

The Effect of Medicaid on Recidivism: Evidence from Medicaid Suspension and Termination Policies

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Abstract

Although people who go through the prison and jail system in the United States have significant health care needs, many leave it with no health insurance and, as a result, they experience gaps in access to care. Exploiting variation in Medicaid eligibility policies for incarcerated individuals across states and using administrative prison release data, we find that suspending rather than terminating Medicaid upon incarceration decreases the probability of returning to prison within one year and three years of release by 1.2 and 3.7 percentage points, respectively. This effect is mostly driven by people returning to prison for property or drug-related offenses, and it is greater for offenders admitted to prison after a state expands its Medicaid program. These estimates are directly relevant to ongoing policy debates on the health care coverage of vulnerable populations.

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1 Introduction

In 2018, over 600,000 people were released from state and federal prisons and almost 11 million people cycled through local jails in the United States (Carson, 2020; Zeng, 2020). Upon release, these individuals face serious collateral consequences of conviction that restrict their access to the labor market, by means such as licensing restrictions (Council of Economic Advisors, 2016), and restrict or deny eligibility for federal and state programs such as federal financial aid (Lovenheim and Owens, 2014), Supplemental Nutrition Assistance Program (SNAP) (Tuttle, 2019), and housing assistance (Council of Economic Advisors, 2016). Ex-offenders face significant and ongoing economic and societal challenges that often prevent them from becoming productive members of society. This can indirectly push them back to crime and prison. The significant challenges ex-prisoners face finding permanent legal employment might make securing private health insurance harder (Pager et al., 2009; Denver et al., 2017). In addition, people who go through the prison and jail system in the United States disproportionately have significant physical and behavioral health problems and are among the individuals in highest need of medical care (Maruschak et al., 2015).¹ Despite having significant health care needs, incarcerated individuals face decreased access to health care following release and possibly have higher demand for services (Kulkarni et al., 2010; Mallik-Kane and Visser, 2008). The reasons for the lack of health care continuity are multifaceted, ranging from lack of employment to potential difficulty enrolling in social safety net programs providing health care coverage. In this paper, we explore whether faster and easier enrollment after release affects recidivism rates.

Policies for individuals who are enrolled in Medicaid when admitted to custody vary across states.² These policies affect whether and when individuals can use Medicaid upon release. As of 2018, nineteen states terminate Medicaid upon incarceration, while the rest suspend coverage for the duration of the incarceration or for a specified period of time. When a state terminates Medicaid coverage upon incarceration, the individual is removed from its Medicaid rolls, and upon release, he or she must submit a new application for Medicaid enrollment and again be deemed eligible.³ When a state suspends Medicaid coverage, the individual is permitted to remain on the Medicaid rolls in a suspended status for the duration

¹Compared to the general US population, incarcerated individuals are much more likely to have chronic physical and mental health conditions, such as HIV/AIDS, a serious mental illness, or a substance abuse disorder (Binswanger et al., 2009).

²Even though inmates in correctional institutions can remain eligible for Medicaid in many states, the Social Security Act of 1935 prohibits states from billing Medicaid for any inmate care unless the covered individual requires an off-site hospital stay of twenty-four hours or more.

³Under federal guidelines, eligibility determination takes between 45 to 90 days. See, U.S. Code of Federal Regulations, Title 42, Public Health, §435.911.

of the incarceration.⁴ This ultimately means that the individual retains his or her eligibility for Medicaid coverage but his or her benefits are cut off during incarceration. Once the individual is released from prison, Medicaid benefits can be reinstated more quickly because no new eligibility determination is needed. This makes it easier and faster for formerly incarcerated individuals to regain health care coverage and access to mental health services, prescription medicines, and other needed care. A natural question therefore is whether potentially easier and faster access to health care treatment in the community has any impact on subsequent criminal behavior. We use variation in states' policies of suspending or terminating Medicaid coverage upon incarceration to shed light on this important question.

Suspending Medicaid rather than terminating it could provide easier and almost immediate access to medical services upon release, which could impact recidivism through several channels. First, it could help to eliminate any gaps in mental or substance-abuse care upon reentry into the community, and thus facilitate health care utilization.⁵ As a result, ensuring continuity of care after release could reduce recidivism through improved management of health conditions.⁶ Second, because having Medicaid coverage could decrease insurance and medical costs for released prisoners, it could therefore reduce their incentives to engage in income-generating criminal activities, such as property crimes or selling illegal drugs. Third, this income effect increases financial security which may in turn reduce financial stress and improve mental health. This eventually could lead to a reduction in recidivism associated with mental health problems. Finally, Medicaid eligibility upon release may create a feeling of being valued by the community, which eventually may reduce incentives to commit crime. All these channels predict that suspending Medicaid coverage rather than terminating it could decrease recidivism rates.

However, other theoretical factors that might lead to observing increases or no change in recidivism rates. For example, expecting to have Medicaid coverage upon release decreases the opportunity cost of committing crime because they will remain eligible for Medicaid. Additionally, crime and recidivism could potentially increase as immediate access to Medicaid could make it easier to obtain prescription medication, such as opioids, that may facilitate both criminal behavior and substance abuse. Ensuring faster and easier reinstatement of

⁴Some states limit suspension to a certain time frame after which they terminate Medicaid coverage. This time frame might or might not cover the whole incarceration duration. This is mostly done to avoid terminating coverage for those serving short sentences.

⁵It is well documented that Medicaid expansion eliminates the coverage gap across income and racial groups (Courtemanche et al., 2019).

⁶Individuals whose coverage is suspended upon incarceration could still face a gap in continuity of health care, although that gap is expected to be much shorter than if their coverage was terminated. Rosen et al. (2014) report that resumption of benefits in most suspension states, although not automatic, occurs within a month of release, suggesting that suspension allows Medicaid benefits to be restored faster than termination does.

Medicaid coverage upon release might not result in any changes in criminal behavior if those enrolled in Medicaid, especially those who have gone through the criminal justice system, face substantial barriers to treatment. These barriers may include supply-side capacity constraints to treat mental health and substance abuse problems, lack of assistance in helping inmates looking to restore coverage, former inmates' lack of information on how to obtain a primary care physician, and financial difficulties covering copays. Overall, the effect of suspending Medicaid upon incarceration on recidivism is ambiguous, and our study aims to identify the aggregate effect of these factors.

Drawing on various primary sources, we assembled information on Medicaid policies for incarcerated individuals at the state level, including their effective implementation dates. Our main data source is the National Corrections Reporting Program (NCRP), and it contains detailed records on state prison releases from 1995 to 2016. Relying on plausibly exogenous variation in the implementation of Medicaid suspension policies across states, we estimate a series of models that relate recidivism rates for individuals admitted to prison in a particular state and year to whether Medicaid is suspended upon incarceration. In our models, we include a wide variety of individual characteristics and time-varying state characteristics that could impact our outcomes of interest and we control flexibly for state and admission year effects.

We find that suspending Medicaid upon incarceration is associated with an approximately 3.7 percentage point reduction in the probability of returning to prison within three years of release. The policy of suspension rather than termination also decreases the probability of returning to prison within one year by 1.2 percentage points. These findings are robust across a variety of specifications. We explore heterogeneous effects across crime types and gender. We observe that the policy effect is mostly driven by people returning to prison for property or drug-related offenses, which indicates that the policy has been effective in reducing recidivism through an income effect channel. We find that the effect of Medicaid suspension policies is not significantly different among gender or race groups. We also find that the policy effect is greater for individuals admitted in a state after it expanded Medicaid, which is plausible because Medicaid expansion increases the population that might be affected by the Medicaid suspension policies.

Because the Affordable Care Act (ACA) expanded health care coverage to low-income childless adults in 2014, including individuals nearing their release from prison, increasing numbers of people will enter prison with Medicaid coverage. Without a process to suspend and reactivate benefits, many of these people risk losing coverage during their time in jail or prison. A loss of coverage could be both harmful at the individual level and a waste of the program resources used for re-enrollment after release. Our results are directly relevant

to ongoing policy debates about providing social assistance, including health care coverage, to the population at high risk of reentering the criminal justice system. Legislators have recently introduced several bills aiming to fix the issue of lapse in care after prison release by maintaining Medicaid eligibility for pretrial inmates, requiring suspension rather than termination of Medicaid benefits for juvenile inmates, and reinstating Medicaid for inmates thirty days before their release.⁷

The remainder of the paper is organized as follows. In section 2, we provide an overview of Medicaid suspension and termination policies for released prisoners across states and put our study in the context of the broad literature exploring health and the criminal justice system. In section 3, we present our data sources and describe our estimation sample. In section 4, we describe our empirical approach, and in section 5 we report the main results, perform various robustness checks, and explore heterogeneous effects. Section 6 concludes.

2 Medicaid Suspension and Termination Policies for Incarcerated Individuals

Upon an individual’s incarceration, his Medicaid coverage is either terminated, suspended for the duration of incarceration, or suspended with a time-limit, depending on the state in which he is imprisoned. When a state terminates Medicaid coverage upon incarceration, the individual’s Medicaid case file is closed, and he must reapply for Medicaid after prison release. When a state suspends coverage, the inmate’s Medicaid file is placed in a suspended status while he is incarcerated. The coverage may be suspended for a certain duration before the case is closed, or it may be suspended regardless of the length of their stay in prison.⁸ In the case of suspension for the duration of incarceration, the individual does not need to reapply for Medicaid and his benefits are restored once he is released from prison.

We collected the implementation dates of the specific state policies on Medicaid suspension or termination upon incarceration by reviewing multiple sources including state and federal Medicaid documents, research publications, state news, and contacting states’ Centers for Medicare and Medicaid Services. We report these data in Table A1 and provide a visual representation in Figure A2.⁹ Figure A1 shows the timing of the change from termi-

⁷For more information refer to <https://www.congress.gov/bill/115th-congress/house-bill/165>, <https://www.govtrack.us/congress/bills/115/s874/details>, and/or <https://www.congress.gov/bill/115th-congress/house-bill/4005/actions>.

⁸Our main estimation sample does not include states with time-limited suspension.

⁹In some states, Medicaid suspension policies are not legislated by law, but rather are internal agency policies. However, both the legislative and administrative implementation of Medicaid suspension work in similar ways and are equally legally binding.

nation to suspension of Medicaid coverage for incarcerated individuals by state, which our identification strategy will exploit.

In 2001, Maine became the first state to allow an indefinite suspension of Medicaid for incarcerated individuals. By 2015, twenty-three states had suspended Medicaid for the duration of incarceration while six states had suspended it for a specific period of time (for example, 12 months). The enactment of the ACA not only broadened access to Medicaid for the incarcerated population but also might explain the sharp increase since then in the number of states that suspend rather than terminate Medicaid upon incarceration since then.¹⁰ Changes in eligibility and enrollment policies implemented by the ACA have forced states to update their information technology systems, which may have encouraged even more states to switch to Medicaid suspension for inmates.¹¹

Making released prisoners re-enroll in Medicaid after having their coverage terminated could result in a much more complex and time-consuming application procedure compared to that of those having their coverage only suspended. Policies expanding Medicaid coverage, such as the ACA, could be a way to cover more of the population involved in the criminal justice system. However, even if access to health care is broadened for these populations, there might exist other barriers to the continuity of medical coverage and care after prison release. The literature has linked creating administrative barriers or increasing administrative burden to limiting access to Medicaid benefits (see, for example, Herd et al. (2013)). We build on findings of this literature and explore whether termination of benefits impacts recidivism rates through limiting access to health care.

As a means-tested program, Medicaid imposed categorical and income-eligibility requirements that could limit access to coverage for inmates. There are no national data that reports on the number of individuals on Medicaid who were admitted to prison and thus affected by Medicaid suspension policy upon incarceration. There is no national data that reports on the number of individuals on Medicaid who were admitted to prison and thus affected by Medicaid suspension or termination policy upon incarceration. However, the 2004 Survey of Inmates in State and Federal Correctional Facilities (SISFCF) conducted by the Bureau of Justice Statistics (BJS) asks inmates in state and federal prisons whether or not anyone they were living with prior to incarceration was receiving public assistance such as Medicaid, SNAP, or housing assistance. While this does not directly show how many individuals were on Medicaid prior to their incarceration, it does suggest the proportion of

¹⁰The Centers for Medicare & Medicaid Services (CMS) has long encouraged states not to terminate coverage for enrolled inmates during their time in correctional facilities, but rather to temporarily suspend it until release (Centers for Medicare and Medicaid Services, 2014, 2016).

¹¹States have the option to use federal funding to implement these changes in their systems, as mentioned in a 2013 CMS informational bulletin.

inmates who were receiving Medicaid or likely eligible for Medicaid due to being low-income or receiving other forms of public assistance. Our analysis of these survey data indicates that among individuals in state prisons nationwide, about a quarter lived in a household receiving public assistance, such as Medicaid, prior to prison admission.¹² Thus, our analysis of the data from SISFCF suggests that a non-trivial fraction of prisoners are already on Medicaid or likely meet Medicaid income and eligibility requirements when admitted to prison.

3 Related Literature

Previous studies have shown that providing treatment for substance abuse and mental health improves mental health outcomes (Prendergast et al., 2002). Few studies have examined the relationship between health care and crime. The evidence from these studies shows that increasing health care utilization leads to reductions in violent and property crime rates (Bondurant et al., 2018; Wen et al., 2017). More specifically, they find that increases in substance-abuse treatment rates significantly reduces criminal behavior. A couple of papers in the medical literature examine the effect of Medicaid enrollment on criminal recidivism (Morrissey et al., 2007, 2006). Morrissey et al. (2006) find suggestive evidence that those enrolled in Medicaid upon release face fewer detentions on average. In a subsequent paper, Morrissey et al. (2007) analyze the effect of expedited Medicaid enrollment upon release on mental health use and criminal recidivism. Using a sample of released individuals with severe mental illnesses, such as schizophrenia or bipolar disorder, the authors find that expedited Medicaid referral results in higher Medicaid take up rates and use of mental health services in a year after release, but has no effect on recidivism. The main shortcoming of these studies is that they use a sample of prisoners with severe mental illness and thus do not look at how Medicaid could affect the general prison population upon release. Our work studies the effect of faster Medicaid re-enrollment for the general population of released prisoners using plausible exogenous changes in state Medicaid policies for incarcerated individuals.

