Incentives Structures and Criminal Justice

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Abstract

The conventional assumption in economics of crime is that criminal justice system actors behave like social planners, choosing punishment levels to equate the marginal benefits and costs from society's perspective. This paper presents empirical evidence suggesting that in practice, punishment is based on a much narrower objective function, leading to over-incarceration. We exploit a natural experiment, that shifted which agency paid for juvenile incarceration while keeping overall costs and responsibilities unchanged. Moving the cost of incarceration from state to counties resulted in a discontinuous drop in the number of juveniles being sent to state facilities, but no change in juvenile arrests. When costs and benefits of incarceration are not borne by the same agency, as is often the case in the US, there is excess incarceration: not only is there more demand for prison than when costs are fully internalized; but there are no gains in terms of crime reduction from this extra incarceration.

1 Introduction

Following Gary Becker's seminal paper in 1968, the main focus in economics of crime has been to determine the elasticity of crime with respect to different law enforcement options. Both theoretically and empirically, there has been a substantial literature on how different aspects of criminal justice (longer sentences, more police, prisons conditions) and outside options (employment, education) affect offending. But on the other side of the equation – the supply for punishment – criminal justice actors are mainly assumed to behave like social planners: given elasticities of crime with respect to various law enforcement options, public officials choose social welfare maximizing levels of expected sanctions, subject to budget constraints. There has been little empirical work to investigate how these decisions are actually made and what parameters matter for these choices. This is all the more puzzling as a long-standing research in psychology and behavioral science have demonstrated the existence of non-altruistic motives for punishment at the individual level. How these translate at the government level?

Safety is often taken as a prime example of a public good: in a given place, it is non-rival and non-excludable.[1] The level of governance at which public goods are optimally be provided has been extensively discussed, with an emphasis on equity and efficiency, in fields such as education or social insurance, but not so much for law enforcement. The American criminal justice is a particularly good place to study how a piecemeal organization affects law enforcement: in most states, policing is local, sentences for non-federal offenses are determined at the municipal or county level, and prisons are state-funded.[2] The overall objective of law enforcement is to reduce offending, but decisions are made and costs are paid at different levels. Beyond overall costs and organization of law enforcement, how does who pays affect choices across different crime policy tools?

Counties only bear a fraction of the total cost of prison sentences that they dole out, so incarceration is largely subsidized by the state from their standpoint. Conversely, other crime-reduction instruments, such as policing, probation, drug-clinics, or primary and secondary interventions are often pro-

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[1]There are of course contexts in which this is not the case. For example, private police forces are excludable. And police resources could be thought of as rival for a given police budget, thinking about the opportunity codes of deploying them in one place.

[2]See part VIII of Rottman et al. (2000) for a description of the court structures in US states. All states but Alaska, Connecticut, Delaware, Hawaii, Rhode Island and Vermont have two levels of incarceration: local jails, which in most cases are meant to house pre-trial detainees and people convicted with sentences of less than one year; and state prisons.

vided and financed locally. If demand for incarceration is price-elastic, in particular if there is a menu of law enforcement options, then prices borne by the decision-maker might impact overall levels of sentencing. Even keeping the cost of incarceration constant, levels of incarceration might depend on whether costs and decision-making are aligned. Given the steep rise in incarceration since the 1970's in the United States and its economic and social consequences, described in Western (2006) or Pettit and Western (2004), it matters from a theoretical and policy standpoint to account for the role of institutional features, in the line of the work of Raphael and Stoll (2009) and Raphael and Stoll (2013). One of the consequences of the 2008 great recession and the financial crises of local governments has been the need to find cost-effective methods of crime-control; realigning incentives could be one of them.

The first objective of this paper is to estimate whether incarceration levels respond to changes in the price borne by those choosing sanctions. Costs of law enforcement are typically not considered as a relevant factor for sentencing, or examined as potential policy levers. For example, Posner (2008) explores many motives beyond the case at hand to choose sentences, such as legal pragmatism, consideration for other judges, or political motivations, but costs of sentencing alternatives is never mentioned. In the policy domain, when mandates to reduce its prison population in 2010, California chose to change laws regulating whether one's sentence would be served in a jail or a prison. Part of the rationale behind this change in laws was to reduce counties' reliance on state-funded prison, yet direct financial levers were not applied.

In order to test the effects of cost structures on sentencing, this paper exploits a natural experiment that modified the financial structure of the juvenile corrections: the 1996 California Juvenile Justice Realignment. Before 1996, juvenile incarceration was mainly paid for by the state, while after the law, the cost burden was shifted onto counties. The overall cost of juvenile incarceration stayed constant, and the only change was in who had to pay for incarceration of juveniles. One way to think about this change in laws is that it shifted from a model in which counties were choosing the "tax rate" (i.e. the total amount that *all* counties would pay for incarceration) to choosing their own contribution to the public good of law enforcement. Using regression discontinuity design, we explore how this affected the number of juveniles being sent to state facilities. Once the law was passed, there is a discontinuous drop in the number of juveniles being sent to state facilities. By contrast, there was no similar drop in the number of adults being sent to state facilities at the same period in time. Turing to the mechanisms, and using juvenile court records to see at what level the changes operated, it appears this change is driven mainly by an increase in the number of youth being referred to probation, rather than

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in a substitution to other modes of incarceration.

The second step is to determine the overall costs and benefits in this shifting of the price burden. With externalities in criminal behavior and sentencing, the effects of this policy change are ambiguous. Pooling costs of incarceration might be welfare-increasing if incarceration has positive externalities on other counties, as would for example be the case if potential delinquents commit offenses in various counties and incapacitation decreases crime in all counties. Likewise, sharing costs could be justified based on equity considerations, with richer counties subsiding incarceration in poorer counties that might not be able to afford optimal levels otherwise. On the other hand, if the use of incarceration has other motives than optimal deterrence, or other punishment options are more costly from the punisher's standpoint, then cost-sharing might lead to over-incarceration. Beyond these geographic externalities, DiTella and Schargrodsky (2013) show that prison sentences increase recidivism relative to non-custodial alternatives. Aizer and Doyle (2011) find long-run negative impacts of juvenile incarceration, which increases likelihood of violent crimes and school dropout.

To explore overall costs and benefits of this shift in the price burden, I look at how this change in cost structures affected juvenile offending. Becker (1968) argues that penal policies should be chosen such that the marginal benefits of crime reduction (deterrence and incapacitation from prison) are equal to marginal costs of crime prevention. In this context, however, the drop in juvenile incarceration due to the shift in costs was not mirrored by a change in arrests, suggesting that levels of incarceration under the "pooled cost" regime were inefficiently high. In other words, the extra incarceration expenditures did not provide extra safety, leading to pure losses.

By investigating the case of sentencing policy, this paper contributes to the public economics literature on fiscal federalism, and demonstrates the potentially powerful lever of re-aligning incentives. This setup allows us to assess the effects of shifting the cost burden, keeping all else constant, and in particular availability of alternatives to this service. From a policy perspective, this informs the question of the design of expenditure and public good provision. This has applications to other domains, such as social welfare funding or education.

The rest of the paper is organized as follows. Section 2 discusses mechanisms through which cost structures might affect levels of incarceration. Section 3, presents the organization of the California juvenile justice, the 1996 Juvenile Justice Realignment and datasources. Sections 4 to 6 show results on incarceration, court outcomes and arrests. Section 7 concludes.

2 Financing Structures and Criminal Justice Organization

2.1 Governance and externalities

The first question we explore is how *who pays* for prison affects penal choices. There has been surprisingly little discussion of how cost structures affect law enforcement, either theoretically or empirically. Relative costs of law enforcement options have been modeled very early on: Becker (1968) already discusses the relative costs and benefits of different punishment options, in particular of incarceration versus fines or community alternatives. Empirically, there has been extensive work on the cost-effectiveness of incarceration and policing, and on their relative benefits (Abrams, 2012, Chalfin and McCrary, 2013 and Lee and McCrary, 2009). Yet the direct focus is not on how cost structures might impact supply for these different crime-control tools. In the basic Beckerian model, the financing structure channel should not matter. The motive behind choosing levels and methods of law enforcement is to sustain cost-effective levels of punishment, and inputs are the overall (social) costs and benefits. However, a long-standing literature in psychology and behavioral science indicates the importance of non-social motives in the demand for punishment. Testing in the lab how cost structures influence individuals' punishment decisions, Ouss and Peysakhovich (2012) find that individuals choose levels of punishment that exceed the Beckerian socially optimal levels when they bear only a fraction of overall costs. When individuals make these decisions, choices of punishment respond to private costs and do not factor in total social costs and benefits. Is this individual-level finding also true in the field, at the institution level?

