

# **EARNED INCOME TAX CREDIT AND CRIME**

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## **Abstract**

This study examines the relationship between EITC laws and crime. Using data from 1999 to 2017, a period with 73 state EITC changes, I evaluate the effects of state-level EITCs on violent and property crime. Estimating difference-in-differences models, I find that higher EITCs are associated with significant reductions in violent crime, while not affecting property crimes. Introducing high state EITC is associated with a 10.0 percent reduction in violent crimes, which corresponds to 40 fewer crimes per 100,000 individuals. Event study estimates confirm the negative association between EITC generosity and violent crime.

**Keywords:** Earned Income Tax Credit; Violent Crime; Property Crime

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## I. INTRODUCTION

The Earned Income Tax Credit (EITC) has become one of the largest anti-poverty programs in the U.S over recent decades. While it has been established that the program is successful in lifting low-income families above the poverty threshold by providing increased employment incentives, the EITC has also been shown to improve several other outcomes related to the well-being of society, such as education (Bastian and Michelmore, 2018) and both individual (e.g. Evans and Garthwaite, 2014; Boyd-Swan et al., 2016) and population health (Hoynes et al., 2015; Markowitz et al., 2017; Lenhart, 2019a). In line with the increased impact of the program, more than half of U.S. states have implemented state-level credits on top of the federal rate. This study examines whether higher state EITCs can provide a positive externality to society by reducing regional crime rates. On the one hand, changes in income and employment could affect crime by developing human capital and reducing incentives to seek supplemental income from illegal sources for people at risk for engaging in criminal activities. On the other hand, given that EITC benefits typically provide one-time tax refunds, they could increase the consumption of complements to crime, such as leisure or illicit drugs and alcohol, if recipients do not smooth their consumption.

Using data for the years 1999 to 2017, a period with 73 state-level EITC changes, this study evaluates the relationship between EITC laws and state crime rates. While previous work has examined the relationship between both welfare reforms and crime (Corman et al., 2014) as well as EITC benefits and criminal activity among recently released prisoners (Agan and Makowsky, 2018), to my knowledge this is the first study evaluating the effect of EITC laws on overall crime rates. Estimating difference-in-differences models with four different measures of EITC, I find that higher EITC credits are associated with significant reductions in violent crime, while having not being associated with changes in property crimes. Compared to having no EITC in place, implementing a state credit equal of at least 10

percent of the federal rate is associated with a 10.0 percent decline in violent crimes. I show that this result is robust to the use of alternate measures of the EITC. When examining specific type of crimes, I show that changes in the number of assaults are responsible for a large share of the reductions in violent crimes. Introducing a high EITC rate is associated with a 14.4 percent reduction in assaults compared to having no state EITC in place. The associations are shown to be persistent, which suggests that changes in employment rather than one-time income boosts might be the primary mechanisms underlying the association between EITC levels and crime. Finally, event study estimates confirm the statistically significant negative association between EITC laws and violent crime.

## II. RELATED LITERATURE

Economists typically have tried explaining the presence of crime by examining how the propensity to commit a crime responds to the expected costs and benefits of an illegal activity (Becker, 1968; Ehrlich, 1974 and 1996). Adding to this groundwork set by these earlier studies, several studies have empirically investigated the determinants of crime, finding that violent and property crime have different causes.

Researchers have established that reductions in income inequality are associated with decreases in violent crimes (Crutchfield, 1989; Kennedy et al, 1998; Fajnzylber et al. 2002a and 2002b). Analyzing data for 39 countries, Fajnzylber et al. (2002b) suggests that the Gini index and the rate of poverty alleviation are strongly associated with violent crime, whereas the mean level of income, average educational attainment of the adult population and the degree of urbanization are not correlated with crime rates. Similarly, Crutchfield (1989) concludes his analysis by suggesting that the presence of life chances in the context of work are important determinants of violent crime (murder). Using a panel of 45 developed and developing countries, Fajnzylber et al. (2002a) also shows that violent crime rates are associated with regional economic conditions showing that violent crime is counter-cyclical.

On the other hand, using data from the same source as this study, Allen (1996) finds that decreases in general income inequality and absolute poverty are actually associated with increased property crimes. In his analysis of determinants of property crime, he finds that macroeconomic stability and actions by the criminal justice system play important roles in reducing property crime. Similarly, Ralston (1999) shows that property crime in the U.S. is highly associated with inflation, as well as both cyclical and frictional unemployment.

To my knowledge, only one previous study has so far examined the association between state-level EITCs and crime. In a current working paper, Agan and Makowsky (2018) examine the effects of both higher minimum wages and state EITCs among a sample of recently released prisoners. The authors provide evidence that state EITCs reduce recidivism among women only. When evaluating the effects on different types of crimes, Agan and Magowsky (2018) show that EITCs are associated with less violent and drug crimes, while finding increases for these crimes among men. For other types of crimes, the authors find no effects for both men and women. Given that criminals may face different mechanisms than those without criminal records, examining the effects of EITC rates on recidivism is likely different than examining the association between the policy and overall crime rates, as done in this study. Thus, my analysis adds to the groundwork set by Agan and Makowsky (2018) in evaluating the role of EITC laws on crime.

In an empirical analysis of property crime in 120 counties in Kentucky, Howsen and Jarrel (1987) find no association between the level of public assistance payments and property crime rates. In contrast to this, Corman et al. (2014) find that the welfare reform in the 1990s had significant negative effect on female arrests for serious property offenses, while having no effects on violent offenses. The authors provide evidence that women responded to the welfare reforms by substituting legal work for illegal income-generating activities. Palmer et al. (2019) find that public policy can reduce crime by insuring people

against negative income shocks. Using quasi-random variation in the allocation of temporary financial assistance to eligible households who experienced economic shocks, the authors show that the emergency support significantly reduces both violent and property crime. Palmer et al. (2019) suggest that financial assistance provides social benefits due to greater social costs of criminal behavior.

Researchers have also shown that crime rates are associated with AFDC benefits (Niskanen, 2006), exit from welfare without employment (Monte and Lewis, 2011), the timing of welfare benefit payments (Foley, 2011; Carr and Packham, 2019a and 2019b), rental housing development subsidies (Freedman and Owens, 2011), unemployment benefits (Bennett and Ouazad, 2019) and labor market programs (Aaltonen et al., 2013). In addition, several studies have provided evidence for a strong association between local labor market conditions and crime. Unemployment rates have been shown to be a determinant of crime rates (Raphael and Winter-Ebmer, 2001; Gould et al., 2002; Aaltonen et al., 2013). Similarly, there is evidence that higher wages for low-skilled workers are associated with reductions in crime activities (Gould et al., 2002; Machin and Meghir, 2004; Yang, 2017). Finally, Uggen (2000) and Schnepel (2018) provide evidence that improved employment opportunities at the time of release are associated with significant reductions in recidivism. While finding that work opportunities do not affect criminal offenders under the age of 27, Uggen (2000) shows that work can be a turning point for those aged 27 or above.

### III. BACKGROUND

#### *A. Earned Income Tax Credit*

The EITC, a tax credit for low-income working families, was introduced in 1975 aimed at supplementing incomes and reducing tax burdens in an attempt to reward work for families with children rather than to provide guaranteed income. Since the original implementation, Congress has expanded the EITC several times both in terms of benefit size

and eligibility requirements. Today, the EITC has become the largest cash transfer program as well as the most important anti-poverty policy in the United States. During the 2017 tax year, more than 25 million eligible tax-filers received almost \$63 billion in federal EITC. In comparison, federal expenditures on Temporary Assistance to Needy Families (TANF), previously the largest cash transfer program in the United States, amounted to only \$15.2 billion (Office of Family Assistance, 2011). The policy has been praised as the largest and most effective anti-poverty program in the United States (Hoynes, 2016; Marr et al., 2015). In 1988, 13 years after the introduction of the federal EITC, U.S. states began introducing state-level credits on top of the federal rate. In 2017, 26 states plus Washington DC had a state EITC in place, with the size of the credits varying from 3.5 percent of the federal rate (Louisiana) to 85 percent of the federal rate (California).

In addition to the augmented importance of the program over the last decades, another reason why the EITC has attracted much interest by researchers is its unique payment structure, which significantly differs from other welfare programs. The size of benefits received by eligible families depends on several factors, such as the presence and number of qualifying children in the household. Depending on the amount of a family's earnings and adjusted gross income, EITC payments have: 1) A phase-in range in which higher earnings yield higher credits; 2) A plateau range where payments remain the same even as earnings rise; and 3) A phase-out range in which higher earnings yield lower credits.

### *B. EITC and Crime*

This study examines whether state-level variations in EITC rates affect crime. Based on existing evidence on the causes of crime and the effects of EITC benefits on well-being, I believe there are several mechanisms through which higher EITC benefits might reduce crime. These include changes in labor force participation, absolute and relative poverty,

opportunity costs as well as financial stress and mental well-being. The remainder of this sections discusses the role of these potential pathways in more detail.

The EITC could affect crime by increasing employment and reducing poverty among individuals with low socioeconomic status. Prior research has established that federal expansions of the EITC increase labor market participation among eligible individuals and help household move above the poverty threshold (Scholz, 1994; Eissa and Liebman, 1996; Meyer and Rosenbaum, 2001; Neumark and Wascher, 2001; Hotz and Scholz, 2003; Eissa et al. 2008; Meyer, 2010; Short, 2014; Hoynes and Patel, 2018; McKeehan, 2018). Similarly, researchers have established that state EITC positively affect labor market outcomes. Two recent studies show that exposure to more generous EITC benefits leads to higher earnings in the long-run among women (Kuka and Shenhav, 2020; Neumark and Shirley, 2020), whereas Lim and Michelmore (2018) find that higher state EITCs induce self-employment among low-income married mothers. Other studies show that refundable state EITCs enhance the effects of the program in reducing poverty (Lim, 2009; Gagnon et al., 2017). A study by Neumark and Williams (2016) shows that state EITCs increase participation in the federal EITC program. The authors further find that the effect of state EITC on federal program participation is larger in states with greater shares of potentially affected population, which matches the increases labor supply effects the they find for these states.

Previous work in the crime literature has shown that criminal activity is closely related to factors related to socioeconomic background. In a review of the literature on the socioeconomic determinants of crime, Buonanno (2003) shows that poverty, wages, and level of education may affect an individual's propensity to commit a crime. Similarly, a recent study by Nilsson et al. (2017) uses Swedish data from three birth cohorts to evaluate crime trends across groups with different socioeconomic background. While the authors show that

crime decreases among more affluent groups, they find that increases in violent crime are primarily driven by individuals in the lower level of the income distribution.

