage law. These results are similar to those already reported. About two-thirds of the states experience reduced accidental gun deaths for children from 1 to 5 and from 10 to 14 years of age, while about 80 percent of the states experience more accidental deaths for children from 5 to 9 years of age. These results indicate that the earlier within age group results were not simply being driven by a few unusual states. However, overall, 23 of the state coefficients imply that safe storage laws increased accidental gun deaths while 31 indicate the reverse. Assume that these coefficient were like a fair coin where the expected value of a head or tail were .5 and in this case the expected probability of having a negative coefficient were also .5. The binomial formula indicates that the probability of obtaining 31 or more negative coefficients is indeed significant at less than 10 percent, though it is important to note that the total effect across these states is not statistically significant.

While not reported here, we have also tried including before-and-after trends for the states that adopted this safe storage laws, but the results were never statistically significant for either the linear or quadratic cases.²⁴ The results were also broken down by whether violating the safe storage law was a felony or misdemeanor and there were no differences between these two sets of states. We had tried this approach to analyze whether the impact of the law changed over time -- for example, more people may have learned about it. We also tried these estimates to explain accidental handgun deaths, but the results were again statistically insignificant.²⁵

²⁴ For example, the before-and-after trends when examining the accidental gun death rate for people under age 20 are respectively $4.00e-8$ (t-statistic=0.550) and $1.73e-7$ (t-statistic=0.969) and the F-test for the difference in trends is 0.44.

²⁵ For example, the estimates for accidental handgun deaths that correspond to those reported for specifications 3, 6, 9, and 12 in Table 3 were: $-1.5e-6$ (t-statistic = 0.646) for children under age 5; $4.00e-7$ (t-statistic = 0.239) for children from 5 to 9; $-1.33e-6$ (t-statistic 1.358) for children from 10 to 14; and $-1.12e-6$ (t-statistic = 1.149) for people age 15 to 19.

Taken together, these estimates provide no consistent evidence that safe storage laws reduce accidental gun deaths. The adverse consequences of safety caps for medicine or car safety regulations do not appear to be present here, but neither are there any benefits. The bottom line is that these effects are almost never statistically significant. Furthermore, not only are the coefficients usually statistically insignificant, but when they are significant, they are more likely to indicate increased accidents after the law. In any case, the effect (if it does indeed exist) is extremely small. At worst, the laws would only imply a few more deaths a year. As noted earlier, in the description of the previous research, one possible reason for these laws not having an effect is that accidental deaths primarily occur among the not so law-abiding segments of society, and these groups do not appear to care very much whether a law exists regarding the storage of guns.

B. Suicides with Guns

Our examination of suicide laws follows the set of specifications used to examine accidental gun deaths, but with two exceptions: 1) The age categories for children under 5, from 5 to 9 and from 10 to 14 have been combined into one group, children under age 15 and 2) the variables on accidental deaths from other sources and for people over age 19 have been replaced by the analogous variables for suicides.

The estimates in Table 7 correspond to the earlier results presented for accidental gun deaths in Table 3. These results also fail to indicate any significant change in gun related deaths. While the coefficients are both negative, they are statistically insignificant and relatively small. The estimates for children under age 15 imply that anywhere from a 2 to 4.8 percent drop in gun suicides from the safe storage law, while the estimates for 15 to 19 year olds is somewhat larger, at about 5 percent. As with the case of accidental gun deaths, the effectiveness of the law was expected to decrease with age, not only because not all 15 to 19 year olds are covered by the law, but also because of the presumed inability to actually prevent older juvenile access. Yet again, however, these differences are not statistically significantly different from zero, and they are not statistically significantly different from each other. The other reported coefficients for non-gun suicides for people in these age groups and the suicide rate for those over 19 are all positive. However, only the suicide

rate for those over 19 is statistically significant in explaining the suicide rate for children under age 15. (An example of the estimated values for the other coefficients are reported in the appendix.)²⁶

The estimated impact of the other gun control laws are reported in Table 8. As in Table 4, these estimates include fixed regional effects by year as well as state fixed effects, though using these more detailed fixed effects do not affect the overall results. Safe storage laws continue to be only insignificantly related to suicide rates, and the coefficients imply about a 3 percent drop in suicides. One-gun-a-month rules again produce one of the two statistically significant gun control law coefficients, and the adverse impact of one-gun-a-month rules on the suicide rate for those under 15 in this case is also about three times larger than the impact of safe storage laws. However, the impact of the one-gun-a-month is not consistent across specifications as it has different signs for suicides by those under 15 and those between 15 and 19 years of age. Right-to-carry laws provide the only gun control law that actually reduces youth suicide,²⁷ but the safest interpretation of this is probably that at least the passage of right-to-carry laws has no adverse effect on youth suicides.

Replacing the safe storage law dummy variable with information on the ages to which the law applies provides the first statistically significant evidence that these laws might reduce gun suicides, though the effects are not consistently significant when other control variables are introduced. Panel A indicates that if a safe storage law has a higher age requirement, it does significantly reduce gun suicides, and if the requirement is set at 16 years of age (the average age at which access restrictions end is 15.5), the reduction in gun suicides is slightly over 8 percent. This raises the issue of whether lives are on net saved, or whether these 15 to 19 year olds will merely substitute towards other methods to kill themselves. Column 4 in Panel A shows that total suicides by 15 to 19 year olds actually rise in states with safe storage laws, though the effect is insignificant and

²⁶ Including the lagged values of the endogenous variable as an explanatory variable does not produce any significant results, though it does alter the pattern of coefficients somewhat. The coefficients and t-statistics for the results that correspond to those shown in columns 3, and 6 of Table 7 are: under 15 year olds it is $9.46e-8$ (t-statistic = 0.224); for 15 to 19, $-4.62e-6$ (t-statistic = 1.506). The pattern thus implies the safe storage law has the least benefit for those it is most aimed at. The possible benefit for those between 15 and 19 raises the issue of total suicides and that coefficient is: $1.97e-06$ (t-statistic = 0.503). Thus while there is some evidence that suicides with guns declines for the 15 to 19 age groups, it appears that total suicides do not decline, that these teenagers may merely be substituting into alternative means.

²⁷ One can only guess why this is the case, though possibly it is because the gun is not always left at home. One way to test this is examining whether increased gun ownership is associated with more suicides.

total deaths remain unchanged. What can be concluded from these estimates is that for 15 to 19 year olds, there is some weak evidence that gun suicides are reduced by safe storage laws, but that whatever benefit is produced is offset by these teenagers switching to other methods to kill themselves.

Panel B again provides some evidence that safe storage laws reduce suicide rates, but again the results are mixed. Whether one examines gun suicide rates or total suicide rates for people under age 20, laws mandating safe storage to prevent access to those under age 14 indicate a reduction in suicides. While the results are not statistically significant, summing the different ages together reduces overall gun suicides, particularly when other gun control laws and regional year fixed effects are accounted for. Yet, the total suicide rate -- as examined in columns 3 and 4 -- again imply that total suicides rates rise as a result of safe storage laws. It is furthermore very puzzling as to why safe storage laws that have 14 as the age threshold would lower total suicides, while age thresholds of 12, 16, or 18 increase total suicides.

Table 10 breaks down the impact of safe storage laws by state. The general conclusion that can be reached is that whatever evidence indicates that safe storage laws reduce gun suicides is offset by an increased reliance on other methods of committing suicide, for there is no reduction in total suicide rates. Nine states experienced drops in gun suicides after adopting safe storage laws. Assuming the probability of a negative coefficient as .5, the binomial formula indicates that the probability that 9 or more of these 15 states would reduce gun suicides is 16 percent, thus the significance of the results falls somewhat short of normal criteria for statistical significance. The evidence for total suicide rates suggests two slightly different results: that either roughly half the states experience an increase and half experience a decrease after the passage of safe storage laws (as is the case for total suicides for children under age 15) or that significantly more states experience an increase in total suicides for ages 15 to 19.²⁸ Interestingly, none of the individual state coefficients that indicate a drop -- either in gun suicides or in total suicides -- is statistically significant, while five of the individual state results have significant increases in suicides.

Replacing the safe storage law with linear before-and-after trends also did not result in statistically significant changes in suicide rates as a result of the law. Figure 7 graphs out the changes in gun suicide rates for people under age 20 using simple linear and squared before and after trends, and this simple graph

²⁸ The probability that only 2 or fewer states have negative coefficients is 8 percent.

illustrates the risk in relying on just the before-and-after averages measured by using dummy variables.²⁹ In looking at the figure it is easy to see why a dummy variable would find that the average suicide rate after the passage of the law was lower after the law than it was before the law. Yet, it is equally easy to see that the lower average was not due to any benefit produced by the safe storage law. Suicide rates were falling up until the passage of the safe storage law and they even started rising slightly for a brief period after that point.

Finally, we also again broke down the different states on the basis of whether violating the safe storage law was a misdemeanor or a felony. In this case, the misdemeanor coefficient indicated a larger drop than did felony penalties (the difference was $1.3e-6$), but the F-statistic is insignificant (0.81 with a probability of 0.37).

Taken together, all these regressions supply only weak and inconsistent evidence that safe storage laws might slightly reduce gun suicides. However, the evidence clearly rejects the hypothesis that the total number of suicides, committed by all methods, would be reduced.

C. Crime Rates

The lack of benefits in the preceding sections are consistent with two possible explanations: either the safe storage laws have no impact on people's behavior in storing or owning guns or the laws alter the behavior of people for whom the risks of accidental gun deaths or suicides were already very low. This second explanation is consistent with what we know about the types of people involved in accidental gun deaths, but additional information on changes in crime rates can help distinguish between these two hypotheses.

The specifications reported here are similar to those discussed in the preceding tables, though the crime specific arrest rates and the execution rate for murder are now included. Table 11 finds that safe storage laws are significantly related to higher rape, robbery, and burglary rates, and that these effects are quite large, at least for the first two categories -- with rape and robbery rates rising by 9 percent and 8 percent respectively.³⁰ Including the other gun control laws and regional year fixed effects in Table 12 produces

²⁹ Lott (1998, pp. 75-79 and 135-138) provides a detailed motivation for this approach.

³⁰ Including lagged values of the crime rates as an explanatory variable does not alter these findings. The coefficients for rape, robbery, and burglary still remain positive and statistically significant and the signs of the

similar results. Rapes, robberies, and burglaries now rise by 9, 11, and 6 percent, respectively, as a result of safe storage laws.

The coefficients from Table 11 predict that the 15 states that had the safe storage law in effect in 1996 experienced 3,819 more rapes, 21,000 more robberies, and 49,733 more burglaries. The estimates from Table 12 predict a slightly different mix of crimes: 3,738 more rapes, 26,724 more robberies, and 69,741 more burglaries. It is possible to put a rough dollar value on the losses from that results from these safe storage laws. The National Institute of Justice has estimated the costs to victims of various types of crime, as a result of lost productivity, out-of-pocket expenses, medical bills, property loses, as well as losses from fear, pain, suffering, and lost quality of life.³¹ Using our smallest estimated increase in these three crime categories, the total annual loss to victims from safe storage laws is about \$652 million in 1998 dollars. If the rest of the country were to adopt similar safe storage laws, the most conservative estimates here imply that there would be 5,070 more rapes, 23,525 more robberies, and 24,058 more burglaries.

As expected, higher arrest rates and higher execution rates for murder deter violent crime and the longer a right-to-carry law is in effect the greater the drop in crime. One-gun-a-month rules raise violent crime, though the effect on crimes other than murder are not statistically significant. It is also interesting to see that one-gun-a-month rules are frequently consistent with increased crime in neighboring states. At the very least, concerns about crime arising from straw purchasers exporting guns to neighboring states appears to be misplaced.

Table 13 replaces the simple dummy variable for the safe storage law with a variable for the age at which access is no longer restricted. In panel A, rape, robbery, and burglary continue to increase as the age limit is raised. Property crimes also consistently increase with a higher age limit. The results are more mixed for aggravated assaults and larceny, though the possible drop in aggravated assaults ~~is~~ IS the one bright spot in the crime data. Panel B disaggregates the states on the basis of their age requirement. One of the more interesting results is that for states where safety restrictions apply for children under age 14 there were significant increases in murders, rapes, and robberies. This was also the one set of states that showed a

other coefficients remain unaltered. The results for the later regressions upon which the figures are based actually become more significant and the pernicious impact of the safe storage law more pronounced.

³¹ Ted R. Miller, Mark A. Cohen, and Brian Wiersema, Victim Costs and Consequences: A New Look, National Institute of Justice: Washington, D.C. (Feb. 1996).

significant drop in suicides in Table 9. It is possible to make a simple comparison of lives lost from murder versus suicides for the five states that have the access restriction for children under age 14 (California, Iowa, Minnesota, Nevada, and Wisconsin). Columns 1 and 3 in Table 9, panel B find that suicides in these five states fell by either 46 or 29. By contrast, the estimates in Table 13, panel B imply that safe storage laws were associated with 182 more murders in these same states. A net loss of 136 or 153 lives. The comparison is even more lopsided than these numbers suggest if murders are viewed as a greater loss than suicides.