Regarding the organization of the criminal justice in the United States, counties can be thought of as individual units, relative to the state; costs of incarceration are borne at the higher, state level. This could reduce incentives to provide public goods at the local level, or lead to over-use of subsided goods. In the Russian context, Zhuravskaya (2000) demonstrates this to be at play by documenting the importance of fiscal incentives for local governments to provide efficient levels of public goods: less local fiscal incentives reduces the efficiency of public spending (law enforcement is not investigated). On the expenditure side in American criminal justice, community sentences are funded at the local level: house arrests, rehabilitation programs, halfway houses, and probation are often provided by counties or municipalities. This would lead to a common resources-type problem: counties might overuse individually cheap

incarceration, while increasing the overall costs of corrections.

This type of mechanism has been documented in other contexts, in particular in health and labor economics. The most commonly described disconnects are between the federal and the state levels of taxation and expenditures (Dahlby, 1996, Baicker, 2001, Keen and Kotsogiannis, 2002, Baicker et al., 2012). There might be an over-use of federally funded programs relative to state-funded programs which are partial substitutes, as could be the case for unemployment insurance, UI, and disability insurance, DI (Autor and Duggan, 2003, Autor and Duggan, 2006). On the other side, there are arguments for having services be locally provided, so that supply is best tailored to local needs (Oates, 2003). The case of UI and DI is particularly informative in the present context. Autor and Duggan (2003) document a rise in disability insurance that could partially be due to a substitution from unemployment insurance. One feature of these insurances is that UI is funded by sates, while DI is federally funded. Overall, DI costs more than UI, in particular because people under DI cannot work, thus lowering incentives to re-enter the labor market, but from states' standpoint, DI is less expensive than UI. This type of mechanism could also be at play in usage of state prisons: lower-priced alternatives to incarceration might not be used because of the state's subsidy to prison. For example, electronic monitoring is much less expensive than incarceration, and DiTella and Schargrodsky (2013) also find that it reduces recidivism rates, but it might be underutilized if more expensive from the county's perspective.

Turning to the effects of this disconnect on offending, there might be spatial, horizontal spillovers in the choices of levels of incarceration. Glaeser (2013) emphasizes the great mobility at the local level: all else equal, citizens might be more willing to move to cities or counties in which incarceration rates are higher if these are safer. Likewise, if offenders are mobile, failure to incapacitate through incarceration in one county could increase crime in neighboring counties. This type of argument was behind "Aimee's law" passed by Congress in 2000: states are held financially accountable for violent crimes committed elsewhere by violent offenders who received an early release. This is a way for states to internalize horizontal externalities due to offending outside their jurisdiction: if a driving force in crime is that offenders move to places with the least law enforcement, then decentralization can lead to excessive law enforcement (Teichman, 2004), which a more centralized mode of provision could help mitigate. Beyond criminal justice, these spatial interactions have been studied at the state (Figlio et al., 1999, Baicker, 2005) or local levels (Case et al., 1993), and the authors find spatial correlations in taxation and provision of public goods.

These questions around the structure of funding and provision of public goods have seldom been applied to the criminal justice. Baicker and Jacobson (2007) investigate the role of direct financial incentives in police work, and find that asset forfeiture laws changed both policing practices and allocation of law enforcement budgets. Ater et al. (2014) is the paper closest to this one. It exploits a quasi-experimental change in costs of arrests in Israel: the responsibility of housing arrestees awaiting trial was transferred from the local police to the prison authority. As a result, there was a sharp increase in arrests, which is consistent with an imperfect factoring in of total costs of crime reduction when making arrest decisions. There are other possible explanations for these results: police officers' effort provision might respond to costs, police evaluations and wages could depend on number of arrests, which would increase when costs are no longer internalized. The authors indeed highlight the importance of the organizational changes as driving their results, beyond the change in cost structures. The setup at the core of our paper is unique in that it helps identify the sole effect of shifts in cost, net of any change in responsibilities. This paper contributes more generally to the public economics literature: what happens when costs are shifted, but no other organizational component is changed in a public sector branch?

2.2   Law enforcement with multiple actors

Counties and municipalities choose policies, such as levels of policing, prosecution and sentencing, which in turn determine incarceration rates; while states pay for prison. Moreover, many laws which guide arrests, prosecution and sentencing are determined at the state level. The growth in incarceration rates in the United States was driven by the war on drugs (Kuziemko and Levitt, 2004), and increased use of mandatory minimums (Raphael and Stoll, 2013). The tools which are used to sentence are thus partially determined by the instance which will pay for incarceration: the state. However, choices on arrests, or how to charge offenses, are made locally. Furthermore, the state only imperfectly observes how laws will be locally applied: this is akin to an incomplete contracts setup, where the principle is the state legislator, and the agent is local law enforcement. The state (the principle) provides tools at the local level to incapacitate and deter effectively, but local authorities (the agent) have some form of discretion as to whom these laws and regulations will be applied to, a choice which will in turn affect state budgets.

There are two disconnects: the state makes laws which are applied at the local level; and locally determined sentences are funded by the state. Under what conditions of behaviors and externalities does this double disconnect lead

to optimal levels of incarceration and crime control? Several mechanisms could be at play, both in the lack of incentives to develop local alternatives to state prison, and given this fact, in the prosecuting choices of district attorneys and sentences eventually chosen. This paper focuses on the second source of disconnect, in the application of law.

3   Institutions and Data

3.1   Organization of Juvenile Justice in California

In California, there is the typical disconnect described in the previous section: cities, counties and the state all play roles in the criminal justice. Policing in California is mainly organized at the municipal and county levels, with local (city) police departments and county sheriff offices.[3] First instance probation and prosecution take place at the county level: California has a superior court for each one of its 58 counties. Judges are elected every 6 years in nonpartisan elections, and each court has an exclusive juvenile jurisdiction. District attorneys (DA) and public defenders are also attached to a county court. Corrections in California have both local and state components. Jails are provided at the locally, as is community supervision. Prisons are run by the state. This also holds true for juveniles: state juvenile facilities are run by the California Youth Authority (CYA), which was renamed the Department of Juvenile Justice in 2005. In February 1996 there were 9,974 youths in CYA facilities.

Figure 1 presents what happens to a juvenile once they have been arrested for a felony or a misdemeanor. As we document later more systematically, many juvenile cases are dropped in preliminary phases. For example, in 2005, 13% of youth arrested were immediately released, 43% of police referrals to probation were also diverted; and eventually 28% were eventually made ward of the court.[4] In general, juvenile justice tends to use diversion much more frequently than adult justice.

3.2   1996 Juvenile Realignment

California Senator Rob Hurtt introduced in February, 1995 a bill to change the financing structure of California's juvenile justice.[5] At that time, counties

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[3]State police represents a small share of overall law enforcement, with a national average of 8%, the Highway Patrol representing the largest state agency in California (Reaves, 2007).

[4]Figures from chapter 5 of Hill (2007)

[5]Full bill available at `http://www.leginfo.ca.gov/pub/95-96/bill/sen/sb_0651-0700/sb_681_bill_960202_chaptered.html`

Figure 1: Outcomes of Juvenile Arrests in California
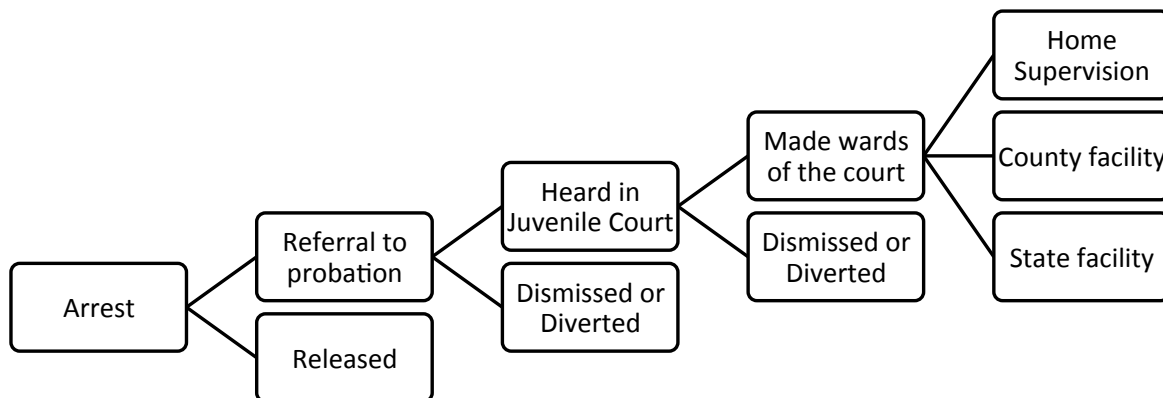
paid a flat fee of $ 25 a month per juvenile incarcerated in CYA facilities. The Senate bill 681 proposed to establish a sliding scale, according to which counties would pay a higher proportion of the actual costs of incarceration, depending on the type of offense upon incarceration was less severe. Namely, the costs raised to:

$ 150 for most severe offenses (murder, armed robbery...)

$ 1,300 for residential robbery, burglary, assault with deadly weapon

$ 1,950 for commercial battery, battery...