Dowd and Horowitz (2011) provide evidence that, rather than providing long-term income support, the EITC often only provides short-term benefits. The authors show that that 61 percent of EITC recipients only claim the EITC for one or two years. The fact that many individuals do receive benefits for long periods further suggests that changes in employment and poverty levels might be a mechanism underlying the relationship between EITC benefits and crime. Evidence by Tach and Halpern-Meehin (2014) suggests that, while unstable and complex work arrangements might make it challenging to alter their labor market participation, low-income households are more likely to make changes to their paperwork in an attempt to maximize their refunds.

A recent study by Hardy et al. (2018) shows that higher EITCs are capable of substantially reducing the levels of inequality between families on the lower tail and the middle of the income distribution. In line with the existing evidence showing that lower income inequality (Crutchfield, 1989; Kennedy et al, 1998; Fajnzylber et al. 2002a and 2002b) and life chances in the context of work (Crutchfield, 1998) are associated with lower levels of violent crime, employment opportunities for low-income individuals could be one mechanisms through which EITC rates affects violent crime. Furthermore, findings by Aaltonen et al. (2016) show that debt problems have a dynamic association with criminal offending suggest that financial security and stress could play a role underlying the link between EITC and crime (Felson et al., 2012). Following evidence that reductions in income inequality and poverty are not associated with property crime (Allen, 1996), we would expect to find that the size of EITC rates has a much larger impact violent crime if this mechanism plays a large role.



Related to the evidence on the association between inequality and crime, the EITC might affect criminal behavior through its effect on relative poverty. Receiving a boost in EITC benefits can improve financial security of low-income households. According to the concept of strain theory (Merton, 1938; Agnew, 1992), crime results from frustration when individuals are not able to achieve goals like wealth status. The theory suggests that these frustrations are present when observing others who are more successful.

Next, in line with the evidence on how the EITC affects labour market outcomes, increases in benefits can impact crime rates through its effect on individual's opportunity costs. Increases in employment can reduce crimes by developing human capital, reducing the time individuals have on hand to engage in criminal activities and thus decreasing the appeal of illegal activities.

Finally, the EITC has been shown to be linked with improved mental health outcomes for low-income individuals (Evans and Garthwaite, 2014; Boyd-Swan et al., 2016). Boyd-Swan et al. (2016) provide evidence that higher EITC benefits reduce the likelihood of being depressed, while increasing happiness and self-esteem. One likely channel through which this occurs is the reduction of (financial) stress (Evans and Garthwaite, 2014). In line with findings showing a link between criminal activity and both debt (Aaltonen et al., 2016) and financial stress (Felson et al., 2012), the effects of the EITC on mental well-being and financial security could be a mechanism underlying the relationship between EITC and crime. In a Swedish study using two different samples, Fazel et al. (2015) provide evidence that depression is a determinant that increases the risk of engaging in violent crime activities, which supports the potential role of mental well-being. Finally, Lenhart (2019b) shows that expansions of the EITC lead to reductions in food insecurity among affected households, which furthermore suggests that the program affects (financial) stress.

The pathways discussed in this section suggest that a combination of several factors could explain any observed association between EITC and crime. Furthermore, in line with existing evidence in the literature, it appears likely that the mechanisms have different effects for violent and property crime. Allen (1996) shows that reductions in poverty reduce violent crimes, while having not being associated with changes in property crime. Factors like financial stress and mental well-being, on the other hand, are likely to be associated with both types of crime. The mechanisms discussed in this section are different from those examined in a recent study evaluating the relationship between timing of SNAP benefits and domestic violence (Carr and Packham, 2019b). The authors find that issuing SNAP benefits on days other than the first of the month increases domestic crimes, while providing evidence that increased opportunities for within-household conflict and drug use are potential mechanisms. While Carr and Packham (2019b) explore the effects of changes in the timing of the provision of SNAP benefits on crime, this study explores the effects of expansions of an income assistance program. Thus, I believe that the mechanisms responsible for any potential association might differ.

Another reason for why different pathways might explain the association between EITC expansions and crime compared to other welfare programs is the fact that the delivery of EITC payments through refund checks destigmatizes the program compared to other cash transfer programs for low-income households (Tach and Halpern-Meek, 2014). Given the existing evidence showing that EITC increases lead to increased employment, reduced poverty, and improved mental health, higher EITCs might actually be related to decreases in within-household conflicts and reduced drug use. While there is no prior evidence on the relationship between EITC benefits and drug use, Averett and Wang (2013) find that expansions of the program reduce maternal smoking.

In line with previous related work, I separately examine the association between EITC laws and both property and violent crime to provide a better understanding of the potential mechanisms underlying the association. I also evaluate both contemporaneous and lagged effects to show whether any crime effects are delayed following EITC expansions. While the evaluation of possible mechanisms is outside the scope of this study, future work should explore the role of the possible channels mentioned in this section.

#### IV. DATA

##### *A. EITC Data*

This study examines the association between state EITC generosity and crime by using data for the period 1999 to 2017. I obtained information on state EITC rates from annual reports by the Internal Revenue Service (IRS). The number of states with EITC policies in place increased from nine in 1999, to 27 in 2017 during the period of the analysis. To capture changes in EITC rates over time, I use four different measures in the analysis. In the baseline model, I divide states into three groups based on the level of their credit: 1) states with no EITC (reference category); 2) states with EITC benefits of less than 10%; 3) states with EITC benefits of at least 10%. The cutoff of 10% is used because it is the median value of EITC benefits among states over the sample period and can be considered a measure of low generosity versus high generosity, as pointed out by Markowitz et al. (2017). Due to the unique structure of its EITC law, which does not match the measurement model used for all other states, Maryland is excluded from the analysis.<sup>1</sup>

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<sup>1</sup> Maryland has an EITC structure that differs from those states that also have state EITC in place. The state offers two different rates and Maryland resident who qualify for the state EITC can choose which of the two they select. While the two offered rates differ in the generosity (in 2017, the rates were 27 and 50 percent), the main difference between the two is that one rate is refundable, while the other one is not. Given that one of the indicators of EITC generosity used in my study exploits both the magnitude of the state credits and whether they are refundable, I decided to exclude Maryland from the main analysis. This is in line with recent studies evaluating the effects of state-level EITC changes that specifically explore differences in the refundability of the credits in addition to size of the credits (Markowitz et al., 2017; Komro et al., 2019; Lenhart, 2019).

Table 1 provides an overview of state-level EITC policy changes for each year of the study. The first three columns show the share of states in each year that have no state EITC, low state EITCs (less than 10 percent of federal EITC), and high state EITCs (at least 10 percent of federal EITC). The share of states with no EITC decreased from 82.4 to 49.0 percent, while the share of states with high EITC rates increased from 9.8 to 37.3 percent between 1999 and 2017. The fourth column of Table 1 shows the number of state EITC changes each year of the study. In total, there were 73 state-level EITC changes, and at least one policy change in each year. Finally, Table 1 shows that these state-level EITC changes correspond to 31 shifts between the three EITC groups. Of the 73 EITC changes during the period of the study, 29 represented changes of at least 5 percentage points, while 14 represented changes of at least 10 percentage points. Appendix Table A1 provides an overview of all EITC state rates during the period of this study.

In addition to the three categories (no EITC/low EITC/high EITC), this study uses three additional measures of EITC. The second measure complements the first one by additionally differentiating whether credit rates are refundable, which increases the number of groups from three to five. In addition to showing the effects of the state EITC size, this second measure also allows evaluating whether the availability of refundable credits impacts crime rates. The third EITC measure is an indicator that equals one if the state has any EITC credit in place in a given year. Thus, this measure evaluates the effect of implementing a new credit rate on crime. Finally, I estimate the impact of a 10 percentage point increase in state-level EITC rates as an alternative way to capture the effect of within-state EITC changes.

### *B. Crime Data*

This study uses state-level annual crime statistics provided by the FBI's Uniform Crime Reports (UCR). Using all the crime information available in the UCRs, I separately examine the effects of state EITCs on violent and property crime. This is in line with

previous work examining the association between public policy and crime (Freedman and Owens, 2011; Agan and Makowsky, 2018). In addition to evaluating these two broad categories, I also evaluate each type of crime within the two categories to examine whether certain types of crime drive the association between state EITC policies and crime. The four types of violent crime listed in the UCRs are murder, rape, robbery, and assault, whereas the reports include the following three property crimes: burglary, larceny, and vehicle theft. My analysis uses state crime rates per 100,000 inhabitants.

Figure 1 shows changes in violent and property crime rates during the period of the study. While both types of crimes decreased overall over time, differences in the trends are observable from 2010 on. During the last three years of the sample period, violent crimes appeared to have increased, while property crime rates continued to decrease. Table 2 provides average violent and property crimes for each state between 1999 and 2017. It is noticeable that Maine had the lowest violent crime rate, while South Dakota had the fewest reported property crimes. For both types of crimes, Washington DC had the most number of reported crimes per 100,000 individuals.

### *C. Other Controls*

The analysis includes a set of controls to account for potential confounding between EITC rates and crime. These include annual state unemployment rates and per capita GDP, obtained by the Bureau of Labor Statistics and the Bureau of Economic Analysis, respectively. To account for state differences in EITC take-up rates, my analysis data from the IRS and controls for the share of tax claims that were filed in each state that included EITC benefits. Furthermore, I control for the share of the state population below the age of 65 without any insurance coverage, state median income levels, and the presence of state parity laws for mental health treatment. Previous work on the EITC provides evidence that higher benefits are associated with changes in insurance coverage (Baughman, 2005; Hoynes et al.,

2015; Baughman and Duchovny, 2016; Lenhart, 2019c). To additionally account for other safety net programs which could potentially change at similar times to the EITC, my analysis controls for state Medicaid and TANF eligibility laws, real state minimum wages, and an index for housing prices, and for state welfare waivers.<sup>2</sup>

#### *D. Descriptive Statistics*

Table 3 presents descriptive statistics for crime and control variables by EITC groups. On average, states with the most generous EITC rates have the highest number of violent crimes, while states with no EITC rates experience the most property crimes of the three groups. The bottom of Table 3 shows that states without EITC on average also have the highest share of uninsured individuals (13.9 percent), the lowest threshold for Medicaid eligibility and lowest state minimum wages throughout the sample period.

Table 1 and Figure 1 show suggestive evidence that state EITC benefits increased and crime rates decreased throughout the period examined in this study, respectively. Figures 2A (violent crime) and 2B (property crime) graphically illustrate the EITC-crime relationship over time. In line with the previous statistics, both graphs provide evidence that the share of states with high EITC rates increased overall, while crime rates generally follow a downward trend. Appendix Figures A1 and A2 show that the relationship remains very similar when using maximum federal EITC rates (for a household with two children) as the indicator for EITC generosity.