Our paper also relates to the literature examining the relationship between public assistance, such as SNAP and welfare, and crime or recidivism (Yang, 2017; Foley, 2011; Hsu, 2017; Carr and Packham, 2019; Palmer et al., 2019; Tuttle, 2019; Luallen et al., 2018; Agan and Makowsky, 2018). Most of this literature finds that an increase in public assistance leads to a reduction in crime or recidivism by lowering the probability of engaging in the illegal sector as a source of income. A couple of studies that look at the effect of Medicaid expansion under the ACA and through Health Insurance Flexibility and Accountability

¹²The proportion of inmates receiving public assistance prior to incarceration varies significantly across states, as shown in Table A11.

(HIFA) waivers on crime. Vogler (2017) studies the effects of the ACA’s Medicaid expansion. He finds that Medicaid expansions have reduced violent crime by 5.8 percent and property crime by 3 percent, with the effects being larger in places that had higher pre-expansion uninsured rates among individuals subsequently eligible for Medicaid. He and Barkowski (2020) echo the findings of Vogler (2017) that Medicaid expansion decreases violent and property crime rates. Wen et al. (2017) also find large reductions in robbery, larceny theft, and aggravated assault rates as a result of HIFA-waiver expansion. Even after the expansion of Medicaid coverage, ex-prisoners could face significant barriers to access to Medicaid or tougher eligibility requirements for obtaining Medicaid coverage. Accordingly, our study seeks to understand whether relaxed Medicaid eligibility rules upon prison release reduce recidivism.

Concurrent with this paper, Aslim et al. (2019) uses variation in ACA Medicaid expansion to look at the effects of broadening the access to public health insurance on recidivism using NCRP data. They find that the ACA Medicaid expansion decreases recidivism for both violent and public order offenders. Despite increasing coverage through the ACA, state policies could potentially impose administrative burdens that make it harder for Medicaid-eligible populations to actually gain access to health care. We compliment Aslim et al. (2019) by exploring the effect on recidivism of not only broadening Medicaid eligibility through the ACA but also facilitating re-enrollment after release.

Our study furthers the literature and the policy debate by exploring whether Medicaid administrative policies that decrease cost of enrollment, such as suspending rather than terminating coverage upon incarceration, matter.

4 Data

We used data on prison admissions and releases from the NCRP compiled by the BJS. The NCRP is an offender-level data set to which participating states voluntarily submit data on prisoners entering and leaving the custody of state authorities. We restrict our sample to individuals admitted to prison after 1995 and released by 2016, the last year of available data. During our sample period, 44 states provided data on entries and exits from prison at some point. For each prison spell, we observe the admission and release dates for each offender, which allows us to construct a recidivism measure and compute total time served.¹³ Additionally, the NCRP contains rich information on offenders’ demographic characteristics, such as age, race, highest grade completed, gender, and whether the offender has previously

¹³Actual time served can differ from the sentence imposed because of early release via parole or time credited (Zapryanova, 2020).

been incarcerated for a felony. We also observe up to three crimes for which offenders were convicted, their combined sentence length, the type of entry (for example, new conviction, parole or probation revocation), and the type of release (for example, parole or probation).

There are two drawbacks to the data for our purposes that could affect the calculation or the interpretation of our recidivism measures. First, recidivism is observed only within the same state. If an inmate reoffends in another state, it will appear as if he did not recidivate. Thus, our recidivism rate could be underestimated if criminals who are more likely to recidivate move across state borders.¹⁴ Second, the NCRP data allows us to calculate only return to prison as a measure of recidivism. This is a proxy for serious reoffense and does not capture people, who are arrested or arrested and sentenced to probation or some other form of noncustodial sanction.

In the main estimation sample we drop individuals who have not yet been released, who died in custody, or who were sentenced to life with or without the possibility of parole. We also drop four states (California, Arizona, Ohio, and Maine) from the treatment group. We exclude Ohio and Maine because these states did not provide data to the NCRP prior to implementing their Medicaid suspension policies. We exclude California because it enacted the Public Safety Realignment Act (PSRA) as a solution to the state’s prison-overcrowding problem, and as a result many convicts served their time in county jail rather than state prison after the enactment. Because we do not observe county jail admissions and releases, we are unable to accurately calculate our recidivism measures in California from 2011 to 2015. Finally, per conversations with officials at Arizona’s Medicaid agency, suspension of Medicaid upon incarceration was a staggered process in which just a few state prisons were included in a pilot program and later the policy was expanded to all counties. Unfortunately, Arizona’s Medicaid agency did not provide us with details about this process. Because we do not know the exact timing of the policy implementation in each county, we exclude the whole state from the main analysis.

Table 1 represents summary statistics of the demographic characteristics of our main estimation sample, while Table 2 summarizes overall and crime-type-specific recidivism.¹⁵ Male and Black prisoners comprise, respectively, 88 percent and 44.5 percent of the sample. The average age at release is 34.9, and the majority of the offenders (39.6 percent) are high school drop outs. Of the offenders of the sample, 29.7 percent were previously incarcerated for

¹⁴Durose et al. (2014) estimate that about ten percent of released prisoners in one of the 30 states they have sampled were rearrested in a state other than the one that released them. This suggests that the majority of released prisoners nationwide recidivate in the state they were released in, and thus making our potential underestimation of the recidivism measure less problematic.

¹⁵Our main estimation sample allows offenders to have three years of post release data. We present the summary statistics on the demographic characteristics for the sample requiring only one year of post release data in Table A2.

a felony. The three most common crimes are violent, property, and drug offenses, representing 20.8 percent, 29.9 percent, and 30.7 percent of offenders, respectively. On average, offenders are sentenced to 61 months, of which they serve less than a third in prison. The most common reason for entrance into prison is a new court commitment, representing 65.6 percent of all offenders. Approximately 34.6 percent of offenders are released under discretionary parole, 15.1 percent are released under mandatory parole, and 31.9 percent serve their full sentence in prison. As seen in Table 2, 19.6 percent of offenders in our sample return to prison within one year of release, while 38% do so within three years. We also note that property and drug crimes are the most common offenses for which a person returns back to prison.

5 Empirical Strategy

5.1 Difference-in-differences

To estimate the effect on recidivism of switching from termination to suspension of Medicaid upon incarceration, we exploit variation in the timing of state policies that suspend rather than terminate Medicaid coverage for incarcerated individuals. In a difference-in-differences framework, we use the effective dates of suspension policies as exogenous shocks that increase the relative ease of re-enrolling in Medicaid upon release. Exploiting the panel nature of our data and the fact that states switch from terminating to suspending Medicaid at different times between 2000 and 2016, we estimate the following baseline regression:

$$Recidivate_{ist} = \alpha_0 + \beta Suspension_{st} + \alpha_1 X_{it} + \alpha_2 Z_{st} + \alpha_3 ACA_{st} + \gamma_t + \delta_s + S_s \times t + \epsilon_{ist} \quad (1)$$

In Equation 1, i indexes the offender, s indexes the state, and t indexes the prison admission year. Our dependent variable of interest, $Recidivate_{ist}$ is an indicator variable that equals to 1 if an offender i , admitted to prison in state s in year-month t , returns to prison in the same state within one or three years of release.¹⁶ Using one-year recidivism as an outcome allows us to use more treated states in our estimation because most states switch from termination to suspension of Medicaid upon incarceration after 2015. However, three-year recidivism rates may more fully capture recidivism probabilities because of the lengthy trial process in criminal cases. Thus, we consider recidivism rates both within one and within three years of release.¹⁷

¹⁶We also calculate recidivism rates by crime types to explore whether the treatment has any heterogeneous effects.

¹⁷While we report only the three-year recidivism results in the main text, we include the counterpart one-year recidivism results in Appendix A.

$Suspension_{st}$ is an indicator that equals to 1 if a state s suspends Medicaid coverage for incarcerated individuals for the year-month t in which the offender was admitted to prison. In other words, individuals are treated if they are admitted to prison after the implementation of a policy that suspends Medicaid for incarcerated individuals. Thus, treatment is defined based on prison admission date rather than the release date. Defining treatment status this way makes more sense in our context because we are interested in how suspension of Medicaid upon incarceration affects the recidivism rate. In addition, if treatment were defined based on release year, our results might be confounded as there will be individuals who were admitted before and released after the policy implementation and who are potentially treated but classified as not treated.¹⁸

X_{it} is a vector of characteristics of the individual offender. These characteristics are both time-invariant (race/ethnicity, gender, highest grade completed at entry) and specific to the particular prison spell (age at release, time served for this spell, offense committed for this spell, and prior felony incarceration indicator). The vector X_{it} also includes indicators for missing data on each of the time-invariant characteristics. Z_{st} captures time-varying state characteristics: unemployment rate and the number of sworn police officers per 1,000 people.¹⁹ These variables are intended to capture time-varying state-level characteristics that impact recidivism. ACA_{st} is an indicator for whether state s expanded Medicaid under the Affordable Care Act for the year-month t in which the offender was admitted to prison. The term γ_t is an admission year fixed effect and δ_s is a state fixed effects, which accounts for average differences across states. The $S_s \times t$ terms are state-specific linear time trends, which absorb possible pre-existing state trends in the outcome measure correlated with the treatment.²⁰ We cluster standard errors ϵ_{ist} at the state level.

Our identification of the impact of switching from termination to suspension of Medicaid upon incarceration compares observably similar offenders admitted to prison in the same state but who are admitted under a policy regime of suspending Medicaid coverage. The coefficient of principal interest, β , is identified by the random variation in the month of admission, whether prison entry occurred before or after a change of Medicaid policy, and how an individual's probability of recidivism compares to that of other prisoners with similar characteristics. Our identifying assumption is that we are adequately controlling for pre-existing trends that are correlated with the timing of Medicaid suspension policies for

¹⁸Note, however, that in our main specification we include release year fixed effects to control for yearly shocks to the environment the prisoner is released into that might affect likelihood of recidivism. In a robustness check in Table A9, we show that our results are not sensitive to excluding these fixed effects.

¹⁹State unemployment rates are obtained from the Bureau of Labor Statistics, and the number of state sworn police officers per 1,000 is taken from the FBI's Law Enforcement Officers Killed or Assaulted (LEOKA) program.

²⁰See, for example, Ghosh et al. (2020) and Doleac and Hansen (2020).

incarcerated populations.

The natural concern with using a difference-in-differences approach is endogeneity in the timing of the policy changes. There might be factors not controlled for in Equation 1 that are correlated with state agencies’ decisions to suspend Medicaid. We take several approaches to mitigate this problem. We argue that endogeneity is unlikely to be a problem for two reasons. First, in most states, the suspension of Medicaid was not mandated by the passage of new laws; rather, the changes were made within Medicaid administrative agencies. Second, many states suspended Medicaid in response to the expansion of Medicaid under the ACA rather than in response to their recidivism rate or to other efforts to address recidivism. We control for Medicaid expansion under the ACA and examine pre-existing trends to ensure as best as we can that the changes in recidivism are attributable to the causal effect of suspending Medicaid upon incarceration, as compared to other differences across states.

Note that our treatment variable, the switch from terminating to suspending Medicaid for people who are incarcerated, represents an *intent to treat*. We do not observe the actual treatment in the data, nor we can identify whether the individuals in the NCRP are eligible for Medicaid. Ideally, we would be able to identify everyone who is Medicaid-eligible and the Medicaid suspension policies would lead immediately to everyone having easy access to Medicaid when released. To the extent that this does not happen—that is, to the extent that the intent to treat does not indicate actual treatment—our estimates will be biased toward zero.

The most likely threat to identification is that Medicaid policies for incarcerated individuals were adopted in states that were motivated to help ex-offenders reintegrate into society. The timing of these policies likely coincides with new state interest in enrolling soon-to-be-released inmates in social safety nets such as Medicaid. This should bias our estimated effects downwards—that is, toward finding a bigger negative effects.

5.2 Event study

We extend our differences-in-differences framework to an event study by including treatment leads and lags as regressors. This allows us to estimate the average dynamic effects of switching from termination to suspension of Medicaid upon incarceration on recidivism.

We use the following event study specification (Jacobson et al., 1993):

$$Recidivate_{ist} = \alpha_0 + \sum_{L \in K} \beta_L Suspension_{st}^L + \alpha_1 X_{it} + \alpha_2 Z_{st} + \alpha_3 ACA_{st} + \gamma_t + \delta_s + S_s \times t + \epsilon_{ist} \quad (2)$$

$K = \{-7, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4\}$, with -7 capturing seven or more years before

and 4 capturing four or more years after the state switches from terminating to suspending Medicaid coverage upon incarceration. In other words, we set a baseline event window running from seven years prior to a state’s reform of Medicaid policies regarding incarcerated individuals to four years after.²¹ The set of $Suspension_{st}^L$ dummies represents year relative to the enactment of a Medicaid suspension policy ($L = -1$ denotes the year prior to switching from Medicaid termination to suspension).²² Each of the β_L coefficients is measured relative to the omitted category (the year prior to policy implementation). The validity of this research design relies on the assumption that outcomes in the treatment and control states would have behaved similarly in the post implementation years if the policy were not implemented. Finding β_L coefficients in the prior years that are indistinguishable from zero would indicate the outcome variables were on a similar trajectory before the Medicaid suspension policy was implemented, which is what we would expect to see if this assumption were true. As we will show throughout the Section 6, the pre-trends we observe imply that the states that terminate Medicaid upon incarceration are a valid control group.