$ 2,600 for technical parole violation, misdemeanors

The idea behind this bill was to reduce the over-reliance by counties on the Youth Authority for less serious juvenile offenders, and to encourage counties to create a fuller spectrum of locally available programs that would to meet the specific needs of juvenile offenders. The bill was finally adopted by both the Senate and the Assembly in August, 1996. This increase in costs was to be applied to all juveniles who were incarcerated after January 1st, 1997, even if they had been sentenced before that date.

Interestingly, the motives for this bill were not intended to reduce punitiveness, but to increase individual counties' fiscal responsibility. These years are otherwise characterized by an increased punitiveness in California: in March 1994, Proposition 184 (better known as the Three Strikes Initiative) became

effective, and in 2000, Proposition 21 made it easier to prosecute juveniles as adults for gang-related activities and violent or serious crimes.[6] Potential changes in incarceration levels did not find their place in an overall context of an unraveling of incarceration, or juvenile incarceration, in California. There were no other changes in the organization of juvenile justice in the 1995 – 2000 period of focus.

This legislation represents a natural experiment: the law discontinuously changed the price that counties would have to pay to incarcerate juveniles. Any discontinuous change in juvenile incarceration or offending around this threshold can be attributed to the change in costs of incarceration. There are three candidate moments for when the change in cost structures could affect dispositions: when the law is first introduced (February, 1995), when the law is adopted (August, 1996), or when the law was effective (January, 1997). The precise timing depends on how likely actors thought that it was for the law to eventually become effective.

3.3   Data

Several administrative data sources are used to estimate the effect of this change in laws on juvenile incarceration and offending. The main data sources are the National Corrections Reporting Program data, California juvenile court case records, and the Uniform Crime Report data. Beyond these main sources, aggregate statistics are also obtained from several administrative reports, as specified in the text.

National Corrections Reporting Program Data.   The NCRP data compiles administrative data regarding all prisoners entering state and federal adults facilities, and the California Youth Authority. It is collected on a yearly basis by the Bureau of Justice Statistics, and the main results in this paper use the data from 1990 to 2001. This paper uses part 1 of the NCRP data, which contains information for all admissions to prisons. Covariates include date of birth, sentence length, offense, county where convicted, and some information on prior criminal history. Using this dataset, we can track changes in the number and composition of inmates in California, both in adult and juvenile state facilities.

A couple of caveats apply to the NCRP data. First, there have been concerns about quality of the data, as noted in particular by Pfaff (2011) and Neal and Rick (2014). In the appendixes to both papers, the authors proceed to

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[6]http://www.lao.ca.gov/ballot/2000/21_03_2000.html

internal and external consistency checks on multiple variables – both in terms of overall flows, and contentious variables such as age. California appears to have no major inconsistencies: while overall the NCRP has problems, California data is particularly good. Second, the NCRP data contains admissions to CYA from criminal court, but not from juvenile court. Using additional yearly data from the California Department of Youth Authority helps establish that overall trends are similar for individuals entering the CYA via juvenile court.[7]

California Juvenile Court Case Records.   Data on juvenile court records was provided by the National Juveniles Court Data Archive (NCJJ)[8] for two counties: Orange County and Santa Clara, from 1992 to 2010. In California, as in many states, courts are run at the county level, and it is not until 1997 that the NCJJ collected data for all counties. Prior to this, only Orange County and Santa Clara county had reliable court data that NCJJ could easily share. Orange County and Santa Clara county are large counties in California: third and sixth largest respectively in terms of overall population, and fourth and fifth in terms of juvenile populations.[9]

This data contains information on all juvenile delinquency cases referred to juvenile probation by arrests. In other words, we have information for all youth arrested whose case had not been immediately dismissed by the police. The files contain information for each case on offenses, date of action, type of judicial action (referral to juvenile court or dismissal / adjustment by probation), and final disposition; as well as date of birth, gender, and ethnicity. Summary statistics on case load and dispositions are available in the appendix.

Uniform Crime Report: Arrests by age, sex and race.   This data provides information on the number of arrests reported to the Federal Bureau of Investigation's Uniform Crime Reporting Program each year by police agencies in the United States. This data presents, for each reporting agency, the counts of arrests by age, sex, and race for a particular offense. This data is used to look at the change in juvenile arrests, as a proxy for offending.

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[7]The report with the yearly statistics can be found at
http://www.cdcr.ca.gov/Reports_Research/docs/research/2004-12YEAR.pdf

[8]I thank Teri Deal and Chaz Puzzanchera at the NCJJ for their help throughout the process

[9]Data from US census, extracted from http://factfinder.census.gov/ for the overall population and http://ojjdp.gov/ojstatbb/ezapop/ for juvenile population

4 Cost structure and juvenile incarceration

4.1 Regression Discontinuity Design Analysis

Change in prices paid by counties. The California Juvenile Justice Realignment introduced a discontinuous change in prices for juvenile incarceration: each slot in a CYA facility after the 1st of January, 1997, costed substantially more to the counties than before January 1st, 1997. Prices jumped discontinuously at this date, which is a good setup for a regression discontinuity design. In this case, date is the running variable, the treatment is counties going from a low-cost to a high-cost regime of juvenile incarceration. The main outcome of interest is the number of juveniles being sent to CYA facilities. This is a sharp RDD framework, since price changes were mandatory and not subject to any discretion. Following Imbens and Lemieux (2008), this paper presents graphic and regression RDD analyses of the change in number of juveniles being incarcerated around the change from the low-cost to the high-cost regime.

Graphic Analysis. The NCRP data has information about individuals entering state prisons and the CYA. Figure 2 presents the change in the number of juveniles being incarcerated each month. Each dots represents the average monthly number of admissions to CYA facilities. The vertical line is placed at August 1996, which was the date at which was passed the bill that changed the cost of incarcerating juveniles in the CYA. The lines represent kernel-weighted local polynomial regression of the number of juveniles entering CYA on months, before and after the August 1996 cutoff. This figure illustrates the discontinuous drop in the number of juveniles being incarcerated at this date.

This figure also indicates that the date of change in August 1996, and not January 1997, which is when the costs actually increased, though also for people sentenced before then. Likewise, there is no change in February 1995, which is when the law was initially introduced. This indicates that the date in which the law was passed is the relevant moment in which changes in costs was internalized by actors, which is in itself an interesting finding from a political economy standpoint.

Regression Analysis. Moving to regression analyses, we look at both monthly and individual specifications. At the monthly level, different specifications of the following equation are identified:

$$Y = \alpha + \beta T + f(m)$$

where Y represents the number of juveniles entering CYA facilities, T is a dummy variable that is 0 in the low-cost regime, and 1 in the high-cost regime; and $f(m)$ is a function of months. Different specifications for $f(m)$ are chosen: linear; linear with an interaction with T, quadratic, and quadratic with an interaction with T. The interaction specifications allow for different slopes before and after the change in cost regimes.[10]

Table 1 presents this regression analysis. Columns 1-4 are for the full sample (1990 - 2000), and column 5 limits the sample to one year before and one year after the change in laws. In all specifications, there is a discontinuous drop in the number of juveniles being admitted after the change in cost regimes: depending on the specification, the RDD estimates indicate that the change in costs resulted in a drop in 39 - 45 juveniles being incarcerated, from a baseline of about 80 new incarcerations per month. Using the full sample, there is no significant change in the trend; while focusing on one year before / after the change in law also indicates a change in slopes.

At the individual level, we look at the probability of being incarcerated in a CYA facility instead of an adult facility for youth under the age of 25 at the age of entry. regress a dummy CYA which takes the value 1 if a person is incarcerated in a CYA facility, and 0 if they are incarcerated in an adult prison. We estimate the following equation:

$$CYA_i = \alpha + \beta T + \gamma X_i + f(m)$$

the other notations staying the same, and X_i capturing individual-level characteristics contained in the NCRP data: age at incarceration, gender, race, ethnicity, offense, and number of days already served in prison and in jail. Results are presented in table 2. The first three columns include all years in the data (1990 - 2001); columns 4 and 5 reduce the time window to 2 and 1 years around August 1996, respectively. In all specifications, controlling for case observables and various time specifications, β is negative and significant: there is a discontinuous drop in likelihood of being sent to a CYA facility, relative to an adult facility, after August 1996.

4.2 Comparison with adults: difference in difference estimates

An alternative specification is to compare the evolution of incarcerations for juveniles to that of adults in California. These can be seen as a potential counterfactual group for juveniles: the economic and social contexts were the

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[10]Robustness to different functional form specifications available upon request

same before and after the change in laws, and costs in incarceration changed only for juveniles around this date. A simultaneous discontinuous change in adult incarcerations would have been indicative of potential confounding changes in the California judicial or relevant social context around this period of time.

Figure 3 shows the change in adult intakes over the same period of time: there was no discontinuous change as there was for juveniles, presented in figure 2. However, this figure also illustrates that trends in juveniles and adult incarceration were different over that period of time: adult incarceration was increasing during in the 1990s, while juvenile incarceration was slightly decreasing in the same period of time. Furthermore, incarceration numbers and rates are very different for adults versus juveniles. These trends in adult incarceration in California mirror the overall tendencies in the US over the same period of time. These differences in trends before the reform makes the whole adult intakes a problematic counterfactual to CYA intakes, since policies at the time were differentially affecting juveniles and adults overall.