## V. METHODS

Using the 73 state-level EITC changes during the sample period (1999 to 2017), I estimate difference-in-differences (DD) models to evaluate the association between EITC laws and crime. The main specification of the analysis is:

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<sup>2</sup> The state Medicaid eligibility used in this study is the eligibility threshold for children aged 1 to 5, in comparison to the Federal Poverty Line (FPL). TANF generosity is measured by the maximum income amounts at which families of three are still eligible to receive benefits. The real housing price index used is obtained from the OECD, with 2015 being equal to 100.

$$\text{Crime}_{st} = \beta_0 + \beta_1 \text{EITC}_{st} + \beta_2 X_{st} + \lambda_1 \text{Year}_t + \lambda_2 \text{State}_s + \varepsilon_{st}, \quad (1)$$

where  $\text{Crime}_{st}$  represents the log of the crime rate per 100,000 individuals in state  $s$  and year  $t$ . While I separately estimate the specifications for violent and property crimes, I also estimate models using each type of crime with these two broad categories in additional specifications.  $\text{EITC}_{st}$  are measures of the generosity of the state EITC in effect in the state at the relevant time. In order to check whether there is a lagged effect of EITC changes on crime, I also re-estimate equation (1) using a lagged indicator for EITC laws ( $\text{EITC}_{st-1}$ ) in alternative models. To test for potential reverse causality in the implementation of EITC law changes, I additionally estimate specifications using lead EITC rates. The lagged model, which also controls for contemporaneous EITC policies, estimates the following equation:

$$\text{Crime}_{st} = \beta_0 + \beta_1 \text{EITC}_{st-1} + \beta_2 \text{EITC}_{st} + \beta_3 X_{st} + \lambda_1 \text{Year}_t + \lambda_2 \text{State}_s + \varepsilon_{st}, \quad (2)$$

where  $\text{EITC}_{st-1}$  is replaced with  $\text{EITC}_{st+1}$  in the lead analysis.  $X_{st}$  represents a set of controls accounting for potential confounding between EITC benefits and crime rate, which include state unemployment rates, the share of tax returns in each state that included EITC benefits, mean income levels, per capita GDP, the share of the state population below the age of 65 without any insurance coverage, the presence of state parity laws for mental health treatment, as well as state Medicaid eligibility thresholds, TANF generosity, and state welfare waivers. Additionally, equation (1) includes both year and state fixed effects. Standard errors in all models are adjusted for within-state serial correlation by clustering at the state level. Finally, in additional models, I include linear state-specific time trends.

Given that almost all states with state-level EITCs changed their credit sizes multiple times throughout the study period, a clear pre- and post-period like in standard DD analyses with a single policy change is not available for this study. However, I test for the validity of the baseline DD assumptions by estimating event study models that use two states (Delaware and Virginia) that both implemented a state EITC rate (20 percent of the federal rate) in 2006

and did not change their credit rate in any other year between 1999 and 2017. In this additional specification, Delaware and Virginia form the treatment group, while all states with not EITC laws throughout the study period form the control group. In addition to the event study analysis, I also estimate lead effects of EITC changes to check for the presence of reverse causality. Statistically significant estimates in the lead specifications might suggest that policymakers introduce more generous EITC policies in response to increasing crime rates.

In an additional specification, I test for the exogeneity of state EITCs by evaluating the effects of the main control variables on the size of the state EITC rate. The results, which are presented in Appendix Table A2, show that only one of the eight control variables (Medicaid eligibility threshold) is statistically significant at the 10 percent level, whereas all others controls have small and statistically insignificant effects on state EITCs. These results suggest that business cycle or other policy changes do not predict changes in state EITC policy.

## VI. RESULTS

### *A. Main Results*

Table 4 presents estimates for the association between state-level EITC levels and violent and property crime rates. Using three levels of EITC (no credit, low credit, and high credit), Panel A shows that the program is associated with statistically significant reductions of violent crime, while having not being associated with changes in property crime rates. I find that compared to states without any EITC, introducing low and high credits is associated with reductions of violent crime rates of 7.3 ( $p < .05$ ) and 10.0 percent ( $p < 0.01$ ), respectively. Based on the sample mean, these estimates correspond reductions in the number of violent crimes per 100,000 individuals by 30 (low EITC) and 40 (high EITC). Additionally, Table 4



shows that the estimates remain similar in magnitude and significance when controlling for state-specific time trends.<sup>3</sup>

Using an alternative measure of EITC, Panel B additionally accounts for whether the state credits are refundable. The estimates suggest that refundability influences the effects of the program on crime. For both low and high EITC states, the estimates show that refundability increases the association between EITC laws and violent crime, with the estimates remaining statistically significant ( $p < 0.01$ ).<sup>4</sup> The results in Panel B suggest that the provision of a refundable credit is as important as the size of the credit rate. Panel C and D show estimates for the effects of introducing any EITC (low or high) and of a 10 percentage point increase in the size of the credit, respectively. I find that implementing an EITC law is associated with a 9.7 percent decline in the rate of violent crimes ( $p < 0.01$ ), which is in line with the previous results. While the estimate in Panel D is statistically insignificant, it shows that a 10 percentage point increase in the state-level EITC is associated with a 2.5 percent reduction in violent crimes. Again, I find no evidence that property crimes are affected by changes to EITC policies.<sup>5</sup>

In a final specification, I also exploit changes in the federal EITC in addition to changes in state EITCs during the study period. In 2009, benefits were expanded for families with at least three children. Using data from the Joint Committee on Taxation and the Internal Revenue Service, I evaluate the effects of maximum EITC benefits on crime rates, while also considering that maximum benefits differ by the number of children. The results, which are presented in Appendix Table A5, confirm that increases in EITC benefits are associated with

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<sup>3</sup> The estimates also remain unchanged when including polynomial time trends to further take into account the two recessions that occurred during the sample period.

<sup>4</sup> The results are not sensitive to the choice of cutoff and remain very similar for different cutoff rates. Appendix Table A3 shows the results obtained from using state credit rates 15 and 20 percent of the federal EITC rate as the cutoffs between low and high EITC.

<sup>5</sup> While the main results are obtained when excluding Maryland from the analysis due to the states' unique EITC structure, I include Maryland in alternative specifications. The results, which are shown in Appendix Table A4, remain in line with the main estimates from Table 4. In additional specifications, I also drop each state that has a state EITC program in place from the analysis and find that the results are not driven by any particular state.

reductions in violent crimes and have no effect on property crimes. However, it should be noted that the negative estimates for violent crime are imprecisely estimated.

The finding that the EITC is only associated with changes in violent crime rates could to some extent be explained by findings by Eissa and Hoynes (2004). Evaluating the effects of the EITC expansions between 1984 and 1996 on employment of married couples, the authors find increases in labor force participation among married men, which is more than offset by declines among married women. Given that violent crimes are dominated by men, the increase in labor force participation among married men along with changes in the opportunity costs making criminal activities costlier could be two pathways explaining the observed reductions in violent crime in my analysis.

### *B. Results by Crime*

Table 5 shows separate estimates for the four types of violent crime and three types of property crime reported in the UCR data. The results in Panel A provide evidence that reductions in the number of assaults explain the largest share of the overall decline in violent crime. While the estimates for murder, rape, and robbery are smaller and statistically insignificant (with one exception), I find that, compared to states with no EITC, the introduction of low and high EITC benefits is associated with declines in assault rates by 9.4 ( $p < 0.05$ ) and 14.4 percent ( $p < 0.01$ ), respectively. The latter estimate corresponds to 37 fewer assaults per 100,000 individuals following the implementation of a high state EITC rate. In line with the results presented in Table 4, the estimates for the three property crimes (burglary, larceny, and vehicle theft) are small and statistically insignificant.

### *C. Lagged and Lead Effects*

If changes in employment and in the opportunity cost of engaging in criminal behavior are two of the mechanisms underlying the relationship between EITC rates and crime, it might be reasonable to expect a delay before potential crime reductions since low-

income individuals at risk of committing crimes might not be able to find work immediately. If changes in crime were solely due to one-time cash assistance received through EITC payments, we might expect the effects to not be persistent. Columns (1) and (2) of Table 6 present results obtained from using three different lags when estimating equation (1). It is noticeable that the magnitude of the estimates remains similar for all three lags, indicating statistically significant associations between EITC credits and violent crimes. The persistence of the estimates suggests that changes in labor force participation might be responsible for the observed association to some extent.

Columns (3) and (4) provide lead estimates for the association between EITC laws and crime. All estimates are substantially smaller than the violent crime results found for contemporaneous and lagged EITC changes. The lead property crime estimates in column (4) again show evidence for a weak association with state EITC levels. Despite two of the six estimates being statistically significant (low EITC,  $p < 0.10$ ), all results for high state EITCs are very small and imprecisely estimates. Overall, the lead and lag estimates in Table 6 alleviate concerns that the main findings are biased due to reverse causality, which would occur if crime rates influence a state's EITC policies.

#### *D. Event Study Analysis*

To further test for the validity of the DD assumptions, I furthermore conduct an event study analysis that examines the 2006 state EITC implementation in Delaware and Virginia. Both states introduced a state-level EITC of 20 percent of the federal credit and did not change their rates in any other years besides 2006. All states with no state EITC laws throughout the study period serve as the control group in the event study analysis.<sup>6</sup> Figures 3A and 3B present graphical evidence on changes in violent and property crime across the

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<sup>6</sup> In line with the main analysis of the study, Maryland is excluded from the event study due to its unique EITC structure that does not match the measurement used in this study.

treatment group (Delaware and Virginia) and the control group. A relative decline in violent crime in Delaware and Virginia is noticeable following the policy change (Figure 3A), whereas Figure 3B provides suggestive evidence for an initial relative increase in property crimes following the policy changes before a relative decrease in the two treatment states is observable several years after the reforms.

Table 7 presents both standard DD effects of this analysis (Panel A) as well as annual treatment effects for the entire period of the study (Panel B). In the DD analysis, I find that the 2006 policy implementation reduced violent crime by 13.3 percent ( $p < 0.01$ ) in the two states, while leading to a small and imprecisely estimated increase in property crimes. These results further support the main findings of the study by indicating that EITC laws reduce the prevalence of violent crime.<sup>7</sup> The annual treatment effects in Panel B indicate that, compared to the year 2005, the magnitude of the negative effect on violent crime increases from 2009 on. However, the annual treatment effects are only statistically significant from 2014 on. In addition to only having two treatment states, this delay in the statistically significant effects is another limitation of the event study approach. While the EITC implementation could have lasting effects on society by impacting outcomes related to human capital accumulation, other factors could potentially explain the differential trends in violent crime between the two treatment states and the control group. When evaluating annual treatment effects on property

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<sup>7</sup> In an alternative event study specification, I also include states with an EITC that did not change it during the study period. The results from this specification remain similar to the estimates shown in Table 7. I find a 12.03 percentage point decrease in violent crime ( $p < 0.05$ ) and a statistically insignificant 4.40 percentage point increase in property crime. In another alternative specification, I exploit the introduction of state EITCs in Indiana, Nebraska, and Oklahoma in 2003. Using an identical event study approach, I find that 8.48 percentage point reduction in violent crime for these three states and a 0.46 percentage point reduction in property crime, with both estimates being statistically insignificant. Finally, I also estimate event study models that include all five states that only altered its EITC in 2003 or 2006 (Delaware, Indiana, Nebraska, Oklahoma, and Virginia), where year 0 is 2003 for Indiana, Oklahoma, and Nebraska and 2006 for Delaware and Virginia. The event study results for this model, shown in Appendix Figures A3 and A4, are in line with both the findings of the main analysis and of the other event study specifications by suggesting that the policy changes are associated with significant reductions in violent crime, while not being associated with changes in property crime.

crime, Panel B shows that only two out of 18 estimates are statistically significant. Figures 3A and 3B present the annual treatment effects for violent and property crime, respectively.