6 Results

Table 3 presents our main difference-in-differences results from Equation 1, which estimates the effect of the Medicaid suspension policies on an individual’s probability of returning to prison within three years of release. The estimate of β reported in Column 1 of Table 3 is from a model that only controls for state and prison-admission-year fixed effects. It suggests that suspending as opposed to terminating Medicaid upon incarceration reduces the probability of returning to prison within three years of release by 3.7 percentage points, or approximately 9.7 percent. This estimate is borderline statistically significant with (with a p -value of $= 0.15$). Controlling for prisoner demographic characteristics produces a slightly larger estimate of β that is statistically significant at the 10% level; merely suspending Medicaid upon incarceration, which perhaps leads to faster and easier access to medical services, is associated with a reduction in the probability of returning to prison within three years of release of 3.9 percentage points. After controlling for time-varying state characteristics (unemployment rate and police force size), we find that Medicaid suspension reduces three-year recidivism rate by 3.7 percentage points. Although we do not observe every initiative at the state or local level that may have affected recidivism rates, and therefore we cannot account

²¹We experimented with different leads and lags and our results are robust to the event window definition.

²²For example, $Suspension_{1(st)}$ is an indicator that equals to 1 if prisoner i is admitted in a state between one and two years after the state starts suspending Medicaid coverage and 0 otherwise.

for their influence, the stability of the estimates reported in Table 3 is reassuring.²³

The validity of the difference-in-differences results depends on the assumption that the parallel pretreatment trends between the treatment and the control states would continue to be parallel in the absence of the treatment (the policy change). While it is not possible to observe the counter-factual, we can test whether the pretreatment trends of the treatment and the control states are parallel. We empirically test the parallel trend assumption using our event study specification (Model 2). Our specification satisfies the assumption if we cannot reject the claim that all β_k coefficients with $k < -1$ in Model 2 are zero. The event study results are presented in Figure 2. The point estimates hint at a slight yet insignificant pre-trend. This indicates that the difference-in-differences results we find are not due to an already-existing downward trend in recidivism rates before the policy changes. This also suggests that the Medicaid policies to suspend coverage for incarcerated individuals were not preceded by, for instance, other initiatives by the treated states aimed at decreasing recidivism. The event study results in Figure 2 also provide evidence that the effect of the policy increases over time. This might not be surprising as Medicaid eligibility has been expanding over time.

We find a relatively moderate effect of switching from termination to suspension of Medicaid upon incarceration on one-year recidivism. The results for the policy’s effect on one-year recidivism are presented in Table A4. We estimate that the policy effect is 1.2 percentage points and statistically significant at the 10% level. The flat pre-trends in Figure 1 support our identifying assumption and the causal interpretation of our estimates for one-year recidivism. A visual comparison of Figure 1 and Figure 2 provides additional evidence for the relatively smaller effect on one-year recidivism that persists over time.

6.1 Heterogeneous effects

When considering a policy change, it is vital to know whether the policy would have homogeneous influence across different types of populations. In general, this information is of interest to policy makers whose goal is to impact specific populations or geographic areas where the policy may be most effective. In this section, we explore the heterogeneous effects of the Medicaid suspension policies by return-crime type, gender, and race.

Table 4 reports difference-in-differences results from Equation 1 by the crime type an offender returns to prison. Column (1) in Table 4 presents our main result from Table 3 Column (3). It shows the effect of suspending rather than terminating Medicaid upon incarceration on an individual’s probability of returning to prison within three years of release

²³Column 3 is our preferred specification. In Section 6.2, we provide evidence that our results are robust across various specifications, modeling assumptions, and sample restrictions.

for any crime type. Columns (2)-(5) show the effect of the Medicaid suspension policies on three-year recidivism for violent, property, drug, and other crime types respectively. Consistent with the main results, we observe that the policy reduces recidivism associated with each crime type. On the other hand, the only result that is statistically significant (at the 1% level) is the effect on recidivism for property crime. We conclude that the Medicaid suspension policies decrease the probability of returning to prison within three years of release with property crimes. The magnitude of the point estimate is -0.95 percentage points, which translates to a 7 percent decrease in property crime recidivism. We estimate that the policy effect on three-year recidivism associated with drug-related crime is -0.97 percentage points (an 8% decrease) and is very close to being statistically significant at the 10% level (the p -value is 0.107). We do not observe a statistically significant effect on recidivism associated with other crime types.

In addition to the difference-in-differences model, we also estimate the associated event study models by crime type. These results are presented in Figure 5 and provide evidence for the nonexistence of a pretreatment period differential trend between treatment and control states. The results are consistent with our difference-in-differences findings. We do not observe any significant policy effect on recidivism associated with violent crime. On the other hand, the point estimates on the effect on recidivism associated with property crime are all negative and statistically significant at the 5% level. The estimates for recidivism associated with drug related crime are also negative and statistically significant. Appendix Figure A5 presents results for one-year recidivism by crime type and provides evidence that that switching from termination to suspension of Medicaid upon incarceration reduces recidivism across different types of crimes. The point estimates are negative and statistically insignificant, but relatively smaller than the ones for three-year recidivism. As with the three-year-recidivism results, the largest in terms of magnitude coefficient estimate is for the property crime recidivism rate.

These results can shed light upon the potential channels through which Medicaid suspension policies affect recidivism. One potential mechanism for the reduction in recidivism is through an income effect. Medicaid coverage decreases overall medical and insurance costs for released prisoners, which could reduce the rate of returning prisoners that commit income-generating crimes, such as property or drug-related crimes. Our results in Table 4 support the argument that the reduction in recidivism due to the implementation of Medicaid suspension policies. They suggest that Medicaid suspension policies do not reduce crimes of passion but do reduce potentially income-generating crimes.²⁴ In contrast to Aslim et al.

²⁴The event study findings for crime-type-specific recidivism presented in Figure 5 support the validity of our difference-in-differences framework.

(2019), who finds that expanding Medicaid through the ACA led to no statistically significant effects on income-generating crimes, we find that specific Medicaid-eligibility policies that potentially restrict enrollment after release do have an impact on property and drug-related recidivism.

Especially prior to the enactment of the ACA, Medicaid eligibility rules have varied by state based on parental status and household income level. Pre-arrest income levels and parental status also vary by gender. So the suspension policies' impact on recidivism is likely to vary by gender. The BJS reports that 53% of men and women in prison were parents of minors before they were imprisoned and that 41.7% of women reported being the sole parent of their household (Glaze, 2008). Moreover, a greater proportion of men in jail had income from wages or salary before arrest compared to women (Bureau of Justice Statistics, 2002). These statistics of custodial responsibility and income imply that Medicaid suspension policies may have a stronger effect on female recidivism than male recidivism. The results by gender are presented in Columns (2) and (3) of Table 5. These regressions include the full set of covariates and report the effect of switching from termination to suspension of Medicaid upon incarceration on three-year recidivism. Our results indicate that the policy change reduces recidivism among women by 2.9 percentage points, a finding statistically significant at the 1% level. Meanwhile, the policy reduces recidivism among men by 3.7 percentage points which is statistically significant at the 5% level. The policy's effect is percentage-wise slightly greater among women (9.7%) than among men (9.4%) although these differences are not statistically different.

Event study Figures 3 and 4 also provide evidence for a similar dynamic effect of the policy among different genders.²⁵ Event study results for the policy's effect on one-year recidivism by gender are presented in Appendix Figures A3 and A4. Parallel to our findings for three-year recidivism, these figures suggest that the policy did not have a differential impact on one-year recidivism by gender prior to policy enactment. On the other hand, our event study results for one-year recidivism are statistically significant only among men post treatment. The results presented in Table A5 supports this finding. Although our coefficient estimate for the policy's effect among women is negative, it is statistically insignificant. We also test the heterogeneous policy effect by gender using difference-in-differences estimates, and we do not find a statistically significant differences by gender.

Table 5 reports results by race. Switching from termination to suspension of Medicaid upon incarceration is associated with a 3 percentage points (8.3%) reduction in recidivism rates among whites and it is statistically significant at the 1% level. The policy's effect

²⁵The event studies also show that pretreatment period coefficients are not statistically different from zero, which indicates no differential pretreatment period trends between the control and treatment groups.

among Blacks is 4.2 percentage points (10.3 %) and close to being statistically significant at the 5% level (the *p-value* is 0.055). However, we cannot reject the hypothesis that the estimates by race are statistically different. The effects on one-year recidivism are smaller than those for three-year recidivism for both racial groups, greater for Blacks than whites, and not statistically significantly different from each other (Table A5).

Some states have enacted legislation to implement a Medicaid suspension policy, whereas others implemented it by changing their Medicaid agencies' administrative rules. We test whether the effect of the policy change differs by the implementation method. Table A7 presents results for our main specification, which includes one more interaction term than Equation 1. This additional term captures potential differential impact of switching from termination to suspension of Medicaid upon incarceration by whether this switch is triggered legislatively or administratively. The results provide no evidence that the effect differs by the implementation type. This might not be surprising given that both modes of implementation are equally legally binding.

Finally, we check whether the effect of suspending Medicaid rather than terminating is greater among states that expanded Medicaid under the ACA. We add an interaction term to our main Model 1 that captures the effect of both expanding Medicaid under the ACA and switching from termination to suspension of Medicaid coverage for incarcerated individuals.²⁶ We report these results in Table A8. We find that the effect of switching from termination to suspension of Medicaid is greater in states that expanded Medicaid. This is plausible because a greater portion of the inmates are likely to have Medicaid coverage prior to incarceration in states that has expanded Medicaid. Thus, inmates in these states are likely to benefit more from the suspension policies. The point estimate suggest that the suspension policy reduces the recidivism rate by 2.7 percentage points (roughly 7.1 %) more in states that has expanded Medicaid compared to other states. Based on this result, we conclude that the ACA Medicaid expansion, or in more general terms a higher Medicaid-coverage rate, increases the magnitude of the effect of suspending rather than terminating Medicaid upon incarceration.

6.2 Robustness

In addition to the event study analysis, we estimate several other models to check the robustness of our main results. First, we run several placebo regressions in which we set different policy implementation dates. We restrict our sample to only include data prior to the policy change in states that implemented suspension policies. Each column in Table A6

²⁶We obtain the ACA expansion dates from the Kaiser Family Foundation.

presents results from a placebo test with a different treatment year. For example, Column (1) presents results from the model that sets the policy implementation date to be one year before the actual policy date in each treatment state. The existence of significant effects in placebo regressions would undermine our results. For instance, a negative finding would indicate that there has been a preexisting negative trend in treatment states' recidivism even before the implementation of the suspension policies. However, all our placebo regression results are statistically insignificant, positive, and small in magnitude, which supports our research design's validity.

Second, we employ another robustness check by using the leave-one-state-out method. In this analysis, we leave one state out of the sample and then re-estimate our main regression model to investigate whether our results are mostly driven by a single state. In these regressions, we expect to see a significant change in our main results if they are sensitive to excluding data from any of the states in our sample. Results for the leave-one-out method are presented in Figure A7. We report the point estimate of our main result along with its 95% confidence interval on the y-axis and the dropped state from the sample on the x-axis. All coefficient estimates on the three-year recidivism are negative and statistically significant at the 5% level. There are minor changes in point estimates across regressions, but qualitatively our results are robust.

Third, Table A6 presents various other robustness checks. Our main results are presented in Table A6 Panel A while Panel B presents estimates from a probit model. As with the linear probability model specification, probit model estimate of the policy's effect on three-year recidivism is statistically significant at the 5% level. In addition, the policy effect on one-year recidivism is statistically significant at the 10% level, as with to the results in Table A6 Panel A. This suggests that our estimates are not dependent on functional form assumptions.

Fourth, several studies using the older versions of the NCRP data have identified issues with data reliability and have used a subset of states to ensure consistency (Neal and Rick, 2016; Pfaff, 2011). For instance, using 1983-2002 NCRP data, Pfaff (2011) compares counts of individuals entering and exiting state prisons to other official counts such as the National Prisoner Statistics. He concludes that only eleven states consistently reported prisoner-level data to the NCRP: California, Colorado, Illinois, Kentucky, Michigan, Minnesota, Nebraska, New Jersey, South Dakota, Virginia, and Washington. Further, Neal and Rick (2016) use 1983-2009 NCRP data to conduct several checks and confirm that these eleven states consistently reported prison admissions. Therefore, in Panel C of Table A6 we restrict our sample to these eleven states to evaluate the robustness of our results. Our estimate for the policy effect is smaller in magnitude (-1.9 percentage point), but the effect on three-

year recidivism is still statistically significant at 10 % level. However, these coefficients lose their significance when using wild bootstrap *p-values* to account for the potential for too few clusters.

Finally, we repeat our main analysis with a restricted sample excluding states that expanded Medicaid early, namely Delaware, Massachusetts, Minnesota, and New York. The results are presented in Table A6 Panel D. We observe very similar results to those in main analysis (Panel A), but the coefficient estimates are slightly greater. The effect on three-year recidivism is 4.4 percentage points and is statistically significant at the 5% level.

One concern about our identification strategy is that recidivism rates have unobserved trends that are correlated with the implementation of the Medicaid eligibility policies for incarcerated individuals, which could bias our results. We employ a variety of specifications to assess potential bias and the sensitivity of our results. Table A9 presents results that explore the sensitivity of our estimates to general and state-specific time trends.²⁷ Our estimates in general are not sensitive to the exclusion of state-specific time trends. In four different specifications the policy effect on one-year recidivism is estimated between -1.2 and -1.6 percentage points and all estimates are statistically significant at the 10% level. On the other hand, various specifications produce policy effect estimates that vary between -3.7 and -4.5 percentage points. All coefficient estimates for the policy effect on three-year recidivism are statistically significant at the 5% level except those in Column (3), which excludes state cubic time trend and is statistically significant at the 10% level.