Table 14 disaggregates the estimates down to the individual states, which reveals that especially for rape and robberies the vast majority of states with safe storage laws experience more crime. For rapes, 14 of the 15 states adopting safe storage laws faced higher rates, and the one state for which this was not true only had an extremely small drop (Texas experienced a .3 percent decline). The numbers are not quite as lopsided for robberies, but 11 of the 15 states experienced an increase. While the overall effect of safe storage laws on aggravated assaults is not statistically significant, 10 of the 15 states did experience a decline in this type of crime.

The preceding tables examine only how the adoption of safe storage laws change the before-and-after average crime rates. Yet, as noted earlier, sometimes such simple averages can be quite misleading. Figures 8 through 12 graph out the estimates based on the simple before-and-after law linear and squared trends. These results indicate that the dummy variable approach underestimates the crime increasing impact of safe storage laws. Figure 8 illustrates the magnitude of this underestimate. The simple dummy variable in Table 11 actually found a very slight insignificant decline in violent crime. Looking at Figure 8 it is easy to see how the after law average violent crime rates is less than the pre-law average, yet it is also obvious that violent crime rates stopped declining and started rising at the time the safe storage law was passed. After an upward displacement in violent crime, the violent starts declining again but remains above what its predicted rate would have been if the law had not been passed. In a country of 270 million people, this difference of 33 violent crimes per 100,000 people would amount to over 89,000 violent crimes. Graphs using county level crime data show more dramatic increases for murder, rape, and robbery and some drop in aggravated assaults.

The graphs also make it clear why rape and robbery rates were the only violent crime categories to show a statistically significant increase in crime after the passage of safe storage laws. While all the violent crime categories increase when safe storage laws go into effect, rape and robbery were the only categories where the crime rates rose above the previous before law averages.

Table 15 provides more refined estimates of the victimization costs of safe storage laws. The first part of the table calculates the difference in the number of crimes by year between the new trend as a result of the safe storage law and what the crime rates would have been if the pre-law trend had continued. The fifteen states with safe storage laws would be expected to experience 168 more murders in the first full year that the law is in effect. The number of murders peaks in the fourth full year at 380 murders. The number of rapes and aggravated assaults is still rising five full years after the law is in effect, while robberies peak at almost 31,000 during the third year. Of the property crimes, burglaries show the biggest increase over the period.

The total victimization costs using the National Institute of Justice's estimates continues rising over the period, reaching \$3.4 billion during the fifth year. The average yearly cost to victims over the five years is \$2.6 billion, of which \$2.4 billion arises because of increased violent crimes.

D. Did Safe Storage Laws Change the Rate At Which People Locked Up Guns ?

While we observe an economically and statistically significant increase in crime after the passage of safe storage laws, a more direct tie between the passage of the laws and individuals locking up guns would be very helpful. Otherwise, it is possible that the passage of the law did not alter the rate at which individuals either locked up or owned guns. Fortunately, several types of survey data is available. One survey sponsored by the Police Foundation (1997) asked 2568 people about whether they owned a gun as well as how they stored them.

A total of 2562 people answered "yes" or "no" to the question of whether a gun in the home was stored loaded and unlocked. The survey included a great deal of information on race (white, black, Hispanic, Asian, or American Indian), how safe the individual feels at home alone (very safe, somewhat safe, unsafe, very safe, don't know, refused), whether they have ever used a gun for self defense (yes, no, don't know, refuse to answer), whether they have had training in how to use a gun (yes, no, don't know, refused), the age that the

person was born and the age squared and cubed, place where you live (open country, farm, small city, medium city, suburb, large city), employed (full-time, part-time, homemaker, student, retired, unemployed, other), marital status (married, widow, divorced, separated, never), education (none, some high school, high school graduate, some college, BA, some graduate school, graduate degree), political views (extremely liberal, liberal, slightly liberal, moderate, slightly conservative, conservative, extremely conservative, don't know), veteran (veteran, currently in military, no), number of children, number of children under age 3, number of times going to religious services (once a week, few times a month, few times a year, once in a while, not attend), religious preferences (protestant, catholic, jewish, other, none), family income (less than 5,000; 5,001 to 10,000; 10,001 to 15,000; 15,001 to 20,000; 20,001 to 30,000; 30,001 to 50,000; 50,001 to 75,000; and greater than 75,000), whether they have ever been arrested, the respondents sex, state codes, and information on whether the survivor thinks that the defensive gun use was invented (yes, no, not reported). Dummy variables were used to identify these different characteristics.³² Table 16 shows the average characteristics for those that acknowledged that they owned guns as well as those who claim that they didn't.

The variable for whether a gun is stored unlocked and loaded equals 1 when this is true and zero otherwise. Because we have a dummy variable as an endogenous variable, we will estimate logit regressions. A dummy is included for whether a safe storage law was in effect at the time of the polling in 1994, as well as a variable for the fraction of the number of years that the safe storage law has been in effect. The results shown in Table 17 indicate that states with safe storage laws had higher rates at which households left gun loaded and unlocked but that the rate fell the longer that the law was in effect. Six years after adoption of the law states with safe storage laws have a lower percentage of their homes with loaded locked guns. Given our earlier findings that crime increases with the passage of safe storage laws, it is the change that occurs the longer that these laws are in effect that is particularly important.

The other coefficient estimates are basically what one would expect. People who have used a gun in self defense or who feel the least safe are more likely to have a gun that is loaded and unlocked, but only the first effect is statistically significant. Men and those living on farms are also more likely to have a gun that is loaded

³² The left out characteristics picked up in the intercept are for an employed, married, veteran, protestant, weekly church attending, white male with no education living in the open country who feels very safe at home and makes less than \$5,000 per year.

and unlocked. Other characteristics of people in this category are interesting, though less obvious: Asians, catholics, and those making between \$50,000 and \$75,000.

Because the decline in the rate that guns are stored loaded and unlocked in the previous regression could be due to either people with gun now storing them differently or because gun ownership is declining, we also reestimated this regression solely on those individuals that report that they own guns. Doing so produces very similar though more significant with results with the coefficient on the number of years that the safe storage law is in effect now equalling $-.0995$ (t -statistic = 1.995).

Other survey data is also available from the General Social Survey (GSS) conducted by the National Opinion Research Corporation. While this survey has the advantage of being given in many different years, it can only investigate what happens to the number of guns owned and not whether guns are being stored loaded and unlocked. There are also a couple of other problems: not all states are surveyed and the survey was only conducted in 1977, 1980, 1982, 1984, 1985, 1987 to 1991, 1993, 1994, and 1996. Fewer people were also included in any given year, with between 907 and 1970 people. Because the GSS reports national weights, we reweighted the state level percentages to reflect the composition of people in that state using the 36 demographic groupings that we have used in the earlier regressions. We regressed the percent of the population with guns on the year trends for before and after the adoption of the safe storage and concealed handgun laws as well as all the measures of income, state population, unemployment, poverty, and demographics used in earlier regressions. While the results imply that gun ownership rates fell by 1 percent per year faster after the law than they did before hand, the change was only statistically significant at the 17 percent level for a two-tailed test.

VI. Conclusion

Safe storage laws have no impact on accidental gun deaths or total suicide rates. While there is some weak evidence that safe storage laws reduce juvenile gun suicides, those intent on committing suicide appear to easily substitute into other methods, as the total number of juvenile suicides actually rises (if insignificantly) after passage of safe storage laws. The only consistent impact of safe storage laws is to raise rape, robbery, and burglary rates, and the effects are very large. Our most conservative estimates show that safe storage

laws resulted in 3,738 more rapes, 21,000 more robberies, and 49,733 more burglaries annually in just the 15 states with these laws. More realistic estimates indicate across the board increases in violent and property crimes. During the five full years after the passage of the safe storage laws, the fifteen states face an annual average increase of 309 more murders, 3,860 more rapes, 24,650 more robberies, and over 25,000 more aggravated assaults.

The impact of safe storage laws are consistent with existing research indicating that the guns which are most likely to be used in an accidental shooting are owned by the least law-abiding citizens and thus are least likely to be locked up after the passage of the law. The safe storage laws thus manage to produce no significant change in accidental deaths or suicides and yet still raise crime rates because households with low accidental death risks are now the ones to most likely to obey the law.

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Table 1: Enactment dates of Safe Storage gun control laws

Safe storage laws		
State	Date law went into effect*	Access is Restricted for children under age
Florida	10/1/89	16
Iowa	4/5/90	14
Connecticut	10/1/90	16
Nevada	10/1/91	14
California	1/1/92	14
New Jersey	1/17/92	16
Wisconsin	4/16/92	14
Hawaii	6/29/92	16
Virginia	7/1/92	12
Maryland	10/1/92	16
Minnesota	8/1/93	14
North Carolina	12/1/93	18
Delaware	10/1/94	18
Rhode Island	9/15/95	16
Texas	1/1/96	18

* Source for the enactment of safe storage laws through the end of 1993 is Peter Cummings, David C. Grossman, Frederick P. Rivara, Thomas D. Koepsell, "State gun Safe Storage Laws and Child Mortality Due to Firearms," Journal of the American Medical Association, October 1, 1997, pp. 1084-1086. The other dates were obtained from the Handgun Control web site at: <http://www.handguncontrol.org/caplaws.htm>.

Table 2: Distribution of Accidental Gun Deaths and Gun Suicides Across States in 1996

	Number of States with a Death	Number of states with one death	Number of states with two deaths	Number of states with three deaths	Number of states with four to six deaths	Number of states with 7 or more deaths	Maximum number of deaths in a state
Accidental Gun Deaths involving children							
Under Age 5	12	10	1	1	0	0	3
from 5 to 9 Years of Age	16	8	5	3	0	0	3
from 10 to 14 Years of Age	32	11	8	5	5	3	9
Suicides with Guns by children							
Under Age 10	1	1	0	0	0	0	1
from 10 to 14 Years of Age	40	8	4	6	18	4	15

Table 3: Examining the Impact of Safe Storage Laws on Accidental Gun Deaths (Number of observations = 918)

	Accidental Gun Death Rate for People in the Following Age Groups											
	Under age 5			From ages 5 to 9			From ages 10 to 14			From ages 15 to 19		
	1	2	3	4	5	6	7	8	9	10	11	12
Safe Storage Law Dummy (Equals fraction of year that the law is first in effect and 1 thereafter)	-1.05e-6 (0.982)	-1.05e-6 (0.988)	-1.03e-6 (0.971)	1.90e-6 (1.69)***	1.78e-6 (1.583)	1.77e-6 (1.581)	-1.46e-6 (1.112)	-1.46e-6 (1.111)	-1.48e-6 (1.123)	7.87e-7 (0.485)	8.30e-7 (0.511)	6.43e-7 (0.405)
Accidental death rate for people in age group from means other than guns		0.001068 (0.175)	.000937 (0.154)		0.0105 (1.109)	0.0102 (1.062)		0.000183 (0.018)	-.0002834 (0.027)		0.00584 (1.021)	0.00425 (0.757)
Accidental gun death rate for people over 19 years of age			-0.169 (2.399)**			0.0275 (0.403)			0.0655 (0.789)			0.6405 (6.34)***
Chi Square	419.48	419.51	425.49	453.47	454.71	454.87	722.46	722.46	723.09	949.30	950.33	986.64

Note: All regressions are weighted tobitts, where the weighting is each state's population, and use state and year fixed effects. Not reported are the 36 demographic variables or the fixed effects.

* The two-tailed t-test is significant at the 1 percent level.

** The two-tailed t-test is significant at the 5 percent level.

*** The two-tailed t-test is significant at the 10 percent level.

Table 4: The Impact of other Gun Control Laws on Accidental Gun Deaths: Controlling for the Variables used in Specifications 3, 6, 9. and 12 in Table 3 and also now including other gun control laws as well as fixed regional effects by year and state fixed effects (Only new gun control variables and the Safe Storage Law are reported, 918 observations)

	Accidental Gun Death Rate Per Capita for People in the Following Age Groups			
	Under age 5	From ages 5 to 9	From ages 10 to 14	From ages 15 to 19
Safe Storage Law Dummy (Equals fraction of year that the law is first in effect and 1 thereafter)	-1.00e-6 (0.843)	6.47e-7 (0.532)	-2.16e-6 (1.516)	7.02e-7 (0.408)
Right-to-carry Laws-- Change in the crime rate from the difference in the annual Change in crime rates in the years before and after the change in the law (annual rate of change after the law - annual rate of change before the law) F-test in parentheses	-6e-10 (0.0)	1.14e-7 (0.15)	1.95e-7 (0.32)	3.58e-7 (0.74)
One gun a month purchase rule (Equals fraction of year that the law is first in effect and 1 thereafter)	-4.12e-6 (0.894)	3.38e-6 (1.003)	0.000011 (2.524)**	3.2e-6 (0.637)
Neighbor's adoption of one gun a month purchase rule (Equals fraction of year that the law is first in effect and 1 thereafter)	-2.75e-6 (0.902)	5.93e-6 (2.073)**	-9.7e-7 (0.288)	-3.42e-6 (0.905)
Waiting period dummy	-5.44e-6 (1.443)	1.80e-6 (0.425)	-7.88e-7 (0.181)	1.43e-6 (0.265)
Length of waiting period in days	1.46e-6 (1.574)	-3.92e-7 (0.372)	3.46e-7 (0.312)	-9.28e-7 (0.677)
Length of waiting period in days - squared	-6.41e-8 (1.262)	9.29e-9 (0.162)	5.50e-9 (0.089)	9.06e-8 (1.199)
Chi Square	504.94	564.02	807.66	1058.81

Note: Note: All regressions are weighted tobitts, where the weighting is each state's population, and use state and year fixed effects. Not reported are the 36 demographic variables or the fixed effects.