## VII. DISCUSSION AND CONCLUSIONS

This study examines state-level variations in EITC rates to evaluate whether the program provides a positive externality on crime. In line with recent papers examining the link between public policy and crime, I find that more generous EITC benefits are associated with significant reductions in state crime rates. This decline is entirely driven by changes in the number of violent crimes. Compared to states with no EITC in place, implementing a credit of at least 10 percent of the federal level is associated with 40 fewer violent crimes per 100,000 individuals, which corresponds to a 10.0 percent decline. The results are robust to a number of EITC measures. I furthermore find that the provision of refundable EITC benefits is as important as the magnitude of the credit rate. As of 2020, there are seven states that offer non-refundable state-level EITC benefits, with one of them offering both a refundable and a non-refundable credit (Maryland).

While providing evidence that the EITC is associated with reductions in violent crime, I find no evidence for changes in property crime. In line with the fact that violent crime is more prevalent among men, this could be related to differences in labor force participation in response to EITC changes. Eissa and Hoynes (2004) find increases in employment among married men, which are more than offset by declines in labor force participation among married women. This is in line with work by Jacob and Ludwig (2010) who evaluate the effects of a housing voucher lottery in Chicago, which substantially increased income of families with low socioeconomic status. The authors show that income boosts reduce violent crime and total arrests and that these effects are driven by males.

In light of the high costs of violent crime on society, this estimated reduction provides additional evidence for positive effects of the EITC program. Shapiro and Hassett (2012)

show that the direct costs of the four types of violent crime examined in this study totaled to \$42 billion in 2010, including associated costs of police, courts, medical expenses and lost earnings. In addition, the authors mention that violent crime has substantial indirect costs on society by affecting quality of life or property levels. I find that the association between EITC generosity and violent crime remains persistent several years after the policy changes, which provides suggestive evidence that the observed main effects are not the result of one-time cash assistance that individuals receive through the EITC. While theoretically individuals could continuously receive EITC payments for several years, Dowd and Horowitz (2011) show that the EITC is often only a short-term safety net for low-income households by providing evidence that 61 percent of recipients only claim the EITC for one or two years.

In line with prior work showing that poverty and income inequality are not associated with property crime (Allen, 1996), I find no evidence that EITC rates are associated with robbery, burglary or vehicle theft. However, this result is in contrast to findings by Corman et al. (2014) who provide convincing evidence that the welfare reforms in the 1990s reduced (female) property crime. One explanation for the differences in the findings could be that welfare reforms with its work requirements, sanctions, waivers, and timing for welfare eligibility provided work incentives in a different way than EITC changes, which rewarded individuals for finding work through additional income support. Another explanation could be that there are gender-specific differences in how the EITC affects crime rates. Examining a sample of recently released prisoners, Agan and Makowsky (2018) provide suggestive evidence that EITC laws might differently affect criminal activity between women and men. While the data used for this study does not provide crime rates by gender, future research should examine the potentially unintended effects of the EITC on overall population crime rates across gender.

Following evidence showing that the EITC is capable of improving several outcomes in addition to income, such as health or education, the program has continued to increase in importance. Hoynes (2016) states that the benefits of the program accrue not only to recipients but indirectly to taxpayers as well through decreased health care costs of those in poverty, long-term increases in productivity and tax revenue generated by higher education levels. Despite the convincing positive effects of higher EITCs, almost half of U.S. states still have not implemented any EITC benefits on top of the federal credit rate. The results presented in this study provide suggestive evidence that reductions in the number of violent crime are an additional benefit of state-level EITC laws to society.

Given the potential benefits to society in light of the immense costs of violent crime, the findings suggest a very high marginal value of the public funds, which is in line with evidence by Bastian and Jones (2018) who show that the EITC has largely paid for itself. To further improve our understanding of the relationship between EITC and crime, future research should examine the role of potential mechanisms, such as employment changes, financial security, relative poverty, opportunity costs, mental health, and within-household domestic violence. Due to the fact that these pathways likely have different effects on violent and property crime, an in-depth analysis would could help understand the association between public policy and criminal behavior. Additionally, while beyond the scope of the current study, a direction for future work could be to use semi-annual crime data to further evaluate the relationship between EITC and crime.

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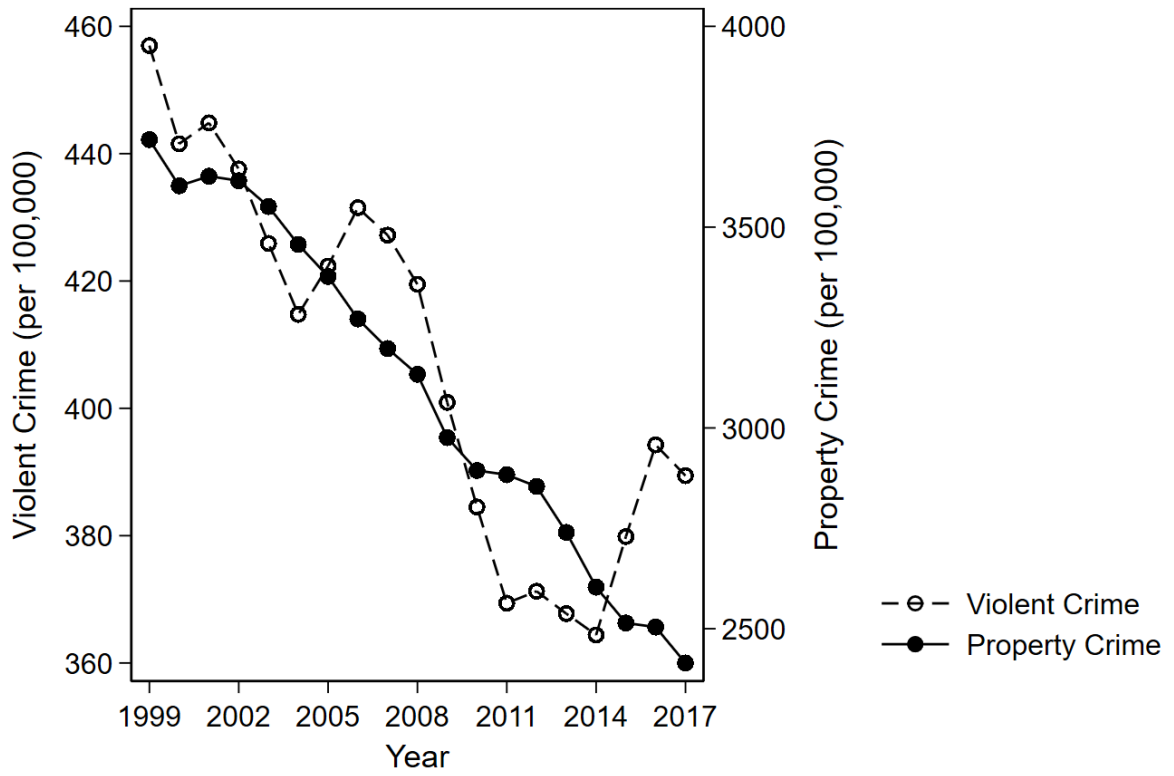
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FIGURE 1

Violent and Property Crime, 1999 to 2017



Note: The crime data is obtained from the FBI's Uniform Crime Reports data set.

FIGURE 2A  
Violent Crime and States with High EITC Rates

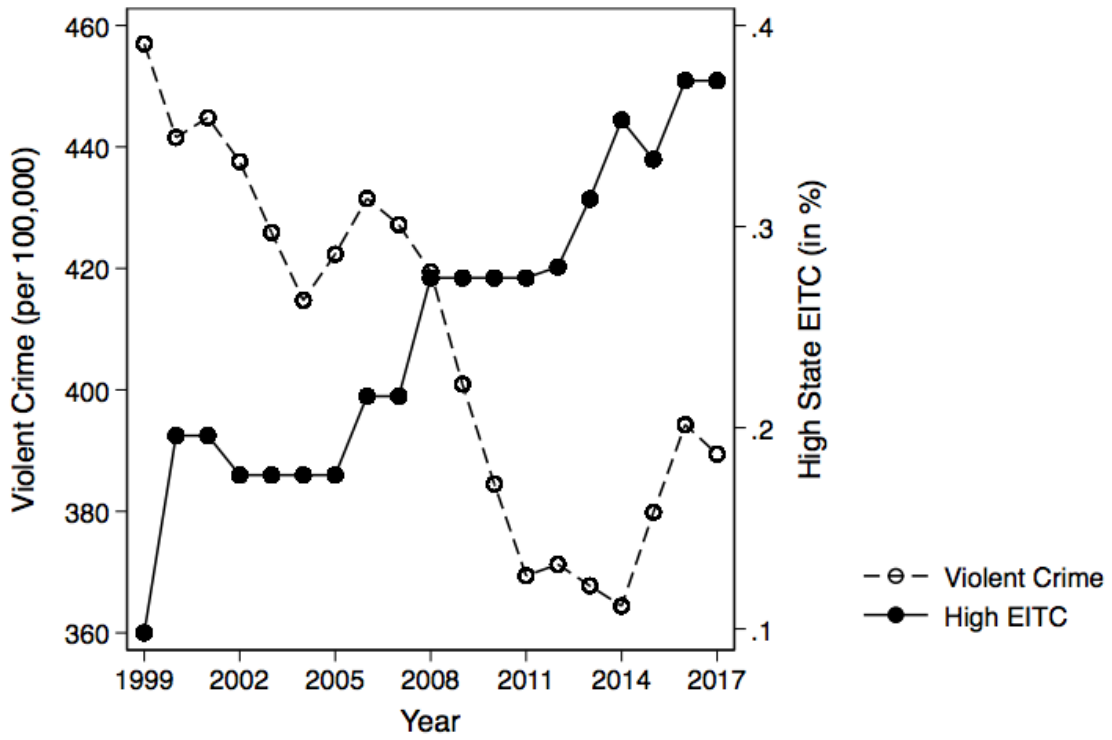
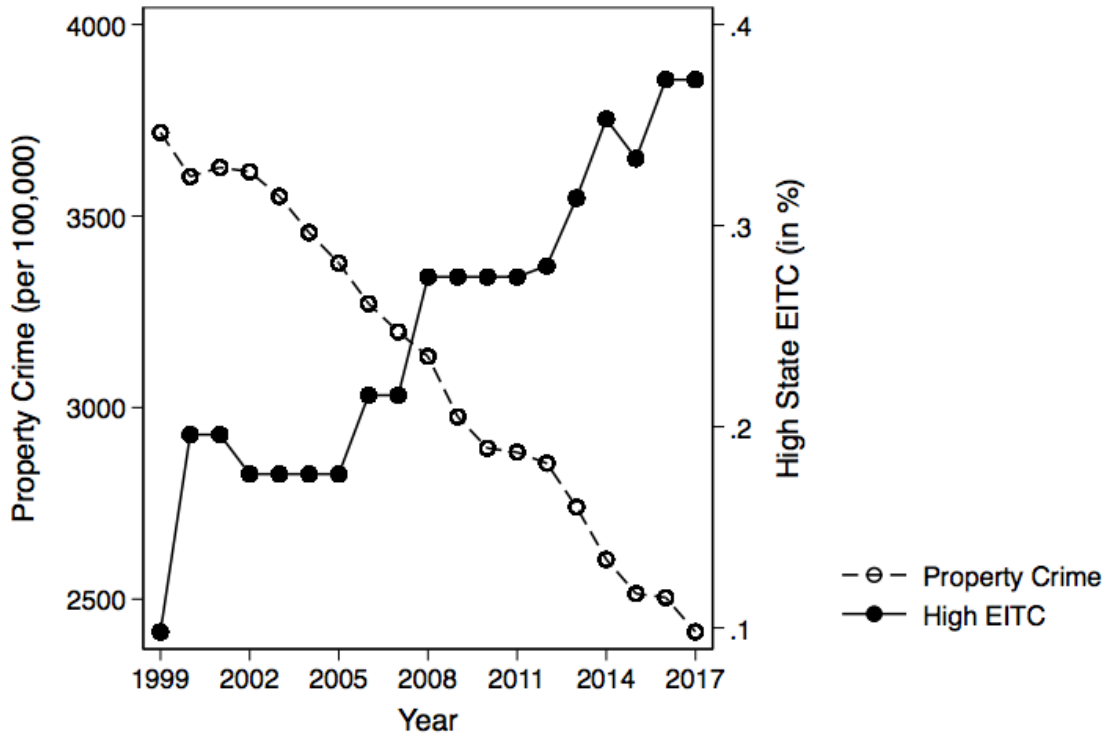