7 Conclusions

Medicaid provides health insurance coverage to millions of low-income Americans. However, in many states, the Medicaid coverage of inmates, a particularly needy and at-risk population, is terminated rather than suspended upon incarceration. Suspension of coverage potentially results in faster and easier restoration of Medicaid benefits upon release. Using NCRP data on offenders admitted between 1995 and 2016 and employing a difference-in-differences models, we find that adopting policies that suspend rather than Medicaid upon incarceration decreases the probability of returning to prison within three years by 2.5 percentage points. This result is statistically significant and robust to the inclusion of various control variables and time trends. It speaks to an important policy discussion about states' implementation of policies that suspend Medicaid coverage upon incarceration. Looking closely at the types of crimes that land these offenders back in prison, we find that the decrease in recidivism is driven by a decrease in crimes that have a monetary motive (prop-

²⁷Time is defined as prison release year.

erty and drug crimes) rather than violent crimes. If a change in that motive is the channel through which suspending Medicaid affects recidivism, then our paper highlights the importance of acknowledging such income effects when designing policies and programs. We also find heterogeneous effects of the suspension policy across gender and race, although we cannot reject the hypothesis that these effects are the same across groups.

Our analysis and results are, of course, subjected to some limitations. The number of states that have adopted suspension policies has more than doubled in the past five years, which can be attributed in part to the expansion of Medicaid under the ACA. Because our data extends to 2016 and we need to allow one to three years to measure recidivism, relatively fewer states are treated in our estimation sample, especially the sample that requires at least three years of postrelease data. In addition, our estimates are intent-to-treat because we do not observe prisoners' Medicaid status at prison admission. Our inability to observe whether individuals are Medicaid beneficiaries before or after prison also means that we do not observe any efforts that correctional and public-assistance institutions make at outreach or assistance before inmates' reentry into the community. If prison-reentry planning, including Medicaid application assistance, is prevalent in most of our treated states, then our results might be biased upwards.

Ultimately, our analysis of Medicaid suspension speaks to prisoner-reentry policy in general. In a review of the literature, Doleac (2019) discusses how health care access could be critical for re-integrating inmates. Although it is important to learn how to enroll the justice-involved people in Medicaid, it is equally important to develop policies and systems to keep them from losing coverage and allow them to re-enroll faster upon release. Even more, our analysis contributes to an active policy discussion about the urge whether state Medicaid agencies should suspend rather than terminate Medicaid coverage upon incarceration.

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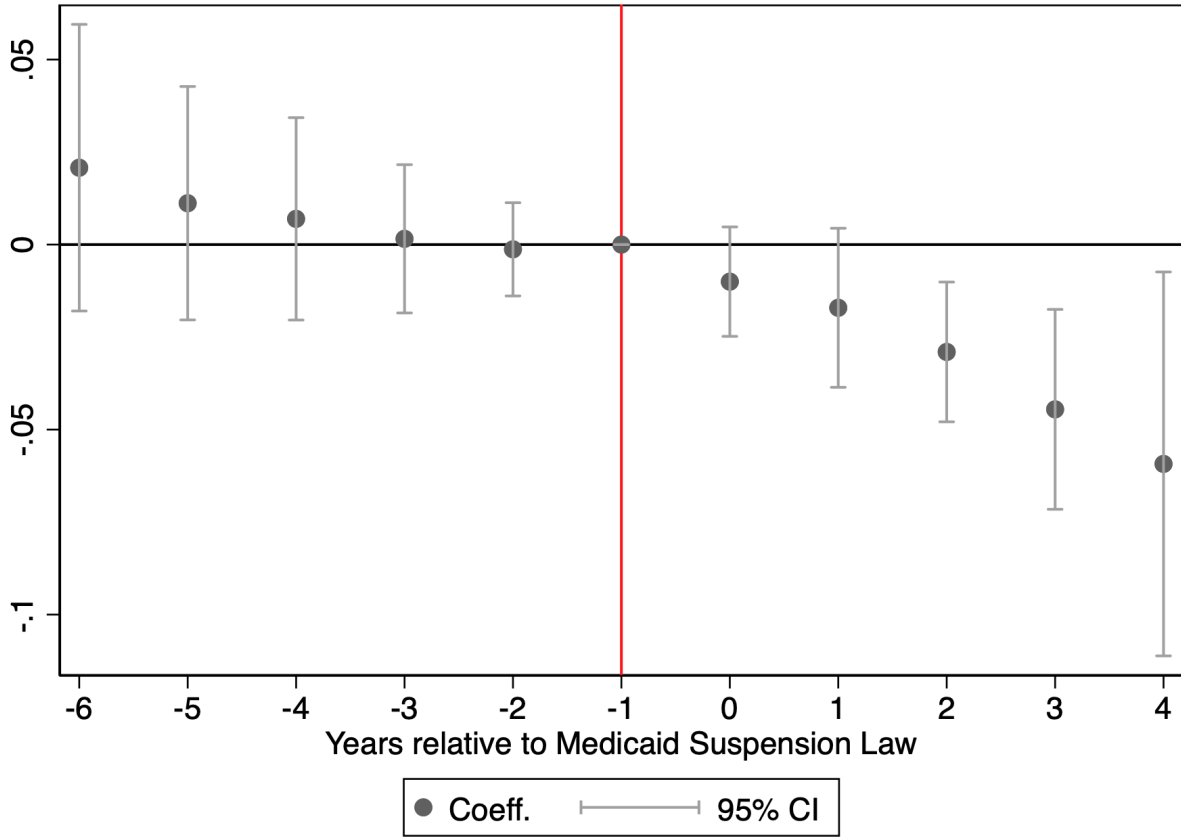
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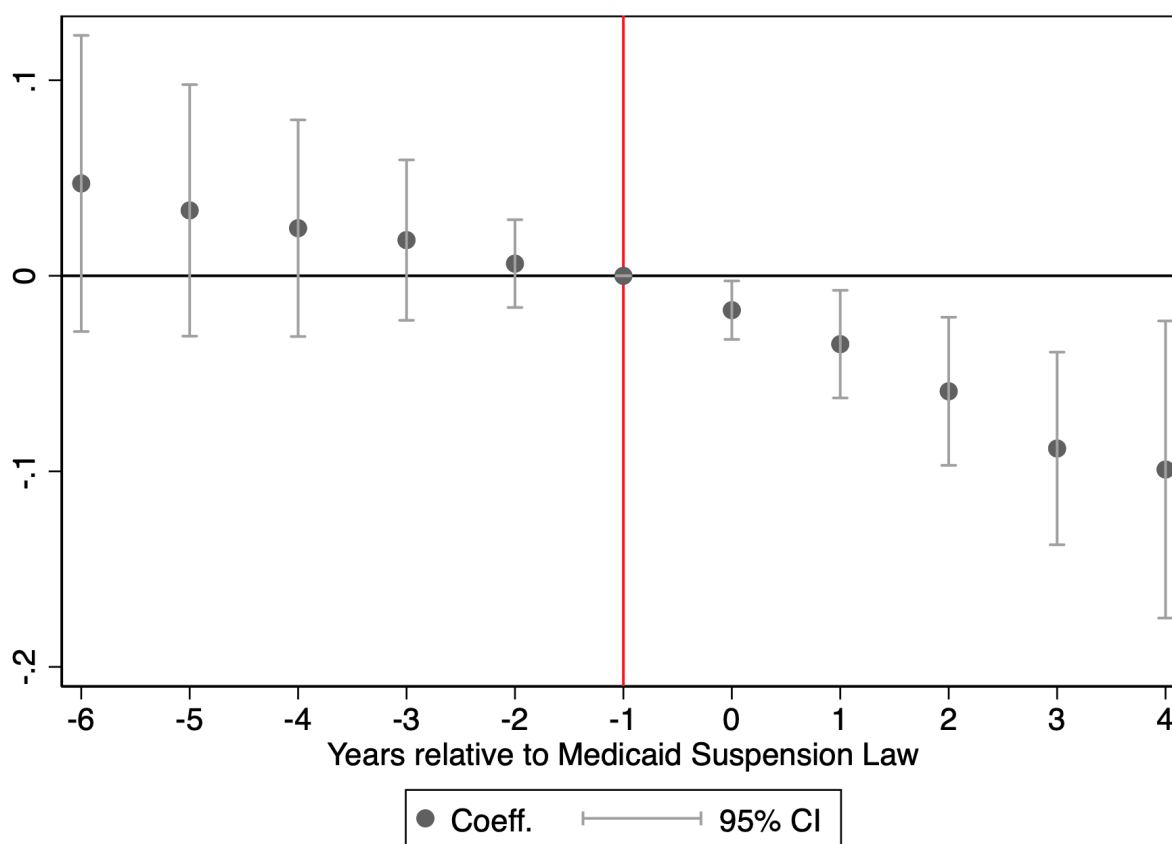
8 Tables and Figures

Figure 1: Effect of Medicaid Suspension Policy on 1-year Overall Recidivism



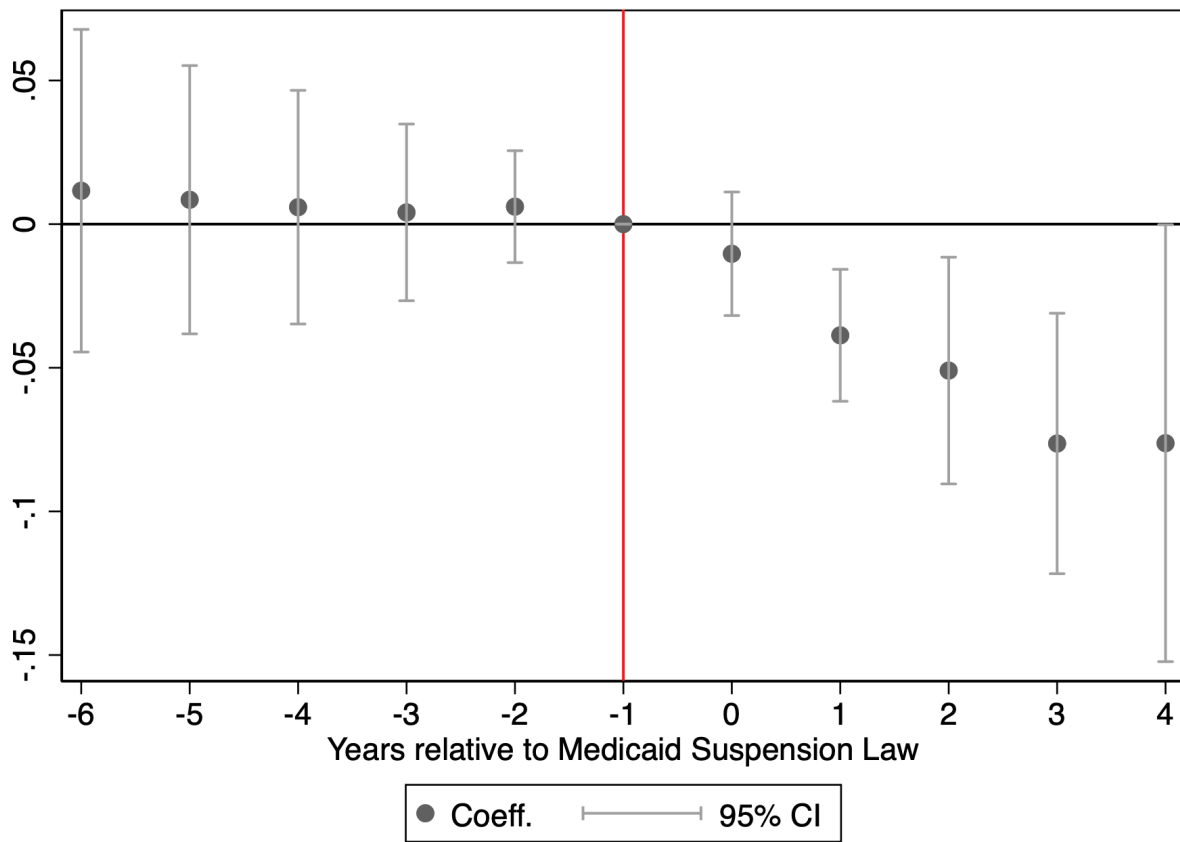
Notes: This figure plots the coefficient estimates (β_L) of Equation 2 and the corresponding 95 percent confidence bands. The outcome of interest is the probability of returning to prison within 1 year of release. The omitted dummy is “year prior to implementation” of the policy that suspends Medicaid upon incarceration, so that coefficient β_{-1} has been set to zero. The first category $L = -6$ represents 6 or more years prior to the implementation of the Medicaid suspension policy for incarcerated individuals, and the final category $L = 4$ represents 4 or more years after the implementation of the policy. We control for individual demographic characteristics (race, ethnicity, gender, age, age squared, highest graded completed, prior felony incarceration indicator) and reason for prison admission. We also include indicators for missing data on each of these control variables, as well as state fixed effects, admission year fixed effects and state-specific time trends. Release year fixed effects are also included. Data are from the NCRP 1995-2016.