Focusing on younger adults helps to address this concern. Figure 4 presents trends in intakes into CYA, and into adult facilities for young adults.[11] Trends are similar before the change in law for these age groups. This is likely driven by the fact that one of the big contributors to the increase in the California prison population in the 1990's were mandatory minima for strikeable offenses, which in general applied to older offenders (Helland and Tabarrok, 2007). For these institutional and empirical reasons, we focus our difference-in-difference estimates on adolescents and young adults.

Tables 3 presents difference-in-difference regression analyses of the change in number of inmates around the law cutoff. Columns 1 and 2 present results for all years, columns 3 and 4 narrow the window of +/- 2 years and 1 year around the change in laws, respectively. The following regression is estimated:

$$Y = \alpha_0 + \alpha_1 J + \alpha_2 T + \alpha_3 J \times T$$

where Y is the number of people entering prison per month; T is a dummy variable that takes the value 1 after the change in laws; J is a dummy for juveniles; and $J \times T$ is an interaction term, α_3 being the difference-in-difference estimate. The comparison group is people aged 19 at time of incarceration, which as discussed earlier is a more adequate comparison group given similar-

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[11]Young people who were incarcerated when aged 19 are chosen as a comparison group rather than younger entrants, since the change in costs could affect CYA usage for some people at ages when either CYA or adult facilities are options. This is discussed more in details later on.

ities in pre-trends than the full sample of adults.[12] In all specifications, α_3 is negative and significant: after the passage of the law, there are less juveniles being incarcerated, relative to all groups of adults.

Note that this comparison is descriptively useful, and the absence of discontinuous changes in trends for adult incarceration around this date confirms the idea that the change in juvenile incarceration was not due to a more general change in the organization of incarceration in California. However, the point estimates, and in particular the difference in difference estimates, are to be taken with caution, since the trends in adult and juvenile incarceration were not exactly the same before the change in laws: juvenile incarceration had already begun to decrease (though not discontinuously), while adult incarceration was generally increasing over that period time.

5 Testing mechanism: substitutions across law enforcement options

The first objective of this paper was to establish the effect of cost structures on law enforcement decisions. Another important question is to determine what substitutions happened as a result of this drop in use of CYA spaces. This is useful to understand the net effects of this change in cost structures. Several mechanisms are addressed here.

Age patterns. We first turn to young adults and minors being incarcerated in adult facilities. An increase in the number of youth being incarcerated in adult facilities would indicate a displacement across prison types in response to price changes, without an actual change in juvenile incarceration.

Figure 4 shows the evolution of the young adults entering inadult prisons, contrasted to that of individuals entering the CYA (red line in figure 4). There is no discontinuous change in the number of 18-19 year-olds or 19-20 year-olds entering adult facilities. There is a slight increase in the number of individuals less than 18 years old entering adult facilities (orange line), which suggests that there was in fact some substitution from juvenile to adult state facilities. Interestingly, this discontinuous substitution is in itself an indicator that costs are factored into criminal justice decisions. However, this increase is much smaller than the decrease in number of individuals entering the CYA: this does not seem to be the leading mechanism at play.

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[12]Results for other age groups are available upon request. Results are similar.

Note that even though this increase in juveniles incarcerated with adults is relatively small, it might have had on average negative effects. While no research has looked at the causal impact of incarcerating youth in adult versus juvenile facilities, but Chen and Shapiro (2007) find that harsher living conditions are likely to increase recidivism. The effect of this transfer could be investigated in future research, using adult data.

State versus local facilities. Juveniles can be incarcerated in different types of facilities: state facilities and local facilities. The drop in incarceration at the state level could have been palliated by an equal increase in the number of juveniles locked up in local facilities. Ideally, we would have wanted to see the evolution in trends in both state and local facilities before and after the Juvenile Justice Realignment. However, to our knowledge, there is no data source accounting for juvenile incarceration in local facilities prior to 1997.

To suggestively document trends in local incarceration, we use data from the census of juveniles in residential facilities, which offers a one-day count and survey of incarcerated juveniles. This bi-annual survey started in 1997, which is just after the passage of the law. But if state incarceration was shifted to local incarceration, then we would have expected to see an increase over time in the stock of juveniles in the "post" period. Figure 5 presents the trends in state and local prison facilities in California, between 1997 and 2010. This figures shows that although the number of inmates in state facilities was declining over those years, the number of inmates in local facilities stayed constant. This data does not allow us to rule out the fact that the levels of incarceration in local facilities were higher in the post-1996 period than the pre-1996 period. However, put together with the shown fact that *intakes* decreased after the change in laws, and that these are stocks of inmates, had there been a one-for-one transfer of juveniles from state to local facilities, the stocks of juveniles in local facilities would have increased thereafter, which figure 5 shows not to be the case.

Criminal court and Juvenile court. As mentioned earlier, the NCRP data has information for a subset of intakes to CYA facilities: for juveniles who were committed to CYA through a criminal court. How indicative of the overall effects of this measure is this subgroup? Using yearly reports from the Department of Youth Authority, we explore whether there was a discontinuous change in the number of juveniles being committed via criminal courts versus juvenile courts, and contrast trends in CYA admissions by both types of courts. Figure 6 presents the evolution in the number of juveniles

being admitted to the CYA via criminal or juvenile courts.[13] There are less juveniles being admitted via criminal courts throughout the period; but there is the same drop as that described previously for youths admitted to the CYA from juvenile courts. If anything, the drop in intakes is steeper for youths admitted from juvenile courts, suggesting that the results using the NCRP data might be an understatement of the true effect of changes in prices on commitments to state facilities.

Juvenile court outcomes: Santa Clara and Orange county. The court records for the counties of Santa Clara and Orange County allow us to see at what level along the juvenile justice chain (documented in figure 1) juvenile dispositions are changing. We can look at the effect of the change of law both on flows of court cases, and outcomes of cases: whether they are being dropped, or if as final outcomes youth are more likely to receive sentences in local facilities, deferrals, or non-custodial sentences. Beyond exploring mechanisms, from a policy implication standpoint, this helps to understand what the counterfactual to incarceration is for youth who are processed in the "high cost of CYA" regime.

We first look graphically at potential changes in the prosecution flows. Had there been a change in the number of court cases, this might indicate that at the arrest stage, youth detectives were more likely to release youth and less likely to send the case to court. Figure 7 presents the evolution in the number of court cases. There is no discontinuous change around the change in law in the number of cases overall: the change in costs is not echoed by police behaviors. Moving to dispositions of cases brought to court, figures 8 and 9 indicate that there is no discontinuous change in number of youth being sent to county facilities, but an increase in the fraction of youth being diverted from incarceration altogether after the change in laws.

Table 4 presents changes in daily flows of cases, while table 5 looks at the change in likelihood of court outcomes around the change in laws. Columns 1 and 2 of table 4 present the change in number of cases overall, and cases brought to court. The first is not significant, and the second significant at the 5 percent level. While noisy, this indicates that part of the drop in incarceration might be driven by more cases being diverted earlier one. There is however no change in the number of case being dropped, once they are brought to court (column 3). This indicates that there does not seem to be a change in the

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[13]Statistics compiled using yearly official statistics from the California Department of Corrections and Rehabilitation `http://www.cdcr.ca.gov/reports_research/docs/research/12YR-2005.pdf`

volume or content of cases brought to court. However, as we had observed state-wide, there is a drop in the number of cases disposed of being sent to CYA, and no significant effect on the number of cases leading to incarceration in county facilities.

Moving to individual probabilities of outcomes, dispositions do change for cases that are brought to court. Columns 1 - 4 of table 5 show changes in the number of youth referred to CYA and county secure facilities, overall (columns 1 and 3), and when cases were brought to court (columns 2 and 4) – i.e. not dropped after referral to probation. The change in number of youth referred to CYA is statistically significant, and the magnitude is larger when looking only at youth being referred by court. Conversely, there is no significant change in the number of youth sent to county facilities: there is not a one-for-one substitution in one method of confinement for another. All in all, there was no statistically significant increase in the number of cases being closed or dismissed; while there is an increase in the number of cases which resulted in ward probation being instituted, other than being sent to a county facility, which includes various forms of formal or informal probation.

Finally, this datasource allows us to distinguishes the effects for two groups of youth: those who are convicted for violent offenses, and those who are convicted for non-violent offenses. The former group had a lesser change in price of incarceration to CYA, while the latter had a steep increase of prices. Column 7 of table 5 presents changes in CYA referrals for violent offenses, and there is no effect of the change in pricing structures on the probability that youth convicted of these offenses be sent to CYA. The results are thus driven by changes in incarceration for youth convicted of non-violent offenses, as shown in column 8 of table 5: this further demonstrates a responsiveness to prices for the youth for whom prices changes most.