FIGURE 2B  
Property Crime and States with High EITC Rates



Note: The crime data is obtained from the FBI's UCR data sets, while EITC data is gathered from the IRS.

FIGURE 3A:  
Annual Treatment Effects Event Study – Violent Crime (Delaware and Virginia, 2006)

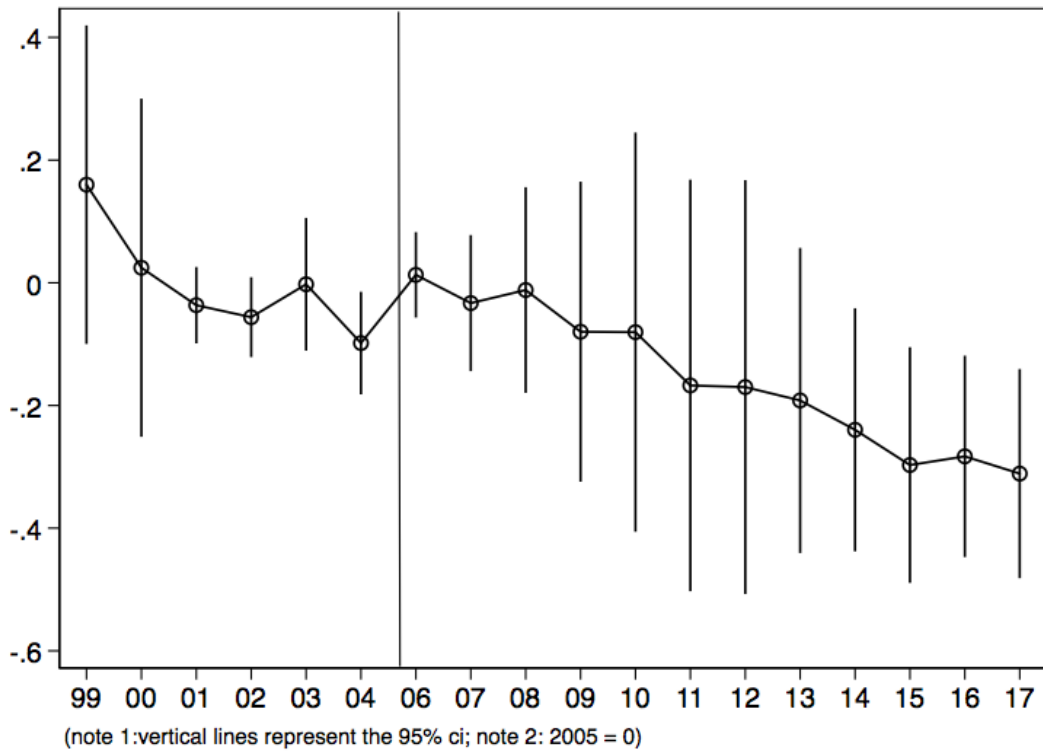


FIGURE 3B:  
Annual Treatment Effects Event Study – Property Crime (Delaware and Virginia, 2006)

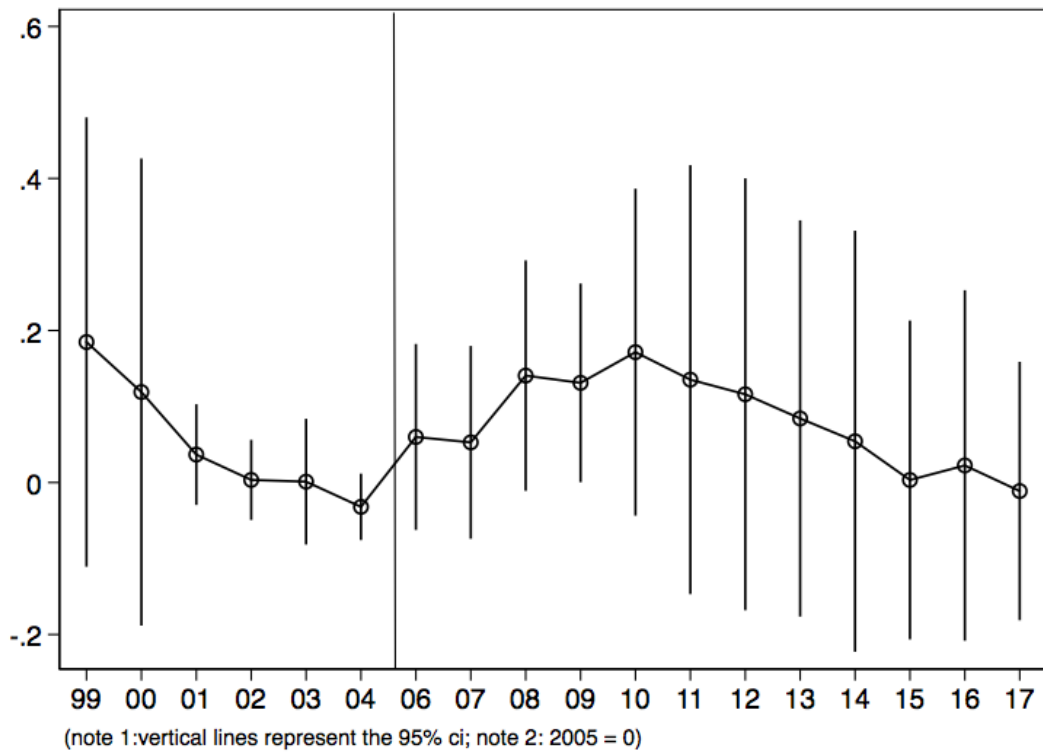




TABLE 1  
Overview of State EITC Changes

Year	% of states in each EITC category			# of state EITC changes	# of switches across categories (No/Low/High)
	<i>No EITC</i>	<i>Low EITC</i>	<i>High EITC</i>		
1999	0.8235	0.0784	0.0980	-	-
2000	0.7059	0.0980	0.1961	9	7
2001	0.7059	0.0980	0.1961	5	0
2002	0.7255	0.0980	0.1765	5	1
2003	0.6667	0.1569	0.1765	6	3
2004	0.6667	0.1569	0.1765	1	0
2005	0.6667	0.1569	0.1765	1	0
2006	0.6275	0.1569	0.2157	3	2
2007	0.6078	0.1765	0.2157	3	1
2008	0.5490	0.1765	0.2745	8	5
2009	0.5490	0.1765	0.2745	4	0
2010	0.5490	0.1765	0.2745	2	0
2011	0.5490	0.1765	0.2745	2	2
2012	0.5200	0.2000	0.2800	3	2
2013	0.5098	0.1765	0.3137	2	1
2014	0.4706	0.1765	0.3529	6	3
2015	0.4902	0.1765	0.3333	2	1
2016	0.4902	0.1373	0.3725	9	3
2017	0.4902	0.1373	0.3725	2	0
Total	-	-	-	73	31

TABLE 2  
Crime Statistics by State, per 100,000 Individuals (1999 to 2017)

State	Violent Crime	Property Crime	State	Violent Crime	Property Crime
Alabama	450.41	3,665.83	Montana	296.21	2,827.69
Alaska	649.06	3,262.70	Nebraska	296.66	3,069.36
Arizona	473.36	4,256.04	Nevada	635.43	3,365.71
Arkansas	492.38	3,654.53	New Hampshire	168.10	2,008.12
California	502.18	2,932.60	New Jersey	323.19	2,213.57
Colorado	342.72	3,176.58	New Mexico	674.32	3,996.74
Connecticut	280.49	2,352.40	New York	432.85	2,023.77
Delaware	598.29	3,273.87	North Carolina	421.57	3,713.75
District of Columbia	1,392.13	5,135.96	North Dakota	169.62	2,075.62
Florida	630.25	3,854.95	Ohio	322.99	3,304.76
Georgia	428.86	3,811.20	Oklahoma	481.06	3,604.75
Hawaii	264.73	4,022.69	Oregon	280.25	3,684.12
Idaho	232.35	2,299.61	Pennsylvania	378.79	2,247.23
Illinois	509.68	2,830.70	Rhode Island	256.14	2,651.64
Indiana	351.36	3,134.12	South Carolina	670.24	3,989.68
Iowa	278.15	2,544.47	South Dakota	244.06	1,924.53
Kansas	386.78	3,405.91	Tennessee	677.07	3,761.26
Kentucky	253.63	2,493.46	Texas	488.01	3,828.75
Louisiana	630.25	3,854.95	Utah	230.45	3,508.43
Maine	117.71	2,330.36	Vermont	125.24	2,225.79
Massachusetts	441.67	2,247.85	Virginia	245.37	2,405.56
Michigan	498.27	2,813.98	Washington	326.03	4,110.18
Minnesota	257.81	2,785.27	West Virginia	300.17	2,309.80
Mississippi	297.58	3,198.96	Wisconsin	262.24	2,565.98
Missouri	493.81	3,546.03	Wyoming	232.18	2,668.90