Figure 2: Effect of Medicaid Suspension Policy on 3-year Overall Recidivism



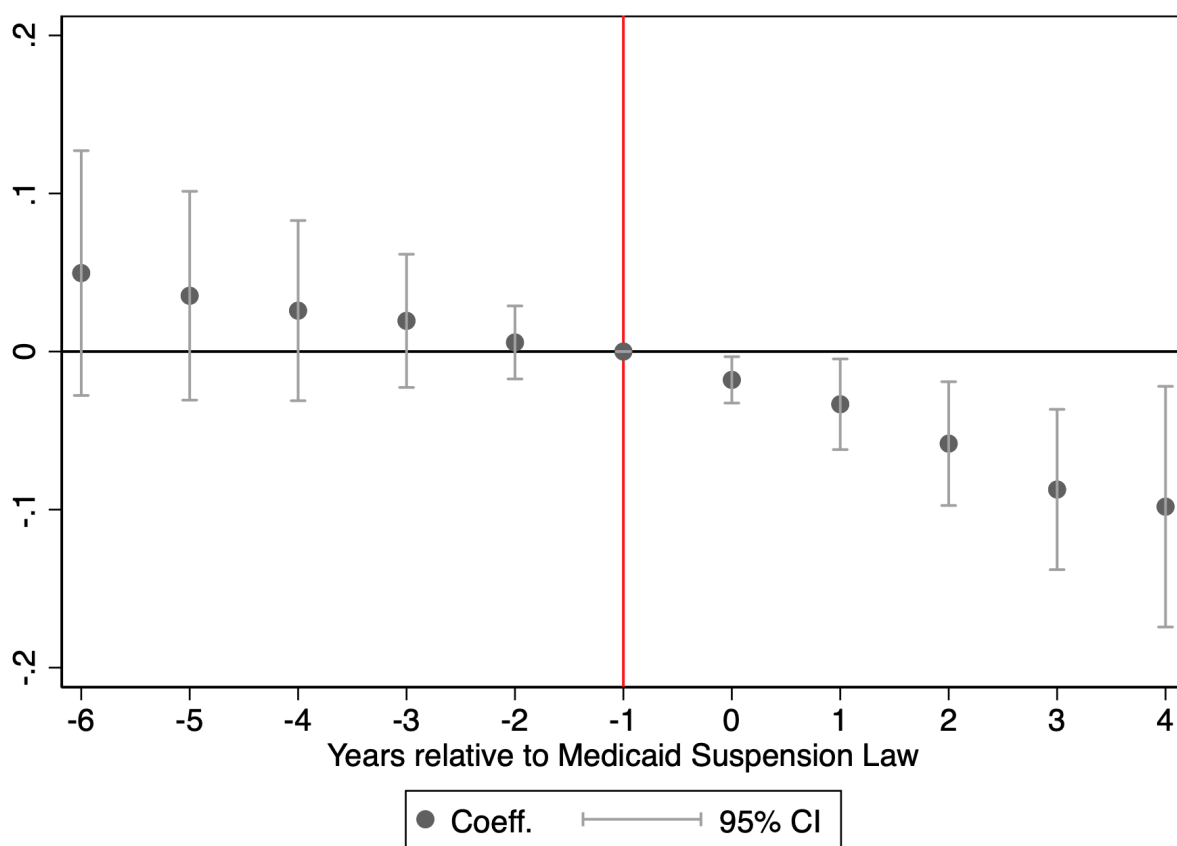
Notes: The outcome of interest is the probability of returning to prison within 3 years of release. See notes for Figure 1 for more detail. Data are from the NCRP 1995-2016.

Figure 3: Effect of Medicaid Suspension Policy on 3-year Overall Recidivism: Female



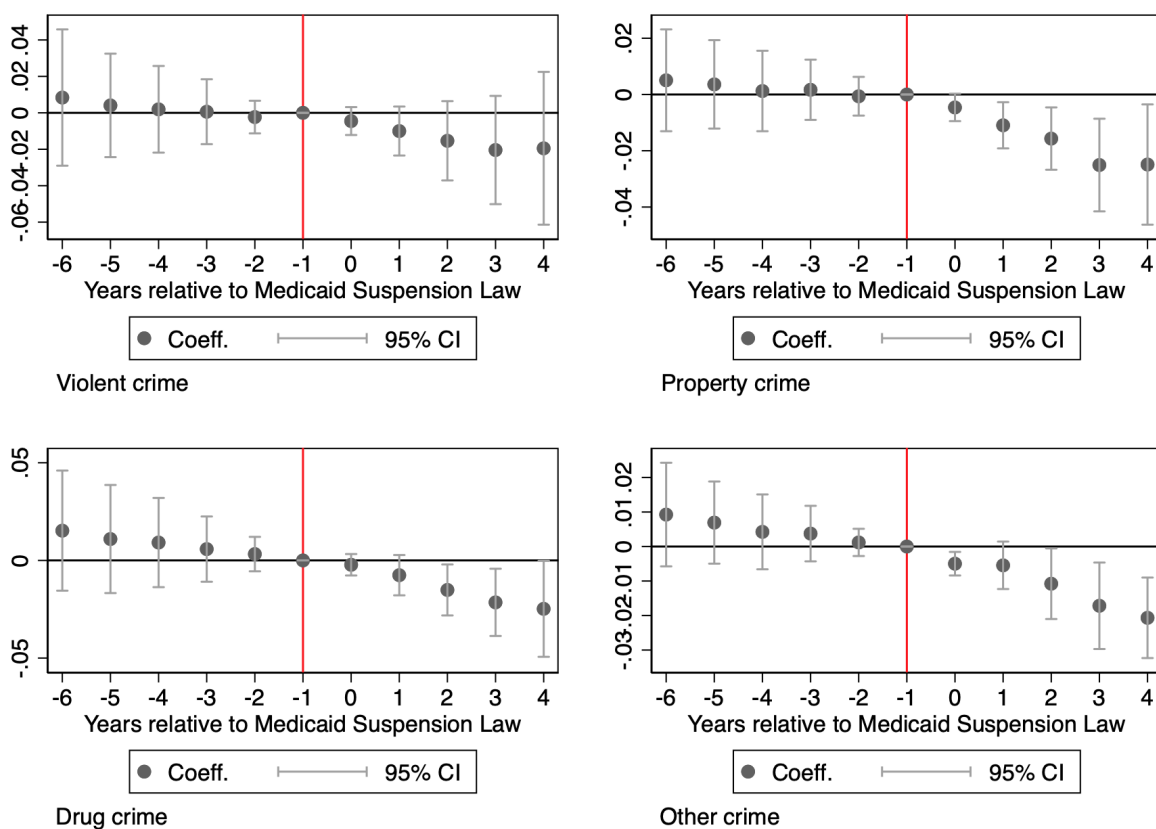
Notes: The outcome of interest is the probability of returning to prison within 3 years of release. Sample is restricted to female offenders. See notes for Figure 1 for more detail. Data are from the NCRP 1995-2016.

Figure 4: Effect of Medicaid Suspension Policy on 3-year Overall Recidivism: Male



Notes: The outcome of interest is the probability of returning to prison within 3 years of release. Sample is restricted to male offenders. See notes for Figure 1 for more detail. Data are from the NCRP 1995-2016.

Figure 5: Effect of Medicaid Suspension Policy on 3-year Recidivism by Reoffending Crime Type



Notes: The outcome of interest is the probability of returning to prison within 3 years of release with the crime specified in each panel. See notes for Figure 1 for more detail. Data are from the NCRP 1995-2016.

Table 1: Summary Statistics: Individual characteristics

	Mean	S.D.
Black	0.445	0.497
White	0.462	0.499
Male	0.882	0.322
Female	0.118	0.322
Hispanic	0.114	0.318
Less than HS Degree	0.396	0.489
HS Degree	0.310	0.462
Some college	0.048	0.214
College Degree	0.008	0.087
Age at Release	34.892	10.264
Prior Felony Incarceration	0.297	0.457
Time served (days)	568.918	708.247
Sentence length (months)	61.328	77.144
New court commitment	0.656	0.475
Parole revocation	0.178	0.382
Probation revocation	0.083	0.276
Parole discretionary	0.346	0.476
Parole mandatory	0.151	0.358
Shock probation	0.088	0.284
Sentence expiration	0.319	0.466
Escape	0.004	0.065
Violent Offense	0.208	0.406
Property Offense	0.299	0.458
Drug Offense	0.307	0.461
Weapons offense	0.035	0.184
DUI offense	0.046	0.210
Other offense	0.102	0.302
ACA	0.008	0.088
Suspension	0.068	0.252
N	5,009,677	

Notes: The sample consists of individuals who have at least 3 years of post-release data. Listed offense types are indicators for the offense for which the offender initially went to prison. ACA represent the average value of the ACA policy variable for the state and month in which the offender was admitted to prison. Data are from the NCRP 1995-2016.

Table 2: Summary Statistics: Recidivism

	1-year Recidivism (1)		3-year Recidivism (2)	
	Mean	S.D.	Mean	S.D.
Overall recidivism	0.196	0.397	0.380	0.485
Violent recidivism	0.039	0.194	0.079	0.270
Property recidivism	0.066	0.249	0.130	0.337
Drug recidivism	0.054	0.225	0.116	0.320
Other crime recidivism	0.036	0.185	0.073	0.261
N	5878736		5009677	

Notes: Column (1) has fewer observations to allow everyone to have 3 years of post-release data, where as Column (2) only requires 1 year of post-release data.

Data are from the NCRP 1995-2016.

Table 3: Effect of Medicaid Suspension Policy on 3-year Overall Recidivism

	(1)	(2)	(3)
Suspension	-0.0316 (0.0219)	-0.0389** (0.0149)	-0.0369** (0.0153)
Mean Dept. Var.	0.382	0.382	0.380
R-squared	0.0449	0.102	0.103
N	5194328	5193967	5009677
State FE	Yes	Yes	Yes
Admission year FE	Yes	Yes	Yes
State-specific linear trends	Yes	Yes	Yes
Individual characteristics	No	Yes	Yes
State characteristics	No	No	Yes

Notes: The dependent variable is individual's probability to return to prison within 3 years of release. Suspension is an indicator for whether a state suspends Medicaid coverage upon incarceration. Robust standard errors clustered by state. Each column is estimated by a separate OLS. State and time FE include state and admission year fixed effects. Individual characteristics include demographic characteristics (race, ethnicity, gender, age, age squared, highest graded completed, prior felony incarceration indicator) and current crime and prison characteristics (main offense type, number of convicted counts, total sentence imposed, reason for release, time served, time served squared) as well as indicators for missing data on each of the time-invariant characteristics. State characteristics include time-varying state characteristics (unemployment rate and the number of sworn police officers per 1000 in the population) and an indicator whether the state expanded Medicaid under the ACA.

Data are from the NCRP 1995-2016.

*** p<0.01, ** p<0.05, * p<0.1

Table 4: Effect of Medicaid Suspension Policy on 3-year Recidivism by Return Crime Type

	Any (1)	Violent (2)	Property (3)	Drug (4)	Other (5)
Suspension	-0.0369** (0.0153)	-0.00963 (0.00756)	-0.00950*** (0.00249)	-0.00971 (0.00587)	-0.0229 (0.0194)
Mean Dept. Var.	0.380	0.0792	0.130	0.116	0.210
R-squared	0.103	0.158	0.202	0.166	0.673

Notes: The dependent variable is individual's probability to return to prison within 3 years of release with any crime (Columns (1)) or with the crime indicated in the column heading (Columns (2)-(4)). Suspension is an indicator for whether a state suspends Medicaid coverage upon incarceration. Robust standard errors clustered by state. Each column is estimated by a separate OLS. State and time FE include state and admission year fixed effects. We control for demographic characteristics (race, ethnicity, gender, age, age squared, highest graded completed, prior felony incarceration indicator) and current crime and prison characteristics (main offense type, number of convicted counts, total sentence imposed, reason for release, time served, time served squared) as well as indicators for missing data on each of the time-invariant characteristics. In addition, we include time-varying state characteristics (unemployment rate and the number of sworn police officers per 1000 in the population) and an indicator whether the state expanded Medicaid under the ACA. Data are from the NCRP 1995-2016. N=5,009,677

*** p<0.01, ** p<0.05, * p<0.1

Table 5: Effect of Medicaid Suspension Policy on 3-year Overall Recidivism by Gender and Race

	Main (1)	Male (2)	Female (3)	White (4)	Black (5)
Suspension	-0.0369** (0.0153)	-0.0371** (0.0163)	-0.0290*** (0.0102)	-0.0297*** (0.00930)	-0.0421* (0.0220)
Mean Dept. Var.	0.380	0.392	0.297	0.359	0.407
R-squared	0.103	0.101	0.0982	0.105	0.0995
N	5009677	4420731	588711	2781368	2228309