Overall, this indicates a decrease in the severity of sentencing, while the volume of cases stayed constant. There is a larger use of in-county sanctions, but cases are not dropped more often. The change in laws therefore seems to have increased the use of non-confinement sentences, which are generally provided for and paid by the county – and less expensive than county jail options. Therefore, the shift in financial burden did not result in counties dropping cases altogether, but in transitioning to using non-confinement county-financed options.

There are several lessons from this case study of Santa Clara and Orange County. First, we confirm from these two counties the state-wide lesser reliance on CYA after the change in laws. Interestingly, the substitution was not for local modes of confinement: more youth were kept out of incarceration altogether as a result of this change in costs. This indicates that the subsidizing

of prison led to over-reliance, relative to its usage when true costs were borne. Finally, this also indicates that the net effect of the policy was that less youth were being incarcerated altogether. To determine the overall effect of this lesser incarceration, and in particular to do a cost-benefits analysis, we now turn to potential changes in offending that this lesser deterrence and incapacitation could have yielded.

6   Juvenile Arrests

Arrests capture a combination of police and delinquent behaviors. An increase in arrests can be due to an increase in offenses, keeping policing constant; an increase in policing, keeping offending constant; or a combination of both. The change in pricing (and resulting decrease in likelihood of incarceration for juveniles that we just showed) could change youth offending, but it might also affect officers' behaviors. If officers less likely to arrest juveniles because incarceration became less likely, then crime could be increasing or constant, but juvenile arrests would be decreasing or staying constant. If one were to observe a null effect on very young offenders (who are clearly less than 18), and an increase in arrests for young adults (who could be taken for adults, and for whom incarceration did not change at this period of time), this could be indicative of police changing their behaviors as a result of the law.

Using the "Uniform Crime Report: Arrests by age, sex and race" database, instead of the more widely used UCR data on reported incidents, we are able to look precisely at this. The remainder of this section presents the evolution of juvenile arrests around 1996, for different ages and offenses. A large share of more minor offenses, such as disorderly conduct or liquor laws, would not have led to incarceration even with after an arrest. Results are presented overall, and for more severe offenses (part 1 UCR violent and property offenses) that would be more likely to lead to incarceration.

Overall results are presented in figures 10. There is no discontinuous change in the number of juveniles being arrested. However, the orders of magnitude are different for the incarceration results and for the offending results: arrests are of the orders of thousands per month, and there is a lot of noise in the arrests data. Looking at different categories of offenses yields estimates with more comparable order of magnitude, and where the relation with incarceration would be more proximate.

Figure 11 presents results for the number of arrests for part 1 violent offenses. There is no discontinuous change around the threshold in the number of juveniles being arrested for these types of offenses. Note that limiting to

these three most severe offenses, the numbers of arrests are much smaller: there are between 1,500 and 2,500 arrests for these motives per month. Figure 12 further detail the evolution of arrests part 1 property offenses. There are no crimes for which there is a discontinuous increase in arrests after 1996. This indicates that the overall absence of change in arrests is not due to more frequent, lesser offenses (which can't be punished by prison and thus were not affected by the law) swamping out more severe offenses.

The UCR data also contains a count for the number of juvenile arrests that were dealt with within the department, and led to a release without further actions. Supposing that police would modify behaviors regarding juveniles due to the change in probability of incarceration, this would be a credible place where this could happen. At this stage, information on age would have been collected, and it in turn determines if an person is less than 18, so less likely to be sent to juvenile prison after 1996. Figure 13 presents the evolution in immediate releases: they do not discontinuously change at the change in laws. Column 7 of table 6 statistically confirms this result.

Table 6 presents regression discontinuity results to estimate how arrests for murder, rape and robbery change as a result of the change in costs of incarceration, for all offenses, and part 1 violent and property crimes. As suggested by the graphs, there is no significant change in number of arrests for any age or offense categories at the time of the change in laws.

Finally, table 7 presents age-specific changes in arrest, for part 1 violent and property offenses. For none of the age groups is there a significant discontinuous change in arrests around the threshold. In particular, there is no increase in arrests of 17 - 19 year-olds, whom law enforcers could have taken for either juveniles or adults, thus making less plausible the idea that this null result is driven by law enforcers arresting less because of the lowered risk of incarceration.

These results indicate that the change in law was not mirrored by a change in levels of arrests detectable with the current data, even for offenses which would most likely lead to incarceration. In other words, this is not only a context in which marginal costs of the change in cost structures exceeded marginal benefits – there seem to have been no benefits from increased use in incarceration. Placing the cost burden of prison on states instead of counties resulted in a state of the world where more money was spent for the same level of a public good – safety.

7   Conclusion

Shifting the cost burden of incarceration from the state to counties entailed a large decrease in the number of juveniles being sent to state facilities. Use of incarceration responds to costs borne, not to overall social costs; and more importantly, we show that this disconnect in the levels of sentencing and the payment of incarceration affects incarceration rates. Stuntz (2011) describes the American criminal justice system as a "relay race", where nobody fully controls the process that determines ultimate incarceration rates. The different actors – police officers, probation officers, district attorneys, judges, correction officers – are not accountable to one another. This disconnect need not necessarily be nefarious: there could be organizational gains from separating the decision-making process (Ater et al., 2014), and if there are externalities across space in crime control, centralized provision of incarceration might be more efficient.

The effects of this disconnect in choices and payments of incarceration in the United States is important to understand, as it might help in understanding one overlooked cause of growth in incarceration, and how to reduce the financial burden of incarceration on states' budgets. This disconnect might also play a role in costs might also be part of the explanation for using incarceration so massively, even though policing seems to be more cost-effective (Donohue and Siegleman (1998), Cook and Ludwig (2010)). Realigning costs and incentives is a very cheap policy to implement, and it could lead to a lower use of state prison spaces. The responsibility of counties argument is also perhaps a way to decrease incarceration without sounding soft on crime. Our estimates furthermore reflect changes only in costs of juvenile incarceration, which represent only a very small fraction of overall incarceration.

Beyond the question of sentencing in the federal context of the USA, this paper more generally illustrates the importance of alignment of incentives in law enforcement. In another context, Mukherjee (2014) demonstrates how the rise in private prisons also have negative side-effect due to misaligned incentives: while they might be less costly per day in prison, these costs might be off put by increased stays in prison that private prisons promote through more disciplinary incidents, to increase their revenue. And even in countries which have unified funding structures in their criminal justice, such as France, misaligned incentives can affect tradeoffs in law enforcement practices. For example, prison directors are responsible for inmates' confinement *and rehabilitation*. Even though the latter can have large effects on future levels of public safety, it is much harder to observe and hold prisons accountable for than the former. The most discussed lever to reduce crime has been changing

incentives of potential offenders, in particular through sentencing laws, while this paper demonstrates the role that incentives also for play in choosing crime control policies. This research on institutions, law enforcement and offending, opens up the question of how to design mechanisms that would best align incentives across different criminal justice actors and sectors.

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Figure 2: Juveniles Committed in California state prisons: Pre / Post August 1996

Juvenile Intakes per Month
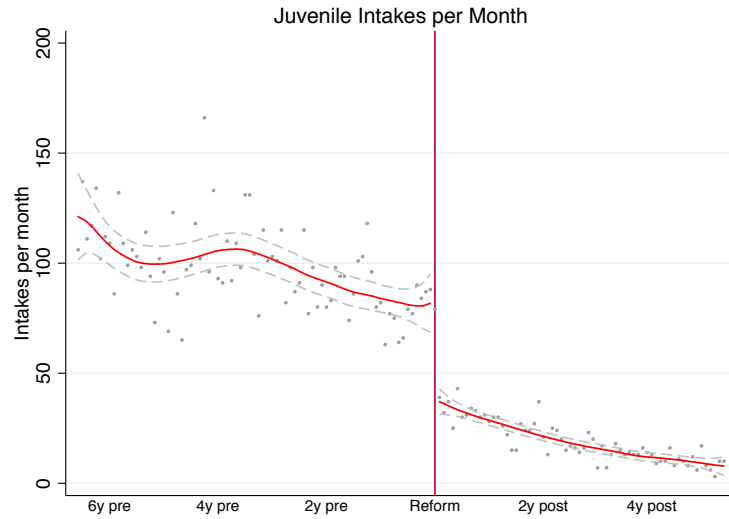
Source: NCRP data