* The two-tailed t-test is significant at the 1 percent level.

** The two-tailed t-test is significant at the 5 percent level.

*** The two-tailed t-test is significant at the 10 percent level.

Table 5: Examining the Different Age Limit For Which the Safe Storage Law Applies on Accidental Gun Deaths

A) The Age Limit's Impact on the Accidental Death Rate for Different Age Groups

	Accidental Gun Death Rate Per Capita for People in the Following Age Groups			
	Under age 5	From ages 5 to 9	From ages 10 to 14	From ages 15 to 19
1) Using the specifications 3, 6, 9, and 12 shown in Table 3				
Age at which Safe Storage Law does not restrict access	-5.96e-8 (0.904)	1.23e-7 (1.754)***	-8.61e-8 (1.049)	6.29e-8 (0.704)
Chi Square	425.36	455.45	722.93	986.97
2) Using the specification shown in Table 4				
Age at which Safe Storage Law does not restrict access	Estimates did not converge	6.69e-8 (0.900)	-8.44e-8 (0.968)	9.17e-8 (0.884)
Chi Square		564.55	806.30	1059.42

B) Examining the Law by the Age Groups for Whom Access is Restricted (Accounting for the control variables used in Table 2)

Access is Restricted for children under age	Accidental Gun Death Rate Per Capita for People Under Age 20	
	Using the Specification in Table 3	Using the Specification in Table 4
under 12	9.16e-7 (0.625)	1.23e-6 (0.508)
under 14	8.88e-7 (1.087)	2.85e-6 (1.916)***
under 16	-7.73e-7 (0.885)	4.97e-7 (0.342)
under 18	5.46e-8 (0.050)	2.39e-6 (1.465)
Chi Square	1354.81	1365.12

Note: All regressions are weighted tobit, where the weighting is each state's population, and use state and year fixed effects. Not reported are the other variables used in Tables 3 and 4.

* The two-tailed t-test is significant at the 1 percent level.

** The two-tailed t-test is significant at the 5 percent level.

*** The two-tailed t-test is significant at the 10 percent level.

Table 6: Creating Separate State Dummy Variables: Using the Specifications Employed in Table 2

Safe Storage Law State Dummies	Accidental Gun Death Rate for those Under 20 Years of Age			
	Under age 5	From ages 5 to 9	From ages 10 to 14	From ages 15 to 19
California	-2.21e-6 (1.030)	4.97e-7 (0.214)	1.01e-6 (0.345)	
Connecticut	-.000091 (0.000)	6.79e-6 (1.470)	-2.39e-6 (0.499)	-1.56e-6 (0.291)
Delaware	4.28e-6 (0.401)	8.06e-6 (0.000)	-.000154 (0.000)	-.000014 (0.554)
Florida	-2.8e-7 (0.120)	-3.18e-6 (1.265)	-4.95e-6 (1.596)	-3.24e-6 (0.866)
Hawaii	-.0000269 (0.000)	-.000067 (0.000)	-.000054 (0.000)	.000021 (1.150)
Iowa	-4.14e-6 (1.038)	3.19e-6 (0.869)	-3.45e-6 (0.800)	
Maryland	-.00009 (0.000)	3.45e-6 (0.779)	-7.74e-6 (1.194)	-1.05e-6 (0.190)
Minnesota	-.000051 (0.000)	5.56e-6 (1.274)	-1.54e-7 (0.032)	
Nevada	-6.42e-7 (0.111)	4.61e-6 (0.723)	-2.51e-6 (0.369)	
New Jersey	-.0000235 (0.000)	7.89e-7 (0.236)	-5.38e-6 (1.339)	3.80e-6 (0.904)
North Carolina	-7.46e-7 (0.282)	3.73e-6 (1.296)	-6.62e-6 (1.830)***	1.14e-6 (0.259)
Rhode Island	7.78e-7 (0.000)	7.06e-6 (0.000)	6.89e-6 (0.000)	-.00013 (0.000)
Texas	4.19e-6 (1.475)	-1.06e-7 (0.035)	5.11e-7 (0.138)	-7.97e-6 (1.760)***
Virginia	-1.85e-6 (0.591)	2.61e-6 (0.906)	7.01e-6 (1.956)**	
Wisconsin	1.55e-6 (0.510)	9.33e-6 (2.847)*	-6.14e-7 (0.160)	
Log Likelihood	5789.49	6510.88	8646.45	9089.55
Chi Square	436.48	470.70	737.00	992.73
Number Positive (Number Significant)	4 (0)	12 (1)	4 (1)	3 (0)
Number Negative (Number Significant)	11 (0)	3 (0)	11 (1)	6 (1)
Binomial function probability that at least this many states have a lower gun accident death rate	.9824	.0176	.9824	.9102

Note: All regressions are weighted tobitts, where the weighting is each state's population, and use state and year fixed effects. Not reported are the 36 demographic variables or the fixed effects.

* The two-tailed t-test is significant at the 1 percent level.

** The two-tailed t-test is significant at the 5 percent level.

*** The two-tailed t-test is significant at the 10 percent level.

Table 7: Examining the Impact of Safe Storage Laws on Suicides (observations = 918)

	Gun Suicide Rate for					
	Children under age 15			15 to 19 year olds		
	1	2	3	4	5	6
Safe Storage Law Dummy (Equals fraction of year that the law is first in effect and 1 thereafter)	-1.74 e-7 (0.403)	-1.84e-7 (0.389)	-7.69e-8 (0.178)	-3.67e-6 (1.195)	-3.83e-6 (1.248)	-3.68e-6 (1.194)
Suicide rate by people in age group committed by means other than guns		.0285 (0.706)	0.0195 (0.477)		0.3598 (0.863)	0.0337 (0.804)
Suicide rate by people over 19 years of age			0.0191 (2.627)**			0.0276 (0.534)
Chi Square	563.71	512.23	570.86	1434.68	1435.43	1435.71

Note: All regressions are weighted tobitts, where the weighting is each state's population, and use state and year fixed effects. Not reported are the 36 demographic variables or the fixed effects.

* The two-tailed t-test is significant at the 1 percent level.

** The two-tailed t-test is significant at the 5 percent level.

*** The two-tailed t-test is significant at the 10 percent level.

Table 8: The Impact of other Gun Control Laws on Suicide: Controlling for the Variables used in specifications 3 and 6 in Table 6 and also now including other gun control laws as well as fixed regional effects by year and state fixed effects (Only new gun control variables and the Safe Storage Law are reported)

	Gun Suicide Rate for	
	Children under age 15	15 to 19 year olds
Safe Storage Law Dummy (Equals fraction of year that the law is first in effect and 1 thereafter)	-1.24e-7 (0.242)	2.0e-6 (0.612)
Right-to-carry Laws-- Change in the crime rate from the difference in the annual Change in crime rates in the years before and after the change in the law (annual rate of change after the law - annual rate of change before the law) F-test in parentheses	-2.59e-7 (4.23)**	-9.4e-7 (0.94)
One gun a month purchase rule (Equals fraction of year that the law is first in effect and 1 thereafter)	3.91e-6 (2.50)**	-6.56e-6 (0.586)
Neighbor's adoption of one gun a month purchase rule (Equals fraction of year that the law is first in effect and 1 thereafter)	1.14e-8 (0.009)	-5.54 (0.647)
Waiting period dummy	-2.91e-6 (1.499)	-0.00011 (0.909)
Length of waiting period in days	5.93e-7 (1.440)	1.41e-6 (0.485)
Length of waiting period in days - squared	-2.48e-8 (1.116)	-1.96e-8 (0.124)
Penalties for using a gun in the commission of a crime	-3.77e-7 (0.813)	-6.81e-6 (1.111)
Chi Square	549.18	1387.50
Number of Observations	867	867

Note: This table uses state-level, violent and property-crime data from the Uniform Crime Report. All regressions are weighted least squares, where the weighting is each state's population, and use state and year fixed effects. Not reported are the 36 demographic variables or the fixed effects.

* The two-tailed t-test is significant at the 1 percent level.

** The two-tailed t-test is significant at the 5 percent level.

*** The two-tailed t-test is significant at the 10 percent level.

Table 9: Examining the Different Age Limit For Which the Safe Storage Law Applies on Suicides

A) The Age Limit's Impact on the Suicide Rate for Different Age Groups

	Percent change in various gun suicide rates for changes in explanatory variables		Percent change in various total suicide rates for changes in explanatory variables	
	Children under age 15	15 to 19 year olds	Children under age 15	15 to 19 year olds
	1	2	3	4
1) Using the specifications 3 and 6 shown in Table 7				
Age at which Safe Storage Law does not restrict access	-8.26e-10 (0.032)	-3.74e-7 (2.039)**	-1.50e-8 (0.465)	2.66e-8 (0.113)
Chi Square	521.10	1380.20	504.77	1240.78
2) Using the specification shown in Table 8				
Age at which Safe Storage Law does not restrict access	-2.99e-9 (0.098)	-1.15e-7 (0.531)	-2.12e-8 (0.562)	2.33e-7 (0.855)
Chi Square	549.13	1387.41	487.34	1209.74

B) Examining the Law by the Age Groups for Whom Access is Restricted

Access is Restricted for children under age	Gun Suicide Rate for People Under Age 20		Total Suicide Rate for People Under Age 20	
	Using the Specification in Table 7	Using the Specification in Table 8	Using the Specification in Table 7	Using the Specification in Table 8
	1	2	3	4
under 12	6.44e-7 (0.304)	7.89e-7 (0.226)	3.59e-6 (1.290)	6.47e-6 (1.479)
under 14	-4.35e-6 (3.686)*	-8.40e-6 (3.956)*	-5.12e-6 (3.292)*	-4.33e-6 (2.642)*
under 16	-1.11e-6 (0.906)	-3.19e-6 (1.563)	1.22e-6 (0.759)	2.41e-6 (1.288)
under 18	1.13e-6 (0.718)	-3.32e-6 (1.432)	3.88e-6 (1.888)*	8.24e-6 (2.539)**
Chi Square	1425.36	1439.76	1241.12	1188.6

Note: All regressions are tobits, where the weighting is each state's population, and use state and year fixed effects. Not reported are the other variables used in Tables 7 and 8.

* The two-tailed t-test is significant at the 1 percent level.

** The two-tailed t-test is significant at the 5 percent level.

*** The two-tailed t-test is significant at the 10 percent level.

Table 10: Creating Separate State Dummy Variables: Using the Specifications Employed in Table 7

Safe Storage Law State Dummies	Gun Suicide Death Rate		Total Suicide Death Rate	
	1	2	3	4
	Under Age 15	From ages 15 to 19	Under Age 15	From ages 15 to 19
California	-4.07e-6 (0.445)		-6.82e-7 (0.585)	
Connecticut	-4.17e-7 (0.287)	5.80e-6 (0.593)	2.41e-6 (1.366)	8.26e-6 (0.655)
Delaware	3.65e-6 (0.976)	-.000016 (0.592)	7.64e-7 (0.159)	-1.8e-5 (0.313)
Florida	-1.06e-6 (1.079)	3.66e-6 (0.521)	-1.78e-6 (1.424)	1.05e-5 (1.163)
Hawaii	6.22e-6 (1.151)	-.000034 (0.999)	1.08e-5 (1.703)***	3.43e-6 (0.079)
Iowa	-1.30e-6 (0.994)		-2.51e-6 (1.497)	
Maryland	5.14e-7 (0.361)	-.0000134 (1.315)	-4.16e-8 (0.023)	-6.32e-6 (0.479)
Minnesota	-1.06e-6 (0.695)		-2.37 e-6 (1.219)	
Nevada	-1.33e-6 (0.615)		-1.65e-6 (0.598)	
New Jersey	1.20e-7 (0.097)	5.87e-6 (0.751)	3.72e-8 (0.027)	1.32 e-5 (1.308)
North Carolina	8.10e-7 (0.689)	.0000242 (2.932)*	3.00e-7 (0.204)	3.6e-5 (3.382)*
Rhode Island	-.0000394 (0.000)	-9.19e-6 (0.298)	-6.71e-5 (0.000)	7.08e-6 (0.179)
Texas	-5.31e-7 (0.456)	-8.96e-6 (0.107)	1.95e-7 (0.131)	4.76e-6 (0.439)
Virginia	2.07e-6 (1.822)***		3.41e-6 (2.357)**	
Wisconsin	-1.95e-7 (0.164)		-3.11e-7 (0.204)	
Log Likelihood	9656.18	8966.55	10270.29	8760.92
Chi Square	530.81	1388.02	525.11	1254.72
Number Positive (Number Significant)	6 (1)	4 (1)	7 (2)	7 (1)
Number Negative (Number Significant)	9 (0)	5 (0)	8 (0)	2 (0)
Binomial function probability that at least this many states have reduced suicide rates	.8491	.7461	.6964	.0898

* The two-tailed t-test is significant at the 1 percent level.

** The two-tailed t-test is significant at the 5 percent level.

*** The two-tailed t-test is significant at the 10 percent level.

Note: This table uses state-level, violent and property-crime data from the FBI Uniform Crime Reports. All regressions are weighted least squares, where the weighting is each state's population, and use state and year fixed effects. Not reported are the 36 demographic variables or the fixed effects. All crime rates are in natural logs.

* The two-tailed t-test is significant at the 1 percent level.

** The two-tailed t-test is significant at the 5 percent level.

*** The two-tailed t-test is significant at the 10 percent level.

Note: This table uses state-level, violent and property-crime data from the Uniform Crime Report. All regressions are weighted least squares, where the weighting is each state's population, and use state and year fixed effects. Not reported are the 36 demographic variables or the fixed effects. All crime rates are in natural logs.

* The two-tailed t-test is significant at the 1 percent level.

** The two-tailed t-test is significant at the 5 percent level.

*** The two-tailed t-test is significant at the 10 percent level.

Table 13: Examining the Age Limit For Which the Safe Storage Law Applies

	Natural Log of the Crime Rate								
	Violent Crime	Murder	Rape	Robbery	Aggravated Assault	Property Crime	Burglary	Larceny	Auto Theft
1) Using the specification shown in Table 11									
Age at which Safe Storage Law does not restrict access	0.00048 (0.298)	.0027 (1.226)	0.0059 (3.896)*	0.0066 (3.008)*	-.0027 (1.317)	0.0022 (1.999)**	0.0042 (3.075)*	0.0021 (1.896)***	-.00016 (0.085)
Adjusted R ²	.9439	.9235	.9024	.9438	.9333	.8993	.9100	.8991	.9228
2) Using the specification shown in Table 12									
Age at which Safe Storage Law does not restrict access	-.00026 (0.154)	0.0023 (1.023)	0.0055 (3.349)*	.0075 (3.347)*	-.0041 (2.090)**	.0020 (1.725)***	.00478 (3.483)*	0.0015 (1.317)	0.0000899 (0.047)
Adjusted R ²	.9491	.9295	.9068	.9514	.9357	.9097	.9242	.9079	.9341

B) Examining the Law by the Age Groups for Whom Access is Restricted: Using the specification shown in Table 12

Access is Restricted for children under age	Crime Rate								
	Violent Crime	Murder	Rape	Robbery	Aggravated Assault	Property Crime	Burglary	Larceny	Auto Theft
under 12	-.044 (0.653)	-.015 (0.181)	.0622 (0.982)	0.044 (0.481)	-.0599 (0.803)	-.025 (0.547)	-.062 (1.099)	-.036 (0.787)	-.003 (0.033)
under 14	0.032 (0.835)	0.17 (3.747)*	0.085 (2.391)**	0.227 (4.476)*	-.047 (1.126)	0.044 (1.702)	0.10 (3.179)*	0.013 (0.523)	0.1297 (2.982)*
under 16	-.0031 (0.079)	-.068 (1.420)	0.122 (3.242)*	-.012 (0.228)	-.074 (1.681)***	0.046 (1.699)***	0.075 (2.262)**	0.056 (2.121)**	-.045 (0.993)
under 18	0.0043 (0.087)	-.053 (0.882)	0.072 (1.529)	0.105 (1.569)	0.0099 (0.182)	0.024 (0.690)	0.04 (0.978)***	0.044 (1.330)	-.123 (2.145)**
Adjusted R ²	.9438	.9200	.9022	.9445	.9332	.8992	.9104	.8991	.9239

Note: All regressions are weighted least squares, where the weighting is each state's population, and use state and year fixed effects. Not reported are the other variables used in Tables 11 and 12. All crime rates are in natural logs.

* The two-tailed t-test is significant at the 1 percent level.

** The two-tailed t-test is significant at the 5 percent level.

*** The two-tailed t-test is significant at the 10 percent level.

Table 14: Creating Separate State Dummy Variables to Study the Differential Impacts on Crime: Using the Specifications Employed in Table 11

Safe Storage Law State Dummies	Natural Log of the Crime Rate								
	Violent Crime	Murder	Rape	Robbery	Aggravated Assault	Property Crime	Burglary	Larceny	Auto Theft
California	.066 (1.137)	0.190 (2.829)*	0.06 (1.118)	0.242 (3.138)*	-.026 (0.410)	0.122 (3.146)*	0.193 (4.046)*	0.103 (2.729)*	0.193 (4.046)*
Connecticut	0.069 (0.783)	0.333 (3.287)*	0.117 (1.440)	0.151 (1.294)	0.096 (0.987)	0.234 (3.976)*	0.2496 (3.454)*	0.214 (3.728)	0.2496 (3.454)*
Delaware	0.22 (0.906)	-.177 (0.989)	0.41 (1.837)***	0.069 (0.213)	0.13 (0.492)	-.132 (0.809)	-.1495 (0.749)	-.161 (1.015)	-.1495 (0.749)
Florida	-.112 (1.728)***	-.191 (5.143)*	0.08 (1.319)	-.23 (2.692)*	-.11 (1.586)	-.083 (1.902)***	-.074 (1.368)	-.055 (1.279)	-.274 (3.744)*
Hawaii	0.116 (1.646)*	0.309 (0.854)	0.356 (1.219)	0.299 (1.683)***	-.5995 (1.735)***	0.545 (2.592)*	0.426 (1.657)***	0.524 (2.557)**	0.426 (1.657)***
Iowa	-.002 (0.026)	-.18 (1.770)***	-.003 (0.004)	-.021 (0.173)	0.037 (0.372)	-.167 (2.787)*	-.0683 (0.927)	-.22 (3.749)*	-.182 (1.819)***
Maryland	0.159 (1.708)***	0.32 (2.998)*	0.213 (4.749)*	0.101 (0.837)	-.052 (0.516)	0.148 (2.394)**	0.079 (1.040)	0.17 (2.833)*	0.079 (1.040)
Minnesota	-.003 (0.028)	0.396 (3.472)*	0.48 (5.261)*	0.298 (2.270)**	-.114 (1.048)	0.0686 (1.033)	0.091 (1.119)	0.04 (0.629)	0.091 (1.119)
Nevada	0.152 (1.109)	0.196 (1.850)***	0.021 (0.161)	0.069 (0.374)	0.231 (1.506)	0.12 (1.293)	0.115 (1.006)	0.089 (0.989)	0.115 (1.006)
New Jersey	-.044 (0.627)	-.071 (0.861)	0.043 (0.642)	-.049 (0.518)	-.115 (1.467)	0.004 (0.080)	0.063 (1.082)	0.011 (0.242)	0.063 (1.082)
North Carolina	0.029 (0.386)	0.094 (1.095)	0.092 (1.330)	0.281 (2.842)*	-.055 (0.667)	0.111 (2.222)**	0.185 (3.025)*	0.106 (2.186)**	0.185 (3.025)
Rhode Island	-.185 (0.670)	-.41 (1.257)	0.120 (0.464)	-.33 (0.892)	-.16 (0.511)	-.22 (1.171)	-.171 (0.740)	-.1738 (0.952)	-.17 (0.740)
Texas	-.099 (1.311)	-.129 (1.185)	-.003 (0.049)	0.21 (2.054)**	0.11 (1.272)	-.101 (2.002)**	-.171 (2.747)	-.04 (0.810)	-.171 (2.747)*
Virginia	-.039 (0.541)	-.014 (0.168)	0.08 (1.186)	0.043 (0.443)	-.052 (0.645)	-.033 (0.673)	-.07 (1.242)	-.047 (0.990)	-.075 (1.242)
Wisconsin	0.028 (0.359)	0.265 (2.930)*	0.037 (0.515)	0.261 (4.475)*	-.175 (2.030)**	0.038 (0.720)	0.072 (1.118)	-.026 (0.513)	0.072 (1.118)
Adjusted R ²	.9440	.9266	.9058	.9462	.9335	.9044	.9133	.9040	.9293
F-test	17.85	10.11	21.86	17.45	24.74	16.83	29.18	17.32	24.70
Number Positive (Number Significant)	8 (2)	8 (6)	14 (3)	11 (6)	5 (0)	10 (5)	9 (4)	8 (4)	9 (3)
Number Negative (Number Significant)	7 (1)	7 (2)	1 (0)	4 (1)	10 (2)	5 (3)	6 (0)	7 (1)	6 (3)
Binomial function estimate that no more than this many states have an reduced crime rate	.5	.5	.0005	.0592	.9408	.1509	.3036	.5	.3036

* The two-tailed t-test is significant at the 1 percent level.

** The two-tailed t-test is significant at the 5 percent level.

*** The two-tailed t-test is significant at the 10 percent level.

Table 15: The Costs of Safe Storage Laws in Terms of Higher Crime Rates (Using quadratic before-and-after trends and the control variables used in Table 11)

Change in the Number of Crimes by Year After the Adoption of the Safe Storage Law

Year After Passage	Murder	Rape	Robbery	Aggravated Assault	Burglary	Larceny	Auto Theft
1	168	1856	16037	7118	58125	14326	28532
2	287	3313	26488	15319	101123	23441	51134
3	358	4326	30758	24565	127850	27313	67369
4	380	4869	28807	34821	137980	25946	77075
5	355	4932	21152	46050	132023	19384	80373

Reduction in Victim Costs in 1998 dollars: Using the National Institute of Justice's Estimates

Year After Passage	Murder	Rape	Robbery	Aggravated Assault	Burglary	Larceny	Auto Theft	Total
1	\$579 Million	\$192 Million	\$153 Million	\$192 Million	\$92 Million	\$6.3 Million	\$12.6 Million	\$1.228 Billion
2	\$994 Million	\$343 Million	\$253 Million	\$412 Million	\$160 Million	\$10.4 Million	\$22.6 Million	\$2.196 Billion
3	\$1.238 Billion	\$447 Million	\$294 Million	\$661 Million	\$202 Million	\$12 Million	\$29.8 Million	\$2.885 Billion
4	\$1.314 Billion	\$504 Million	\$276 Million	\$937 Million	\$219 Million	\$11.5 Million	\$34 Million	\$3.294 Billion
5	\$1.228 Billion	\$510 Million	\$202 Million	\$1.24 Billion	\$209 Million	\$8.6 Million	\$35.5 Million	\$3.434 Billion
							Average	\$2.6 Billion

Table 16: Summary Statistics for Police Foundation

Variable	Obs	Mean	Std. Dev.	Min	Max
gun stored loaded and unlocked	2562	.2177986	.4128303	0	1
Safe Storage Law Number of Years	2568	.31581	.4649282	0	1
Safe Storage Law In Effect	2568	.9854945	1.543711	0	5.083333
arrested	2495	.0669339	.2499575	0	1
Race					
Black	2568	.1674455	.3734458	0	1
Hispanic	2568	.1584891	.3652701	0	1
Asian	2568	.0101246	.10013	0	1
American Indian	2568	.0136293	.1159688	0	1
Don't Know	2568	.0077882	.0879234	0	1
Refused	2568	.0093458	.0962396	0	1
How safe do you feel at Home Alone					
Somewhat safe	2568	.2698598	.4439733	0	1
Safe	2568	.0673676	.2507064	0	1
Very safe	2568	.0272586	.1628676	0	1
Don't Know	2568	.0035047	.059108	0	1
Refused	2568	.0035047	.059108	0	1
Used a gun for self defense					
No	2513	.9295663	.2559275	0	1
Refused to answer	2513	.0015917	.0398726	0	1
Training in how to use a gun					
No	2568	.4283489	.4949359	0	1
Don't Know	2568	.0003894	.0197334	0	1
Refused to Answer	2568	.0003894	.0197334	0	1
Age					
Age	2516	43.16415	16.39438	18	95
Age Squared	2516	2131.813	1612.765	324	9025
Age Cubed	2516	117979.2	133272.5	5832	857375

Place where you live

Farm	2568	.0541277	.2263136	0	1
small city	2568	.3025701	.4594602	0	1
medium city	2568	.1639408	.370294	0	1
suburb	2568	.1242212	.329898	0	1
Large city	2568	.220405	.4146005	0	1
Don't know	2568	.0073988	.0857139	0	1
Refused to Answer	2568	.0077882	.0879234	0	1
Employment Status					
part-time	2568	.097352	.2964943	0	1
homemaker	2568	.1055296	.3072944	0	1
student	2568	.0408879	.198069	0	1
retired	2568	.1577103	.3645401	0	1
unemployed	2568	.0330997	.1789317	0	1
other	2568	.0023364	.0482897	0	1
undocument code	2568	.010514	.1020173	0	1
Marital Status					
widow	2568	.0689252	.2533763	0	1
divorced	2568	.1066978	.3087888	0	1
separated	2568	.0346573	.182946	0	1
never	2568	.1974299	.398137	0	1
Refused to Answer	2568	.0132399	.1143227	0	1
Education					
Some High School	2568	.1323988	.3389898	0	1
High School Grad	2568	.3341121	.471771	0	1
Some College	2568	.2846573	.451339	0	1
BA	2568	.1133178	.3170426	0	1
Some Graduate	2568	.0272586	.1628676	0	1
Graduate Degree	2568	.0872274	.282223	0	1
Refused to Answer	2568	.0140187	.1175906	0	1
Political views					
Extremely liberal	2568	.1514798	.3585857	0	1
liberal	2568	.0708723	.2566613	0	1
slightly liberal	2568	.2718069	.4449775	0	1
moderate	2568	.1222741	.327666	0	1
slightly conserv	2568	.232866	.4227399	0	1
conservative	2568	.0393302	.1944173	0	1
extremely conserv	2568	.0607477	.2389134	0	1
don't know	2568	.0307632	.1727092	0	1
Military					
Currently in	2568	.0525701	.2232171	0	1

no		2568	.7838785	.4116783	0	1
Refused to Answer		2568	.0155763	.1238534	0	1
children		2568	.472352	.4993322	0	1
Number of Times Going to Religious Service						
Few times a month		2568	.1312305	.3377181	0	1
few times a year		2568	.123053	.328562	0	1
once a year		2568	.0206386	.142199	0	1
once in a while		2568	.0712617	.2573116	0	1
not attend		2568	.194704	.3960498	0	1
undoc code		2568	.0260903	.1594351	0	1
Religious preference						
Catholic		2568	.2807632	.4494596	0	1
Jewish		2568	.010514	.1020173	0	1
Other		2568	.1892523	.3917852	0	1
None		2568	.0669782	.2500329	0	1
Refused to Answer		2568	.029595	.1695003	0	1
Family Income						
< 10,000		2568	.0607477	.2389134	0	1
< 15,000		2568	.0681464	.2520461	0	1
< 20,000		2568	.0961838	.2949006	0	1
< 30,000		2568	.1487539	.355915	0	1
< 50,000		2568	.2254673	.4179711	0	1
< 75,000		2568	.1214953	.3267657	0	1
> 75,000		2568	.0778816	.2680374	0	1
Survey person thinks that defensive gun use invented						
No		2568	.2702492	.444175	0	1
Not report		2568	.7239097	.4471491	0	1
Sex (Male =1)		2568	1.538162	.4986386	1	2

Table 17: Logit Estimates Examining the impact of safe storage laws on the rate at which guns are stored unlocked and loaded

Variable	Coefficient	t-statistic
Dummy for Safe Storage Law	.691453	2.340
Number of Years Safe Storage Law in effect	-.1248134	-1.646
Dummy for arrest record	.0535852	0.237
Race		
Black	-.5032711	-2.350
Hispanic	-1.128787	-4.170
Asian	.3114991	0.561
American Indian	-.5929703	-1.058
Don't Know	-.8001269	-0.951
Refused	-.6957485	-0.937
How safe do you feel at Home Alone		
somewhat safe	.117646	0.763
safe	-.6006354	-1.756
very safe	-.1325624	-0.261
don't know	.3288089	0.258
refused	1.741625	1.419
Self defense use of gun (no=1)	-.2044738	-2.882
Training in how to use a gun	-1.382093	-8.291
Age	.0545009	0.543
Age squared	-.0001969	-0.093
Age cubed	-4.72e-06	-0.339
Place where you live		
farm	.2312606	0.797
small city	-.3085388	-1.571
medium city	-.7650141	-3.236
suburb	-.8984886	-3.626
large city	-.7206177	-3.097
undocumented code	-.5520472	-0.475
Employed		
part-time	-.251827	-0.960
homemaker	-.3527456	-1.105
student	-1.82566	-3.303

retired	.1099978	0.435
unemployed	-.6172964	-1.510
other	-.5695925	-0.425
undocumented	-.7331526	-0.478
marital status		
widow	-.1235675	-0.361
divorced	.0140073	0.067
separated	-.1629457	-0.366
never	.1540855	0.713
undocumented	.3908575	0.330
Education		
some high school	18.05618	9.447
high school graduate	17.7663	9.308
some college	17.7737	9.239
BA	17.56027	9.111
some graduate	17.36058	8.852
graduate degree	17.64871	9.146
undocumented	18.6759	5.254
Political Views		
liberal	.4187635	0.807
slightly liberal	.5049957	0.938
moderate	.5773175	1.148
slightly conservative	.8902465	1.713
conservative	.6314561	1.245
extremely conservative	.5060078	0.874
don't know	.0409019	0.068
undocumented	.6950846	0.954
Veteran		
Current member of military	-.2249301	-0.669
never in military	.4224406	2.330
children under age 3	-.0391783	-0.254
# of Times going to religious services		
few times a month	.0451864	0.224
few times a year	-.0298277	-0.148
once a year	.344869	0.874
once in a while	-.0152767	-0.061
not attend	.1853004	1.016
undoc code	-.2058192	-0.250

Religious preference		
Catholic	.120564	0.717
Jewish	-.9308658	-1.309
Other	-.3180818	-1.736
None	-.1931213	-0.723
undoc code	-.3083093	-0.364
Family Income		
<\$5,000	-.0358889	-0.072
<\$10,000	-.3808279	-0.761
<\$15,000	.4312357	0.992
<\$20,000	.4882521	1.155
<\$30,000	.6239122	1.495
<\$50,000	.5899838	1.350
<\$75,000	.6523913	1.424
>\$75,000	-.4246258	-0.762
don't know	-.4026066	-0.712
Undocumented	-.0103993	-0.022
Survey person thinks that defensive gun use invented		
no	.9245655	1.039
not reported	1.026805	1.154
Female	-2.057465	-12.233
constant	-18.54507	
Number of obs =	2394	
chi2(123)	= 781.03	
Prob > chi2	= 0.0000	
Pseudo R2	= 0.3098	
Log Likelihood	= -870.039	

Appendix: The Descriptive Statistics for Endogenous Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Accidental Gun					
Death Rate for					
Ages					
Under 5	918	2.62e-06	5.01e-06	0	.0000455
5 to 9	918	4.21e-06	7.31e-06	0	.0000604
10 to 14	918	.000011	.0000123	0	.0000875
15 to 19	918	.0000182	.0000211	0	.000208
Non-gun Accidental					
Death Rate for					
Ages					
Under 5	918	.0001995	.0000788	-1.10e-12	.0005212
5 to 9	918	.0001164	.0000483	0	.0003763
10 to 14	918	.0001229	.0000484	0	.0003382
15 to 19	918	.0004679	.0001598	.0000347	.0012447
Suicide Rates for					
those Under Age 15					
by gun	918	3.38e-06	3.47e-06	0	.0000285
by other					
method	918	2.48e-06	2.83e-06	0	.0000242
total	918	5.86e-06	4.75e-06	0	.0000449
Suicide Rates for					
those between 15 and 19					
by gun	918	.0000763	.0000426	0	.0003402
by other					
method	918	.00004	.0000232	0	.0001844
total	918	.0001162	.0000527	0	.000431
Natural Log of					
Crime Rates					
Violent	1010	5.9692	.7013274	2.68	7.979955
Murder	1017	1.749346	.7675413	-2.3	4.39
Rape	1010	3.412765	.4988437	0	4.9
Robbery	1017	4.658273	.9991612	1.17	7.4
Aggravated					

Assault	1017	5.450054	.6910092	2	7.350902
Property	1017	8.346207	.3342765	6.4	10.02
Burglary	1017	6.961164	.4242595	4.65	9.8
Larceny	1017	7.922934	.3196749	6.08	8.81
Auto Theft	1017	5.846315	.6062313	3.28	7.517467

Accidental Deaths Per Child Under Age 15

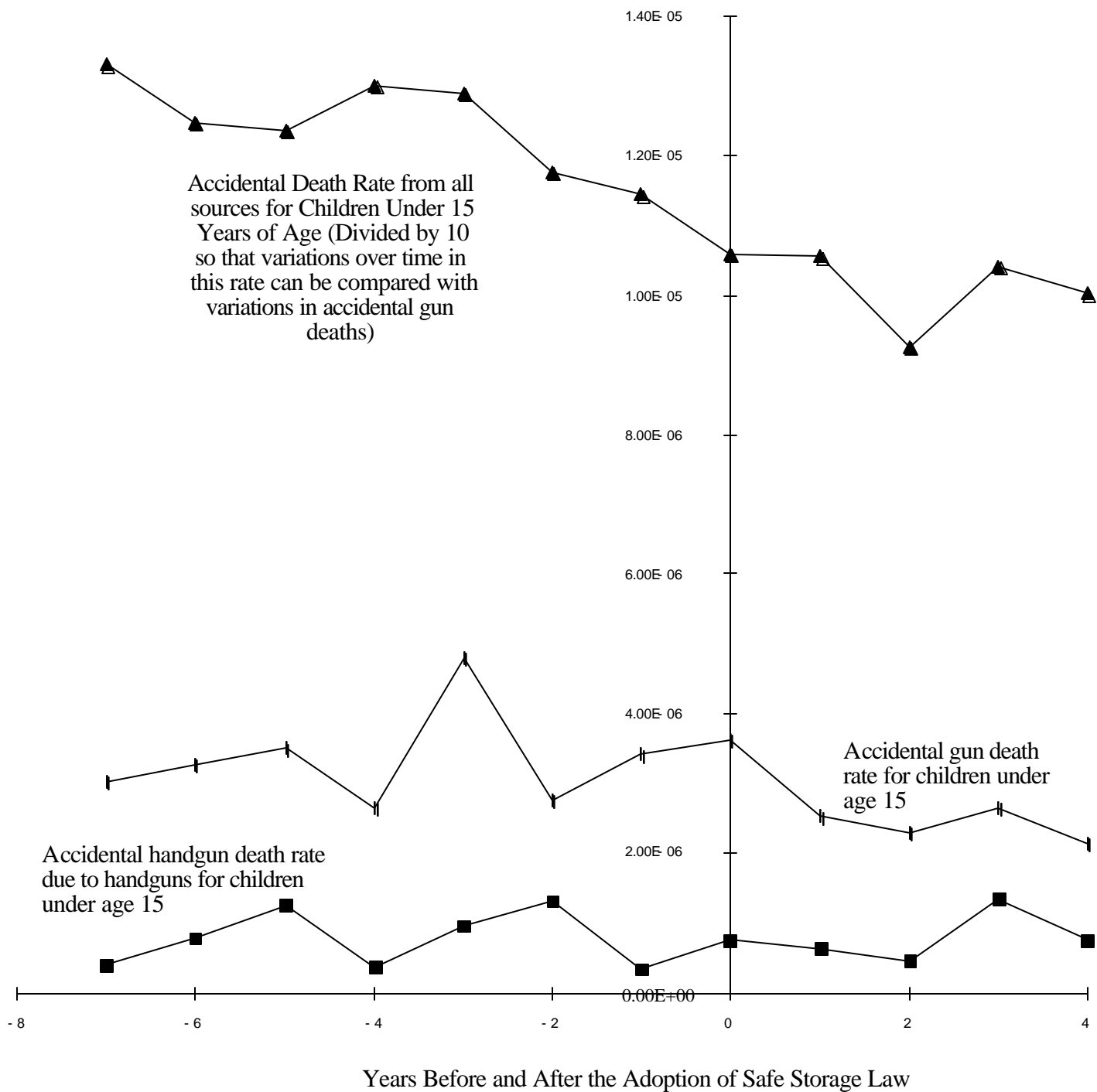


Figure 1: Accidental Death Rate for States that Adopted Safe Storage Law

Accidental Deaths Per Capita

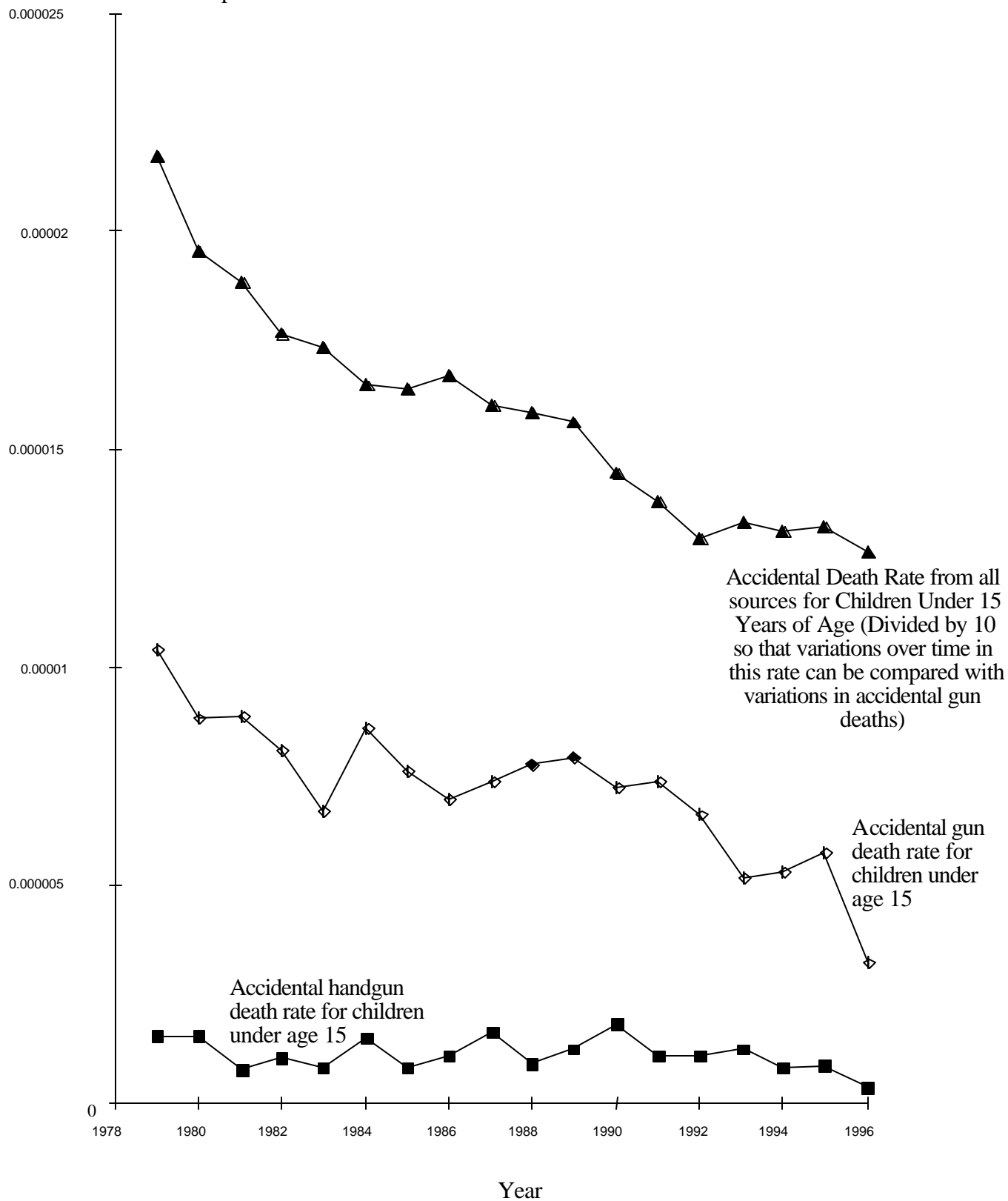


Figure 2: Accidental Death Rates for States that Adopt Safe Storage Laws

Suicides Per Capita for Children Under Age 15

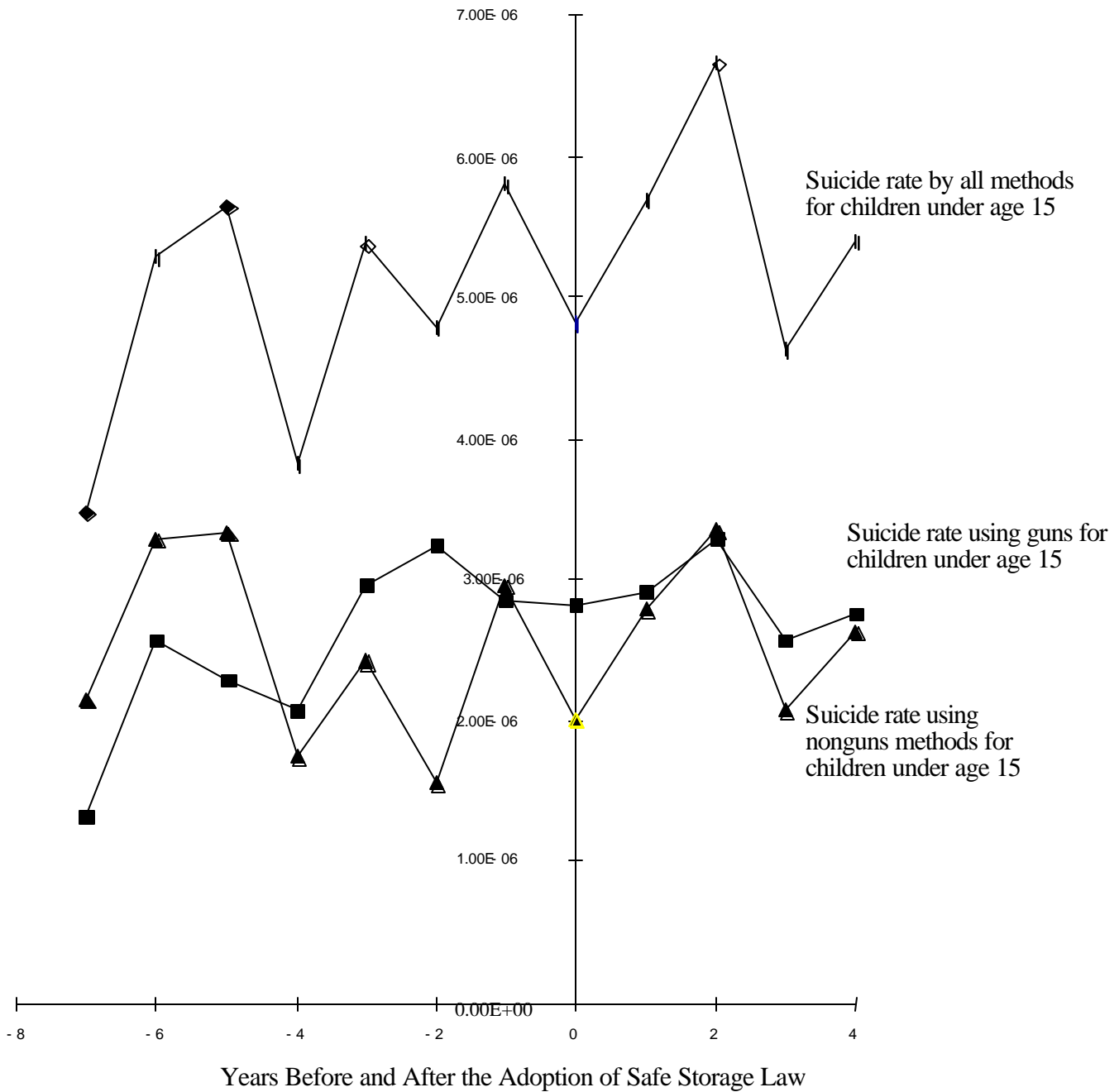


Figure 3: Suicide Rates for States that Adopted Safe Storage Laws

Suicide Rate for Children Under Age 15

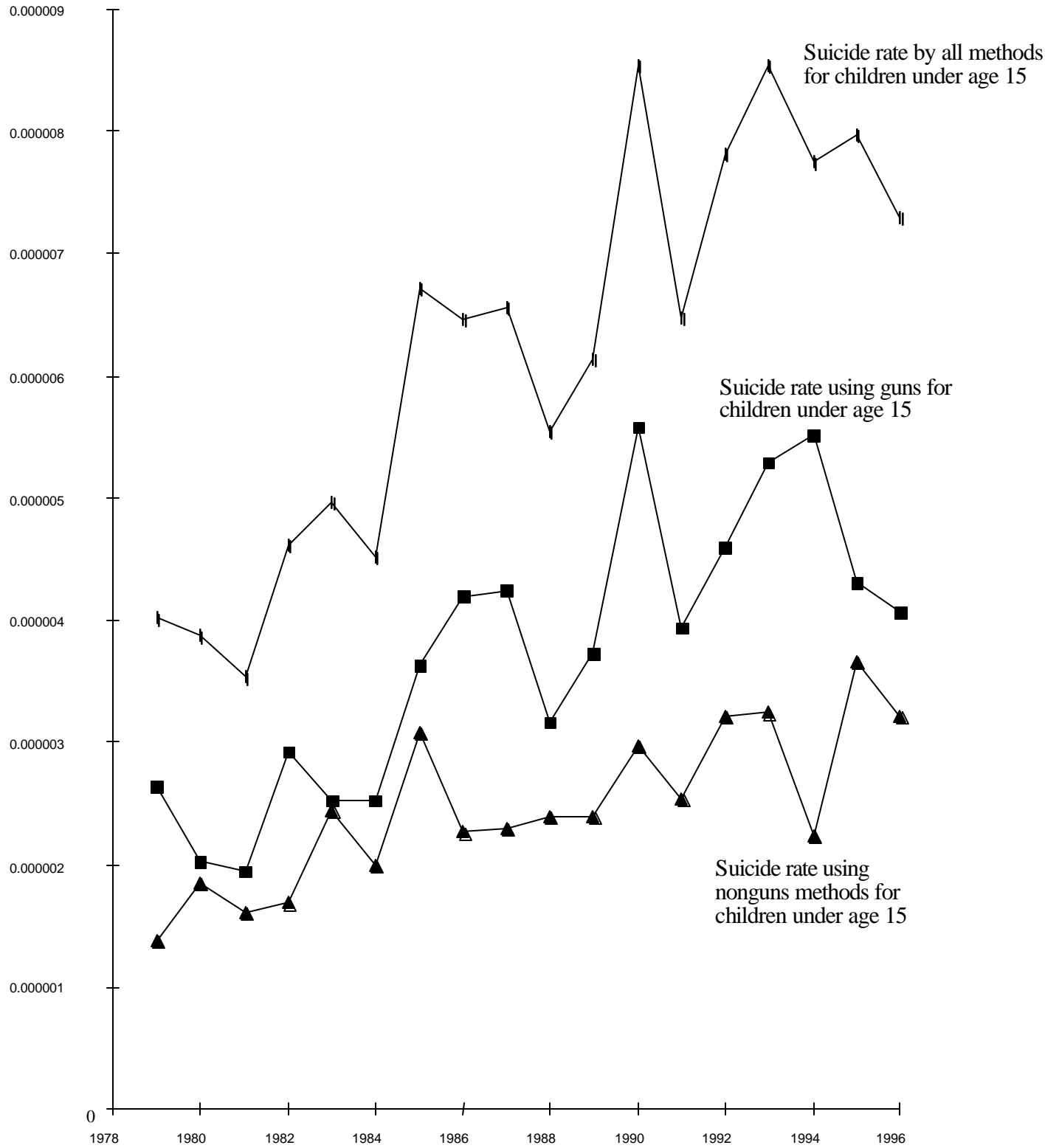


Figure 4: Suicide Rates for States that did not Adopt Safe Storage Laws

Violent Crimes per 100,000 People

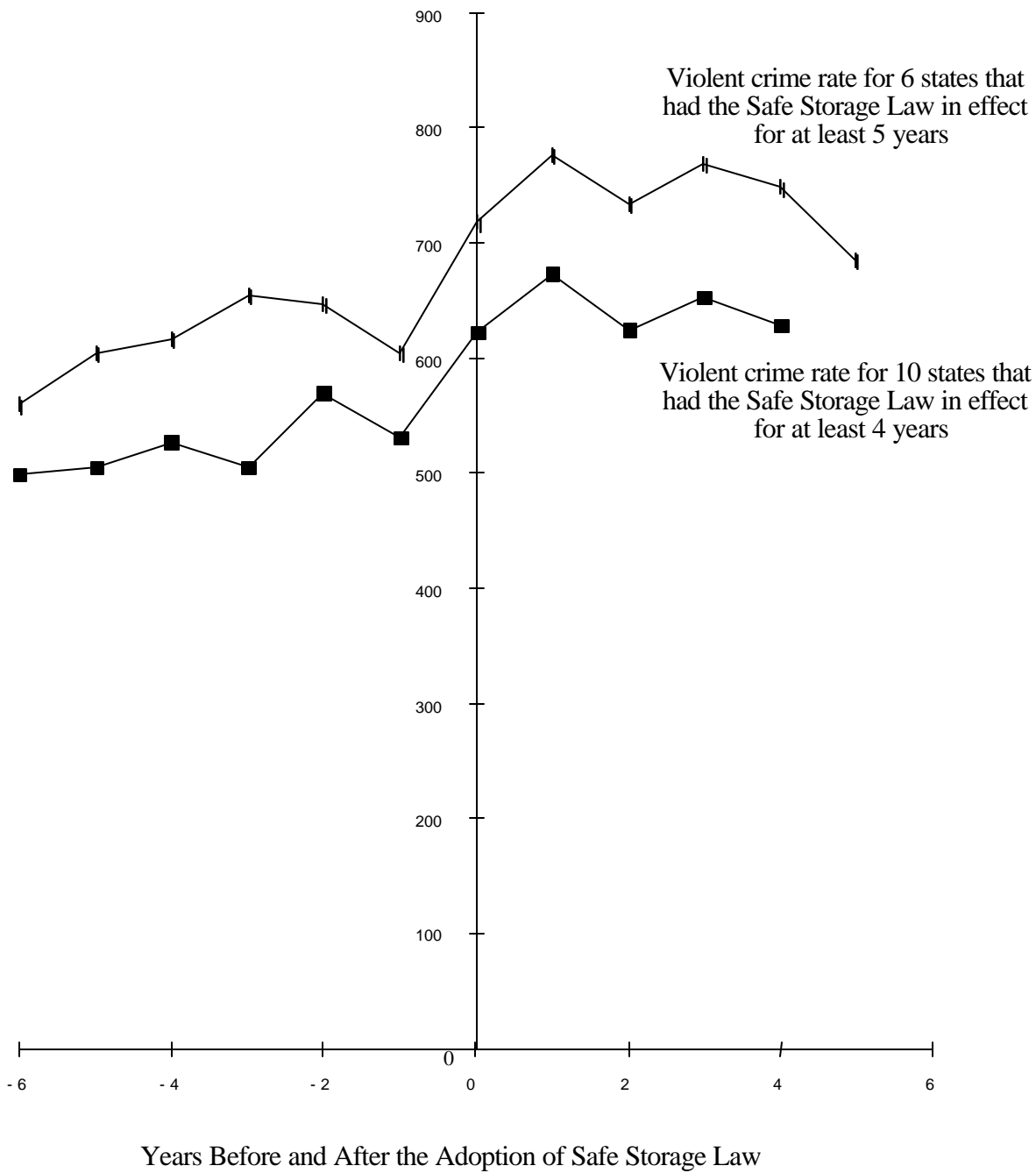


Figure 5: Violent Crime Rates for those states that Adopted Safe Storage Laws

Violent Crimes per 100,000 People

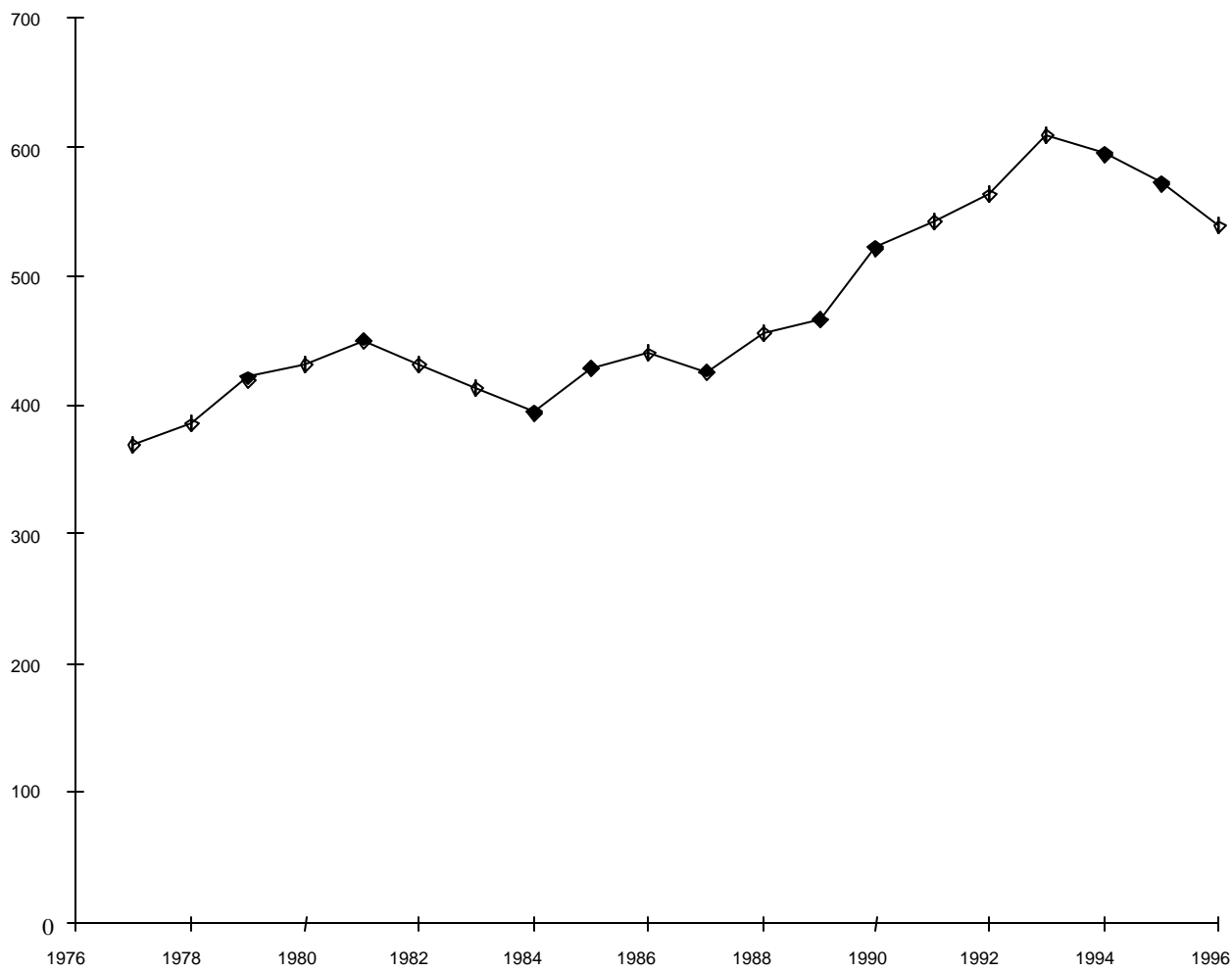


Figure 6: Violent Crime Rate for States that did not Adopt Safe Storage Laws

Figure 7: Gun Suicides for People Under Age 20: Comparing the Change After the Adoption of a Safe Storage Law with the Pre-existing Trend

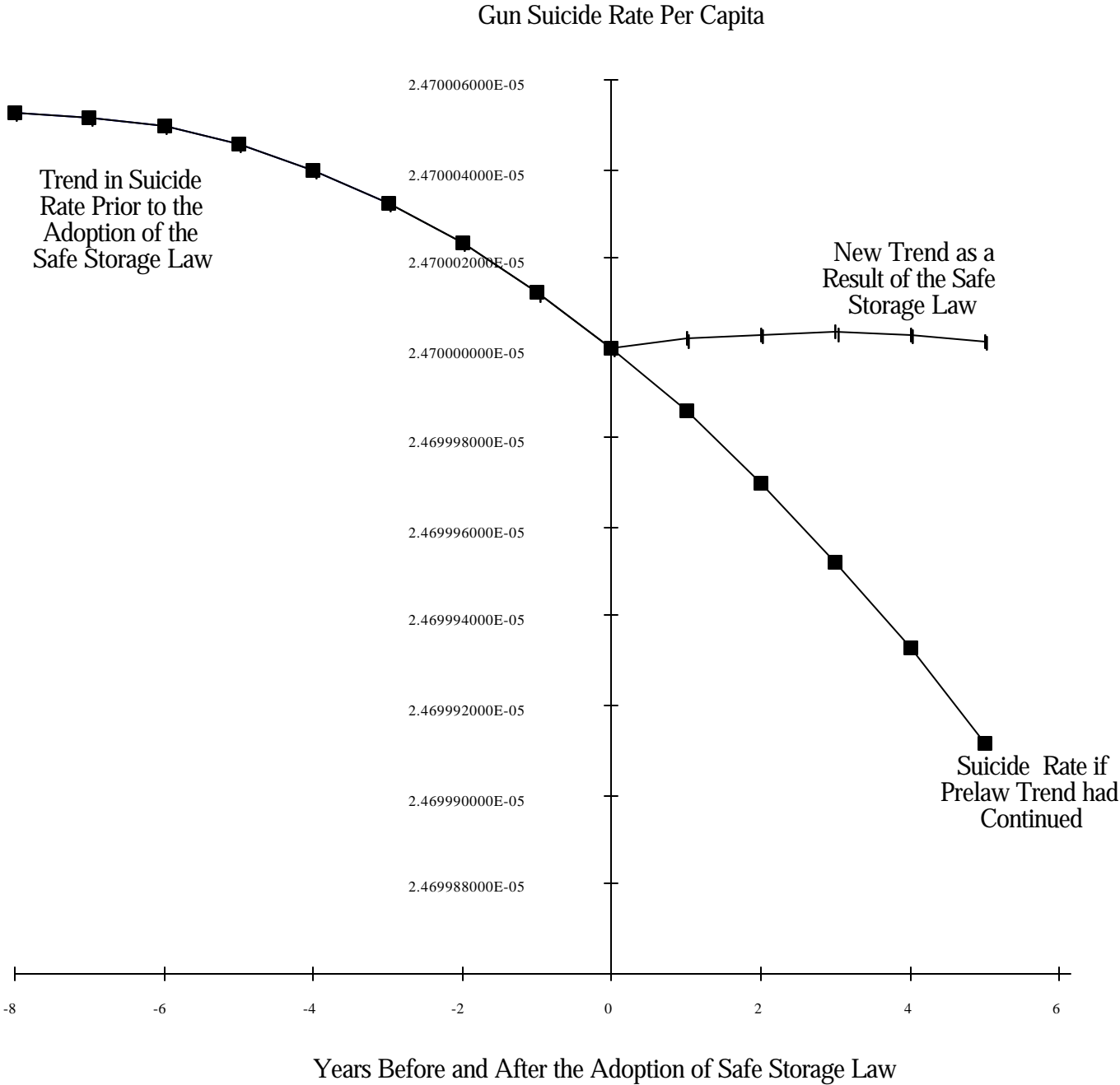


Figure 8: Violent Crime: Comparing the Change After the Adoption of a Safe Storage Law the Pre-existing Trend

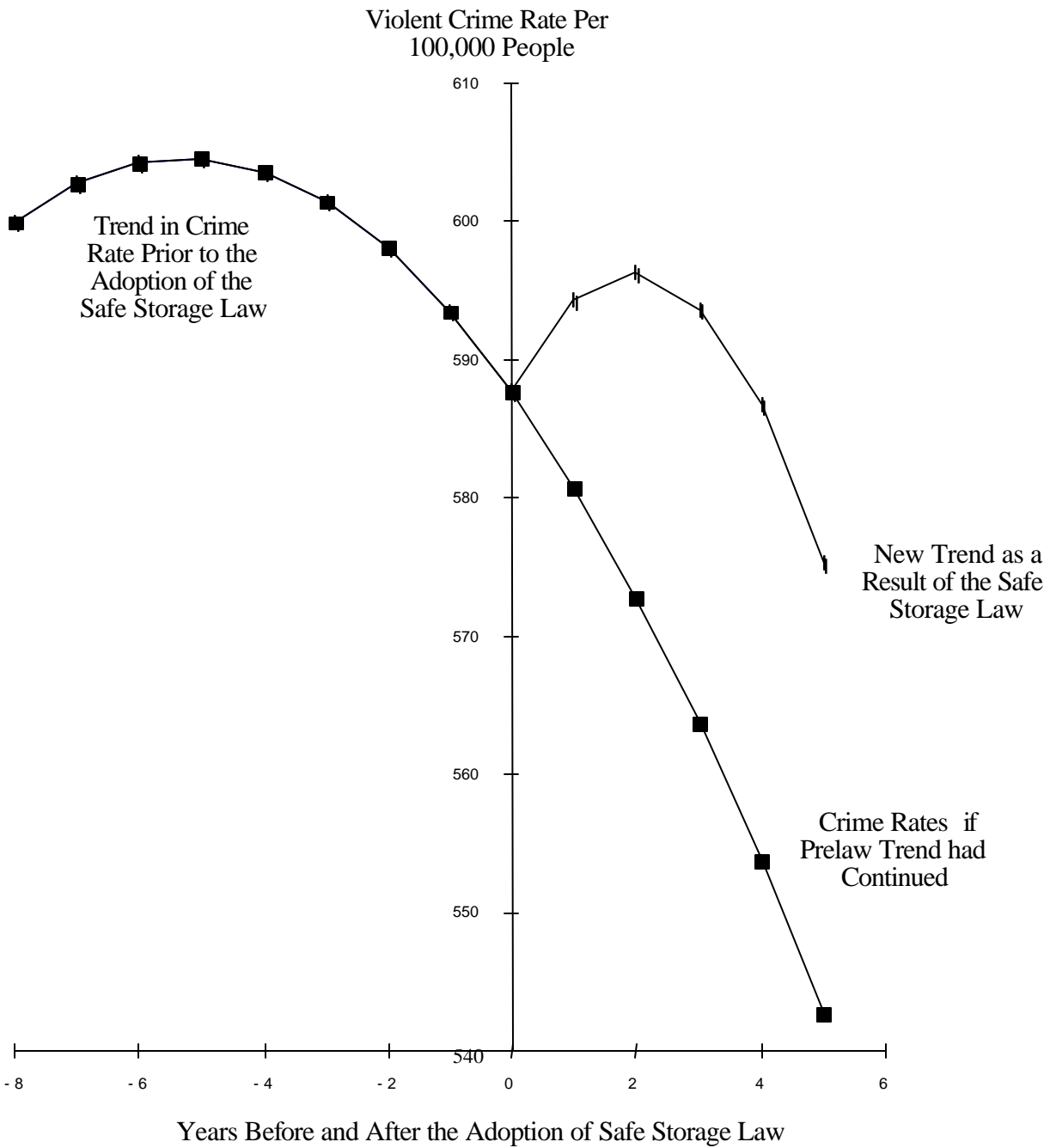


Figure 9: Murder Rate : Comparing the Change After the Adoption of a Safe Storage Law with the Pre-existing Trend

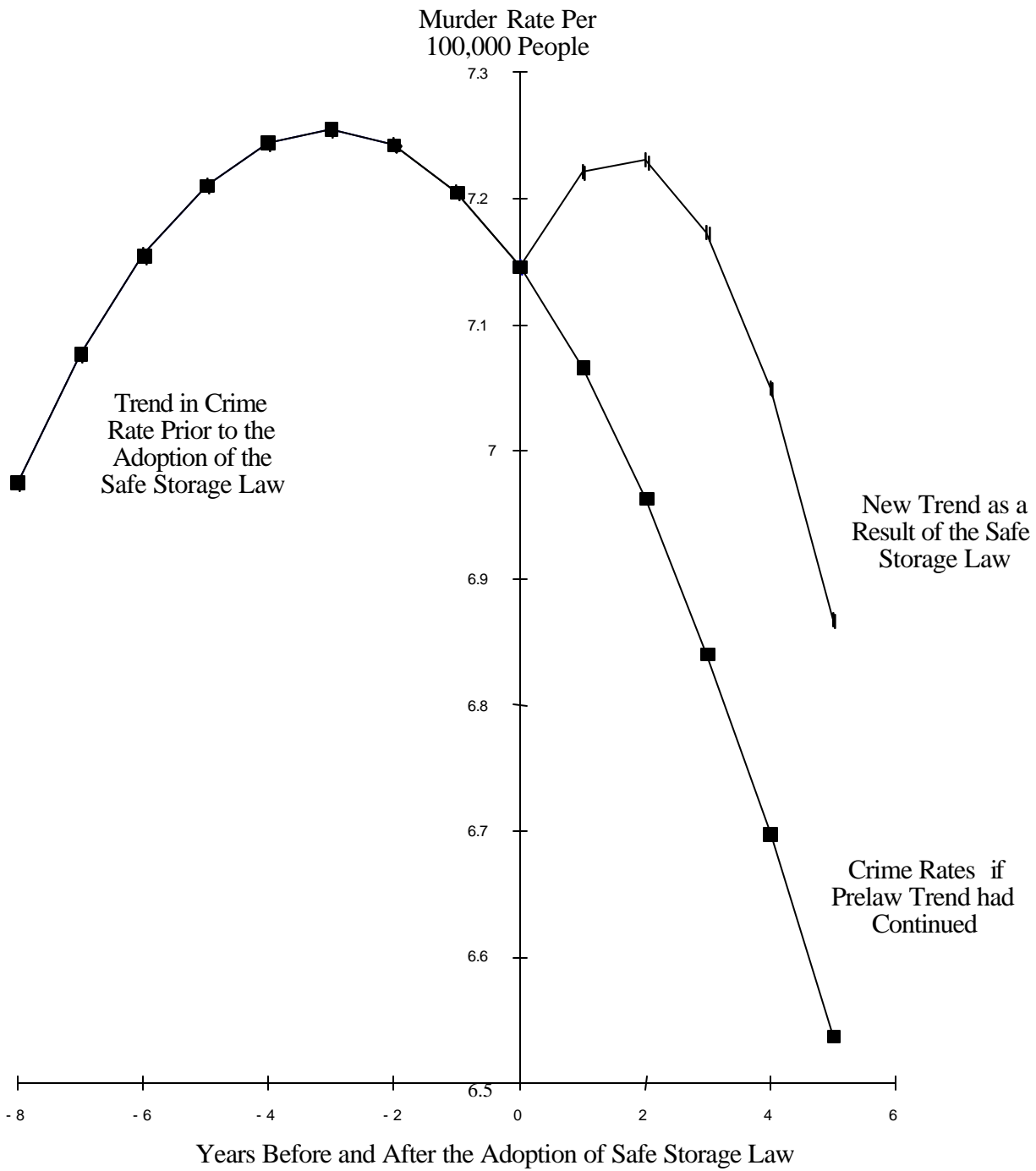


Figure 10: Rape Rate : Comparing the Change After the Adoption of a Safe Storage Law with the Pre-existing Trend

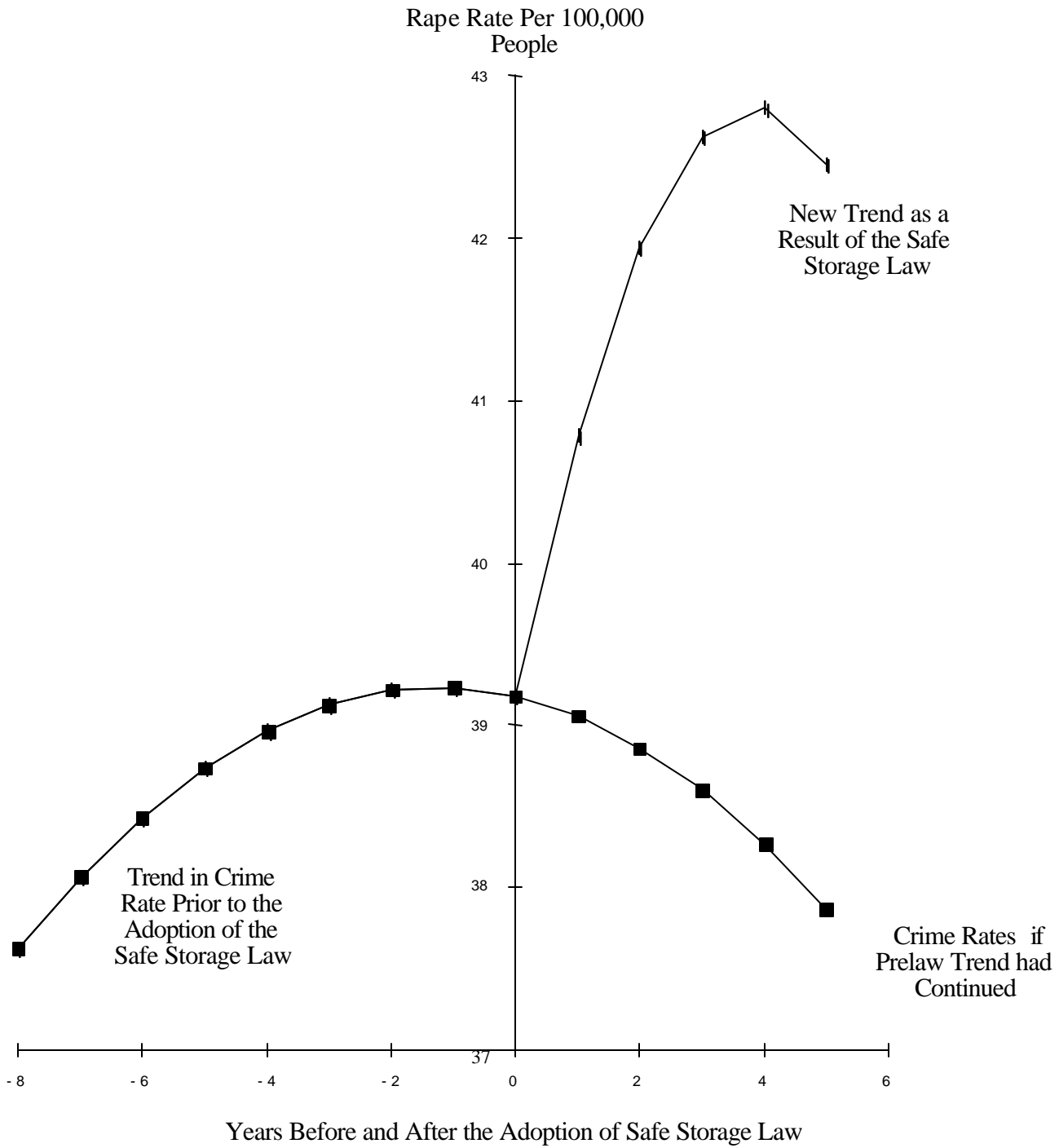


Figure 11: Robbery Rate : Comparing the Change After the Adoption of a Safe Storage Law with the Pre-existing Trend

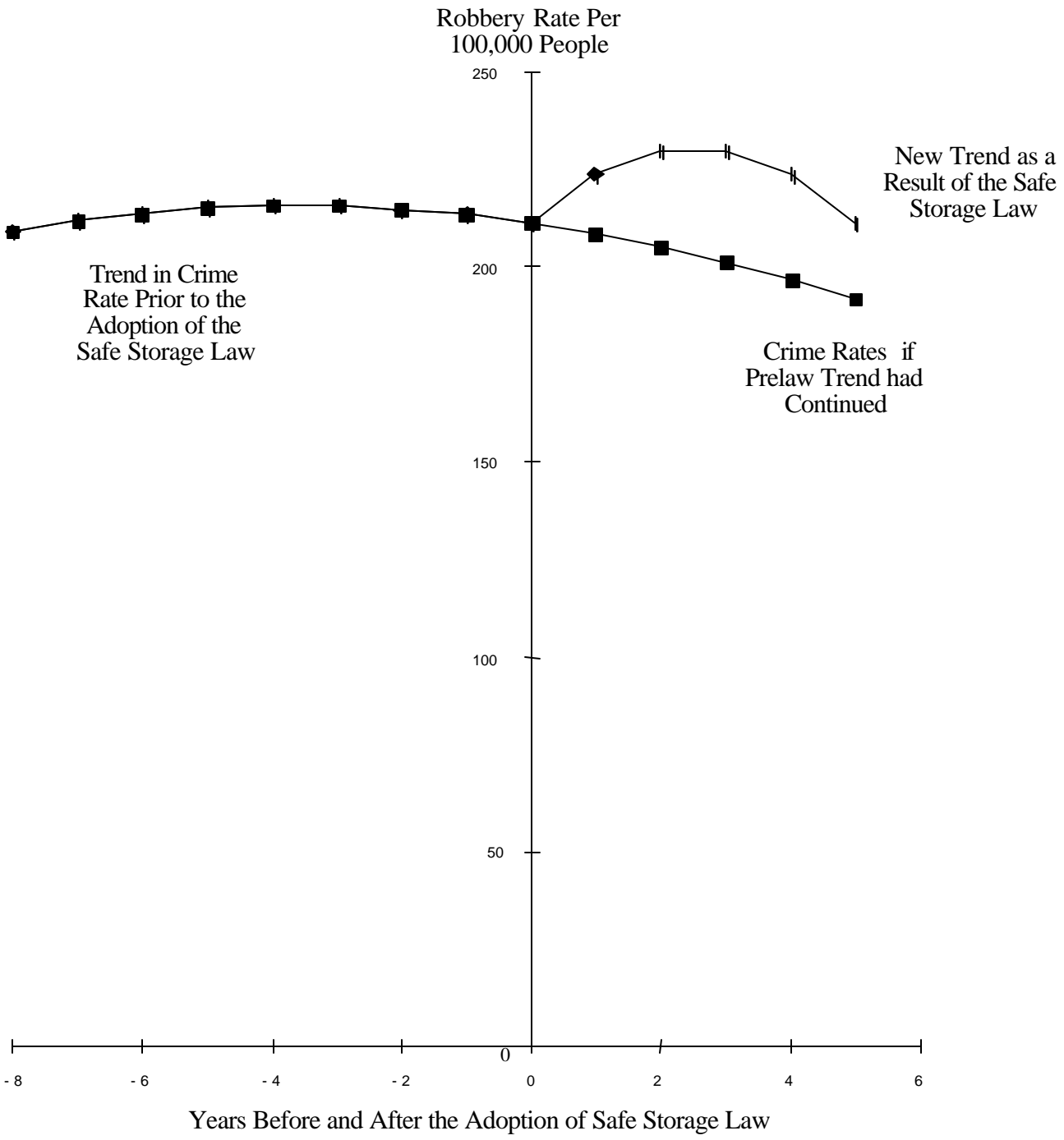


Figure 12: Aggravated Assault Rate : Comparing the Change After the Adoption of a Safe Storage Law with the Pre-existing Trend