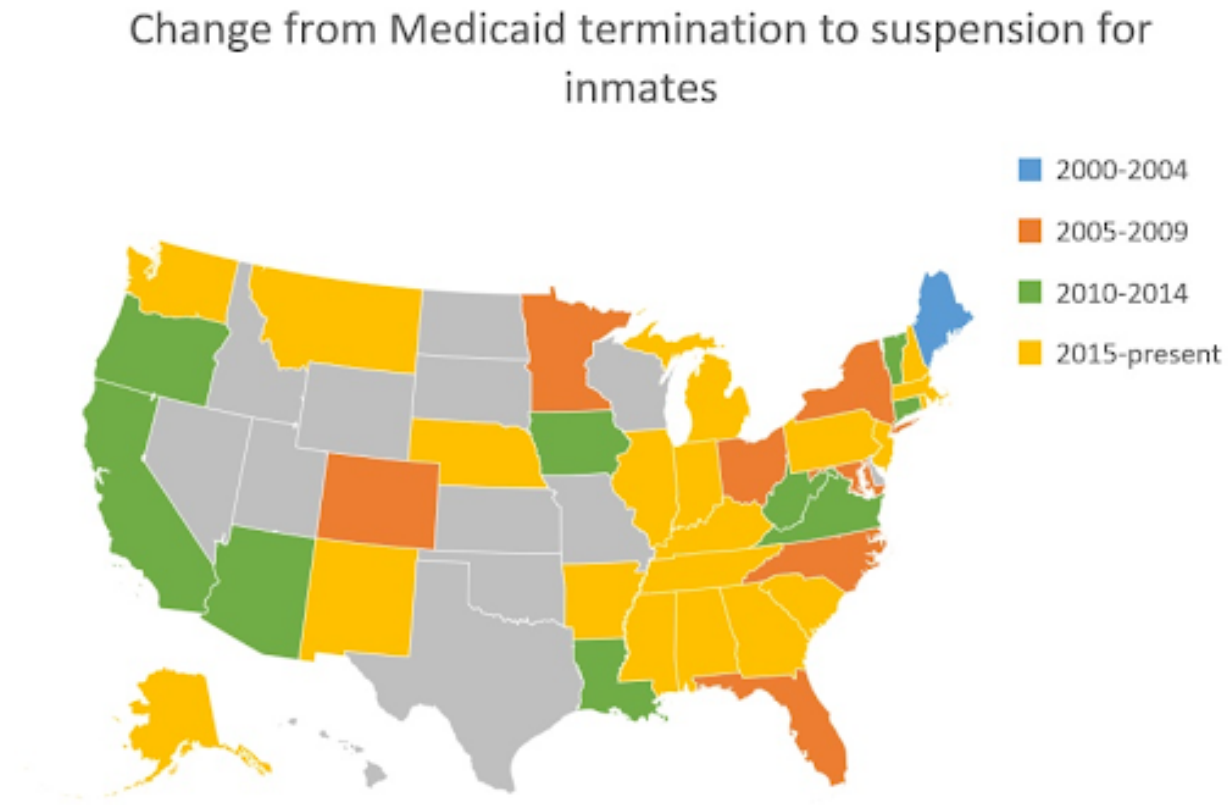
Notes: The dependent variable is individual's probability to return to prison within 3 years of release. Suspension is an indicator for whether a state suspends Medicaid coverage upon incarceration. Robust standard errors clustered by state. Each column is estimated by a separate OLS. Coefficients show the effect of Medicaid suspension (as opposed to termination) on recidivism by gender (Columns (2) and (3)) and race (Columns (4)-(6)). Our main results are presented in Column (1) for comparison. State and time FE include state and admission year fixed effects. Individual characteristics include demographic characteristics (race, ethnicity, gender, age, age squared, highest graded completed, prior felony incarceration indicator) and current crime and prison characteristics (main offense type, number of convicted counts, total sentence imposed, reason for release, time served, time served squared) as well as indicators for missing data on each of the time-invariant characteristics. State characteristics include time-varying state characteristics (unemployment rate and the number of sworn police officers per 1000 in the population) and an indicator whether the state expanded Medicaid under the ACA.

Data are from the NCRP 1995-2016.

*** p<0.01, ** p<0.05, * p<0.1

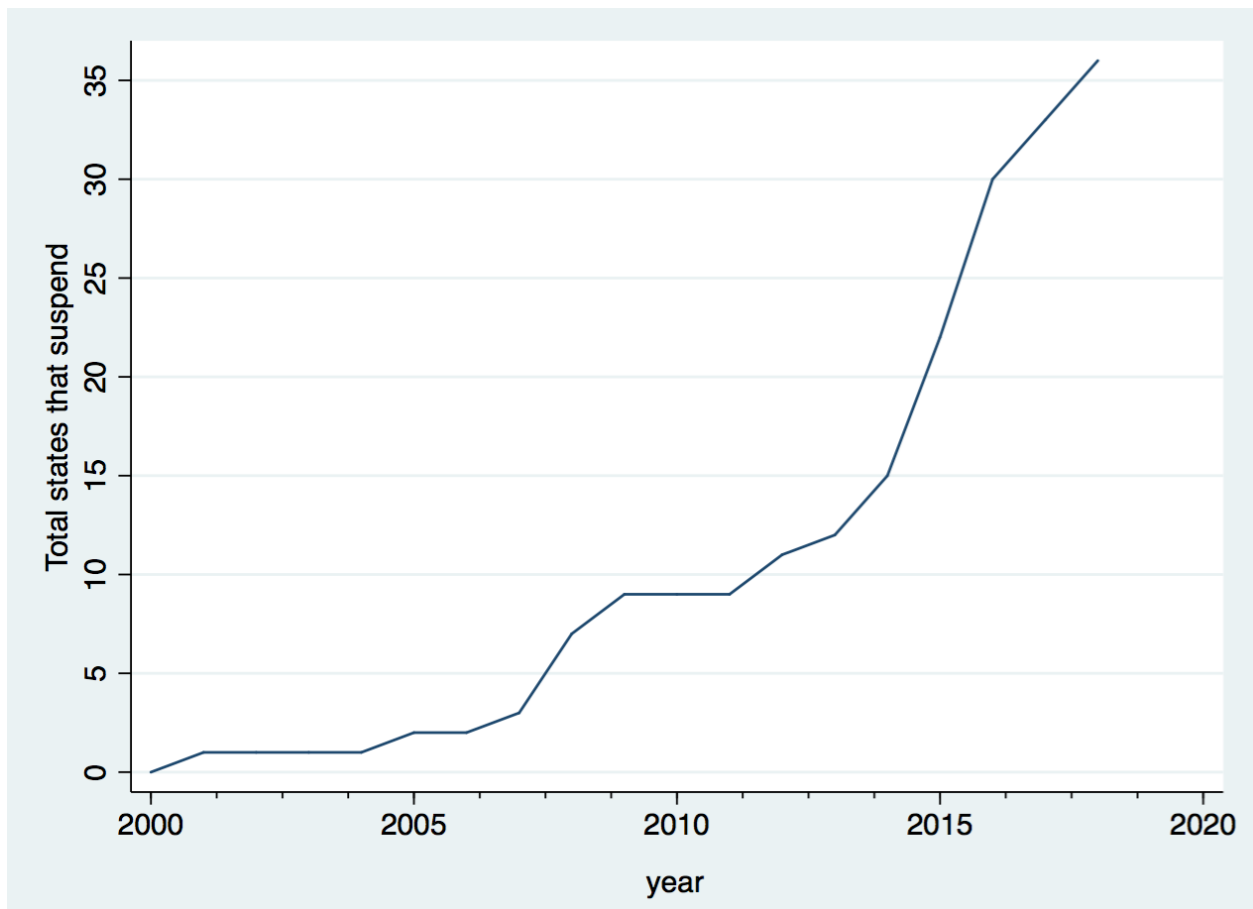
A Appendix

Figure A1: Timing of Medicaid Suspension Policies



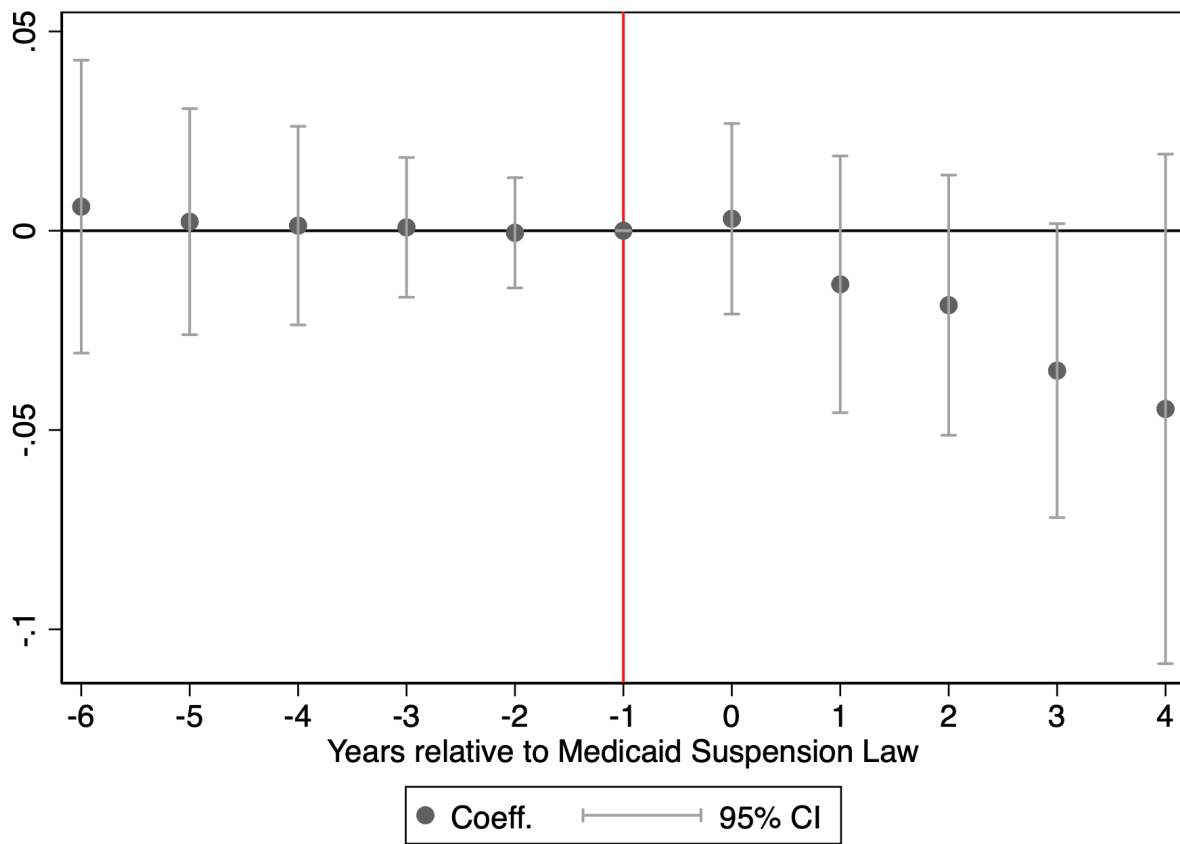
Notes: See notes in Table A1 for more detail on the source of our data. States in grey terminate Medicaid coverage.

Figure A2: Changes in States' Medicaid Suspension Policies for Prisoners over Time



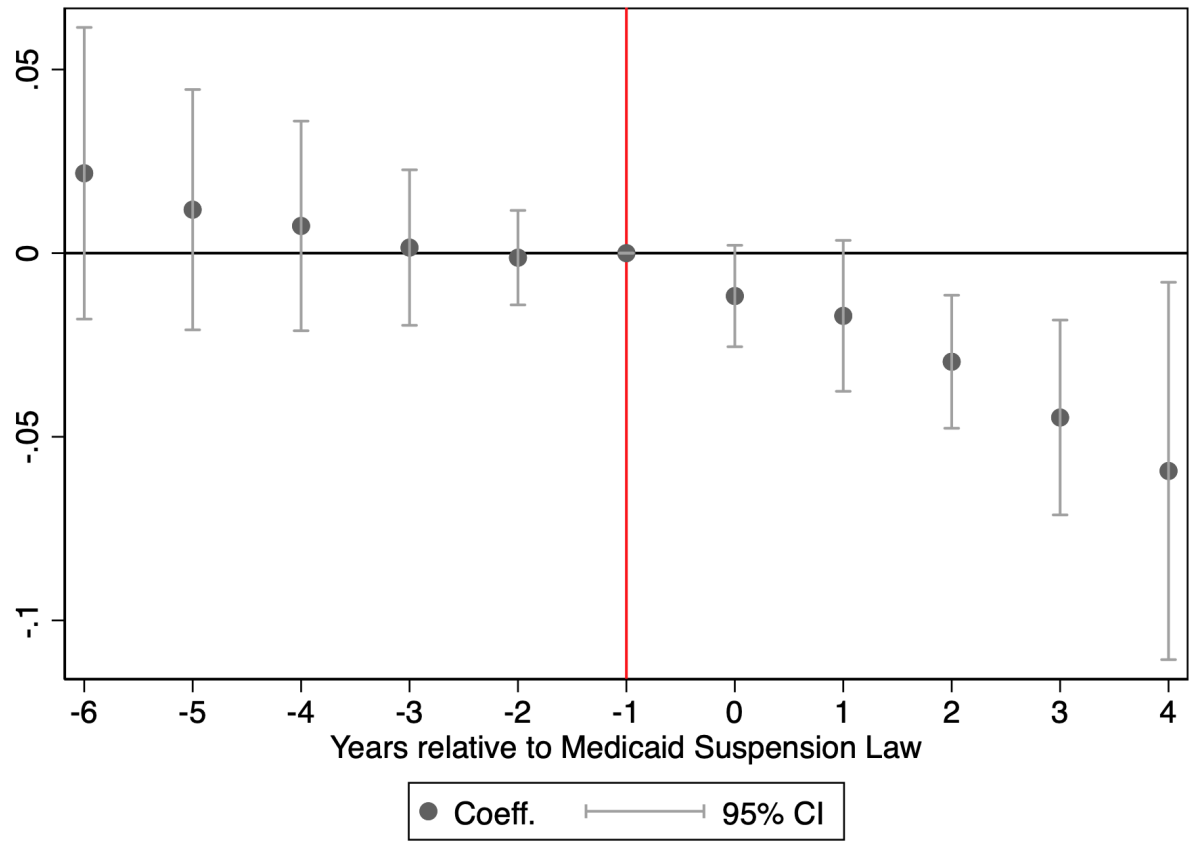
Notes: See notes in Table A1 for more detail on the source of our data.