Figure 3: Adults Committed in California state prisons: Pre / Post August 1996

Adult Intakes per Month
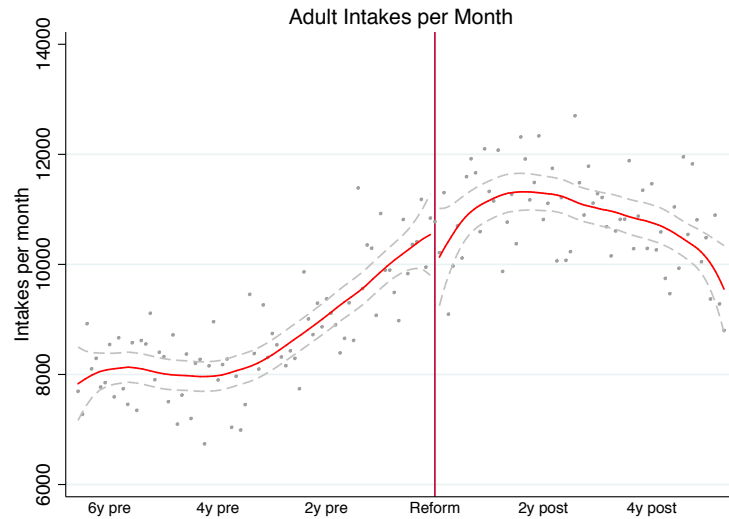
Source: NCRP data

Figure 4: Commitments into California state prisons, by age at intake
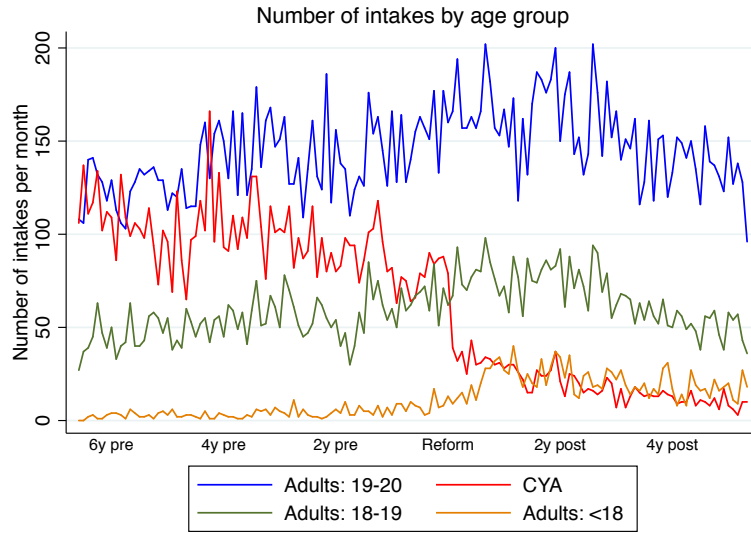
Source: NCRP data

Figure 5: 1-day count of juveniles in state and local facilities, 1997 - 2010
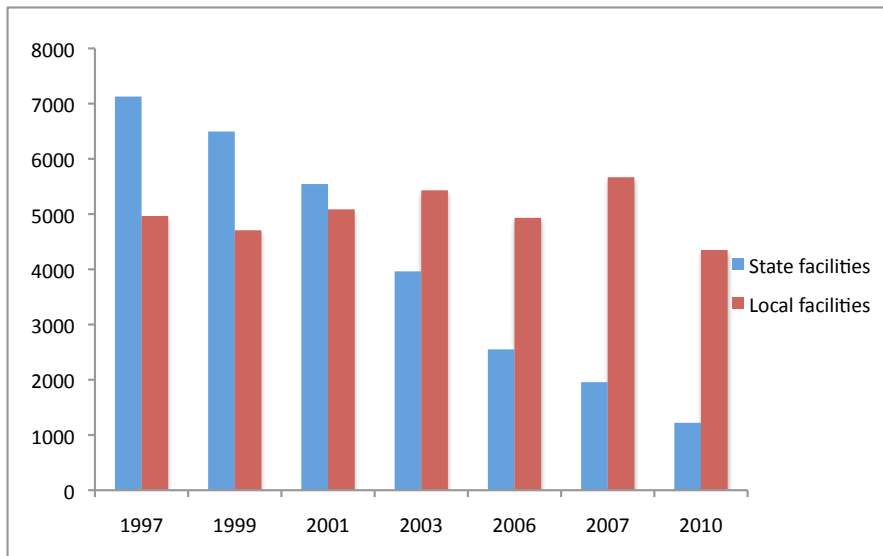
Source: Census of Juveniles in Residential Placement

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Figure 6: Intakes in CYA, by court of commitment: juvenile and criminal courts
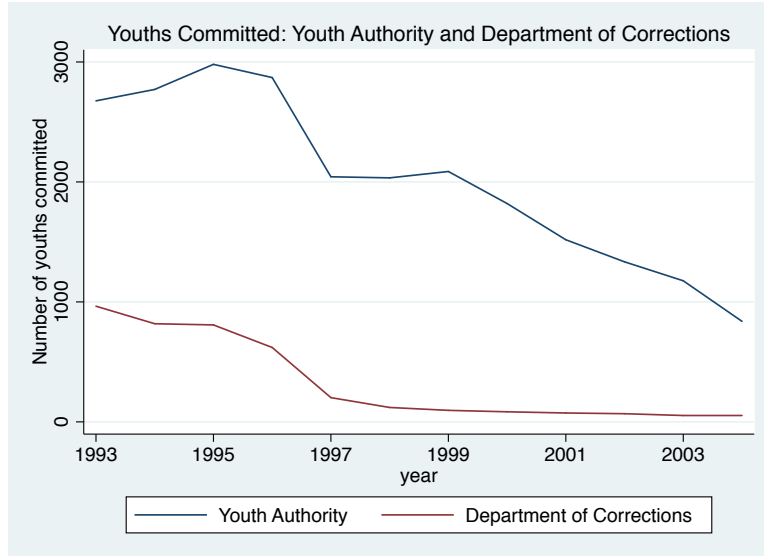
State of California Department of the Youth Authority report

Figure 7: Number of cases per month, Orange County and Santa Clara County
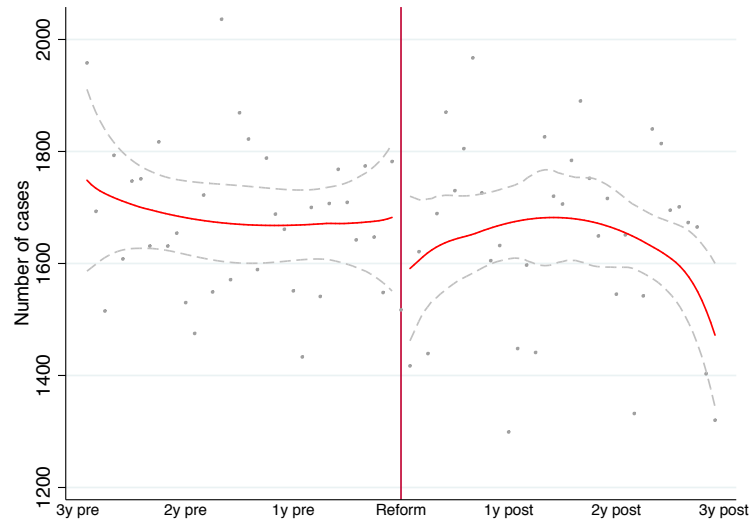
Juvenile Court Cases

Figure 8: Fraction of youth sent to county facilities, Orange County and Santa Clara County
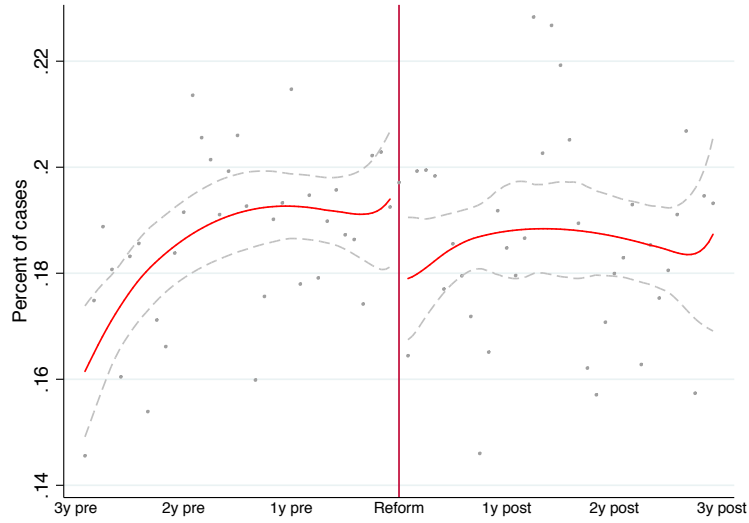
Data source: California Juvenile Court Case Records

Figure 9: Fraction of youth diverted, Orange County and Santa Clara County
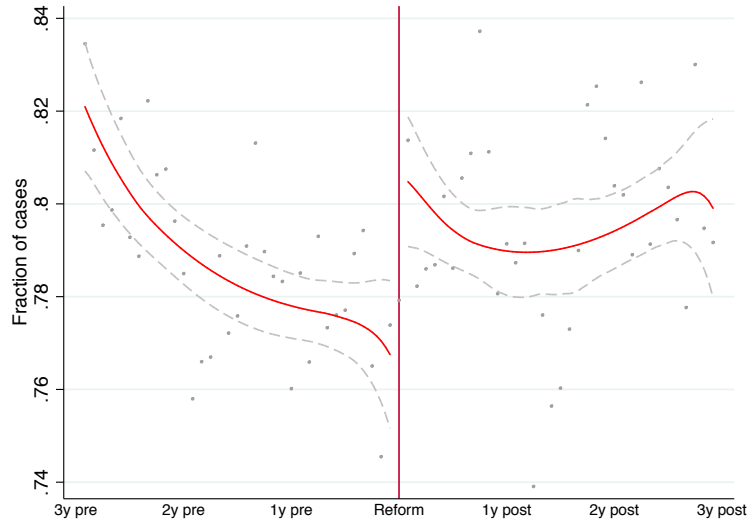
Data source: California Juvenile Court Case Records

Figure 10: Juvenile Arrests in California: 1991 - 2003
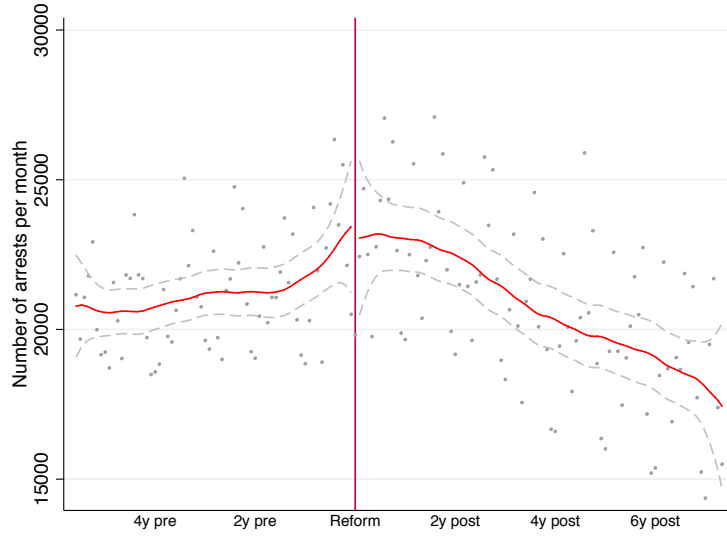
Source: Uniform Crime Report: Arrests by age, sex and race

Figure 11: Juvenile Arrests in California for Part 1 violent offenses: 1991 - 2003
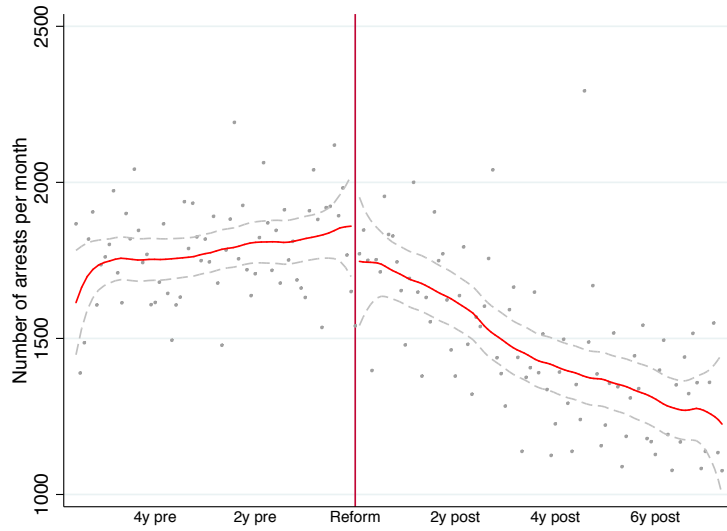
Source: Uniform Crime Report: Arrests by age, sex and race

Figure 12: Juvenile Arrests for Part 1 property offenses: 1991 - 2003
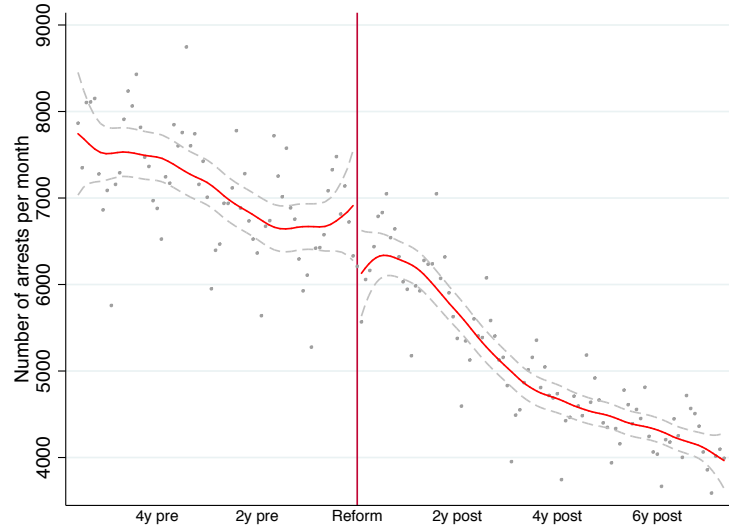
Source: Uniform Crime Report: Arrests by age, sex and race

Figure 13: Number of Juveniles Handled Within the Department and Released: 1991 - 2003
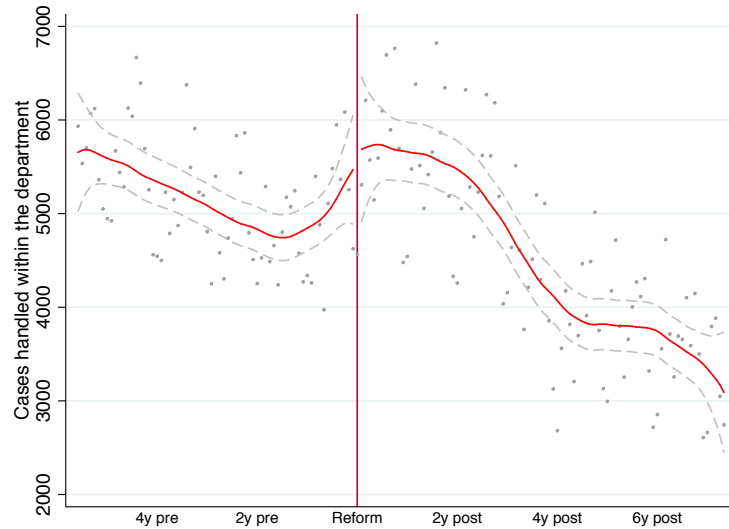
Source: Uniform Crime Report: Arrests by age, sex and race

Table 1: RDD estimates: monthly juvenile intakes pre-post August 1996, full sample

	(1)	(2)	(3)	(4)	(5)
cutoff date	-43.63	-43.68	-43.66	-31.39	-43.35
	(-9.03)	(-9.00)	(-9.00)	(-4.98)	(-4.29)
month	-0.498	-0.470	-0.498	-0.972	6.902
	(-7.21)	(-4.73)	(-7.17)	(-2.98)	(2.57)
cutoff*month		-0.0545		0.0355	-13.75
		(-0.39)		(0.07)	(-3.33)
quadratic month			-0.000438	-0.000661	0.407
			(-0.39)	(-0.15)	(2.56)
cutoff*quadratic month				0.000138	-0.0000803
				(2.95)	(-0.01)
CYA intake mean pre-reform	95	95	95	95	78
Observations	121	121	121	121	25

t statistics in parentheses

(1) - (4): 1990 - 2001; (5): +/- 1year

Table 2: RDD estimates: likelihood of being sent to CYA for inmates < 25 years old at the age of entry, pre-post August 1996

	Dependent variable: dummy = 1 if incarcerated at CYA				
	(1)	(2)	(3)	(4)	(5)
cutoff date	-0.028	-0.029	-0.028	-0.015	-0.019
	(-14.90)	(-15.73)	(-15.42)	(-6.12)	(-5.39)
prior jail time	-0.000017	-0.000017	-0.000017	0.000016	0.000010
	(-2.70)	(-2.73)	(-2.70)	(1.85)	(1.06)
prior prison time	0.000018	0.000020	0.000020	0.000057	0.000052
	(2.58)	(2.74)	(2.72)	(10.06)	(6.93)
Black	-0.00052	-0.00078	-0.00073	0.0068	0.0071
	(-0.57)	(-0.84)	(-0.79)	(4.48)	(3.50)
Hispanic	-0.00058	-0.00081	-0.00077	0.0080	0.0089
	(-0.63)	(-0.89)	(-0.84)	(5.64)	(4.67)
Male	-0.0028	-0.0028	-0.0028	-0.0049	-0.0079
	(-2.29)	(-2.26)	(-2.28)	(-2.26)	(-2.35)
Age	-0.52	-0.52	-0.52	-0.53	-0.59
	(-36.87)	(-36.88)	(-36.87)	(-23.33)	(-18.20)
Age square	0.011	0.011	0.011	0.012	0.013
	(36.59)	(36.59)	(36.59)	(23.19)	(18.08)
month	-0.00014	-0.00018	-0.00041	0.00024	0.0025
	(-5.71)	(-5.08)	(-3.71)	(0.58)	(2.40)
cutoff*month		0.00011	0.00053	-0.0015	-0.0053
		(2.17)	(2.57)	(-1.91)	(-2.77)
quadratic month			-0.0000029	0.000036	0.00018
			(-1.96)	(2.17)	(2.27)
Percent CYA pre-reform	0.054	0.054	0.054	0.047	0.043
Observations	258234	258234	258234	85127	41379

t statistics in parentheses

All regressions include controls for offense

(1) - (3) 1990 - 2001; (4) 2 years around the August 1996 cutoff ; (5) 1 year around the August 1996 cutoff

Table 3: DD estimates: number of intakes per month, juveniles vs. 19-year-old adults, pre-post August 1996

	(1)	(2)	(3)	(4)
Juvenile*cutoff	-91.69	-91.69	-75.19	-60.03
	(-24.17)	(-24.13)	(-12.44)	(-8.69)
Juvenile	-42.44	-42.44	-62.04	-75.33
	(-14.73)	(-14.70)	(-14.01)	(-16.48)
cutoff date	13.27	28.92	18.15	4.409
	(3.66)	(5.51)	(2.55)	(0.44)
Month		-0.217	0.0388	0.990
		(-4.21)	(0.17)	(1.38)
Intake means pre-reform	119	119	116	115
Observations	288	288	92	46

t statistics in parentheses

(1) - (2): CYA vs. 19yo adults, 1990 - 2001

(3) and (4): CYA vs. 19yo adults, +/-2years and +/-1year respectively

Table 4: RDD estimates daily estimates, Santa Clara and Orange County: number of cases overall, sent to court, dropped, resulting in CYA, or in confinement in a secure county facility

	(1) Cases	(2) Court	(3) Dropped	(4) CYA	(5) County
cutoff date	-4.57	-5.46	0.89	-0.78	-1.26
	(-1.09)	(-2.29)	(0.42)	(-6.03)	(-1.35)
month	-0.023	-0.16	0.13	0.021	-0.055
	(-0.06)	(-0.80)	(0.77)	(1.93)	(-0.72)
quadratic month	-0.0056	-0.0091	0.0036	-0.00039	-0.0030
	(-0.66)	(-1.92)	(0.84)	(-1.52)	(-1.60)
cutoff*quadratic month	-0.00019	-0.00013	-0.000063	-0.0000070	-0.000017
	(-1.23)	(-1.46)	(-0.80)	(-1.48)	(-0.48)
cutoff*month	0.49	0.76	-0.27	-0.0018	0.19
	(0.79)	(2.17)	(-0.87)	(-0.10)	(1.39)
Outcome mean	56.6	29.2	27.4	0.8	10.5
Observations	2084	2084	2084	2084	2084

t statistics in parentheses

Control for type of offense. Columns 2 and 4 are estimates for youth sent to court, others are for all arrests.

Table 5: RDD estimates: probability of CYA or County Secure Facility, in Orange County and Santa Clara

	(1) CYA	(2) CYA, Court cases	(3) County	(4) County, Court cases	(5) Case closed	(6) No confinement	(7) CYA Violent	(8) CYA Non-violent
cutoff date	-0.010***	-0.019***	-0.012**	-0.014	0.0040	0.023***	-0.035	-0.022***
	(-7.94)	(-7.83)	(-2.95)	(-1.95)	(0.77)	(5.41)	(-1.77)	(-10.60)
cutoff*month	-0.00031	-0.00034	-0.00050	0.00095	0.0021*	0.00076	0.0021	-0.0013***
	(-1.19)	(-0.72)	(-0.62)	(0.70)	(2.06)	(0.93)	(0.55)	(-3.48)
quadratic month	-0.0000032	-0.0000079	-0.000014	-0.000046*	-0.000040**	0.000020	-0.000056	0.0000046
	(-0.91)	(-1.24)	(-1.25)	(-2.53)	(-2.85)	(1.76)	(-1.04)	(0.90)
month	0.00038**	0.00060*	0.00070	0.00030	-0.0012*	-0.00097*	-0.00012	0.0011***
	(2.90)	(2.51)	(1.70)	(0.44)	(-2.24)	(-2.32)	(-0.06)	(5.50)
Sex	-0.0083***	-0.016***	-0.063***	-0.10***	0.066***	0.069***	-0.059***	-0.010***
	(-9.63)	(-9.24)	(-23.39)	(-21.48)	(19.26)	(25.12)	(-3.94)	(-7.84)
age	0.0021***	0.0056***	-0.0047***	0.011***	0.026***	0.0030***	0.022***	0.0034***
	(10.08)	(13.73)	(-7.23)	(9.29)	(31.15)	(4.44)	(6.26)	(11.25)
Black	0.0071***	0.015***	-0.0038	0.023**	0.077***	-0.0040	0.027	0.0097***
	(5.36)	(5.76)	(-0.92)	(3.13)	(14.65)	(-0.94)	(1.33)	(4.75)
Hispanic	0.0073***	0.014***	0.053***	0.098***	0.0066*	-0.057***	0.068***	0.0087***
	(9.68)	(9.97)	(22.29)	(24.66)	(2.21)	(-23.69)	(5.18)	(8.12)
Other	0.0058***	0.011***	0.0074*	0.029***	0.029***	-0.0090*	0.071***	0.0051**
	(5.25)	(5.48)	(2.15)	(4.94)	(6.55)	(-2.56)	(4.35)	(3.19)
Outcome mean	0.013	0.025	0.186	0.343	0.459	0.791	0.109	0.011
Observations	117581	63717	117581	63717	117581	117581	3027	71331

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6: RDD estimates: monthly juvenile arrests pre-post August 1996, +/- 5 year

	(1) Arrest	(2) Arrest	(3) Arrest	(4) Arrest	(5) FBI part 1 violent	(6) FBI part 1 property	(7) Released
cutoff date	1342.3 (1.56)	1238.4 (1.56)	1275.3 (1.61)	518.3 (0.49)	-92.7 (-1.03)	152.8 (0.58)	746.6 (2.33)
month	-17.0 (-1.38)	36.3 (2.23)	-16.1 (-1.42)	40.7 (0.74)	4.23 (0.91)	-16.4 (-1.19)	4.99 (0.30)
cutoff date*month		-103.9 (-4.57)		-58.4 (-0.64)	-12.6 (-1.64)	-31.1 (-1.37)	-17.6 (-0.64)
quadratic month			-0.83 (-4.57)	-0.38 (-0.52)	0.036 (0.58)	0.087 (0.47)	-0.099 (-0.45)
cutoff date*quadratic month				-0.0083 (-1.05)	-0.00019 (-0.29)	0.0015 (0.73)	-0.0064 (-2.66)
Pre-reform arrest mean	21306	21306	21306	21306	1794	7030	5104
Observations	121	121	121	121	121	121	121

t statistics in parentheses

(1) - (2): CYA vs. 19yo adults, 1990 - 2001

(3) and (4): CYA vs. 19yo adults, +/-2years and +/-1year respectively

Table 7: RDD estimates: monthly arrests for Part 1 property and violent crimes by age group pre-post August 1996, +/- 5 year

	(1) Nb 16yo	(2) Nb 17yo	(3) Nb 18yo	(4) Nb 19yo	(5) Nb 16yo	(6) Nb 17yo	(7) Nb 18yo
cutoff date	15.3	18.4	37.2	-16.5	-12.5	-21.4	-9.49
	(0.31)	(0.57)	(1.24)	(-0.83)	(-0.67)	(-1.16)	(-0.46)
month	-0.70	1.62	1.23	2.32	0.67	0.83	2.52
	(-0.27)	(0.96)	(0.80)	(2.25)	(0.70)	(0.87)	(2.37)
quadratic month	0.0080	0.069	0.092	0.031	0.0018	0.0010	0.034
	(0.24)	(3.07)	(4.44)	(2.27)	(0.14)	(0.08)	(2.43)
cutoff date*quadratic month	-0.00057	-0.00059	-0.00044	-0.000064	-0.00027	-0.00037	-0.00035
	(-1.54)	(-2.40)	(-1.97)	(-0.43)	(-1.94)	(-2.70)	(-2.29)
cutoff date*month	-4.61	-8.00	-7.27	-6.38	-2.40	-1.58	-4.18
	(-1.09)	(-2.86)	(-2.83)	(-3.72)	(-1.51)	(-1.00)	(-2.37)
Pre-reform arrest mean	1309	1145	942	444	480	509	484
Observations	121	121	121	121	121	121	121

t statistics in parentheses

8 Appendix: Descriptive statistics on Santa Clara and Orange County juvenile court dispositions

Table 8: Juvenile Court Case dispositions in Santa Clara and Orange County

	Number	Percent
Number of court cases		
Santa Clara	137,336	62.2%
Orange County	225,876	37.8%
Demographics		
Black	25,936	7%
Hispanic	192,849	53%
Female	69,488	19%
Age at entry (average)	15.5	
Final disposition in 1995		
Closed, dismissed	9,310	45%
Probation	2,023	10%
Own, relative's home	3,837	19%
Secure county facility	3,902	19%
CYA	311	1.5 %