TABLE 3  
Summary statistics, by EITC group (1999-2017)

	<b>EITC Group</b>		
	<i>No EITC</i>	<i>Low EITC</i>	<i>High EITC</i>
<b>CRIME (per 100,000)</b>			
<i>All Violent Crimes</i>	410.52 (179.13)	340.77 (136.96)	426.41 (314.97)
<i>Murder</i>	4.92 (2.91)	4.28 (2.64)	5.59 (7.43)
<i>Rape</i>	37.45 (14.16)	32.86 (10.07)	33.53 (13.98)
<i>Robbery</i>	98.52 (59.89)	84.75 (42.85)	135.76 (156.79)
<i>Assault</i>	269.63 (130.68)	218.88 (99.36)	251.53 (160.89)
<i>All Property Crimes</i>	3,245.71 (869.66)	3,010.47 (652.11)	2,776.50 (920.80)
<i>Burglary</i>	690.02 (248.92)	640.41 (197.69)	523.05 (180.21)
<i>Larceny</i>	2,243.57 (553.47)	2,133.46 (442.80)	1,969.15 (603.17)
<i>Vehicle theft</i>	312.12 (180.59)	236.60 (102.47)	284.31 (266.35)
<b>CONTROL VARIABLES</b>			
<i>State Unemployment Rate (in %)</i>	5.59 (1.99)	5.88 (1.99)	5.64 (1.96)
<i>Per Capita GDP (in 2012 \$)</i>	297,257.40 (400,385.10)	254,529.10 (175,641.60)	337,873.90 (391,255.40)
<i>% Uninsured in State</i>	13.93 (4.16)	12.05 (3.73)	9.95 (3.68)
<i>Medicaid eligibility threshold (% of FPL)</i>	161.55 (42.01)	167.08 (34.64)	197.58 (65.84)
<i>TANF eligibility (maximum income)</i>	\$793.16 (374.40)	\$837.36 (397.43)	\$845.24 (301.72)
<i>State parity law</i>	0.09 (0.28)	0.24 (0.43)	0.28 (0.45)
<i>State minimum wage</i>	6.32 (1.18)	6.73 (1.18)	7.20 (1.34)
<i>Real housing price index (100 = 2015)</i>	98.28 (10.86)	99.23 (10.29)	98.93 (9.80)
Observations	579	147	224

TABLE 4  
Effects of EITC Laws on Crime

	Log (Violent Crime per 100,000)		Log (Property Crime per 100,000)	
	(1)	(2)	(3)	(4)
<i>Panel A: Effects of EITC levels (comparison group: no EITC)</i>				
Low EITC	-0.0719** (0.0306)	-0.0727** (0.0308)	-0.0015 (0.0257)	-0.0017 (0.0257)
High EITC	-0.0999*** (0.0374)	-0.0998*** (0.0375)	-0.0016 (0.0252)	-0.0012 (0.0252)
<i>Panel B: Accounting for EITC refundability (comparison group: no EITC)</i>				
Low EITC no refund	-0.0438 (0.0507)	-0.0453 (0.0511)	0.0331 (0.0370)	0.0259 (0.0381)
Low EITC with refund	-0.0957*** (0.0340)	-0.0965*** (0.0343)	-0.0160 (0.0299)	0.0071 (0.0129)
High EITC no refund	-0.0929** (0.0438)	-0.0934** (0.0436)	0.0348 (0.0390)	0.0666 (0.0426)
High EITC with refund	-0.1128*** (0.0459)	-0.1130*** (0.0461)	-0.0180 (0.0289)	0.0108 (0.0213)
<i>Panel C: Effects of introducing state-level EITC</i>				
State-level EITC introduction	-0.0879*** (0.0279)	-0.0974*** (0.0294)	-0.0028 (0.0215)	0.0184 (0.0151)
<i>Panel D: Effects of EITC size</i>				
10 p.p. increase in state-level EITC	-0.0224 (0.0208)	-0.0246 (0.0212)	0.0057 (0.0086)	0.0058 (0.0086)
Year fixed effects	x	x	x	x
State fixed effects	x	x	x	x
State-specific time trends		x		x
Observations	949	949	949	949

Robust standard errors, clustered by state, are shown in parentheses. All models include controls for annual state unemployment rates, annual per capita GDP, state median income levels, the share of the state population under 65 without insurance, state Medicaid eligibility, the share of tax returns that included EITC benefits in each state, state TANF generosity, a housing price index, state minimum wages, state mental health parity laws and state welfare waivers. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

TABLE 5  
Effects of EITC Laws on Crime (By Type of Crime)

<i>Panel A: Violent Crime</i>	<b>Log (Murder)</b>	<b>Log (Rape)</b>	<b>Log (Robbery)</b>	<b>Log (Assault)</b>
(comparison group: no EITC)				
Low EITC	-0.0598 (0.0417)	-0.0569* (0.0323)	-0.0626 (0.0473)	-0.0943*** (0.0351)
High EITC	0.0616 (0.0676)	-0.0559 (0.0519)	-0.0376 (0.0410)	-0.1438*** (0.0475)
<i>Panel B: Property Crime</i>	<b>Log (Burglary)</b>	<b>Log (Larceny)</b>	<b>Log (Vehicle Theft)</b>	
(comparison group: no EITC)				
Low EITC	-0.0019 (0.0310)	0.0005 (0.0273)	-0.0603 (0.0659)	
High EITC	0.0127 (0.0332)	-0.0143 (0.0280)	0.0228 (0.0622)	
Year fixed effects	x	x	x	x
State fixed effects	x	x	x	x
State-specific time trends	x	x	x	x
Observations	949	949	949	949

Robust standard errors, clustered by state, are shown in parentheses. All models include controls for annual state unemployment rates, annual per capita GDP, state median income levels, the share of the state population under 65 without insurance, state Medicaid eligibility, the share of tax returns that included EITC benefits in each state, state TANF generosity, a housing price index, state minimum wages, state mental health parity laws and state welfare waivers. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

TABLE 6  
Effects of EITC Laws on Crime (Lagged and Lead EITC)

	Lags		Leads	
	<i>Log (Violent Crime per 100,000)</i>	<i>Log (Property Crime per 100,000)</i>	<i>Log (Violent Crime per 100,000)</i>	<i>Log (Property Crime per 100,000)</i>
	(1)	(2)	(3)	(4)
<i>Panel A: 1-Year Lag/Lead EITC</i>				
Low EITC	-0.0739*** (0.0275)	-0.0250 (0.0229)	0.0258 (0.0215)	0.0269* (0.0136)
High EITC	-0.0930*** (0.0261)	-0.0097 (0.0223)	0.0031 (0.0270)	0.0132 (0.0169)
<i>Panel B: 2-Year Lag/Lead EITC</i>				
Low EITC	-0.0932*** (0.0323)	-0.0315 (0.0251)	-0.0017 (0.0218)	0.0318* (0.0175)
High EITC	-0.1166*** (0.0344)	0.0034 (0.0252)	0.0013 (0.0281)	0.0085 (0.0190)
<i>Panel C: 3-Year Lag/Lead EITC</i>				
Low EITC	-0.0855** (0.0355)	-0.0305 (0.0251)	0.0075 (0.0218)	0.0319 (0.0237)
High EITC	-0.1041*** (0.0374)	0.0049 (0.0260)	0.0105 (0.0298)	0.0124 (0.0227)
Year fixed effects	x	x	x	x
State fixed effects	x	x	x	x
State-specific time trends	x	x	x	x

Robust standard errors, clustered by state, are shown in parentheses. All models include controls for contemporaneous EITC, annual state unemployment rates, annual per capita GDP, state median income levels, the share of the state population under 65 without insurance, state Medicaid eligibility, the share of tax returns that included EITC benefits in each state, state TANF generosity, a housing price index, state minimum wages, state mental health parity laws, and state welfare waivers.

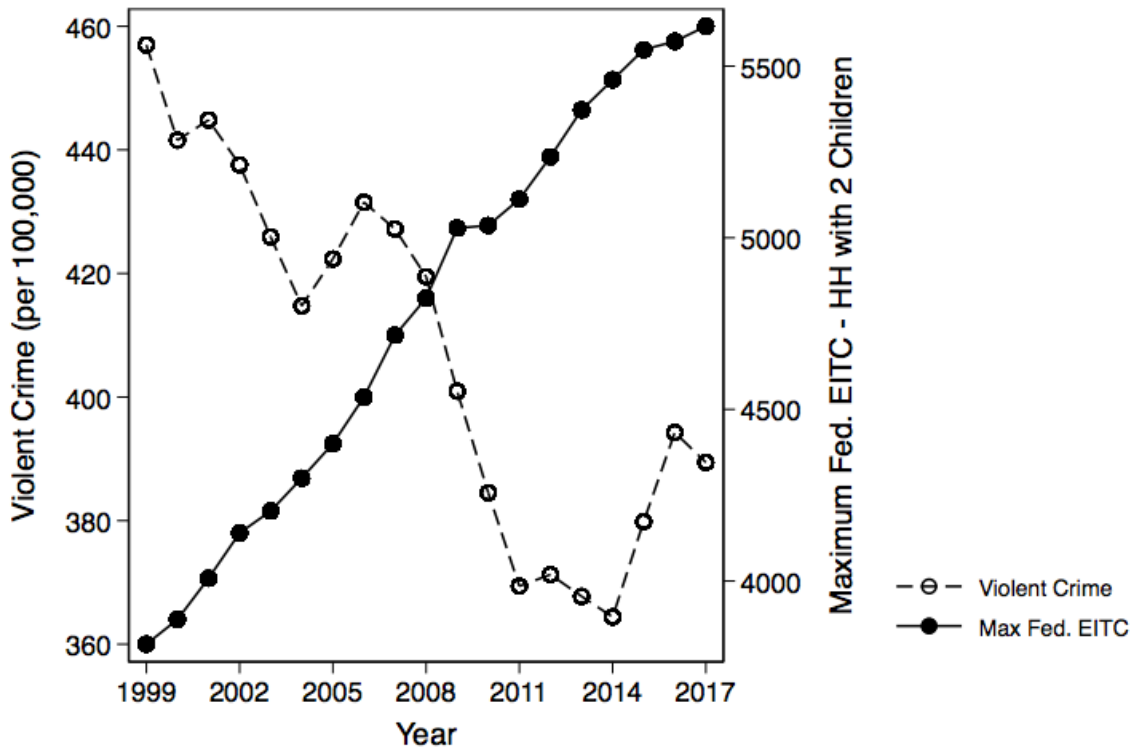
\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