Figure A3: Effect of Medicaid Suspension Policy on 1-year Overall Recidivism: Female



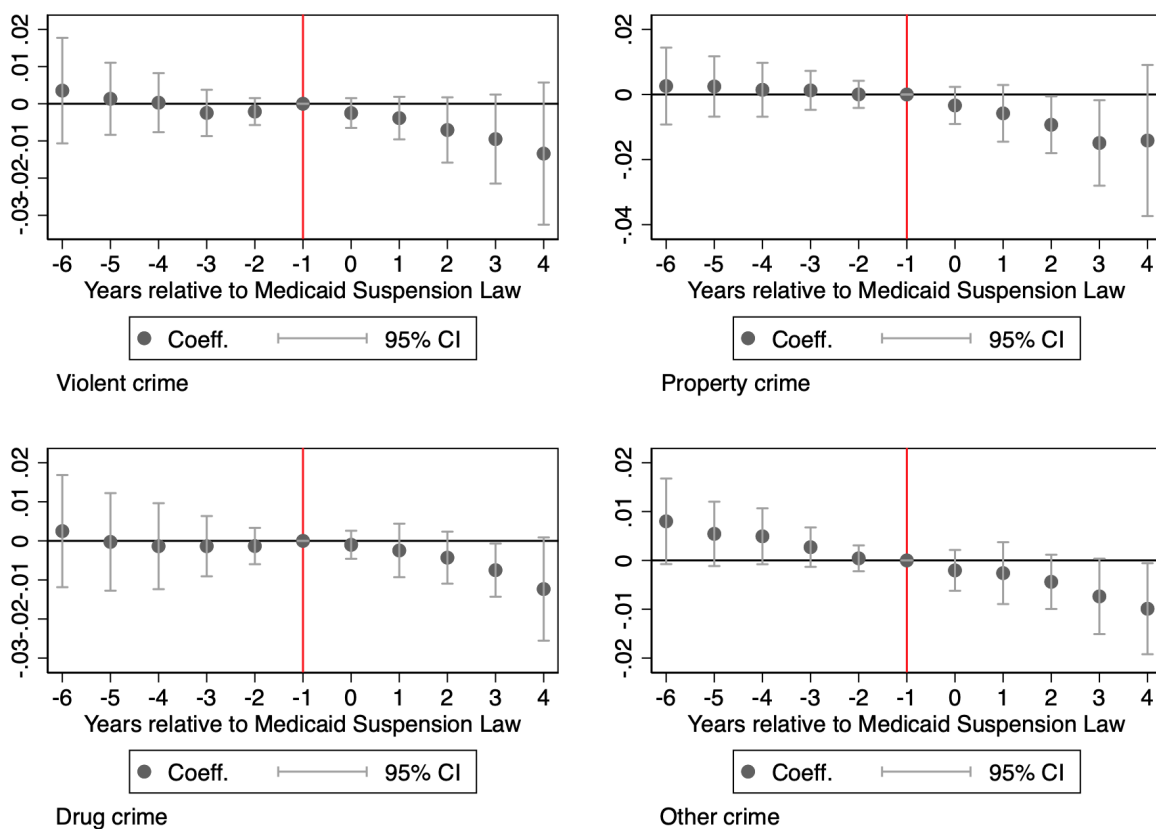
Notes: The outcome of interest is the probability of returning to prison within 1 year of release. Sample is restricted to female offenders. See notes for Figure 1 for more detail. Data are from the NCRP 1995-2016.

Figure A4: Effect of Medicaid Suspension Policy on 1-year Overall Recidivism: Male



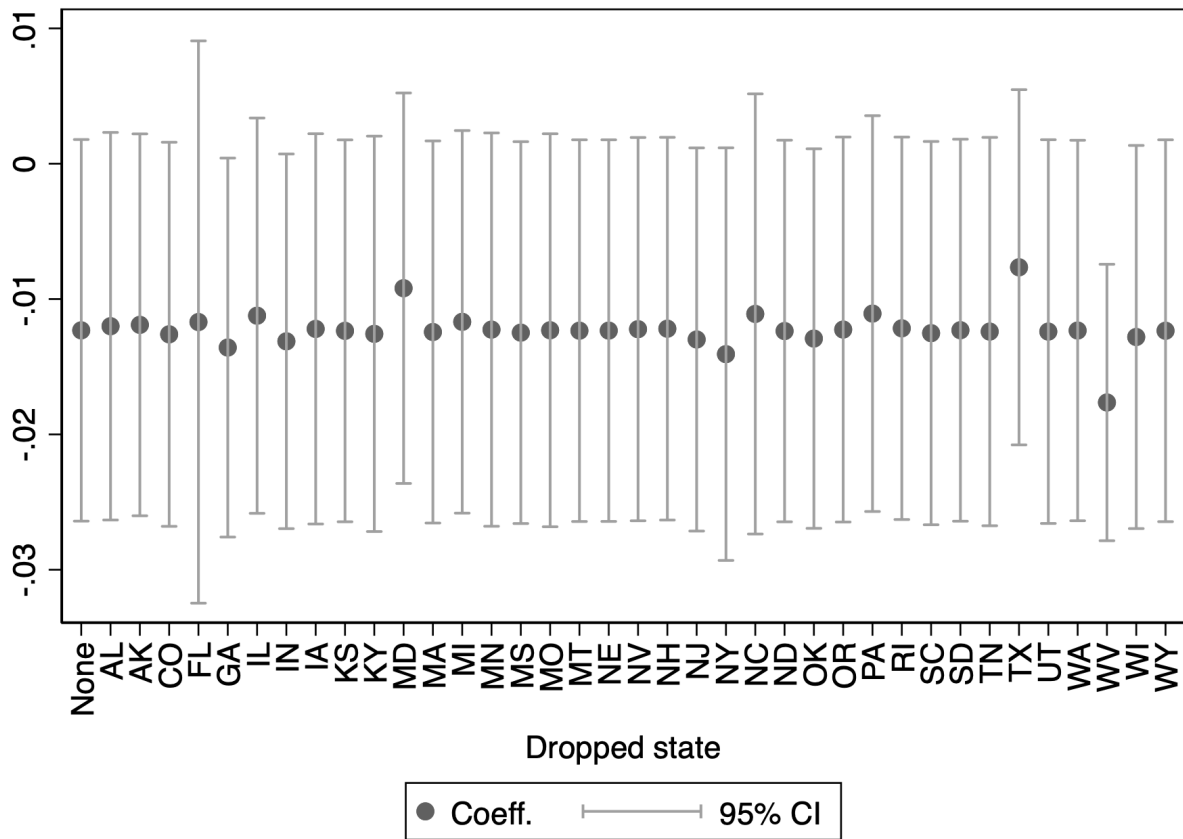
Notes: The outcome of interest is the probability of returning to prison within 1 year of release. Sample is restricted to male offenders. See notes for Figure 1 for more detail. Data are from the NCRP 1995-2016.

Figure A5: Effect of Medicaid Suspension Policy on 1-year Recidivism by Reoffending Crime Type



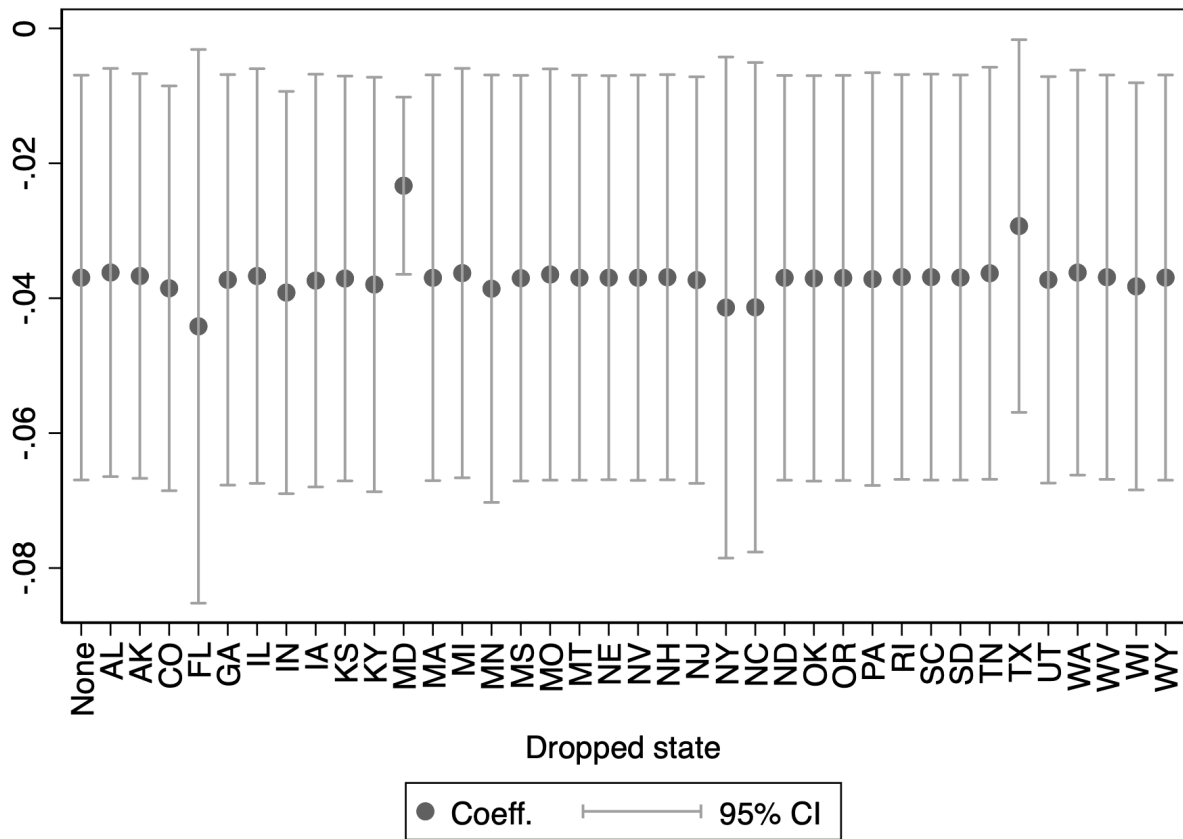
Notes: The outcome of interest is the probability of returning to prison within 1 year of release with the crime specified in each panel. See notes for Figure 1 for more detail. Data are from the NCRP 1995-2016.

Figure A6: Alternative Specifications for the Effect of Medicaid Suspension Policy on 1-year Overall Recidivism: Leave-One-Out Method



Notes: The figure reports the coefficient estimates of the full model in Table A3 along with their 95% confidence intervals resulting from dropping out data from one specific state at a time.

Figure A7: Alternative Specifications for the Effect of Medicaid Suspension Policy on 3-year Overall Recidivism: Leave-One-Out Method



Notes: The figure reports the coefficient estimates of the full model in Table 3 along with their 95% confidence intervals resulting from dropping out data from one specific state at a time.

Table A1: State Medicaid Policies for Incarcerated Individuals

State	Policy (1)	Time limit (2)	Implementation date (3)	Type (4)
Alabama	suspend		1/1/2018	Legislative
Alaska	suspend		7/11/2016	Legislative
Arizona	suspend	12	7/31/2014	Administrative
Arkansas*	suspend	12	8/1/2015	Administrative
California	suspend		1/1/2014	Legislative
Colorado	suspend		3/1/2017	Legislative
Connecticut*	suspend		6/1/2015	Administrative
D.C.	suspend		6/9/2017	Administrative
Delaware	terminate			Administrative
Florida	suspend		6/30/2008	Legislative
Georgia	suspend	18	7/1/2018	Administrative
Hawaii*	terminate			Legislative
Idaho	terminate			Administrative
Illinois	suspend		8/20/2015	Legislative
Indiana	suspend	24	7/1/2017	Administrative
Iowa	suspend		1/1/2012	Legislative
Kansas	terminate			Administrative
Kentucky	suspend		8/19/2015	Administrative
Louisiana*	suspend		9/30/2012	Administrative
Maine	suspend		9/21/2001	Legislative
Maryland	suspend		7/1/2005	Legislative
Massachusetts	suspend		7/1/2015	Legislative
Michigan	suspend		1/2/2015	Legislative
Minnesota	suspend	12	7/1/2007	Legislative
Mississippi	suspend		11/30/2015	Administrative
Missouri	terminate			Administrative
Montana	suspend		11/30/2015	Administrative
Nebraska	suspend		8/30/2015	Legislative
Nevada	terminate			Administrative
New Hampshire	suspend		8/29/2016	Administrative
New Jersey	suspend		12/31/2014	Legislative
New Mexico	suspend		11/30/2015	Legislative
New York	suspend		4/1/2008	Legislative
North Carolina	suspend	12	9/1/2008	Administrative
North Dakota	terminate			Administrative
Ohio	suspend		4/7/2009	Administrative
Oklahoma	terminate			Administrative
Oregon	suspend	12	6/1/2011	Legislative
Pennsylvania	suspend	24	7/8/2016	Legislative
Rhode Island	suspend	12	11/30/2015	Administrative
South Carolina	suspend		6/30/2016	Administrative
South Dakota	terminate			Administrative
Tennessee	suspend		4/1/2015	Legislative
Texas	terminate			Administrative
Utah	terminate			Administrative
Vermont*	suspend		7/30/2014	Administrative
Virginia*	suspend		9/30/2014	Legislative
Washington	suspend		6/30/2017	Legislative
West Virginia	suspend		12/31/2013	Administrative
Wisconsin	terminate			Administrative
Wyoming	terminate			Administrative

Notes: Column (1) indicates whether a state Medicaid is suspended or terminated for enrollees who become incarcerated. For states that suspend Medicaid eligibility for a specific time period (rather than from the full duration of incarceration), we indicate this time limit, measured in months, in Column (2). Column (3) reports the exact implementation date for states that switch from termination to suspension of Medicaid upon incarceration. Column (4) indicates whether the Medicaid policy for incarcerated individuals is an administrative internal agency policy or legislated by law. States marked with * do not report data to the NCRP.

Source: Several sources were consulted to construct this table: 1) section 1115 Waiver Demonstration documents from the Centers for Medicare and Medicaid Services; 2) state government documents and reports; 3) reports from national health policy organizations including The Henry J. Kaiser Family Foundation, the National Academy for State Health Policy, and the National Council of State Legislators; and 4) direct communications with officials at state's Centers for Medicare and Medicaid Services.

Table A2: Summary Statistics: Individual characteristics

	Mean	S.D.
Black	0.434	0.496
White	0.467	0.499
Male	0.880	0.324
Female	0.119	0.324
Hispanic	0.115	0.319
Less than HS Degree	0.383	0.486
HS Degree	0.313	0.464
Some college	0.048	0.214
College Degree	0.008	0.088
Age at Release	35.058	10.360
Prior Felony Incarceration	0.300	0.458
Time served (days)	579.639	742.394
Sentence length (months)	61.779	79.021
New court commitment	0.650	0.477
Parole revocation	0.174	0.379
Probation revocation	0.085	0.278
Parole discretionary	0.349	0.477
Parole mandatory	0.145	0.352
Shock probation	0.092	0.289
Sentence expiration	0.311	0.463
Escape	0.004	0.061
Violent Offense	0.212	0.408
Property Offense	0.299	0.458
Drug Offense	0.300	0.458
Weapons offense	0.037	0.188
DUI offense	0.047	0.211
Other offense	0.103	0.304
ACA	0.032	0.177
Suspension	0.085	0.278
N	5,878,736	

Notes: The sample consists of individuals who have at least one year of post-release data. Listed offense types are indicators for the offense for which the offender initially went to prison. ACA represent the average value of the ACA policy variable for the state and month in which the offender was admitted to prison.

Data are from the NCRP 1995-2016.

Table A3: Effect of Medicaid Suspension Policy on 1-year Overall Recidivism

	(1)	(2)	(3)
Suspension	-0.00736 (0.0102)	-0.0121* (0.00703)	-0.0123* (0.00719)
Mean Dept. Var.	0.197	0.197	0.196
R-squared	0.0559	0.0921	0.0923
N	6112544	6111834	5878736
State FE	Yes	Yes	Yes
Admission year FE	Yes	Yes	Yes
State-specific linear trends	Yes	Yes	Yes
Individual characteristics	No	Yes	Yes
State characteristics	No	No	Yes

Notes: The dependent variable is individual's probability to return to prison within 1 year of release. Suspension is an indicator for whether a state suspends Medicaid coverage upon incarceration. Robust standard errors clustered by state. Each column is estimated by a separate OLS. State and time FE include state and admission year fixed effects. Individual characteristics include demographic characteristics (race, ethnicity, gender, age, age squared, highest graded completed, prior felony incarceration indicator) and current crime and prison characteristics (main offense type, number of convicted counts, total sentence imposed, reason for release, time served, time served squared) as well as indicators for missing data on each of the time-invariant characteristics. State characteristics include time-varying state characteristics (unemployment rate and the number of sworn police officers per 1000 in the population) and an indicator whether the state expanded Medicaid under the ACA.

Data are from the NCRP 1995-2016.

*** p<0.01, ** p<0.05, * p<0.1

Table A4: Effect of Medicaid Suspension Policy on 1-year Recidivism by Return Crime Type

	Any (1)	Violent (2)	Property (3)	Drug (4)	Other (5)
Suspension	-0.0123* (0.00719)	-0.00284 (0.00282)	-0.00393 (0.00233)	-0.00115 (0.00261)	-0.00292 (0.00248)
Mean Dept. Var.	0.196	0.0394	0.0664	0.0536	0.0356
R-squared	0.0923	0.120	0.141	0.110	0.105

Notes: The dependent variable is individual's probability to return to prison within 1 year of release with any crime (Columns (1)) or with the crime indicated in the column heading (Columns (2)-(4)). Suspension is an indicator for whether a state suspends Medicaid coverage upon incarceration. Robust standard errors clustered by state. Each column is estimated by a separate OLS. State and time FE include state and admission year fixed effects. We control for demographic characteristics (race, ethnicity, gender, age, age squared, highest graded completed, prior felony incarceration indicator) and current crime and prison characteristics (main offense type, number of convicted counts, total sentence imposed, reason for release, time served, time served squared) as well as indicators for missing data on each of the time-invariant characteristics. In addition, we include time-varying state characteristics (unemployment rate and the number of sworn police officers per 1000 in the population) and an indicator whether the state expanded Medicaid under the ACA.

Data are from the NCRP 1995-2016. N=5,878,736

*** p<0.01, ** p<0.05, * p<0.1

Table A5: Effect of Medicaid Suspension Policy on 1-year Overall Recidivism by Gender and Race

	Main (1)	Male (2)	Female (3)	White (4)	Black (5)	Hispanic (6)
Suspension	-0.0123* (0.00719)	-0.0134* (0.00701)	-0.00184 (0.0101)	-0.00980 (0.00974)	-0.0144* (0.00740)	-0.00884** (0.00419)
Mean Dept. Var.	0.196	0.202	0.156	0.191	0.203	0.172
R-squared	0.0923	0.0921	0.0909	0.0966	0.0899	0.0896
N	5878736	5176013	702464	3326517	2552219	674024

Notes: The dependent variable is individual's probability to return to prison within 1 year of release. Suspension is an indicator for whether a state suspends Medicaid coverage upon incarceration. Robust standard errors clustered by state. Each column is estimated by a separate OLS. Coefficients show the effect of Medicaid suspension (as opposed to termination) on recidivism by gender (Columns (2) and (3)) and race (Columns (4)-(6)). Our main results are presented in Column (1) for comparison. State and time FE include state and admission year fixed effects. Individual characteristics include demographic characteristics (race, ethnicity, gender, age, age squared, highest graded completed, prior felony incarceration indicator) and current crime and prison characteristics (main offense type, number of convicted counts, total sentence imposed, reason for release, time served, time served squared) as well as indicators for missing data on each of the time-invariant characteristics. State characteristics include time-varying state characteristics (unemployment rate and the number of sworn police officers per 1000 in the population) and an indicator whether the state expanded Medicaid under the ACA.

Data are from the NCRP 1995-2016

*** p<0.01, ** p<0.05, * p<0.1

Table A6: Effect of Medicaid Suspension Policy on 1-year and 3-year Overall Recidivism: Robustness

	1-year Recidivism	3-year Recidivism
Panel A: Main results		
	(1)	(2)
Suspension	-0.0123* (0.00719)	-0.0369** (0.0153)
Mean Sentence	0.196	0.380
R-squared	0.0923	0.103
N	5878736	5009677
Panel B: Probit		
	(1)	(2)
Suspension	-0.0646* (0.0350)	-0.121** (0.0554)
Mean Sentence	0.196	0.380
N	5878736	5009677
Panel C: Consistent states		
	(1)	(2)
Suspension	-0.0123 (0.00715)	-0.0188* (0.00892)
Wild bootstrap p	0.268	0.258
Mean Sentence	0.225	0.417
R-squared	0.0842	0.101
N	1888072	1674519
Panel D: Excluding early Medicaid expansion states		
	(1)	(2)
Suspension	-0.0143* (0.00812)	-0.0442** (0.0207)
Wild bootstrap p	0.185	0.0490
Mean Sentence	0.191	0.376
R-squared	0.0965	0.106
N	5378406	4572773

Notes: The dependent variable is individual's probability to return to prison within 1 year of release (Column (1)) and 3 year (Column (2)) of release. See notes for Table 3 for more detail. Data are from the NCRP 1995-2016. Panel A presents our main results. Panel B estimates Equation 1 using a probit model. In Panel C, sample is limited to the following eleven states that consistently reported data as identified by Neal and Rick (2016): California, Colorado, Illinois, Kentucky, Michigan, Minnesota, Nebraska, New Jersey, South Dakota, Virginia, and Washington. Panel D excludes early Medicaid expansion states, namely Delaware, Massachusetts, Minnesota, and New York. As suggested by Cameron et al. (2008) in cases with a small number of clusters, we report p -values from 1000 wild-cluster bootstrap iterations for the results presented in Panels C and D. Column (2) has fewer observations to allow everyone to have 3 years of post-release data, whereas Column (1) only requires 1 year of post-release data.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A7: Effect of Medicaid Suspension Policy on 1-year and 3-year Overall Recidivism by Policy Type

	1-year Recidivism (1)	3-year Recidivism (2)
Suspension	-0.0181*** (0.00588)	-0.0423** (0.0190)
Suspension*Administrative	0.0256 (0.0266)	0.0221 (0.0170)
Mean Sentence	0.196	0.380
R-squared	0.0923	0.103
N	5878736	5009677

Notes: The dependent variable is individual's probability to return to prison within 1 year of release (Column (1)) and 3 year (Column (2)) of release. Administrative is an indicator for whether the Medicaid suspension policy for incarcerated individual is administrative (as opposed to only legislative). See notes for Table 3 for more detail. Data are from the NCRP 1995-2016. Column (2) has fewer observations to allow everyone to have 3 years of post-release data, whereas Column (1) only requires 1 year of post-release data.

*** p<0.01, ** p<0.05, * p<0.1

Table A8: Effect of Medicaid Suspension Policy on 1-year and 3-year Overall Recidivism

	1-year Recidivism (1)	3-year Recidivism (2)
Suspension	-0.0118* (0.00669)	-0.0368** (0.0153)
Suspension*ACA	-0.0115 (0.0299)	-0.0270*** (0.00566)
Mean Sentence	0.196	0.380
R-squared	0.0923	0.103
N	5878736	5009677

Notes: The dependent variable is individual's probability to return to prison within 1 year of release (Column (1)) and 3 year (Column (2)) of release. ACA is an indicator whether state expanded Medicaid under the Affordable Care Act for the year-month into which the offender was admitted in prison. Medicaid expansion dates are same as in Simon et al. (2017). See notes for Table 3 for more detail. Data are from the NCRP 1995-2016. Column (2) has fewer observations to allow everyone to have 3 years of post-release data, whereas Column (1) only requires 1 year of post-release data.

*** p<0.01, ** p<0.05, * p<0.1

Table A9: Effect of Medicaid Suspension Policy on 1-year and 3-year Overall Recidivism: Time Trend Sensitivity Analysis

Panel A: 1-year Recidivism				
	(1)	(2)	(3)	(4)
Suspension	-0.0123*	-0.0134*	-0.0126*	-0.0163*
	(0.00719)	(0.00752)	(0.00716)	(0.00834)
Mean Sentence	0.196	0.196	0.196	0.196
R-squared	0.0923	0.0920	0.0928	0.0932
N	5878736	5878736	5878736	5878736
Panel B: 3-year Recidivism				
	(1)	(2)	(3)	(4)
Suspension	-0.0369**	-0.0401**	-0.0412*	-0.0449**
	(0.0153)	(0.0167)	(0.0204)	(0.0207)
Mean Sentence	0.380	0.380	0.380	0.380
R-squared	0.103	0.102	0.103	0.103
N	5009677	5009677	5009677	5009677
State FE	Yes	Yes	Yes	Yes
State-specific linear time trend	Yes	Yes	Yes	Yes
Release year FE	Yes	No	Yes	Yes
State-specific quadratic time trend	Yes	No	Yes	No
State-specific cubic time trend	Yes	No	No	Yes

Notes: The dependent variable is individual's probability to return to prison within one year or three years of release (indicated in the panel heading). See notes for Table 3 for more detail. Data are from the NCRP 1995-2016. Column (2) has fewer observations to allow everyone to have 3 years of post-release data, whereas Column (1) only requires 1 year of post-release data.

*** p<0.01, ** p<0.05, * p<0.1

Table A10: Effect of Medicaid Suspension Policy on Overall Recidivism: Placebo Test

	t-1	t-2	t-3	t-4
Panel A: 1-year Recidivism				
	(1)	(2)	(3)	(4)
Suspension	0.00682 (0.0124)	0.00802 (0.00949)	0.00998 (0.00859)	0.00960 (0.00695)
Mean Dept. Var.	0.196	0.196	0.196	0.196
R-squared	0.0931	0.0931	0.0931	0.0931
N	5469524	5469524	5469524	5469524
Panel B: 3-year Recidivism				
	(1)	(2)	(3)	(4)
Suspension	0.0282 (0.0243)	0.0281 (0.0235)	0.0229 (0.0186)	0.0184 (0.0136)
Mean Dept. Var.	0.383	0.383	0.383	0.383
R-squared	0.101	0.101	0.101	0.101
N	4726276	4726276	4726276	4726276

Notes: The dependent variable is individual's probability to return to prison within 1 year of release (Panel A) and 3 years of release (Panel B). Each column defines treatment from 1 (t-1) to 4 (t-4) years earlier than actual implementation date. Suspension is an indicator for whether a state suspends Medicaid coverage upon incarceration. Robust standard errors clustered by state. Each column is estimated by a separate OLS. State and time FE include state and admission year fixed effects. Individual characteristics include demographic characteristics (race, ethnicity, gender, age, age squared, highest graded completed, prior felony incarceration indicator) and current crime and prison characteristics (main offense type, number of convicted counts, total sentence imposed, reason for release, time served, time served squared) as well as indicators for missing data on each of the time-invariant characteristics. State characteristics include time-varying state characteristics (unemployment rate and the number of sworn police officers per 1000 in the population) and an indicator whether the state expanded Medicaid under the ACA.

*** p<0.01, ** p<0.05, * p<0.1

Table A11: Proportion of State Inmates Likely Receiving Public Assistance at the Time of Prison Admission by State

State	Prop.	State	Prop.	State	Prop.	State	Prop.
AK	0.275	IA	0.278	MO	0.293	OK	0.217
AL	0.233	ID	0.22	MS	0.345	OR	0.222
AR	0.315	IL	0.318	MT	0.349	PA	0.305
AZ	0.218	IN	0.172	NC	0.21	RI	0.225
CA	0.245	KS	0.25	ND	0.143	SC	0.225
CO	0.16	KY	0.217	NE	0.244	SD	0.323
CT	0.304	LA	0.335	NH	0.185	TN	0.274
DC	0.143	MA	0.239	NJ	0.182	TX	0.257
DE	0.238	MD	0.198	NM	0.226	UT	0.194
FL	0.192	ME	0.5	NV	0.125	VA	0.188
GA	0.196	MI	0.259	NY	0.255	VT	0.4
HI	0.4	MN	0.256	OH	0.234	WA	0.237

Notes: We report by state the proportion of state prison inmates who answered affirmatively to the question “Were you or anyone living with you receiving public assistance or welfare, for example, Temporary Assistance for Needy Families (TANF), food stamps, Medicaid, Women, Infants, and Children Program (WIC), or housing assistance, before you were admitted to prison.”

Data comes from the 2004 Survey of Inmates in State and Federal Correctional Facilities.