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Does Longer Incarceration Deter or Incapacitate Crimes? New Evidence from Truth-in-Sentencing Reform

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Keywords: Deterrence, incapacitation, Truth-in-Sentencing, violent crime rates.
JEL codes: I18, J18, K49

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Abstract

This paper estimates how violent crimes respond to a policy change which requires violent offenders to serve a substantial proportion of their sentenced terms before being eligible to release to community supervision. Focusing on states with effective TIS laws which meet the federal 85 percent rule, we utilize the differences-in-differences design to investigate both deterrent and incapacitative effect of TIS on crimes. We observe statistically significant -7 percent deterrent effect of TIS on growth of violent crime two years after its passage. A series of placebo tests confirm the robustness of the estimates and inferences. In the long-run, additional incapacitative effect also becomes significant, making the treatment effect of TIS even greater in magnitude. Even though insignificant in the first two years after TIS was passed, growth of non-violent property crime rates decreases by 7 percent in the long-run in TIS states, indicating relative greater importance of incapacitative effect which locks up offenders who commit both types of crimes. A rough approximation shows that TIS is an economically efficient method to decrease crimes.

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1 Introduction

In this paper we exploit the implementation of Truth-in-Sentencing (TIS) laws in 27 states in the United States during the 1990s to reveal the relationship between longer incarceration and crime rates. Under TIS framework, all violent offenders are mandated to serve at least 85 percent of their sentenced terms before being eligible to release to community supervision. To assure that offenders serve a substantial percentage of their sentence, the federal government provides additional material incentives to states with effective TIS laws.

Violent offenders released earlier than their sentence tend to have higher rate of recidivism (Wootton, 1993 and Hughes and Wilson, 2002). Correspondingly, a crucial question for criminal justice is that whether sentence enhancement such like longer incarceration reduces crime especially violent crime. Crime-control policies impact crime mainly through two channels: incapacitation and deterrence. The former is displayed by almost every policy concerning crime control as long as this policy includes contents about removing criminals from society to disable them to recidivate. The latter has garnered more and more attention since the seminal work of Becker (1968). Specifically, deterrence reduces crimes through imposing heavier penalties to offenders, making criminal behavior's cost outweighs the corresponding return. Isolating deterrence from incapacitation is not easy as both effects are expected to increase when crime-fighting policies are introduced. Economists argued that incarceration impacted crime rate through both deterrence and incapacitation. For example, in his influential paper, employing the variation in the prison population induced by prison over-crowding litigation as the instrument, Levitt (1996) found that releasing one inmate will increase annual crimes by 15 percent, and this estimate includes both deterrence and incapacitation. Levitt (1998) addressed the issue of measurement errors in reported crimes and found deterrence was an important factor for the decline in property crimes. Using California's Proposition 8 which imposes enhanced sentence on repeat offenders, Kessler and Levitt (1999) developed a structural model to distinguish between deterrence and incapacitation and found both short-run deterrence and long-run incapacitation effect. Katz, Levitt and Shustorovich (2003) estimated the effect of harsh prison condition on crime rates at the state level and found that states with more correctional facilities were associated with lower crime rates during 1950-1990. In two more recent works, both Owens (2009) and Drago, Galbiati and Vertova (2009) used individual level data and found some evidence that sentence disenchantment will incur higher probability of recidivism, which confirms that incapacitation reduces crime.

In spite of voluminous literature on the impact of the scale of imprisonment on crime, there has been remarkably little rigorous research on TIS. To our knowledge, Chen (2000) provided the earliest comprehensive examination on the treatment effect of TIS and found that TIS had few observable short-term treatment effects on the volume and composite of inmates, but in the long-run it exhibited effect in Washington relative to other states. Since larger correctional population is associated with incapacitation, the treatment effect of TIS should be also related to crime rates, which are not included in Chen (2000). Using county-level data, Shepherd (2002) constructed a theoretical model to estimate the treatment effect of TIS on all categories of crime. She found significant treatment effect of TIS on violent crimes and criminals tended to substitute into less severe property crimes. Besides the evidence of lower level of criminal activity in TIS-adopting states, Ross (2011) also found a migration of criminal activity into neighboring non-TIS states. Sridharan et al. (2003) implemented an intervention time series analysis to estimate the impact of TIS in Virginia and found evidence of deterrent impact of the new legislation.

In this article, we contribute to literature by examining how TIS impact crimes within relative longer time period. We firstly confirm the existence of deterrent effect by using observations between 1990 and 1999. Then, in order to differentiate deterrence from incapacitation, we follow the way Kessler and Levitt (1994) used and estimate the treatment effect of TIS in short-term (1-2 years

after TIS was passed), mid-term (3-4 years after TIS was passed) and long-term (TIS was passed more than 4 years), respectively. The key argument of this separation is that TIS should have little incapacitation immediately after TIS was passed: the mean time served for a Part I violent offender released from a state prison is 45 months or about four years, any incapacitative effect on crime rates caused by TIS should have not been exhibited before 1999.¹ Thus, most variation in crime rates should be attributed to deterrence instead of incapacitation. Thus, by checking when the treatment effect of TIS arises, one could isolate deterrence from incapacitation. Specifically, we use a differences-in-differences design to carry out an investigation concerning the treatment effect of TIS on both violent and non-violent crimes under different timelines. We start with a discussion of our identification strategies, because a failure to control for the simultaneity problem will lead to serious mismeasurement of the impact of crime-fighting policies (Levitt, 2006). In our work, the major concern for identifying the treatment effect of TIS is that TIS states may suffer higher crime rates than non-TIS states, so that crime-control policies such like TIS are more desirable and attractive to these states. First, we restrict our attention to the 27 states which passed TIS laws that meet the federal 85 percent requirement. Under the “85 percent rule”, offenders are required to serve at least 85 percent of their sentenced terms before being eligible to release to community supervision. Second, we conduct several placebo tests to check whether systematic differences exist within TIS and non-TIS states based on some observable characteristics. In addition, because some social and historical factors may also affect the incidence of crimes, in most regressions we also include region-by-year fixed effect to account for multiple shocks over time and to allow states in different census regions to follow different trajectories.

After discussing our identification, we begin with an examination on the existence of deterrent effect of TIS based on observations between 1990 and 1999. We find that growth of violent crime rates decreases by around 7 percent in TIS states relative to non-TIS states. However, such a treatment effect is not statistical significant until two and more than two years after TIS was passed. Moreover, the significant deterrent effect of TIS on violent crimes is mainly contributed by a sharp decline in growth of robbery rate, while growth of murder, rape and aggravated assault rates do not exhibit significant changes. A series of robustness tests confirm that the detected deterrent effect is robust and not driven by statistical coincidence. Then, we extend the data to 2010 to estimate the additional incapacitative effect which should not be exhibited before 1999. We find that the estimate of the treatment effect on violent crimes increases to 10-12 percent in the long-run. However, for the two most serious violent crimes, murder and rape, we still do not observe any significant declines.

We additionally check the relative importance of deterrent and incapacitative effect through estimating how non-violent property crimes respond to TIS. If deterrent effect predominates, enhancing penalties on violent crimes would lead to a substitution to non-violent crimes due to relative lower expected costs. On the contrary, if incapacitative effect predominates, both violent and non-violent crimes should decline since offenders who commit both will be detained for longer period (Levitt, 1998). We do not find evidence of substitution from violent crimes to non-violent crimes after TIS was passed: growth of non-violent crime rates is not significantly higher in TIS states than in non-TIS states. On the contrary, we find a significant 7 percent decrease in growth of non-violent crime rates in the long-run, implying that for TIS incapacitation has relative greater importance than deterrence. Moreover, we find that TIS respectively decreases burglary, larceny and motor theft by 7, 6 and 13 percent in the long-run.

In summary, our findings concerning the impact of TIS again provide support to the existence of deterrence in sentence enhancement. Such a deterrence becomes significant on violent crimes two years after TIS was passed and gets stronger as time goes by. Compared to deterrence, incapacitation has relative greater importance. The identified incapacitation on non-violent crime takes longer

¹Ditton and Wilson, ‘Truth in Sentencing in State Prisons’ (<http://bjs.gov/content/pub/pdf/tssp.pdf>).

period to become obvious. However, we would also like to note some important caveats regarding our findings. First, we mainly concentrate on growth of crime rates as our outcome variables, there are some other consequences related to TIS that we do not examine. For example, we do not estimate the impact of TIS on state budgets. Second, the main data we rely on are FBI's Uniform Crime Report (UCR), which tends to underestimate the number of incidence as it only collects crimes known to the police. It also only reports the most serious crime in a single incidence in which multiple offenses are committed. This may cause inaccuracy to the estimate of incapacitation on crime especially non-violent crime. Third, even though our results conclude that TIS is somewhat useful in reducing crime, it is possible that other approaches, for instance, Three Strike laws, would have cost less in reaching similar results.

The remained parts of the paper are organized as follows. Section 2 provides an overview of TIS in the United States. Section 3 describe the data and our identification strategy. Section 4 and ?? report estimating results of deterrence and incapacitation, respectively. We give concluding remarks in Section 5.

2 An Overview of Truth-in-Sentencing

Truth-in-Sentencing legislation is built upon several other sentencing reforms in 1970s when the commonly used indeterminate sentencing system and parole release became less effective. Early release leads to large disparities between sentenced terms and the amount of time offenders actually serve in prison, causing failure in correctional rehabilitation and directing to a "get tough on crime" public policy agenda. This agenda includes a transition to determinate sentencing system, abolition of discretionary parole, adoption of sentence enhancement on repeat offenders, and reduction of good conduct credits, etc. A direct consequence of the series of reforms is the expansion of correctional population: from 1984 to 2004, the number of incarcerated people in the United States has grown from 682,000 to more than 2.2 million, a 20-year growth rate that is 10 times that for the total population in the United States.² The over-crowding prison and large incarceration rate cause nontrivial fiscal expenses on correctional facility construction and inmate supervision.

In order to alleviate such a dilemma, on one hand, by the early 1990s, sentence enhancement became more focused on repeat offenders who committed the most serious violent crimes. For example, California passed Proposition 8 on June 8, 1982, which added Sections 667(a) and 1192.7(c) to require a 5-year enhancement for offender with prior conviction of a "serious" felony offense or a 1-year enhancement for offender with a prior prison term served for any offense, whichever was greater.³ On the other hand, the federal government provided a substantial material incentive to states which guarantee longer incarceration on violent criminals. For example, in 1994, the federal Violent Crime Control and Law Enhancement Act of 1994 (hereafter, the 1994 Crime Act) was passed, associated with the federal Violent Offender Incarceration and Truth-in-Sentencing Incentive Grants (VOI/TIS) program. The 1994 Crime Act promised grants to states "to construct, develop, expand, modify, operate, or improve correctional facility... [in order to] ensure that prison cell space is available for the confinement of violent offenders, and to implement truth-in-sentencing laws for sentencing violent offenders."⁴ To be eligible to the grants, applying states should either demonstrate that they had effective laws that require violent offenders to serve at least 85 percent of their sentenced terms, or show that they had increased the percentage of convicted violent offenders sentenced to prison, increased the average incarcerating time served by violent offenders, increased

²Bureau of Justice Statistics, Prisoners in 2004 (<http://www.bjs.gov/content/pub/pdf/p04.pdf>).

³According to Cal. Penal Code §1192.7(c), "serious" felony offenses include all violent felonies covered under the previous law as well as some nonviolent felonies such as burglary of a residence.

⁴Violent Crime Control and Law Enforcement Act of 1994, PL 103-322 §20101 (a).

the percentage of sentence served by violent offenders, and that they had laws in effect requiring 85 percent of the sentence imposed to be served if the offender had a prior conviction for a violent or serious drug offense.⁵

Table 1 lists the 27 states which are qualified for the VOI/TIS grants and the date their TIS laws became effective. Except for Pennsylvania, Utah and Delaware, all the other states passed TIS laws in the 1990s, mainly in the mid-1990s. The specific measures which guarantee longer incarceration are heterogenous among different states. For example, worktime credits are limited to 15 percent of the sentence in California, Minnesota abolished all “good time” for crimes committed on or after August 1, 1993, under statute 244.101, Oregon created mandatory minimum sentences for some crimes, Virginia completely abolished discretionary parole on violent offenders and enhanced sentences on repeat criminals.⁶ Even though such differences exist, one thing in common is that all the 27 states have effective laws ensuring violent offenders to serve at least 85 percent of sentences before being eligible for release.

[INSERT TABLE 1 ABOUT HERE.]

How does the passage of TIS in these states translate to the change of population incarcerated and population eligible for release? In summary, on one hand, between 1990 and 1997, the average annual prison population grew by 7 percent, and most of the growth should be attributed to violent offenders, which account for 50 percent of the total increment in state prison inmates.⁷ Even though targeting on violent offenders, Ditton and Wilson (1999) found that arrests for the major violent crimes (except for aggravated assault) actually declined between 1990 and 1996. However, the commitment rate, or the likelihood of going to prison upon arrested, increased for most violent offenses during that period. Thus, state prison admissions by violent offenses increased from 86,600 in 1990 to 96,300 in 1996, while that for property and drug offenses decreased between 1990 and 1996 (Ditton and Wilson, 1999). On the other hand, the adoption of TIS would lead to about 15 months longer incarceration than the projected average minimum sentence to be served by violent offenders entering prison in 1996 due to the 85 percent requirement (Ditton and Wilson, 1999). Specifically, in 1996, except for offenders committed murder still serve about the same time in prison under 85 percent requirement (215 months v.s. 214 months), offenders for rape, robbery and assault are estimated to serve at least extra 1.5 years in their minimum sentence under TIS.⁸ In addition, from the perspective of release, between 1990 and 2000, the release rate of state prisoner declined from 37 percent to 31 percent, and then remained stable, while the annual state parole population rose 2.4 percent, which is much more modest comparing to the 5.3 percent annual growth in the prison population.⁹ Among inmates released in 1997, the average sentence for a violent offender was about 93 months and the average time served was 49 months, or 54 percent of the average total maximum sentence, up from 47 percent in 1993 and 51 percent in 1995 (Ditton and Wilson, 1999). As for the method of release, from 1980 to 2000, the percentage of release after expiration of sentence increased from about 14 percent to about 20 percent, while the percentage of release by mandatory parole increased from about 19 percent to 39 percent due to the abolition of discretionary parole in many TIS states. Accordingly, the percentage of release by discretionary parole declined sharply from about 55 percent to 24 percent.¹⁰ As a result of the shrinkage in the total percentage of release

⁵Violent Crime Control and Law Enforcement Act of 1994, PL 103-322 §20102 (a) (2).

⁶Chen (2000) provided a thorough summary for the differences of TIS laws among the 27 states.

⁷Ditton and Wilson, ‘Truth in Sentencing in State Prisons’ (<http://bjs.gov/content/pub/pdf/tssp.pdf>).

⁸According to Ditton and Wilson (1999), offenders in prison for rape, robbery and assault will respectively serve 47, 26 and 16 months longer than the 1996 projected minimum term.

⁹Hughes and Wilson, ‘Reentry Trends in the United States’ (<http://www.bjs.gov/content/reentry/reentry.cfm>).

¹⁰Hughes and Wilson, ‘Reentry Trends in the United States’ (<http://www.bjs.gov/content/reentry/reentry.cfm>). According to Bureau of Justice Statistics, mandatory parole generally occurs in jurisdictions using determinate sen-

through parole, all offenders released for the first time in 1999 served on average 49 percent of their sentences, a 10 percent jump from 38 percent in 1990.¹¹

3 Data and Identification

I briefly introduce the data used for estimation in this section. Then I discuss the identification strategy in estimating the treatment effect of TIS.

3.1 Data

I collect both the aggregated violent and non-violent property crime rates per 100,000 populations from FBI's Uniform Crime Report (UCR) from 1990 to 2010 in 50 states (excluding the District of Columbia). The UCR program collects the number of seven Part I offenses — murder and non-negligent homicide, forcible rape, robbery, aggravated assault, burglary, motor vehicle theft and larceny-theft violent crime includes — because “they are serious crimes, they occur with regularity in all areas of the country, and they are likely to be reported to police.”¹² Of the seven Part I offenses, murder and nonnegligent homicide, forcible rape, robbery and aggravated assault are classified to be violent, and burglary, motor vehicle theft and larceny are categorized to be non-violent. Considering the seriousness is different among each type of Part I offenses, besides the aggregated violent/non-violent crime rates, we also collect rates for the seven part I offenses between 1990 and 2010 to examine whether the impact of TIS is heterogenous among them.

I also collect data about state-level characteristics which may affect violent and non-violent crime rates in that state. These variables are categorized into socio-economic variables and demographic variables:

- Socio-economic variables: median of household's real income (Bureau of Labor Statistics), unemployment rate (Bureau of Labor Statistics), poverty rate (Bureau of Labor Statistics), incarceration rate per 100,000 populations (Bureau of Justice Statistics), adults on parole per 100,000 populations (Bureau of Justice Statistics), per capita government spending on assistance and subsidies (Bureau of Census), per capita government spending on public welfare (Bureau of Census), per capita spending on police protection (Bureau of Census), implementation of “*Three Strikes*” law (National Conference of State Legislatures), abortion rate (Guttmacher Institute) and per capita consumption (in British thermal unit) of motor gasoline excluding fuel ethanol (U.S. Energy Information Administration).
- Demographic variables: population size (UCR), percentage of male aged between 18 and 24 (Bureau of Census), percentage of male aged between 25 and 64 (Bureau of Census), percentage of white and percentage of African-American (Bureau of Census).

As Shepherd (2002) argued, socio-economic variables about income and poverty rate represent the opportunity cost and the amount of wealth available for potential offenders. Unemployment rate mirrors the general labor market situation in one state, which is also a proxy of opportunity cost for potential offenders. Government spending on public welfare, assistance and subsidies indicates how

tencing statutes in which inmates are conditionally released from prison after serving a specified portion of their original sentence minus any good time earned, while discretionary parole exists when a parole board has authority to conditionally release prisoners based on a statutory or administrative determination of eligibility.

¹¹Hughes and Wilson, ‘Reentry Trends in the United States’ (<http://www.bjs.gov/content/reentry/reentry.cfm>).

¹²The formal definitions of Part I offense are included in UCR Offense Definitions (<http://www.ucrdatatool.gov/offenses.cfm>).

much nonmarket earnings could be transferred to help poor and unemployed neighbors. Government spending on police protection is a proxy of the size of law enforcement in a state. Both parole and incarceration rates could reflect the general public safety situation in one state. Chen (2000) argued that the 1990s' trend about "get tough on crime" is also featured by the implementation of the "*Three Strikes and You're Out*" law, or the so called "Three Strikes" law. Under "Three Strikes" system, habitual offenders would be incarcerated for longer time with limits on time off for good behavior. To isolate the treatment effect of "Three Strikes" law, I also introduce a dummy for states with effective "Three Strikes" law. In addition, Donohue and Levitt (2001) found that states with high abortion rate saw dramatic declines in crime relative to states with low abortion rate when the first cohorts exposed to legalized abortion reached the high crime ages in the 1990s. To control for this effect, I include the state level abortion rates from 1973. Furthermore, to control for the potential lead exposure effect on adolescents, as discussed in Reyes (2015), I add the per capita consumption of motor gasoline (excluding fuel ethanol) from 1965. As for the demographic variables, they contain information about the possible different treatments among various age, gender and race segments in the justice system, and these segments all meet different opportunity costs of time through the life cycle. For example, Donohue and Levitt (2001) argued that the peak ages for violent crime were roughly between 18-24. Thus, the variable of percentage for populations aged between 18-24 between 1990-2010 is able to reflect the fertility and abortion rates in these states about 20 years ago. To save space, I will not list a separate table to demonstrate the summary of these variables. A table of comparisons among control and treatment groups about the means of these variables is postponed to the next section.

3.2 Identification Strategy

One intuitive question is that why these 27 states chose to pass TIS which meets the federal 85 percent requirement while the other 23 states did not. In other word, how can we identify the mechanisms behind the states which choose to enact more stringent laws to incarcerate violent offenders for longer time. If these states are randomly selected, the comparison between control and treatment groups should be easy. Unfortunately, some of these states did not establish TIS system randomly. George Allen, former governor of Virginia, recalled that when he took office in 1994, TIS laws were "*exactly what I did because we knew that Virginians at that time did not feel secure in their own neighborhoods with so many crimes being committed by repeat offenders, including a woman raped by early released rapist and a police officer killed on Father's Day by a criminal on parole. ... Because of our prioritization of concern for protecting law-abiding citizens and their communities, probably tens of thousands of Virginians are NOT victims of rape, murder or other violence to their loved ones.*"¹³ Thus, Virginia is an example for those states which attempt to crack down violent crimes by imposing longer incarceration. I run the linear probability regression to check whether states with higher crime rates tend to enact more stringent laws such like TIS which requires all violent offenders have to serve a substantial part of their terms. As shown by column 1 and 2 in Table 2, based on observations in year 1993, which is the eve of the passage of the 1994 Crime Act, neither higher violent crime rates nor higher property crime rates are of importance in TIS states selection, since neither has statistical significant coefficient. In column 3, violent and property crime rates are jointly insignificant in selecting TIS states. Moreover, column 4 further suggests that none of the controls mentioned above have statistical significant power in TIS states selection except for the percentage of male aged between 25 and 64. In addition, for the 23 non-TIS states, some of them also established laws which have similar idea as TIS does. For instance, Indiana, Maryland, Nebraska and Texas require offenders to serve 50 percent of sentenced terms, Arkansas requires mandatory 70

¹³Laura Vozzella, 'George Allen Warns Against Bringing 'Dangerously Lenient' Parole Back to Va.' Washington Post (June 25, 2015).

percent of sentence for certain violent offenses and manufacture of methamphetamine, Colorado requires violent offenders with 2 prior violent convictions to serve 75 percent of sentence and 1 prior violent conviction to serve 56.25 percent.¹⁴ Thus, even though states choose TIS laws to control violent crimes, the selection of TIS states is neither determined by prior crime rate levels nor other relating socio-economic and demographic indicators before the passage of the 1994 Crime Act.¹⁵ Moreover, in order to minimize the endogeneity caused omitted variables, besides the state and year fixed effect, I also consider both the census region-by-year fixed effect to account for other policy shocks to states in different geographical regions and the state-specific time trends.

[INSERT TABLE 2 ABOUT HERE.]

The other way to relieve the selection bias is to examine whether the paths of violent crime rates are different between TIS and non-TIS states (control). Figure 1 demonstrates both the paths of logarithmic violent crime and non-violent crime rates over the period 1990-2010 for non-TIS states and TIS states which enacted TIS laws in 1993, 1994, 1995, 1996, 1997 and 1998, respectively.¹⁶ I have three observations for panel(a). First, the trajectories of violent crime rates in TIS states are similar to that in non-TIS states, even though they are different in magnitude. Except for the two states (Louisiana and New Jersey) enacted TIS laws in 1997, I do not observe drastic decline in violent crime rates in TIS states before the adoption of TIS laws. Second, similar to the test results above, it is not necessary that states with lower violent crime rates have no incentive to adopt TIS laws. Even though there are three lines are well above that of non-TIS states, there are also three lines close to or below the line of non-TIS states. As a matter of fact, based UCR, for the top 10 states with the highest violent crime rates during 1965-1990, half of them have not adopted TIS laws during 1990-2010. Third, the order of the TIS adoption does not depend on the level of violent crime rates. States with lower violent crime rates may pass TIS laws earlier than states with higher level of violent crime rates. All these three observations indicate that, even though some states adopted TIS laws for the purpose of controlling violent crimes, there is no strong selection bias for states enacted TIS. As for non-violent property crimes, I could see quite similar patterns in panel (b) of Figure 1.

[INSERT FIGURE 1 ABOUT HERE.]

Furthermore, the state-level characteristics are also quite similar among TIS and non-TIS states. Table 3 displays the comparison of both the socio-economic and demographic variables in 1994, the year in which the 1994 Crime Act was passed. As it shows, there are no significant differences between TIS and non-TIS states in all of these characteristics except for population, which is expected as there are four more states have effective TIS laws. I also check this comparison for 1990-1993 and the results are quite similar, indicating that at least before 1995, the socio-economic conditions and the demographic composition in both groups are not quite different from each other. Also, under my identification assumption, all these socio-economic and demographic controls should not change drastically over time between control and treatment groups, because if they do, it will suggest that crime rates in both groups might have diverged in the absence of TIS laws. Thus, in our estimating part I will also check if the estimates changes in a meaningful manner after plugging in these controls. In practice, the inclusion of those time-varying controls would improve the estimates' precision by reducing the variance of the error term. Also, I present standard errors clustered at the state level.

[INSERT TABLE 3 ABOUT HERE.]

Since I will carry out the differences-in-differences method to estimate the treatment effect, following Angrist and Pischke (2009), I further assume that all unobserved endogenous heterogeneity is additive and then run the differences-in-differences regressions.

¹⁴Truth-in-Sentencing in State Prisons, Bureau of Justice Statistics Special Report (1999).

¹⁵I also checked observations from 1990-1992 and the results are quite similar.

¹⁶We exclude Delaware, Pennsylvania, Utah and Washington as they enacted TIS laws earlier than the other 23 states.

4 Estimating Results

In this section we estimate whether TIS laws immediately deter crime rates per 100,000 populations in TIS states. To isolate deterrent effect, which should become significant soon after TIS was passed, from incapacitative effect, which takes longer time to become salient, we first consider the period between 1990 and 1999 because for one thing, the last wave of TIS passage ended in 1998; for another thing, the 1994 Crime Act was passed in 1994, while the average time served by violent offenders is about four years in the 1990s. Thus, if we detect treatment effect during this period, it should be attributed to deterrent effect, otherwise we could argue that TIS only has incapacitative effect if it takes more than four years for crime rates to display significant decline. Our findings show that TIS has deterrent effect, even though it takes about two years to become significant.

4.1 Average Impacts on Crimes: 1990-2010

To estimate the average treatment effect of TIS on crime rates, I exploit the differences-in-differences design and run the following regression model:

$$\log(Y_{i,t}) = \alpha_i + \beta_t + \gamma TIS_{i,t} + \mu X_{i,t} + \epsilon_{i,t}, \quad (1)$$

where $Y_{i,t}$ represents crime rate for state i in year t , $TIS_{i,t}$ is a dummy variable equals to 1 if state i has effective TIS laws that meet the federal 85 percent requirement at time t . Note that some states enacted TIS laws not at the beginning of the year, so I set TIS equals to the proportion of the year when TIS was passed. $X_{i,t}$ is the vector of time-varying controls, and α_i and β_t represent state and year fixed effects, respectively. To account for the regional shocks over time in different census regions (Northeast, Midwest, South and West), I also consider the region effect by including the census region-by-year fixed effects, which allow states in different regions to have different paths.

In equation (1), γ measures the difference in growth of crime rate for TIS states relative to non-TIS states. The estimates of γ for violent crimes are displayed in Table 4. Standard errors are in parentheses and are clustered at the state level. Column 1 reports the OLS results with state and year fixed effects. Column 2 adds the region-by-year fixed effects. Column 3 further adds the time-varying controls. As one way to check the robustness of the estimates, state-specific time trends are included in column 4.

[INSERT TABLE 4 ABOUT HERE.]

I have three observations on Table 4. First, compared with non-TIS states, TIS states enjoyed lower aggregated violent crime rates. Specifically, relative to non-TIS states, growth in the aggregated violent crime rate has declined by 10-14 percent on average in TIS states, which translates to about 45-60 less reported violent crimes per 100,000 populations on average since 1994. Second, for TIS states, all four categories included in violent crime declined significantly after TIS. Such results are desirable and expected since TIS mainly targets on violent offenders. Of the four categories, robbery rate and aggravated assault rate have the largest decline in magnitude: the former has declined by 16-20 percent on average and the latter has declined by 8-14 percent on average. This finding should be also expected, because robbery and aggravated assault are less severe compared with murder and rape. Some offenders who commit murder or rape have some preparations and are clear about the serious consequences, while others commit impulsive senseless murders without apparent motives. Psychologists and criminologists usually attribute these aberrant crime behavior to poor impulse control or other psychopathic tendencies such as blurring of the boundaries between fantasy and reality, blunted and shallow emotional reactions, and a violent and primitive fantasy life (Satten et al., 1960 and Shackelford, 2002). All these explanations suggest that it would be difficult to effectively

deter murder and rape through simply locking up those offenders longer. On the contrary, robbery and aggravated assault happen more frequently. As a matter of fact, during the 10 years between 1990 and 1999, robbery and aggravated assault account for about 32 percent and 61 percent of the total reported violent crimes, while murder and rape only account for about 1 percent and 6 percent. Compared to murder and rape, the costs of committing robbery and aggravated assault are relative lower if arrested, but the economic benefits are almost immediate. According to Becker (1968), longer incarceration will force robbery and assault offenders to carry higher costs if arrested, so that the average treatment effects are greater on both. The third observation is from column 4: the additional state-specific time trends kill the impact of TIS on the aggregated violent crime, rape and assault, while the statistical significance is preserved in murder and robbery. This raises the concern that perhaps states were on diverging trends before TIS was passed. To check this, I use the event-study analysis method to examine the evolution of crime rates during each of the years before and after TIS. Put differently, I simultaneously check when TIS laws begin to display treatment effect and validate my identification assumption that the trajectories of violent crimes in both TIS and non-TIS states are parallel before TIS. Specifically, I estimate the following equation:

$$\log(Y_{i,t}) = \alpha_i + \beta_t + \sum_{\tau \in \{-3, -2, 0, 1, 2+\}} \gamma_\tau TIS_{i,\tau} + \mu X_{i,t} + \epsilon_{i,t}. \quad (2)$$

$TIS_{i,\tau}$ denotes five dummies which equal to 1 if τ years have elapsed since the passage of TIS in state i . τ is between -3 and 2+, where 2+ represents 2 and more years. 1 year before the passage of TIS is left for comparison. To make the parallel trends assumption validated, I hope the coefficients γ_{-3} and γ_{-2} to be insignificantly different from zero. The results are reported in Table 5. Column 1 shows results with state and year fixed effects. Column 2 and 3 further add time-varying controls and region-by-year fixed effect. I also draw the results in column 1, 4, 7, 10 and 13 in panel(a)-(e) of Figure 2. Graphical evidence shows that coefficients to the right of the date of adopting TIS are all negative and many of them are statistical significant, suggesting the decline in violent crime rates after TIS. The estimated coefficients to the periods before TIS are very close to zero and precisely estimated, indicating that, prior to TIS, the evolution of violent crime rates is the same in both TIS and non-TIS states. Thus, I do not find evidence of diverging trends.

[INSERT TABLE 5 ABOUT HERE.]

[INSERT FIGURE 2 ABOUT HERE.]

Next, I consider the impacts of TIS on property crimes. Even though not eligible to TIS, property crime offenders are frequently associated with violent crimes. For example, offenders commit burglary might also commit murder to kill witnesses. Through locking up offender who might have committed both violent and property crimes, one should expect property crime rates should also decrease. Table 6 summarizes the estimates for impacts of TIS on property crimes.

[INSERT TABLE 6 ABOUT HERE.]

Similar to Table 4, column 1 considers both state and year fixed effects. Column 2-4 further add the region-by-year fixed effects, time-varying controls and state-specific time trends. According to the preferred specification in column 3, both the aggregated property crime rates and its three categories decline in TIS states, but none of them are still statistically significant after adding the trends. I also check whether the trends have diverged before TIS and the estimates are presented in Table 7. Similarly, the results from column 1 are also shown in panel(f)-(i) in Figure 2. Combining the observations from both, I could also conclude that there is no significant difference between

TIS and non-TIS states before adopting TIS. In other word, there is no evidence of diverging trends. Besides, Table 7 provides additional information that it takes time for the impacts to become significant. For almost all property crimes, TIS begins to take hold after two and more years, which should be also expected as offenders who would have committed both violent and property crimes are isolated from society.

[INSERT TABLE 7 ABOUT HERE.]

4.2 Robustness Check

To check the robustness of these findings, I employ a series of robustness tests. First, I check that whether my inferences about the statistical significance of TIS are correct or not. Specifically, I follow the way in Bertrand et al. (2004) and construct 21-year panels from 1965 to 1990. Then I randomly select states to the treatment dates, i.e., the dates when TIS was passed, without replacement. In other words, I assume that TIS was enacted in a randomly chosen state on July 1, 1993 in the 21-year panel, just as Kansas which formally enacted TIS on July 1, 1993. Similarly, I randomly choose another five states enacted TIS in 1994, etc. After generating a complete 21-year panel, I run OLS with both state and year fixed effects and obtain an estimate of γ . I repeat this procedure 1000 times and then get a distribution of $\hat{\gamma}$. This distribution could be used to check how often I reject the null hypothesis of no treatment effect at the 5 percent level, and how many of the placebo estimates are smaller than the actual estimated effects reported in Table 4-6, a percentage which is similar to the p -value used in the permutation tests by Abadie et al. (2010). The results are demonstrated in Figure 5.

[INSERT FIGURE 5 ABOUT HERE.]

Panel(a) in Figure 5 displays the distribution of placebo test estimates for TIS on violent crime rates. The blue vertical line denotes -0.143, which corresponds to the first cell in column 1 of Table 4. The estimate of -0.143 ranks in the 1_{st} percentile, indicating that less than 1 percent of the placebo test estimates are smaller than or equal to it. In other words, based on this empirical distribution, I get a p -value which is less than 0.01 to infer the statistical significance of TIS laws' impact on the growth of violent crimes. Similarly, I calculate the " p -values" for the remaining violent and property crimes: 0.164 (murder), 0.026 (rape), 0 (robbery), 0 (assault), 0.007 (property crime), 0.008 (burglary), 0.029 (larceny) and 0.005 (motor theft). Thus, based on the permutation tests, I could conclude that the statistical significance of TIS on all violent crimes and most property crimes is not likely to be driven by coincidence.

The second robustness test aims to examine whether the paths of violent and property crime rates in the 27 control states have ever diverged in the manner which is similar to what they did during the 1990-2010 period. I follow the way in Cheng and Hoekstra (2013). Specifically, I create 26 separate panels from 1965 to 1990 and they each cover 21-year period. For example, the first panel covers 1965-1985, the second panel covers 1966-1976, etc. The last panel covers 1990-2010, which is the period I have discussed in the main analysis. For each panel, I assume that Kansas enacted TIS on July 1 in the fourth year of the 21-year period, and Arizona, California, Michigan, Missouri and North Carolina enacted their respective TIS laws in the fifth year of the 21-year period, etc. After considering both the state and year fixed effects, I run OLS regressions and obtain 26 estimates for each type of crimes. The results are reported in Table 9. The first column in Table 9 gives the results for violent crime rates. It shows that, compared with the estimate in the last row, only four of the 25 estimates are significant and smaller in magnitude. It is worth noting that all these four estimates are from periods when TIS has been passed for a long time. We could find similar patterns for other crimes. Above all, it is unlikely that the paths of violent and property crime rates in the 27 TIS

states exhibit general decreasing trends relative to their regional counterparts. At least during the past 25 years, these paths have never diverged among TIS and non-TIS states as much as they did after enacting TIS.

[INSERT TABLE 9 ABOUT HERE.]

4.3 Dynamic Impacts on Crimes: 1990-2010

In this section I extend to examine how the impact of TIS evolves as time goes by. Checking such a dynamic impact is desirable as it is one way to differentiate deterrence and incapacitation (Kessler and Levitt, 1999): if there is immediate decline in eligible crimes, it should be likely attributed to deterrence, while incapacitation and further deterrence should be demonstrated by a continued decline over a longer period when both effects begin to take hold.¹⁷

Specifically, following Wolfers (2006), I estimate the following regression model:

$$\log(Y_{i,t}) = \alpha_i + \beta_t + \sum_{k \geq 1} \gamma_k TIS_{i,t} + \mu X_{i,t} + \epsilon_{i,t}. \quad (3)$$

The notations in equation (3) have exactly the same meaning as they are in equation (1), except that I decompose the post-treatment period into five periods: I introduce dummies for the first two years, 3-4 years, 5-6 years, 7-8 years and 9 years and more after TIS was passed. Such a specification is able to model the dynamic response of various crimes to TIS explicitly. Like the main analysis, I also introduce the state-specific trends to identify preexisting trends and check the robustness of the estimates.

The estimates in Table 8 present the compact version of the findings for the effects of TIS on various crimes. Column 1 to 3 in panel A report the dynamic response of the aggregated violent crime rates on TIS. According to column 1, when only state and year fixed effects are included, decline in the aggregated violent crime rates is not significant in the first two years but becomes significant since the third year when TIS was passed. Column 2 shows the same pattern even though in smaller magnitude as region-by-year fixed effects and time-varying controls are added. The dynamic pattern in column 2 is also drawn in Panel(a) of Figure 3 and it is obvious that, relative to non-TIS states, TIS states have lower growth in violent crime rates and the impact of TIS increases remarkably as time extends. This is expected since incapacitation begins to take hold. I further add the state-specific trends and the results in column 3 show that all estimates are insignificantly different from zero except for the impact during years 3-4, indicating that the treatment effect of TIS is only temporary instead of continuing. Results for impacts on murder and robbery are more interesting. Column 5 shows that, considering state/year fixed effects, region-by-year fixed effects and time-varying controls, growth in murder rate in TIS states began to decline after the third year when TIS was passed and the magnitude of the impact expanded over time. Such an effect is robust after adding the state-specific trends in column 6. We also find that, after considering the time trends, the deterrence becomes significant and the difference in growth of murder rate between TIS and non-TIS states becomes more sizable by comparing panel(b) in Figure 3 with panel(b) in Figure 4. Similar to murder rate, the change in robbery rate is also robust to the inclusion of time trends and the deterrence becomes significant. The decline becomes larger in magnitude over time and is significant in every period, which is demonstrated in panel(d) in both Figure 3 and 4. Unlike murder

¹⁷In a 15 state study conducted by Bureau of Justice Statistics, 67.5 percent of prisoners released in 1994 were rearrested within 3 years, an increase over the 62.5 percent found for those released in 1983. In addition, the 1994 recidivism study estimated that within 3 years, 51.8 percent of prisoners released during the year were back in prison either because of a new crime for which they received another prison sentence, or because of a technical violation of their parole. See Hughes and Wilson (2002).

and robbery, even though rape and aggravated assault rates are also lower in TIS states over time, the impact of TIS is not significant, suggesting that TIS is not likely to exhibit remarkable impact on both crimes in both short run and long run.

[INSERT TABLE 8 ABOUT HERE.]

[INSERT FIGURE 3 ABOUT HERE.]

[INSERT FIGURE 4 ABOUT HERE.]

Panel B in Table 8 reports estimates of TIS on property crimes. The response of the aggregated property crime is not immediate to TIS but becomes significant after the third year and grows larger in magnitude as time goes by, which should be expected as many property crimes such as burglary is frequently associated with murder, rape or other violent crimes. Even though the impact of TIS during years 3-4 and year 5-6 becomes insignificant, the additional time trends do not remarkably affect the significance of TIS after the 7_{th} year, suggesting that TIS exhibit impact on property crimes only in the long run. This maybe due to the incapacitation of TIS on violent offenders who would have also committed property crimes. The estimates for changes in burglary rate is in line with such an explanation. TIS exhibits significant impacts on burglary rate after the third year and such impacts are robust to the inclusion of time trends. The treatment effect expands over the ensuing decade, indicating a permanent lower burglary rate in TIS states relative to non-TIS states. Since TIS does not apply to offenders committed burglary, the treatment effect during the first 3-4 years should be attributed to deterrence on those who would have committed both violent crimes and burglary. Declines in growth of larceny and motor theft rates are both significant, as shown in column 8 and 11. However, the inclusion of the time trends kill the impact of TIS in all periods.

Above all, we conclude the following remarks based on Table 8. First, TIS has led to 6-8 percent decline in growth of the aggregated violent crime rate during the 3-4 years after its adoption. Considering that the average incarcerating time for violent offenders during the 1990s is about 48 months, or 4 years, the significant impact during years 3-4 should be attributed to deterrence. Second, significant declines in growth in both murder and robbery rates occur almost immediately after TIS was passed, implying deterrence on both crimes. Such impacts do not die down over the ensuing decade but expand gradually as time goes by, suggesting the long-lasting treatment effects and the permanent lower levels of murder and robbery rates in TIS states. Third, TIS exhibits some robust long run impacts on the aggregated property crime rate, which should be attributed to that TIS has successfully isolated violent offenders who would have committed both violent and property crimes for a longer time. For burglary, which is closely related to some kinds of violent crimes, impact of TIS becomes significant almost immediately and is long-lasting, providing some evidence for the existence of deterrence.

5 Conclusion

Despite its public policy importance, Truth-in-Sentencing itself is not a typical sentence enhancement but rather an idea to narrow the disparity between sentenced term and actual term served. Through a series of measures such as abolition of parole and reduction of good conduct credits, violent offenders are required to be incarcerated at least 85 percent of their sentences before being eligible to be conditionally released. We find statistical significant treatment effect of TIS on violent crimes. However, we also find that this treatment effect is not immediate; its significance is delayed to two years after TIS was passed. A series of placebo tests confirm the robustness of our results. Extending observations to 2010, we further find that growth of violent crime and non-violent

property crime rates in TIS states decreased by about 12 percent and 7 percent on average relative to non-TIS states in the long-term. But unlike rates for all three types of non-violent crime which exhibit decreasing trend in the long-run, rates for the two types of most serious violent crime — murder and rape — do not have significant decline even in the long-run.

Truth-in-Sentencing is one “get to tough on crime” approach and the federal government promises to provide financial assistant to states which passed effective laws to guarantee that violent criminals are locked up by at least 85 percent of their sentences. Thus, the question related to our work is whether the investment of the federal government has been cost-effective. A serious cost-benefit analysis is beyond the scope of the paper. Levitt (1996) suggested that current levels of prison population are excessive even under the most generous estimates of the crime reduction attributed to incarceration. After adopting TIS, these states will have an extra annual cost averaged between 4 million and 5 million.¹⁸ The benefits of crime reduction is difficult to calculate. The commonly used estimates of the cost of crime to victims quantify the costs of crime are about 500 million dollars annually in the early 1990’s (Miller, Cohen and Rossman, 1993). Levitt (2004) also cited this amount but readjusted it to about 400 million dollars due to the sharp declines in crime during the 1990’s. If we further lower this number to 300 million dollars, and TIS reduced violent and non-violent crime by 10-15 percent as a whole, then the corresponding benefit of crime reduction is 30-45 million dollars, well above the estimated costs. Thus, the rough approximation still provides support to TIS as a cost effective way to reduce crime. However, TIS should not be implemented alone as the policy itself is not able to effectively reduce serious crime like murder and rape; policy makers should simultaneously implement some other sentence enhancements, such as “Three Strikes” laws, to maximize the efficacy of TIS. But these measures would bring about other costs, making the cost-benefit analysis even more complicated.

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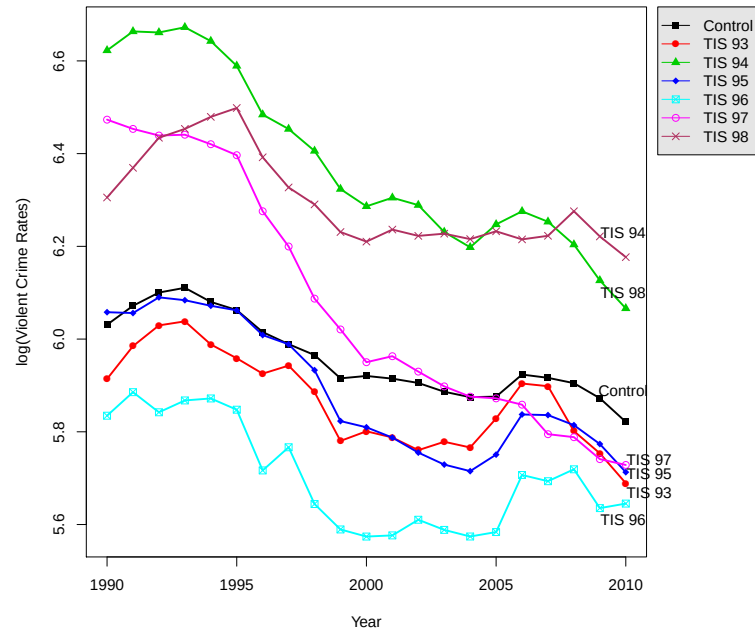
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¹⁸Truth-in-Sentencing in the federal prison system
(http://www.sentencingproject.org/doc/publications/inc_truthinsentencing.pdf).

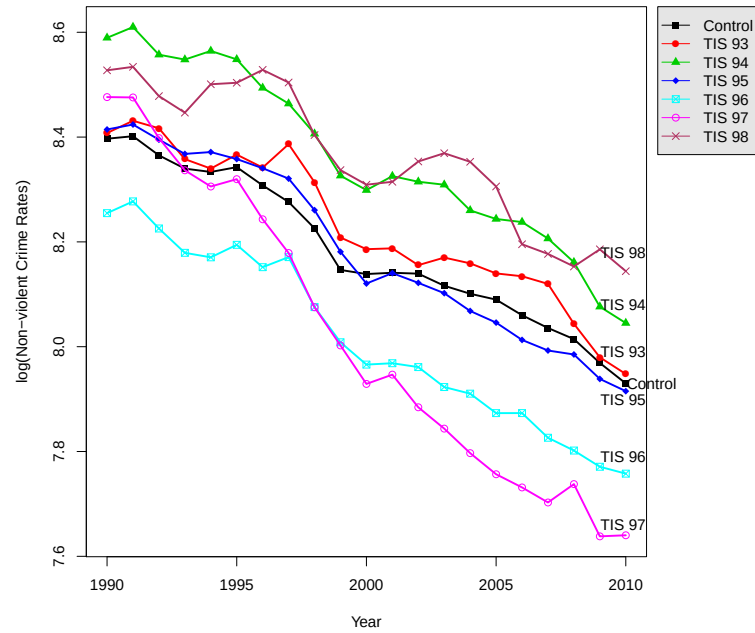
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Figure 1: COMPARISONS OVER PERIODS BETWEEN 1990-2010



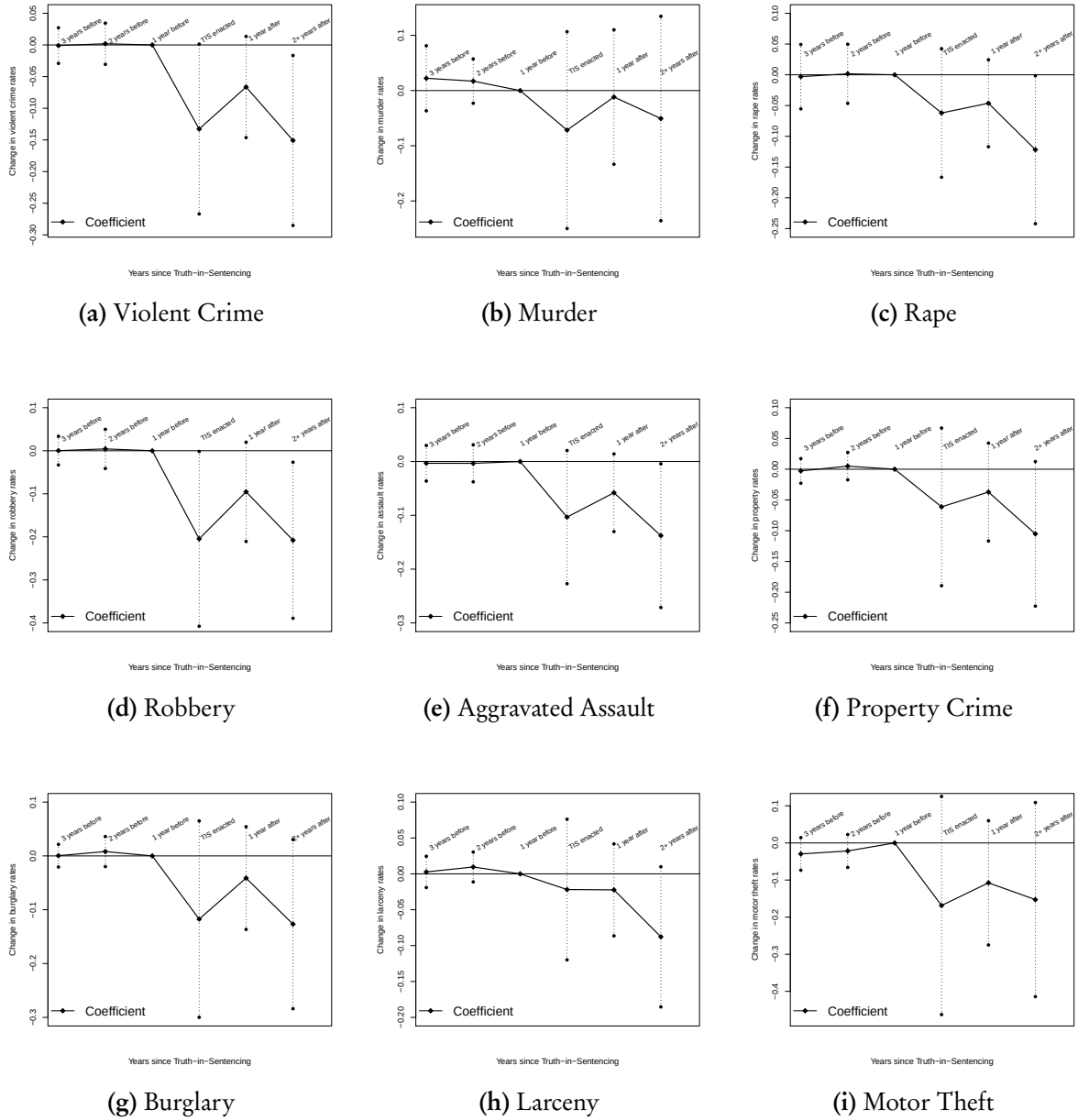
(a) PATHS OF LOGARITHMIC VIOLENT CRIME RATES



(b) PATHS OF LOGARITHMIC NON-VIOLENT CRIME RATES

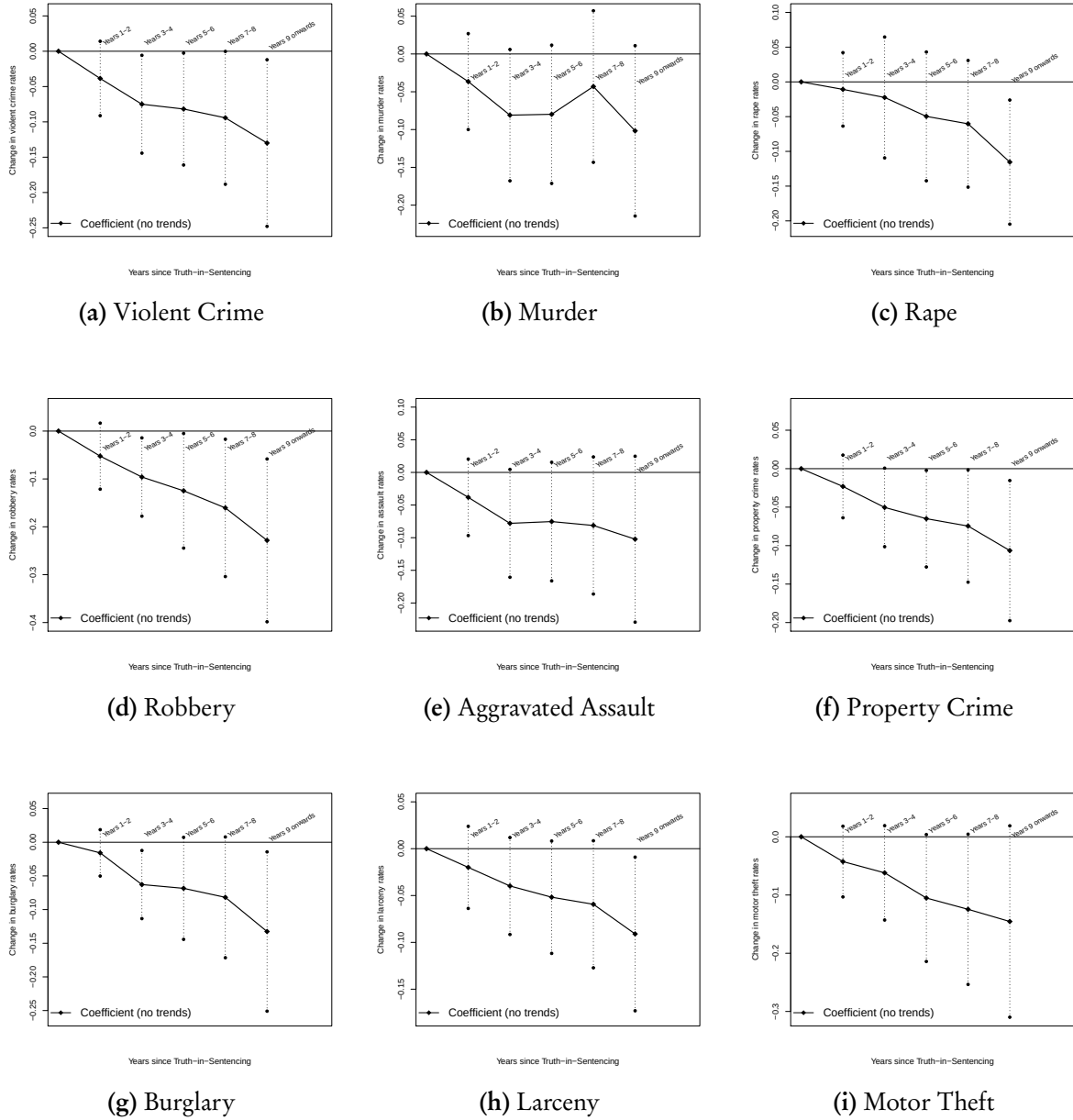
Panel(a) displays paths of logarithmic violent crime rates over 1990-2000 in control states and states that enacted TIS laws in 1993, 1994, 1995, 1996, 1997 and 1998, respectively. Panel(b) displays paths of logarithmic non-violent crime rates over 1990-2000 in control states and states that enacted TIS laws in 1993, 1994, 1995, 1996, 1997 and 1998, respectively.

Figure 2: EVENT-STUDY ANALYSIS OF THE IMPACT OF TIS ON CRIME RATES



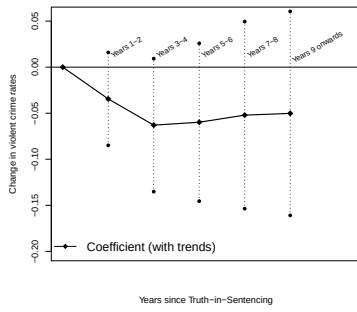
The horizontal axis represents years since TIS. The squares connected by the solid lines indicate changes in growth of crime rates in TIS states (relative to non-TIS states) compared to one year before TIS was passed, which is demonstrated as an impact of zero for convenience of visual analysis. The regressions include both state and year fixed effects. See points in column 1, 4, 7, 10 and 13 in Table 5 and column 1, 4, 7 and 10 in Table 7 for the values of these points. The dashed lines represent the 95% confidence interval, where the standard errors are clustered at the state level.

Figure 3: DYNAMICS OF DECLINE IN CRIME RATES AFTER TIS (WITHOUT TRENDS)

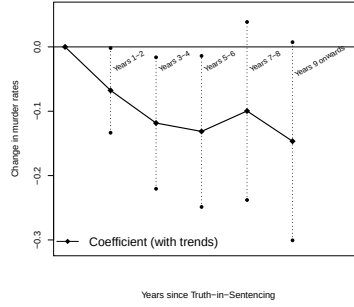


The horizontal axis represents years since TIS. The squares connected by the solid lines indicate changes in growth of crime rates in TIS states (relative to non-TIS states) compared to the year when TIS was passed, which is demonstrated as an impact of zero for convenience of visual analysis. The regressions include both state and year fixed effects, region-by-year fixed effects and time-varying controls. See points in column 2, 5, 8, 11 and 14 in panel A of Table 8 for the values of these points. The dashed lines represent the 95% confidence interval, where the standard errors are clustered at the state level.

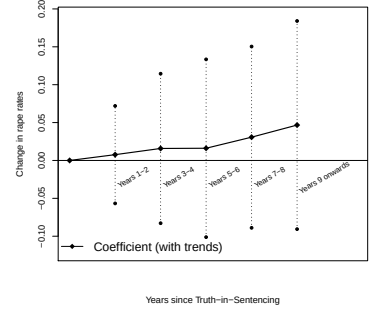
Figure 4: DYNAMICS OF DECLINE IN CRIME RATES AFTER TIS (WITH TRENDS)



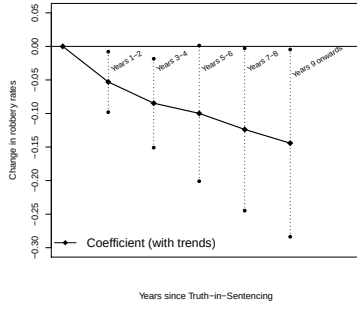
(a) Violent Crime



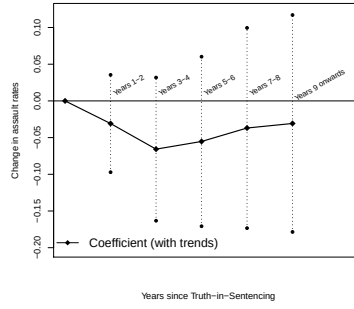
(b) Murder



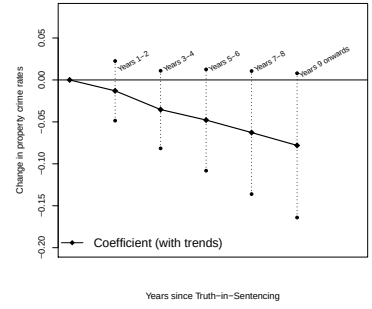
(c) Rape



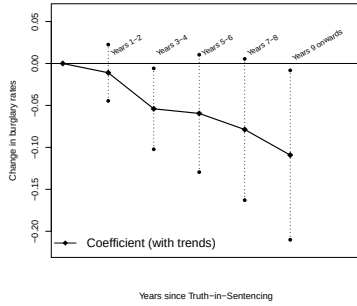
(d) Robbery



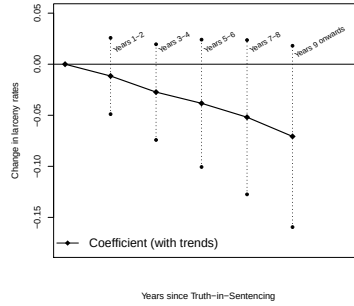
(e) Aggravated Assault



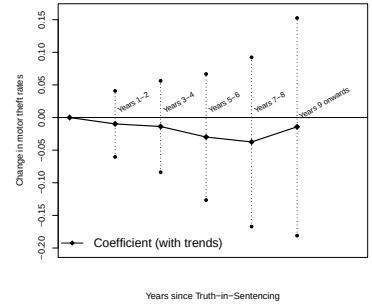
(f) Property Crime



(g) Burglary



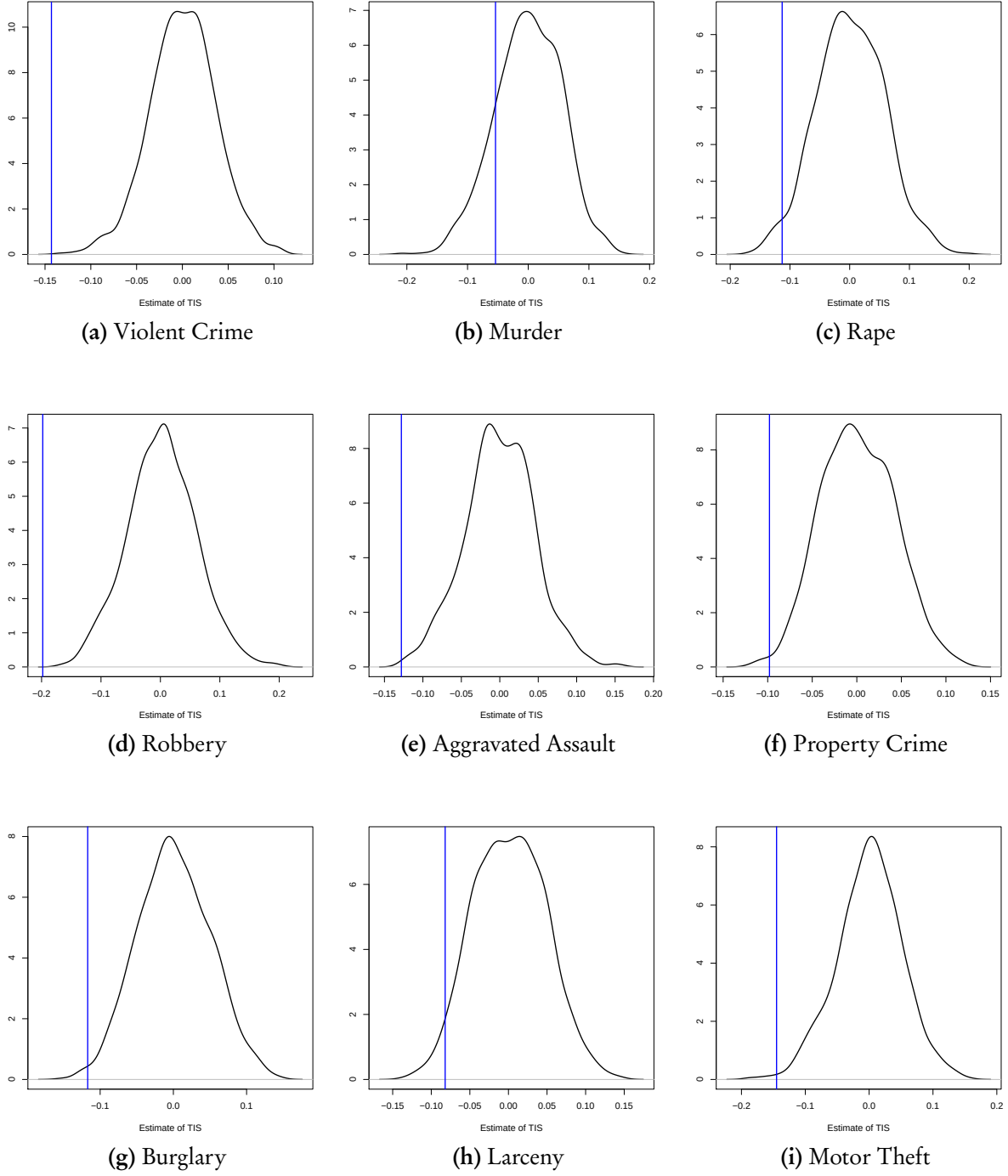
(h) Larceny



(i) Motor Theft

The horizontal axis represents years since TIS. The squares connected by the solid lines indicate changes in growth of crime rates in TIS states (relative to non-TIS states) compared to the year when TIS was passed, which is demonstrated as an impact of zero for convenience of visual analysis. The regressions include both state and year fixed effects, region-by-year fixed effects, time-varying controls and state-specific time trends. See points in column 2, 5, 8, 11 and 14 in panel A of Table 8 for the values of these points. The dashed lines represent the 95% confidence interval, where the standard errors are clustered at the state level.

Figure 5: EMPIRICAL DISTRIBUTIONS OF PLACEBO TESTS ESTIMATES ON TIS



Distribution in each panel is generated from 1000 repeats. The red vertical lines in panel (a) - (i) denote estimates in column 1 of Table 4 and 6, respectively.

Table 1: STATES HAVE TIS LAWS THAT MEET THE FEDERAL 85 PERCENT REQUIREMENT

State	Year passed	Date effective
Arizona	1993	1/1/1994
California	1994	9/21/1994
Connecticut	1995	7/1/1996
Delaware	1989	6/30/1990
Florida	1995	10/1/1995
Georgia	1994	1/1/1995
Iowa	1996	7/1/1996
Kansas	1992	7/1/1993
Lousiana	1996	1/1/1997
Maine	1995	10/1/1995
Michigan	1994	6/27/1994
Minnesota	1992	8/1/1993
Mississippi	1995	7/1/1995
Missouri	1994	8/28/1994
New Jersey	1997	6/9/1997
New York	1995	10/1/1995
North Carolina	1993	10/1/1994
North Dakota	1995	8/1/1995
Ohio	1995	7/1/1996
Oklahoma	1997	7/1/1998
Oregon	1995	4/1/1995
Pennsylvania	1911	1911
South Dakota	1995	1/1/1996
Tennessee	1995	7/1/1995
Utah	1985	12/1/1985
Virginia	1994	1/1/1995
Washington	1990	7/1/1990

Sources: *National Conference of State Legislatures*, “1993-1997 State Laws Related To ‘Truth In Sentencing’” (1997), General Accounting Office, *Truth in Sentencing: Availability of Federal Grants Influenced Laws in Some States* (1998), *Truth in Sentencing in State Prisons* (1999).

Table 2: TEST OF TIS STATES SELECTION (YEAR=1993)

	(1)	(2)	(3)	(4)
	TIS state	TIS state	TIS state	TIS state
log(Violent)	0.0689 (0.112)		0.0397 (0.152)	-0.202 (0.260)
log(Property)		0.190 (0.303)	0.118 (0.409)	-0.112 (0.626)
Unemployment				-0.0499 (0.0795)
log(Income)				1.170 (1.251)
log(Lag parole)				0.0276 (0.0742)
log(Lag Prisoner)				0.0700 (0.291)
Poverty				0.0480 (0.0494)
log(Gas)				0.118 (0.441)
Abort				0.0137 (0.0171)
strike				0.539 (0.562)
log(Subsidy)				0.456 (0.350)
log(Welfare)				-0.434 (0.577)
log(Police)				-0.108 (0.589)
% of male aged at 18-24				-20.68 (24.92)
% of male aged at 25-64				-18.36* (9.088)
% of African-Americans				2.447 (1.565)
% of Whites				1.013 (1.129)
Observations	50	50	50	50
R ²	0.00780	0.00812	0.00957	0.333

The table reports the selection of TIS states based on the linear probability regression. The results are robust to logit and probit. Each column represents a separate regression. Significant at ***1%, **5%, *10%.

Table 3: COMPARISONS OF STATE-LEVEL CHARACTERISTICS (YEAR = 1994)

	Violent/non-violent crime rate			Socio-economic			Demographics		
	TIS	non-TIS	t-Value	TIS	non-TIS	t-Value	TIS	non-TIS	t-Value
Violent	570.84 (266.52)	531.78 (302.03)	0.48	49879.74 (6448.82)	51146.57 (8884.33)	-0.57	6534111 (6569673)	3623913 (4139408)	1.90*
Murder	7.40 (4.44)	6.68 (3.76)	0.63	12.65 (3.57)	12.36 (3.74)	0.28	0.05 (0.00)	0.05 (0.00)	-0.51
Rape	40.86 (14.48)	37.99 (13.07)	0.74	Unemployment	5.56 (1.33)	-0.24	0.25 (0.01)	0.26 (0.01)	-1.6
Robbery	176.69 (106.72)	136.22 (110.48)	1.31	Prisoner	332.55 (142.95)	0.55	0.85 (0.09)	0.86 (0.14)	-0.26
Assault	345.89 (172.29)	350.88 (203.18)	-0.09	Welfare	649.41 (202.59)	0.10	0.12 (0.10)	0.08 (0.09)	1.28
Property	4520.39 (1141.70)	4280.20 (999.41)	0.79	Subsidy	115.69 (60.27)	0.66			
Burglary	991.13 (317.51)	905.36 (249.40)	1.07	Police	132.32 (37.12)	0.21			
Larceny	3035.42 (717.02)	2962.98 (721.07)	0.35	Gas	44583374 (11422805)	1.12			
Motor	493.82 (248.12)	411.86 (189.63)	1.32	Three Strikes	0.33 (0.48)	0.91			
				Abortion	22.20 (9.54)	1.37			
				Parole	188.50 (156.81)	1.24			

The table reports the means of violent and property crime rates, socio-economic indicators and demographics in 1994 for both TIS and non-TIS states. It shows that, except for population, the differences in these variables are not significant in 1994 when the 1994 Crime Act was passed. Significant at ***1%, **5%, *10%.

Table 4: IMPACTS OF TIS ON VIOLENT CRIMES: 1990-2010

	(1)	(2)	(3)	(4)
	log(Violent Rate)	log(Violent Rate)	log(Violent Rate)	log(Violent Rate)
TIS	-0.143** (0.0653)	-0.147** (0.0697)	-0.0962** (0.0408)	-0.0517 (0.0324)
Observations	1050	1050	1050	1050
R ²	0.927	0.935	0.959	0.986
	log(Murder Rate)	log(Murder Rate)	log(Murder Rate)	log(Murder Rate)
TIS	-0.0539 (0.0907)	-0.067 (0.0894)	-0.0748* (0.0407)	-0.0735* (0.0433)
Observations	1050	1050	1050	1050
R ²	0.91	0.92	0.942	0.962
	log(Rape Rate)	log(Rape Rate)	log(Rape Rate)	log(Rape Rate)
TIS	-0.113** (0.0559)	-0.113* (0.057)	-0.0653* (0.0381)	0.00503 (0.0399)
Observations	1050	1050	1050	1050
R ²	0.887	0.897	0.925	0.967
	log(Robbery Rate)	log(Robbery Rate)	log(Robbery Rate)	log(Robbery Rate)
TIS	-0.198** (0.0896)	-0.203** (0.0911)	-0.156** (0.0582)	-0.0553* (0.0279)
Observations	1050	1050	1050	1050
R ²	0.941	0.948	0.964	0.988
	log(Assault Rate)	log(Assault Rate)	log(Assault Rate)	log(Assault Rate)
TIS	-0.128** (0.0629)	-0.136* (0.0685)	-0.0830* (0.0446)	-0.0566 (0.0432)
Observations	1050	1050	1050	1050
R ²	0.92	0.927	0.95	0.98
State/Year Fixed Effects	Yes	Yes	Yes	Yes
Region-by-year Fixed Effects		Yes	Yes	Yes
Time-varying Controls			Yes	Yes
State-specific time trends				Yes

This table reports the baseline results from the differences-in-differences regression. Each column represents a separate regression of one specific crime. The unit of observation is state-year. Robust standard errors are clustered at the state level and are reported in parentheses. Time-varying controls include population, median of household's real income, unemployment rate, poverty rate, one year lag of incarceration rate per 100,000 populations, one year lag of the number of adults on parole, per capita government spending on assistance and subsidies, per capita government spending on public welfare, per capita government spending on police protection, implementation of the Three Strikes laws, abortion rates and per capita consumption of motor gasoline excluding fuel ethanol. Significant at ***1%, **5%, *10%.

Table 5: DYNAMIC IMPACTS ON VIOLENT CRIMES: COMPARISON WITH ONE YEAR BEFORE TIS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	log(Violent Rate)	log(Violent Rate)	log(Murder Rate)	log(Rape Rate)	log(Robbery Rate)	log(Assault Rate)									
Three years before	-0.000954 (0.0140)	0.00620 (0.0172)	-0.00274 (0.0160)	0.0223 (0.0293)	0.0600* (0.0354)	0.0429 (0.0356)	-0.00303 (0.0260)	-0.00903 (0.0223)	-0.0108 (0.0205)	0.000272 (0.0165)	0.0159 (0.0235)	-0.00976 (0.0215)	-0.00326 (0.0164)	-0.00165 (0.0180)	-0.00226 (0.0180)
Two years before	0.00189 (0.0162)	0.00187 (0.0175)	-0.00465 (0.0145)	0.0171 (0.0200)	0.0231 (0.0272)	0.00999 (0.0240)	0.00161 (0.0239)	-0.00813 (0.0214)	-0.0128 (0.0189)	0.00428 (0.0226)	0.00277 (0.0263)	-0.0147 (0.0233)	-0.00338 (0.0171)	-0.00367 (0.0186)	-0.00492 (0.0167)
TIS year	-0.133* (0.0667)	-0.124* (0.0627)	-0.0718* (0.0358)	-0.0716 (0.0887)	-0.0643 (0.0865)	-0.0444 (0.0502)	-0.0621 (0.0520)	-0.0760 (0.0478)	-0.0342 (0.0376)	-0.205** (0.101)	-0.176* (0.0982)	-0.123* (0.0659)	-0.103* (0.0616)	-0.110* (0.0626)	-0.0599 (0.0391)
One year after	-0.0664 (0.0398)	-0.0774* (0.0409)	-0.0497* (0.0288)	-0.0117 (0.0606)	-0.0152 (0.0620)	-0.0226 (0.0353)	-0.0463 (0.0352)	-0.0475 (0.0352)	-0.0238 (0.0266)	-0.0954 (0.0574)	-0.0965 (0.0580)	-0.0750** (0.0365)	-0.0580 (0.0359)	-0.0791* (0.0415)	-0.0463 (0.0318)
Two or more years after	-0.151** (0.0668)	-0.150** (0.0704)	-0.1102** (0.0421)	-0.0507 (0.0921)	-0.0557 (0.0899)	-0.0709 (0.0429)	-0.122** (0.0599)	-0.124** (0.0604)	-0.0765* (0.0407)	-0.208** (0.0902)	-0.209** (0.0897)	-0.170*** (0.0589)	-0.138** (0.0664)	-0.140* (0.0709)	-0.0870* (0.0467)
Observations	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050
R ²	0.928	0.935	0.960	0.910	0.921	0.942	0.888	0.898	0.927	0.942	0.949	0.964	0.921	0.927	0.950
State/Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region-by-year Fixed Effects		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes
Time-varying Controls			Yes			Yes			Yes			Yes			Yes

This table reports the results from the event-study regression. Each column represents a separate regression of one specific crime. The unit of observation is state-year. Robust standard errors are clustered at the state level and are reported in parentheses. The estimates in each cell could be described as changes of growth of crime rates in TIS states (relative to non-TIS states) compared to one year before TIS was officially adopted. Time-varying controls include population, median of household's real income, unemployment rate, poverty rate, incarceration rate per 100,000 populations and its lag, the number of adults on parole and its lag, per capita government spending on assistance and subsidies, per capita government spending on public welfare, per capita government spending on police protection, implementation of the Three Strikes laws, abortion rates and per capita consumption of motor gasoline excluding fuel ethanol. Significant at ***1%, **5%, *10%.

Table 6: IMPACTS OF TIS ON PROPERTY CRIMES: 1990-2010

	(1)	(2)	(3)	(4)
	log(Property Rate)	log(Property Rate)	log(Property Rate)	log(Property Rate)
TIS	-0.0980*	-0.0966*	-0.0740**	-0.0173
	(0.0569)	(0.0564)	(0.0328)	(0.0207)
Observations	1050	1050	1050	1050
R ²	0.906	0.934	0.954	0.985
	log(Burglary Rate)	log(Burglary Rate)	log(Burglary Rate)	log(Burglary Rate)
TIS	-0.117	-0.112	-0.0910**	-0.0239
	(0.0736)	(0.0670)	(0.0389)	(0.0227)
Observations	1050	1050	1050	1050
R ²	0.907	0.94	0.957	0.986
	log(Larceny Rate)	log(Larceny Rate)	log(Larceny Rate)	log(Larceny Rate)
TIS	-0.0820*	-0.0826*	-0.0596*	-0.00821
	(0.0472)	(0.0484)	(0.0305)	(0.0213)
Observations	1050	1050	1050	1050
R ²	0.911	0.933	0.95	0.982
	log(Motor Theft Rate)	log(Motor Theft Rate)	log(Motor Theft Rate)	log(Motor Theft Rate)
TIS	-0.145	-0.137	-0.110*	-0.0287
	(0.1300)	(0.1020)	(0.0568)	(0.0293)
Observations	1050	1050	1050	1050
R ²	0.853	0.921	0.947	0.98
State/Year Fixed Effects	Yes	Yes	Yes	Yes
Region-by-year Fixed Effects		Yes	Yes	Yes
Time-varying Controls			Yes	Yes
State-specific time trends				Yes

This table reports the baseline results from the differences-in-differences regression. Each column represents a separate regression of one specific crime. The unit of observation is state-year. Robust standard errors are clustered at the state level and are reported in parentheses. Time-varying controls include population, median of household's real income, unemployment rate, poverty rate, one year lag of incarceration rate per 100,000 populations, one year lag of the number of adults on parole, per capita government spending on assistance and subsidies, per capita government spending on public welfare, per capita government spending on police protection, implementation of the Three Strikes laws, abortion rates and per capita consumption of motor gasoline excluding fuel ethanol. Significant at ***1%, **5%, *10%.

Table 7: DYNAMIC IMPACTS ON PROPERTY CRIMES: COMPARISON WITH ONE YEAR BEFORE TIS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	log(Property Rate)			log(Burglary Rate)			log(Larceny Rate)			log(Motor Theft Rate)		
Three years before	-0.00280 (0.00995)	0.0124 (0.00987)	-0.000541 (0.00810)	0.000444 (0.0105)	0.0252** (0.0112)	0.00901 (0.0121)	0.00271 (0.0109)	0.00837 (0.0104)	-0.00197 (0.00962)	-0.0297 (0.0218)	0.0147 (0.0216)	-0.00832 (0.0134)
Two years before	0.00497 (0.0111)	0.0131 (0.0115)	0.00180 (0.0101)	0.00811 (0.0139)	0.0231 (0.0143)	0.00943 (0.0142)	0.00956 (0.0103)	0.00811 (0.0108)	-0.00118 (0.0104)	-0.0217 (0.0220)	0.0213 (0.0241)	0.00275 (0.0170)
TIS year	-0.0612 (0.0638)	-0.0360 (0.0586)	-0.0145 (0.0356)	-0.117 (0.0908)	-0.0642 (0.0705)	-0.0375 (0.0429)	-0.0219 (0.0488)	-0.0162 (0.0519)	-0.000910 (0.0349)	-0.169 (0.146)	-0.0834 (0.102)	-0.0382 (0.0595)
One year after	-0.0372 (0.0396)	-0.0403 (0.0394)	-0.0326 (0.0234)	-0.0412 (0.0475)	-0.0308 (0.0414)	-0.0295 (0.0223)	-0.0223 (0.0319)	-0.0340 (0.0357)	-0.0246 (0.0245)	-0.108 (0.0833)	-0.0862 (0.0666)	-0.0710** (0.0340)
Two or more year after	-0.105* (0.0585)	-0.0966* (0.0566)	-0.0778** (0.0340)	-0.127 (0.0782)	-0.112 (0.0687)	-0.0952** (0.0418)	-0.0877* (0.0486)	-0.0835* (0.0489)	-0.0634* (0.0319)	-0.153 (0.130)	-0.131 (0.0999)	-0.113* (0.0569)
Observations	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050	1050
R ²	0.907	0.934	0.955	0.908	0.941	0.958	0.913	0.933	0.950	0.853	0.921	0.947
State/Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region-by-year Fixed Effects		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes
Time-varying Controls			Yes			Yes			Yes			Yes

This table reports the results from the event-study regression. Each column represents a separate regression of one specific crime. The unit of observation is state-year. Robust standard errors are clustered at the state level and are reported in parentheses. The estimates in each cell could be described as changes of growth of crime rates in TIS states (relative to non-TIS states) compared to one year before TIS was officially adopted. Time-varying controls include population, median of household's real income, unemployment rate, poverty rate, incarceration rate per 100,000 populations and its lag, the number of adults on parole and its lag, per capita government spending on assistance and subsidies, per capita government spending on public welfare, per capita government spending on police protection, implementation of the Three Strikes laws, abortion rates and per capita consumption of motor gasoline excluding fuel ethanol. Significant at ***1%, **5%, *10%.

Table 8: DYNAMIC IMPACTS OF TIS ON CRIME RATES: 1990 - 2010

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	A: Violent crimes (<i>Observations = 1050 state-years</i>)														
	log(Violent Rate)														
First 2 years	-0.0516 (0.0359)	-0.0386 (0.0262)	-0.0345 (0.0251)	-0.0200 (0.0593)	-0.0365 (0.0316)	-0.0676** (0.0327)	-0.0348 (0.0310)	-0.0108 (0.0263)	0.00764 (0.0320)	-0.0770 (0.0539)	-0.0524 (0.0343)	-0.0530** (0.0224)	-0.0429 (0.0325)	-0.0382 (0.0291)	-0.0308 (0.0330)
Years 3-4	-0.0998** (0.0479)	-0.0750** (0.0345)	-0.0629** (0.0359)	-0.0500 (0.0845)	-0.0809** (0.0432)	-0.118** (0.0509)	-0.0623 (0.0495)	-0.0224 (0.0433)	0.0158 (0.0491)	-0.126* (0.0708)	-0.0960** (0.0407)	-0.0847** (0.0330)	-0.0968* (0.0484)	-0.0780* (0.0411)	-0.0657 (0.0485)
Years 5-6	-0.127** (0.0597)	-0.0818** (0.0394)	-0.0598 (0.0426)	-0.0637 (0.0953)	-0.0798* (0.0455)	-0.131** (0.0584)	-0.102* (0.0581)	-0.0496 (0.0461)	0.0161 (0.0584)	-0.180* (0.0909)	-0.125** (0.0596)	-0.0999* (0.0503)	-0.109* (0.0560)	-0.0753 (0.0452)	-0.0553 (0.0575)
Years 7-8	-0.154** (0.0717)	-0.0943** (0.0468)	-0.0521 (0.0505)	-0.0384 (0.105)	-0.0431 (0.0499)	-0.0996 (0.0688)	-0.114* (0.0614)	-0.0603 (0.0453)	0.0307 (0.0595)	-0.223** (0.106)	-0.160** (0.0714)	-0.124** (0.0602)	-0.136* (0.0681)	-0.0813 (0.0522)	-0.0369 (0.0679)
Years 9 onwards	-0.189** (0.0910)	-0.130** (0.0587)	-0.0502 (0.0551)	-0.0655 (0.110)	-0.102* (0.0561)	-0.147* (0.0766)	-0.170** (0.0752)	-0.115** (0.0444)	0.0467 (0.0684)	-0.264** (0.115)	-0.228** (0.0846)	-0.144** (0.0694)	-0.170* (0.0916)	-0.102 (0.0632)	-0.0308 (0.0735)
R ²	0.929	0.960	0.986	0.910	0.943	0.962	0.892	0.929	0.968	0.943	0.966	0.988	0.922	0.950	0.980
	B: Property Crimes (<i>Observations = 1050 state-years</i>)														
	log(Property Rate)														
First 2 years	-0.0238 (0.0387)	-0.0231 (0.0203)	-0.0130 (0.0177)	-0.0186 (0.0439)	-0.0158 (0.0171)	-0.0110 (0.0167)	-0.0139 (0.0301)	-0.0200 (0.0218)	-0.0116 (0.0186)	-0.0846 (0.0828)	-0.0426 (0.0302)	-0.00978 (0.0252)			
Years 3-4	-0.0600 (0.0496)	-0.0504* (0.0254)	-0.0353 (0.0230)	-0.0685 (0.0606)	-0.0629** (0.0252)	-0.0540** (0.0240)	-0.0437 (0.0402)	-0.0398 (0.0258)	-0.0273 (0.0233)	-0.124 (0.106)	-0.0619 (0.0403)	-0.0138 (0.0349)			
Years 5-6	-0.0948 (0.0606)	-0.0650** (0.0312)	-0.0478 (0.0301)	-0.0994 (0.0733)	-0.0685* (0.0377)	-0.0595* (0.0348)	-0.0747 (0.0509)	-0.0518* (0.0298)	-0.0383 (0.0310)	-0.180 (0.126)	-0.105* (0.0542)	-0.0299 (0.0481)			
Years 7-8	-0.124* (0.0679)	-0.0746** (0.0363)	-0.0627* (0.0365)	-0.132 (0.0856)	-0.0818* (0.0446)	-0.0787* (0.0419)	-0.105* (0.0566)	-0.0594* (0.0338)	-0.0519 (0.0376)	-0.200 (0.144)	-0.125* (0.0642)	-0.0374 (0.0646)			
Years 9 onwards	-0.128* (0.0684)	-0.106** (0.0453)	-0.0780* (0.0428)	-0.157 (0.0935)	-0.133** (0.0589)	-0.109** (0.0502)	-0.118** (0.0566)	-0.0910** (0.0408)	-0.0707 (0.0442)	-0.133 (0.167)	-0.146* (0.0818)	-0.0142 (0.0830)			
R ²	0.909	0.956	0.985	0.910	0.959	0.987	0.915	0.952	0.982	0.853	0.947	0.980			
State/Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region-by-year Fixed Effects		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes
Time-varying Controls		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes
State-specific Time Trends			Yes												Yes

This table reports the dynamic response of violent crimes (panel A) and property crimes (panel B) to the adoption of TIS. Each column represents a separate regression. The unit of observation is state-year. Robust standard errors are clustered at the state level and are reported in parentheses. Time-varying controls include population, median of household's real income, unemployment rate, poverty rate, incarceration rate per 100,000 populations and its lag, the number of adults on parole and its lag, per capita government spending on assistance and subsidies, per capita government spending on public welfare, per capita government spending on police protection, implementation of the Three Strikes laws, abortion rates and per capita consumption of motor gasoline excluding fuel ethanol. Significant at ***1%, **5%, *10%.

Table 9: PLACEBO TREATMENTS OF TIS

Sample period	log(Violent)	log(Murder)	log(Rape)	log(Robbery)	log(Assault)	log(Property)	log(Burglary)	log(Larceny)	log(Motor Theft)
1965 - 1985	-0.00920 (0.0532)	0.0830 (0.0586)	-0.0387 (0.0664)	0.0153 (0.0739)	-0.0180 (0.0707)	-0.0426 (0.0455)	-0.0738 (0.0553)	-0.0404 (0.0526)	0.000823 (0.0517)
1966 - 1986	-0.0231 (0.0509)	0.0776 (0.0605)	-0.0330 (0.0636)	0.00168 (0.0696)	-0.0204 (0.0686)	-0.0494 (0.0454)	-0.0735 (0.0552)	-0.0482 (0.0518)	-0.0129 (0.0557)
1967 - 1987	-0.0268 (0.0488)	0.0607 (0.0565)	-0.0300 (0.0609)	-0.00481 (0.0666)	-0.0161 (0.0670)	-0.0485 (0.0446)	-0.0689 (0.0541)	-0.0488 (0.0501)	-0.0100 (0.0598)
1968 - 1988	-0.0237 (0.0467)	0.0325 (0.0563)	-0.0347 (0.0608)	0.00494 (0.0621)	-0.0125 (0.0652)	-0.0427 (0.0467)	-0.0586 (0.0552)	-0.0455 (0.0514)	-0.00198 (0.0636)
1969 - 1989	-0.0184 (0.0437)	0.0362 (0.0572)	-0.0359 (0.0603)	0.0195 (0.0571)	-0.0132 (0.0608)	-0.0406 (0.0483)	-0.0554 (0.0547)	-0.0463 (0.0541)	0.0118 (0.0676)
1970 - 1990	-0.0160 (0.0428)	0.0423 (0.0622)	-0.0395 (0.0578)	0.0406 (0.0579)	-0.0249 (0.0549)	-0.0386 (0.0495)	-0.0564 (0.0537)	-0.0467 (0.0561)	0.0337 (0.0737)
1971 - 1991	-0.0211 (0.0449)	0.0373 (0.0615)	-0.0464 (0.0551)	0.0543 (0.0644)	-0.0455 (0.0498)	-0.0360 (0.0492)	-0.0520 (0.0543)	-0.0461 (0.0543)	0.0421 (0.0797)
1972 - 1992	-0.0262 (0.0458)	0.0247 (0.0597)	-0.0542 (0.0577)	0.0605 (0.0673)	-0.0600 (0.0470)	-0.0327 (0.0458)	-0.0479 (0.0533)	-0.0438 (0.0482)	0.0476 (0.0842)
1973 - 1993	-0.0303 (0.0439)	0.0343 (0.0546)	-0.0628 (0.0570)	0.0684 (0.0663)	-0.0709 (0.0465)	-0.0243 (0.0438)	-0.0428 (0.0526)	-0.0340 (0.0441)	0.0632 (0.0855)
1974 - 1994	-0.0389 (0.0433)	0.0254 (0.0490)	-0.0681 (0.0563)	0.0626 (0.0660)	-0.0805* (0.0475)	-0.0193 (0.0429)	-0.0409 (0.0536)	-0.0278 (0.0414)	0.0769 (0.0842)
1975 - 1995	-0.0474 (0.0405)	0.00356 (0.0416)	-0.0749 (0.0568)	0.0368 (0.0612)	-0.0738 (0.0455)	-0.0201 (0.0425)	-0.0453 (0.0564)	-0.0262 (0.0391)	0.0792 (0.0804)
1976 - 1996	-0.0571 (0.0376)	-0.0135 (0.0377)	-0.0822 (0.0611)	0.0158 (0.0561)	-0.0738* (0.0420)	-0.0217 (0.0442)	-0.0472 (0.0591)	-0.0263 (0.0404)	0.0796 (0.0760)
1977 - 1997	-0.0519 (0.0361)	-0.0339 (0.0445)	-0.0966 (0.0665)	0.0167 (0.0531)	-0.0633 (0.0395)	-0.0220 (0.0448)	-0.0386 (0.0587)	-0.0315 (0.0425)	0.0855 (0.0715)
1978 - 1998	-0.0466 (0.0370)	-0.0331 (0.0529)	-0.109 (0.0711)	0.0122 (0.0529)	-0.0496 (0.0393)	-0.0253 (0.0447)	-0.0321 (0.0573)	-0.0400 (0.0436)	0.0851 (0.0721)
1979 - 1999	-0.0473 (0.0388)	-0.0243 (0.0622)	-0.120 (0.0747)	0.0000521 (0.0543)	-0.0427 (0.0394)	-0.0308 (0.0451)	-0.0302 (0.0554)	-0.0486 (0.0453)	0.0778 (0.0755)
1980 - 2000	-0.0511 (0.0407)	-0.0287 (0.0687)	-0.133* (0.0761)	-0.0166 (0.0582)	-0.0385 (0.0414)	-0.0366 (0.0452)	-0.0329 (0.0554)	-0.0551 (0.0459)	0.0664 (0.0774)
1981 - 2001	-0.0480 (0.0426)	-0.0320 (0.0745)	-0.132* (0.0730)	-0.0304 (0.0631)	-0.0281 (0.0478)	-0.0400 (0.0459)	-0.0322 (0.0564)	-0.0590 (0.0470)	0.0544 (0.0808)
1982 - 2002	-0.0599 (0.0440)	-0.0415 (0.0785)	-0.133* (0.0704)	-0.0515 (0.0684)	-0.0415 (0.0501)	-0.0409 (0.0491)	-0.0333 (0.0600)	-0.0578 (0.0502)	0.0384 (0.0847)
1983 - 2003	-0.0925* (0.0478)	-0.0668 (0.0800)	-0.139** (0.0676)	-0.0901 (0.0744)	-0.0785 (0.0502)	-0.0457 (0.0527)	-0.0383 (0.0629)	-0.0589 (0.0530)	0.00960 (0.0894)
1984 - 2004	-0.120** (0.0522)	-0.0832 (0.0810)	-0.139** (0.0651)	-0.127 (0.0814)	-0.106** (0.0506)	-0.0538 (0.0573)	-0.0427 (0.0667)	-0.0643 (0.0560)	-0.0227 (0.0962)
1985 - 2005	-0.139** (0.0558)	-0.0930 (0.0846)	-0.138** (0.0625)	-0.150* (0.0877)	-0.128** (0.0506)	-0.0634 (0.0619)	-0.0467 (0.0708)	-0.0707 (0.0584)	-0.0588 (0.108)
1986 - 2006	-0.145** (0.0597)	-0.0818 (0.0872)	-0.137** (0.0600)	-0.162* (0.0922)	-0.137** (0.0538)	-0.0666 (0.0644)	-0.0459 (0.0729)	-0.0708 (0.0584)	-0.0844 (0.120)
1987 - 2007	-0.147** (0.0629)	-0.0813 (0.0911)	-0.129** (0.0573)	-0.175* (0.0947)	-0.136** (0.0553)	-0.0712 (0.0648)	-0.0555 (0.0736)	-0.0698 (0.0566)	-0.109 (0.131)
1988 - 2008	-0.149** (0.0665)	-0.0792 (0.0954)	-0.128** (0.0563)	-0.192* (0.0966)	-0.135** (0.0585)	-0.0809 (0.0646)	-0.0768 (0.0748)	-0.0737 (0.0550)	-0.124 (0.138)
1989 - 2009	-0.150** (0.0674)	-0.0697 (0.0951)	-0.126** (0.0560)	-0.202** (0.0948)	-0.133** (0.0613)	-0.0910 (0.0614)	-0.0994 (0.0743)	-0.0782 (0.0510)	-0.140 (0.137)
1990 - 2010	-0.143** (0.0653)	-0.0539 (0.0907)	-0.113** (0.0559)	-0.198** (0.0896)	-0.128** (0.0629)	-0.0980* (0.0569)	-0.117 (0.0736)	-0.0820* (0.0472)	-0.145 (0.130)
State/Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

This table reports the placebo treatments of TIS on violent and property crimes. Each cell represents a separate regression during the corresponding sampling period. The unit of observation is state-year. Robust standard errors are clustered at the state level and are reported in parentheses. The values in the last row are corresponding to column 1 in Table 4 and 6. Significant at ***1%, **5%, *10%.

Appendix

According to UCR Offense Definitions, the Part I offenses are defined as:

- **Criminal homicide:** a.) Murder and nonnegligent manslaughter: the willful (nonnegligent) killing of one human being by another. Deaths caused by negligence, attempts to kill, assaults to kill, suicides, and accidental deaths are excluded. The program classifies justifiable homicides separately and limits the definition to: (1) the killing of a felon by a law enforcement officer in the line of duty; or (2) the killing of a felon, during the commission of a felony, by a private citizen. b.) Manslaughter by negligence: the killing of another person through gross negligence. Deaths of persons due to their own negligence, accidental deaths not resulting from gross negligence, and traffic fatalities are not included in the category Manslaughter by Negligence.

- **Forcible rape:** The carnal knowledge of a female forcibly and against her will. Rapes by force and attempts or assaults to rape, regardless of the age of the victim, are included. Statutory offenses (no force used — victim under age of consent) are excluded.

Note: In December 2011, the UCR Program changed its SRS definition of rape: “Penetration, no matter how slight, of the vagina or anus with any body part or object, or oral penetration by a sex organ of another person, without the consent of the victim.” The effect of this definition change will not be seen in reported crime data until after January 2013. Data reported from prior years will not be revised.

- **Robbery:** The taking or attempting to take anything of value from the care, custody, or control of a person or persons by force or threat of force or violence and/or by putting the victim in fear.
- **Aggravated assault:** An unlawful attack by one person upon another for the purpose of inflicting severe or aggravated bodily injury. This type of assault usually is accompanied by the use of a weapon or by means likely to produce death or great bodily harm. Simple assaults are excluded.
- **Burglary (breaking or entering):** The unlawful entry of a structure to commit a felony or a theft. Attempted forcible entry is included.
- **Larceny-theft:** The unlawful taking, carrying, leading, or riding away of property from the possession or constructive possession of another. Examples are thefts of bicycles, motor vehicle parts and accessories, shoplifting, pocketpicking, or the stealing of any property or article that is not taken by force and violence or by fraud. Attempted larcenies are included. Embezzlement, confidence games, forgery, check fraud, etc., are excluded.
- **Motor vehicle theft:** The theft or attempted theft of a motor vehicle. A motor vehicle is self-propelled and runs on land surface and not on rails. Motorboats, construction equipment, airplanes, and farming equipment are specifically excluded from this category.
- **Arson:** Any willful or malicious burning or attempt to burn, with or without intent to defraud, a dwelling house, public building, motor vehicle or aircraft, personal property of another, etc. Arson statistics are not included in this table-building tool.