TABLE 7  
Event Study Results (Delaware & Virginia, 2006 EITC Implementation)

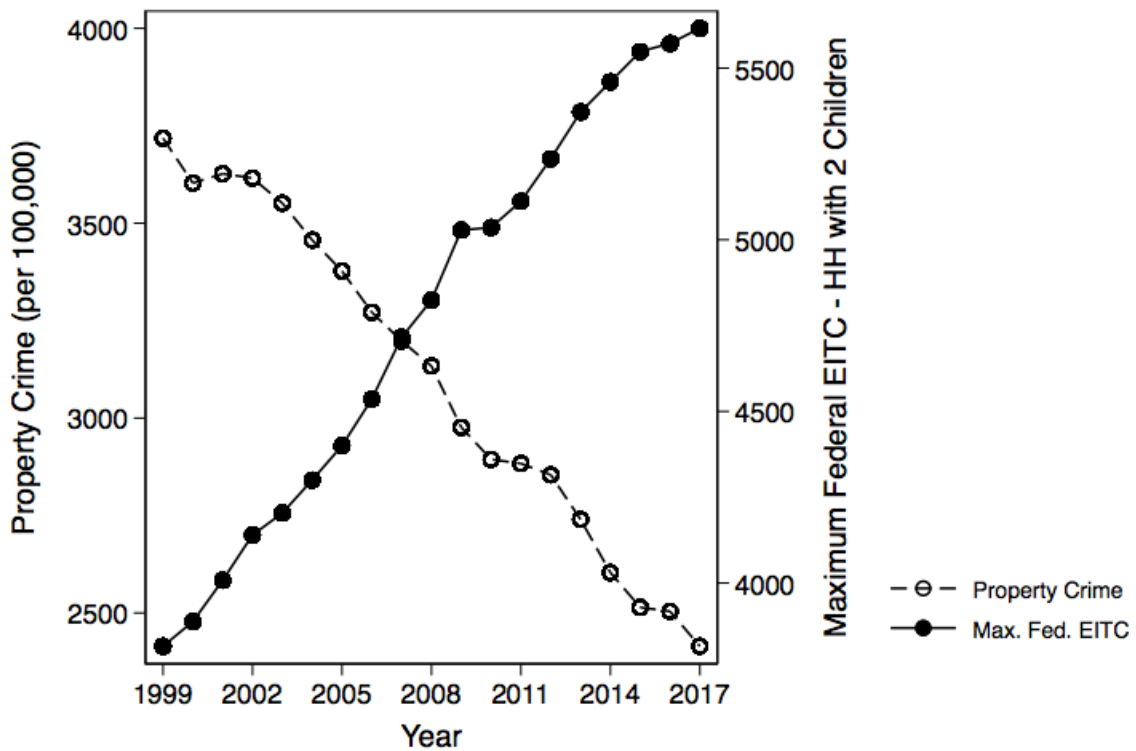
	Log (Violent Crime per 100,000)	Log (Property Crime per 100,000)
<i>Panel A: DD Effects</i>		
Treatment Effect	-0.1327*** (0.0491)	0.0405 (0.0417)
Year fixed effects	x	x
State fixed effects	x	x
State-level controls	x	x
Observations	470	470
 <i>Panel B: Annual Treatment Effects</i>		
Treat*1999	0.1599 (0.1258)	0.1848 (0.1432)
Treat*2000	0.0245 (0.1335)	0.1190 (0.1489)
Treat*2001	-0.0366 (0.0302)	0.0367 (0.0321)
Treat*2002	-0.0561 (0.0316)	0.0034 (0.0256)
Treat*2003	-0.0025 (0.0524)	0.0011 (0.0401)
Treat*2004	-0.0983** (0.0405)	-0.0320 (0.0212)
Treat*2006	0.0129 (0.0338)	0.0599 (0.0593)
Treat*2007	-0.0331 (0.0537)	0.0528 (0.0614)
Treat*2008	-0.0118 (0.0812)	0.1406* (0.0734)
Treat*2009	-0.0798 (0.1185)	0.1311** (0.0633)
Treat*2010	-0.0805 (0.1577)	0.1715 (0.1042)
Treat*2011	-0.1673 (0.1625)	0.1353 (0.1367)
Treat*2012	-0.1701 (0.1635)	0.1162 (0.1376)
Treat*2013	-0.1919 (0.1205)	0.0843 (0.1263)
Treat*2014	-0.2397** (0.0960)	0.0542 (0.1342)
Treat*2015	-0.2971*** (0.0931)	0.0034 (0.1016)
Treat*2016	-0.2830*** (0.0795)	0.0225 (0.1117)
Treat*2017	-0.3111*** (0.0826)	-0.0112 (0.0824)
Year fixed effects	x	x
State fixed effects	x	x
State-level controls	x	x
Observations	470	470

Robust standard errors, clustered by state, are shown in parentheses. All models include controls for annual state unemployment rates, annual per capita GDP, state median income levels, the share of the state population under 65 without insurance, state Medicaid eligibility, the share of tax returns that included EITC benefits in each state, state TANF generosity, a housing price index, state minimum wages, state mental health parity laws and state welfare waivers. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

APPENDIX FIGURE A1  
Violent Crime and Maximum Federal EITC (2 Children)



APPENDIX FIGURE A2  
Property Crime and Maximum Federal EITC (2 Children)

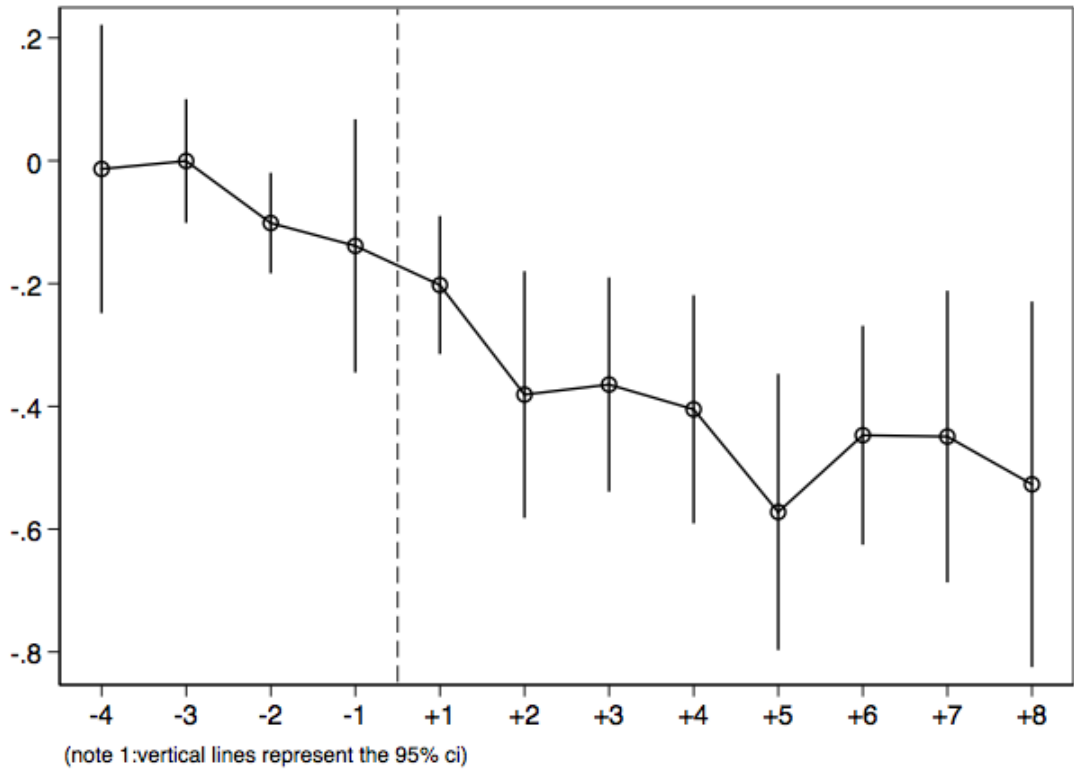


Note: The crime data is obtained from the FBI's UCR data sets, while EITC data is gathered from the Joint Committee on Taxation and the IRS.



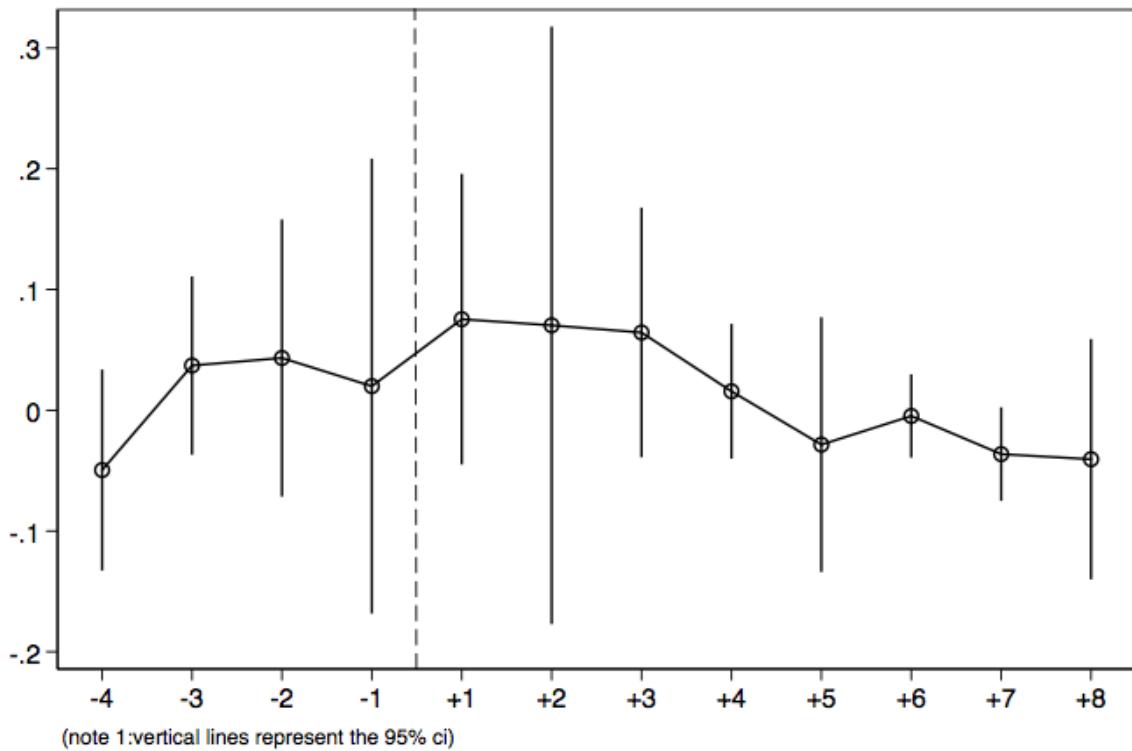
APPENDIX FIGURE A3

Annual Treatment Effects Event Study – Violent Crime (DE, IN, NE, OK, VA)



APPENDIX FIGURE A4

Annual Treatment Effects Event Study – Property Crime (DE, IN, NE, OK, VA)



APPENDIX TABLE A1  
State EITC Rates (1999-2017)

	AL	AK	AZ	AR	CA	CO	CT	DE	DC	FL	GA	HI	ID	IL	IN	IA	KS
1999						0.085										0.065	0.10
2000						0.10			0.10					0.05		0.065	0.10
2001						0.10			0.25					0.05		0.065	0.10
2002									0.25					0.05		0.065	0.15
2003									0.25					0.05	0.06	0.065	0.15
2004									0.25					0.05	0.06	0.065	0.15
2005									0.35					0.05	0.06	0.065	0.15
2006								0.20	0.35					0.05	0.06	0.065	0.15
2007								0.20	0.35					0.05	0.06	0.07	0.17
2008								0.20	0.40					0.05	0.06	0.07	0.17
2009								0.20	0.40					0.05	0.09	0.07	0.17
2010								0.20	0.40					0.05	0.09	0.07	0.18
2011							0.30	0.20	0.40					0.05	0.09	0.07	0.18
2012							0.30	0.20	0.40					0.075	0.09	0.07	0.18
2013							0.30	0.20	0.40					0.10	0.09	0.07	0.18
2014						0.10	0.275	0.20	0.40					0.10	0.09	0.14	0.17
2015						0.10	0.275	0.20	0.40					0.10	0.09	0.14	0.17
2016					0.85	0.10	0.275	0.20	0.40					0.10	0.09	0.15	0.17
2017					0.85	0.10	0.275	0.20	0.40					0.10	0.09	0.15	0.17

	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT	NE	NV	NH	NJ	NM	NY	NC
1999				0.10	0.10											0.20	
2000			0.05	0.15	0.10		0.33							0.10		0.225	
2001			0.05	0.16	0.15		0.33							0.15		0.25	
2002			0.05	0.16	0.15		0.33							0.175		0.275	
2003			0.049	0.18	0.15		0.33				0.08			0.20		0.30	
2004			0.049	0.20	0.15		0.33				0.08			0.20		0.30	
2005			0.049	0.20	0.15		0.33				0.08			0.20		0.30	
2006			0.05	0.20	0.15		0.33				0.08			0.20		0.30	
2007			0.05	0.20	0.15		0.33				0.08			0.20	0.08	0.30	
2008		0.035	0.05	0.25	0.15	0.10	0.33				0.10			0.225	0.10	0.30	0.035
2009		0.035	0.05	0.25	0.15	0.20	0.33				0.10			0.25	0.10	0.30	0.05
2010		0.035	0.05	0.25	0.15	0.20	0.33				0.10			0.20	0.10	0.30	0.05
2011		0.035	0.05	0.25	0.15		0.33				0.10			0.20	0.10	0.30	0.05
2012		0.035	0.05	0.25	0.15	0.06	0.33				0.10			0.20	0.10	0.30	0.05
2013		0.035	0.05	0.25	0.15	0.06	0.33				0.10			0.20	0.10	0.30	0.05
2014		0.035	0.05	0.25	0.15	0.06	0.33				0.10			0.20	0.10	0.30	0.05
2015		0.035	0.05	0.25	0.15	0.06	0.33				0.10			0.20	0.10	0.30	0.05
2016		0.035	0.05	0.26	0.23	0.06	0.33				0.10			0.30	0.10	0.30	
2017		0.035	0.05	0.27	0.23	0.06	0.33				0.10			0.30	0.10	0.30	

	ND	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VT	VA	WA	WV	WI	WY
1999				0.05								0.25				0.04	
2000				0.05		0.26						0.32				0.04	
2001				0.05		0.255						0.32				0.04	
2002				0.05		0.25						0.32				0.04	
2003			0.05	0.05		0.25						0.32				0.04	
2004			0.05	0.05		0.25						0.32				0.04	
2005			0.05	0.05		0.25						0.32				0.04	
2006			0.05	0.05		0.25						0.32	0.20			0.04	
2007			0.05	0.05		0.25						0.32	0.20			0.04	
2008			0.05	0.06		0.25						0.32	0.20			0.04	
2009			0.05	0.06		0.25						0.32	0.20			0.04	
2010			0.05	0.06		0.25						0.32	0.20			0.04	
2011			0.05	0.06		0.25						0.32	0.20			0.04	
2012			0.05	0.06		0.25						0.32	0.20	0.10		0.04	
2013			0.05	0.06		0.25						0.32	0.20	0.10		0.04	
2014		0.05	0.05	0.08		0.25						0.32	0.20	0.10		0.04	
2015		0.05	0.05	0.06		0.25						0.32	0.20			0.04	
2016		0.10	0.05	0.08		0.13						0.32	0.20			0.04	
2017		0.10	0.05	0.08		0.125						0.32	0.20			0.04	

APPENDIX TABLE A2  
Test for Exogeneity of State EITC Policies

	State EITC Rate
State Unemployment Rate	0.0041 (0.0041)
<i>Medicaid Eligibility</i>	0.0397* (0.0227)
<i>TANF Eligibility</i>	0.0000 (0.0000)
State Minimum Wage	0.0175 (0.0119)
State Parity Law	-0.0083 (0.0137)
<i>Per Capita GDP</i>	0.0002 (0.0002)
<i>% Uninsured</i>	-0.0030 (0.0018)
<i>Housing Price Index</i>	0.0002 (0.0008)
Observations	949

Robust standard errors, clustered by state, are shown in parentheses. State EITC is measured as the share of the state EITC in addition to the federal EITC rate. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

APPENDIX TABLE A3  
Effects of EITC Laws on Crime (Alternative Cutoffs)

	Cutoff 15% of Federal EITC		Cutoff 20% of Federal EITC	
	Log (Violent Crime per 100,000)	Log (Property Crime per 100,000)	Log (Violent Crime per 100,000)	Log (Property Crime per 100,000)
<i>Panel A: Effects of EITC levels (comparison group: no EITC)</i>				
Low EITC	-0.1017*** (0.0308)	0.0093 (0.0151)	-0.0928*** (0.0328)	0.0174 (0.0155)
High EITC	-0.0873*** (0.0369)	-0.0396* (0.0234)	-0.1077*** (0.0411)	0.0210 (0.0301)
<i>Panel B: Accounting for EITC refundability (comparison group: no EITC)</i>				
Low EITC no refund	-0.0557 (0.0424)	0.0096 (0.0394)	-0.0500 (0.0438)	0.0160 (0.0406)
Low EITC with refund	-0.1095*** (0.0354)	0.0064 (0.0154)	-0.1011*** (0.0364)	0.0150 (0.0147)
High EITC no refund	-0.0915* (0.0490)	0.0977*** (0.0339)	-0.0934* (0.0489)	0.0953*** (0.0346)
High EITC with refund	-0.0894** (0.0444)	0.0124 (0.0205)	-0.1259** (0.0558)	-0.0200 (0.0276)
Year fixed effects	x	x	x	x
State fixed effects	x	x	x	x
State-specific time trends	x	x	x	x
Observations	949	949	949	949

Robust standard errors, clustered by state, are shown in parentheses. All models include controls for annual state unemployment rates, annual per capita GDP, the share of the state population under 65 without insurance, state Medicaid eligibility, state TANF generosity, a housing price index, state minimum wages, state mental health parity laws, and state welfare waivers. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

APPENDIX TABLE A4  
Effects of EITC Laws on Crime (including Maryland)

	Log (Violent Crime per 100,000)		Log (Property Crime per 100,000)	
	(1)	(2)	(3)	(4)
<i>Panel A: Effects of EITC levels (comparison group: no EITC)</i>				
Low EITC	-0.0785** (0.0306)	-0.0794** (0.0323)	-0.0009 (0.0281)	0.0108 (0.00124)
High EITC	-0.0981** (0.0386)	-0.0982** (0.0387)	0.0007 (0.0265)	0.0238 (0.0209)
<i>Panel B: Accounting for EITC refundability (comparison group: no EITC)</i>				
Low EITC no refund	-0.0412 (0.0509)	-0.0426 (0.0513)	0.0341 (0.0368)	0.0258 (0.0385)
Low EITC with refund	-0.0884** (0.0338)	-0.0893** (0.0341)	-0.0134 (0.0295)	0.0066 (0.0129)
High EITC no refund	-0.0884** (0.0441)	-0.0889** (0.0439)	0.0364 (0.0390)	0.0656 (0.0422)
High EITC with refund	-0.1028** (0.0456)	-0.1027** (0.0458)	-0.0138 (0.0286)	0.0105 (0.0215)
<i>Panel C: Effects of introducing state-level EITC</i>				
State-level EITC introduction	-0.0892*** (0.0295)	-0.0896*** (0.0296)	0.0002 (0.0213)	0.0179 (0.0151)
<i>Panel D: Effects of EITC size</i>				
10 p.p. increase in state-level EITC	-0.0226 (0.0217)	-0.0229 (0.0219)	0.0057 (0.0086)	0.0058 (0.0086)
Year fixed effects	x	x	x	x
State fixed effects	x	x	x	x
State-specific time trends		x		x
Observations	968	968	968	968

Robust standard errors, clustered by state, are shown in parentheses. All models include controls for annual state unemployment rates, annual per capita GDP, state median income levels, the share of the state population under 65 without insurance, state Medicaid eligibility, the share of tax returns that included EITC benefits in each state, state TANF generosity, a housing price index, state minimum wages, state mental health parity laws and state welfare waivers. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

APPENDIX TABLE A5  
Effects of Maximum EITC Benefits on Crime (Federal + State)

	<b>Log (Violent Crime per 100,000)</b>	<b>Log (Property Crime per 100,000)</b>
No Children	-0.0529 (0.0488)	0.0091 (0.0190)
One Child	-0.0079 (0.0073)	0.0014 (0.0029)
Two Children	-0.0048 (0.0044)	0.0008 (0.0017)
3+ Children	-0.0044 (0.0041)	0.0007 (0.0016)
Observations	949	949

The results show the effects of an increase in maximum benefits by \$100. Robust standard errors, clustered by state, are shown in parentheses. All models include controls for annual state unemployment rates, annual per capita GDP, the share of the state population under 65 without insurance, state Medicaid eligibility, state TANF generosity, a housing price index, state minimum wages, state mental health parity laws, and state welfare waivers. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .