

Tough on young offenders: harmful or helpful?*

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Preliminary and Incomplete

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ABSTRACT

Should we be tough on young offenders or should we not? We have the unique opportunity to exploit a quasi-natural experiment that occurred in the 1980's in England and Wales and can shed light on this matter. We analyse a sample of young offenders who appeared in court when 20/21 years old and were given a custodial sentence. Through a fuzzy regression discontinuity design, we exploit the fact that young offenders who were below 21 years old were sent to youth custody centres and detention centres, while young offenders who were above 21 years old were sent to prison. At the time, young offenders who went to youth custody and detention centres experienced a tougher regime than usual. Our sample is made of all the offenders in England and Wales who were born in 3 randomly sampled weeks in 1963 and were sentenced either to the harsher youth custody and detention centres or to adult prisons, depending on the age at which they went to court. According to our local linear regression estimates, the young offenders exposed to the harsher punishment are 19.3% more likely to recidivate and commit on average 2.88 offences more than their counterpart in the 9 years subsequent to their custody.

JEL: K42, Z13

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1. Introduction

Whether our societies should be tough on young offenders or not has always been at the centre of a heated debate in history. Currently the answer is still unknown and the evidence mixed.

On the one hand, tough policies and harsh sentences will lead future criminals to avoid criminal activity, known as *general deterrence effect*. Severe punishment could also deter the same criminals from committing new crimes in the future, known as *specific deterrence effect* [Galbiati et al. 2014]. On the other hand, an oppressive regime may have instead a negative effect on offenders who are incarcerated, weakening even more their already fragile link with society, nourishing negative networks and consequently increasing the offenders' future criminal activity. Nowadays the division between supporters of tough policies to reduce crime and opponents to it is still present, but each position is more often based on different views and personal opinions rather than empirical causal evidence.

We have the chance to investigate on a quasi-natural experiment that occurred in the 1980's in England and Wales and can add relevant scientific evidence to the debate. At the time, young offenders who were sentenced to youth custody and detention centres experienced a tougher regime than usual. Indeed, youth custody centres and detention centres in Britain had become more punitive, as it was reflected in the way the centres were managed.

We analyse a sample of young offenders who appeared in court when 20/21 years old and were given a custodial sentence. Through a fuzzy regression discontinuity design, we exploit the fact that young offenders who were below 21 years old were sent to youth custody centres and detention centres, while young offenders who were above 21 years old were sent to prison.

Our sample is made of all the offenders in England and Wales who were born in 3 randomly sampled weeks in 1963. In total we have 558 young offenders. We observe their criminal records until they are 30 years old. This setup allows us to estimate the effect of experiencing a milder/harsher custody on recidivism in the long-run.

The remainder of the paper is organized as follows: in Section 2 we discuss the most relevant empirical literature related to the effects of detention on criminal re-offending. In Section 3 we outline the background of the quasi-natural experiment and the design. In Section 4 we describe the data. In

Section 5 we present the empirical strategy and the results. In Section 6 we conduct some robustness checks and in Section 7 we conclude.

2. Literature Review

The empirical literature on the general and specific deterrent effects is still scarce (Galbiati and Drago, 2014). The main reason behind it lies in the difficulty to identify a causal link between custody conditions and crime rates. In most cases self-selection impedes to establish more than correlations: the most dangerous criminals are both more likely to be sentenced to harsher custody conditions and to reoffend in the future, precisely because they are intrinsically more prone to criminal activity. Therefore, whether higher reoffending rates are driven by harsher custody conditions or by the offenders' higher propensity of recidivating cannot be distinguished.

The difficulty of identification is exacerbated by the uneasiness to access micro-level data on offenders, necessary to isolate a specific deterrence effect and determine the causal link between the harsh conditions of a custodial system and the offenders' propensity to be reconvicted. Moreover, the time span over which offenders are usually observed is frequently short.

In this work we will be able to compare the specific deterrence effects of two different treatments. We will now consider the main findings of the literature so far.

Katz, Levitt and Shustorovich (2003) use aggregate data and find evidence of general deterrence. They use prison death rates (per state per year) as a proxy for prison conditions. They show that in 1950-90 there was a negative relationship between death rates among prisoners and violent and property crime rates in the US, even though very small (they find elasticities smaller than 0.05).

Hjalmarsson (2009) examines juveniles (16 years old on average) sentenced to custody in juvenile residential facilities in the State of Washington. He exploits the discontinuities in punishment in juvenile sentencing and finds that incarcerated offenders are 13% less likely to reoffend than non-incarcerated ones after 1.5 years. However, as the author points out, he is only examining juvenile residential facilities in the State of Washington, and "it is certainly feasible that incarceration has an

exacerbating effect in states other than Washington, which have, for instance, worse prison conditions or educational programs” (Hjalmarsson, 2009). Lee and McCrary (2009) also find support for a specific deterrence effect, but very small: there is a 2% decline in the crime rates when offenders turn 18 and the punishment is harsher, as measured by a higher expected sentence length.

Aizer and Doyle (2014) look at a slightly younger population: juvenile offenders between 10 and 16 years old. They use randomly-assigned judges as an instrumental variable to show that offenders who have been incarcerated are more likely to recidivate over a 10-year period. Chen and Shapiro (2007) also find evidence against a specific deterrence effect. They observe 949 inmates for 3 years after release. Exploiting the discontinuities in the assignment rules of prisoners to security levels, they estimate that the offenders incarcerated in higher security level prisons are no less prone to be rearrested than offenders in minimum security. Finally, Drago and Galbiati (2011) employ the variation in the prison assignment to evaluate the impact of prison harshness (given by prison overcrowding and number of deaths in prison), and the degree of isolation of a prison on the propensity to recidivate: the harshness of Italian prisons increases the likelihood of re-offending in the 7 months following release.

The reason why the evidence on the specific deterrence effects is mixed is mainly due to the difference in punitive treatments, targeted populations and time windows: it is hard to draw conclusions from few and diverse studies.

Moreover, the current evidence refers mainly to adult or juvenile offenders. The former are more mature and less likely to change in response to the circumstances. The latter are more vulnerable to the surrounding environment. Malleability is not a desirable or undesirable trait per se: it implies that a young individual who lives in a negative environment is more likely to be negatively affected by it; at the same time, a young individual who lives in an edifying environment is more likely to positively change. How an individual is affected in the context of custody environments might push the individual in two directions: either he/she will be damaged and become more likely to reoffend in the future or he/she will not be willing to engage in crime anymore to avoid experiencing custody again.

How offenders respond to the environment when they are 20/21 years old is even more uncertain: individuals at that age are not as young as juveniles and not as mature as adults. There is no study we are aware of that looks at how 20/21 years old offenders respond to harsh prison conditions.

3. Background and Design

The desire to keep young offenders separate from their older peers in the prison environment gained a broader consensus at the beginning of the 20th century in England. The idea was to focus on education rather than punishment and it brought to the birth of a new type of youth detention centre, the borstal, an institution initially meant to guard and rehabilitate young offenders. Its name derived from the city where the first centre was opened in 1902: Borstal, Kent, England. During the 1930's borstals appeared to be successful.

In 1952 detention centres were also open. Their purpose was to “provide a sanction for those who could not be taught to respect the law by such milder measures as fines, probation and attendance centres, but for whom long-term residential training was not yet necessary or desirable...”[Walker, 1965]. At the time the age for borstals was 15-21 and for detention centres 14-21.

Despite their initial success, across the years borstals did not adapt to the new more criminally sophisticated generations and 70% of the offenders released from borstals were reconvicted after two years [Warder and Wilson, 1973]. More in general, in the 1980s crime rates rose (particularly youth crime rates), and the public attitude toward young offenders became more concerned with their punishment.

In 1979 the conservative party pushed for the implementation of a “short, sharp shock” on young offenders in detention centres. “The theory was that if a young man who was convicted of a first crime was given a short period of intense regimented activity from morning till night, with everything done ‘at the double’, the experience would give him such a shock that he would give up any idea of a life of crime” [Coyle, 2005]. Moreover, the 1982 Criminal Justice Act abolished borstals and replaced them with youth custody centres. The name of the sentence was changed from ‘borstal training recommendation’ to ‘youth custody order’, reflecting “the view that containment is more

appropriate than attempts to rehabilitate via ‘training’”. The 1982 Act “for good or ill abandons the notions that young people are sent to penal establishments for treatment or rehabilitation” [Muncie 1984]. The two changes together represented a shift from a welfare policy system targeting rehabilitation towards a justice and retributive system focused on tighter control [Muncie, 2005; Smith, 2010]. Anecdotal evidence highlights the suffering that these centres imposed on young offenders [Muncie 1984; Taylor et al 1979]; “they were, if anything, more brutal jungles than the adult prisons” [Smith, 1984].

It is in these years that our quasi-natural experiment takes place. As the Criminal Justice Act 1982 stated, if an offender was to be punished with custody in England and Wales, he/she would have been sentenced to detention/youth custody centres if he/she was below 21 years old and to prison if he/she was above.

4. Data

Data have been kindly provided by the Research, Development and Statistics Directorate of the Home Office. A wide range of variables is available: gender, ethnicity¹, the type and number of offences for which the transgressors appeared in court, the sentence length they were given, the disposal, whether they pleaded guilty or not, the type of proceedings (e.g. summoned by police, committed to Crown Court for trial, beach of probation order, etc.), month of birth and year of birth.

We are able to access the offenders’ crime records since they are born until 30 years old. We measure the age at which they commit their first offence to have an indication of their initial propensity to commit a crime.

We also construct several outcome variables: the likelihood to be brought to court at least once in the following 9 years, the number of offences for which an individual is sent to court in the following 9 years and the number of times the offender appears in court again in the following 9 years. We reduce the time window in which we analyse the future criminal records of the offenders to 9 years (instead of 10) so that the outcomes of the two groups of offenders are comparable: we could

¹ Unfortunately the variable describing the ethnicity of the offenders has a high percentage of missing values.

observe for 10 years the offenders in our sample who have been sentenced when 20, but we cannot do the same with the offenders who are sentenced when 21. This is why we choose a time window of 9 years to construct our outcome variables. Therefore, we measure the future offences of the offenders who are sentenced when 20 since they are 21 to 29 and we compare them with the future offences of the offenders who are sentenced at 21 since they are 22 to 30.

The number of offences for which an individual is brought to court is different from the number of times the individual is brought to court: an offender could be brought to court once for having committed multiple offences. For example, an individual who stole a car and when escaping broke a shop window will go to court once but he/she will be sentenced for two different offences.

To measure the degree of danger of the offences committed we also construct a variable capturing the number of times the offender goes to prison in the future.

Being able to distinguish which is the type of offence committed, we can also analyse whether the offences committed in the future are thefts, violent offences, sexual offences, burglaries/robberies, frauds, criminal damages, drug offences, minor offences or other offences. This way we can have a measure of both the quantity and quality of future crimes.

Our sample consists of all the offenders who were born in three randomly sampled weeks² of 1963 and who were sent to either youth custody centres, detention centres or adult prisons in England and Wales when they were 20/21 years old. The Criminal Justice Act 1982 was implemented on the 24th of May 1983. We therefore include in our sample only offenders who were 20/21 years old after that date. In total they are 558 offenders, 315 offenders who were sent to adult prisons (treatment group) and 243 offenders who were sent to youth custody/detention centres (control group).

We exclude from our sample offenders who committed their first crime when they were younger than 14 years old. This way we get rid of the most dangerous criminals, who are more numerous in our control group and consequently might bias our results. In a robustness check we will re-conduct the analysis in the full sample, including offenders who committed their first crime when younger than 14 years old.

² 3rd-9th March, 28th September-4th October, 17th-23rd December.

Summary statistics of the observable characteristics of offenders are reported in Table 1. 93.2% of the offenders are male and on average they appeared at court for the first time when they were almost 17 years old. Approximately 90% of them pleaded guilty when they appeared in court at 20/21 years old and they were given a sentence of approximately 9.5 months. 13.1% of the offences at that age are malicious wounding and alike, more than 30% are burglaries and 30% are stealings/thefts of different kinds.

4.1 Treatment-Control Comparisons: Balancing Tests

As in every regression discontinuity design, we rely on the assumption that the assignment to treatment is not correlated to individuals' characteristics other than age. Therefore, we provide visual evidence of whether other covariates exhibit a jump around the threshold. As we can see in Figures 1-13 this is not the case for any of the available observable characteristics: gender, ethnicity, birth year (they are all born in 1963), month of birth (March, September/October, December), whether they pleaded guilty, the type of offence, the age at which they committed their first offence and the proceedings. The absence of a jump in observable characteristics around the cutoff further supports our analysis.

5. Empirical Strategy and Results

5.1 Empirical Strategy

The estimation of the local average treatment effect (LATE) is carried out by the two-stage least squares (2SLS) method. The following model illustrates how:

First stage equation:

$$D_i = \alpha + f_1(\tilde{x}_i) + \rho T_i + \eta_i \quad (1)$$

Second-stage equation:

$$Y_i = \alpha + f_2(\tilde{x}_i) + \gamma D_i + e_i \quad (2)$$

Where:

Y_i = the outcome for individual i , i.e. the likelihood to re-offend in the subsequent 9 years, the number of crimes committed, the number of court appearances, the number of sentences to prison, the number of specific types of crime committed;

D_i = the treatment variable, equal to 1 if individual i is sentenced to an adult prison, and 0 otherwise;

T_i = 1 if individual i is 21 years old or older, and 0 otherwise; it is used as instrument for D_i .

X_i = age of individual i when sentenced, centred so that it is 0 when the individual turns 21 years old, positive if the individual is sentenced when 21 years old or older, and negative when the individual is younger than 21 years old³.

The functional forms f_1 and f_2 need to be correctly specified.

Our main specification is estimated through a non-parametric approach, implementing a local linear regression constructed with a triangular kernel regression.

As a robustness check we will also estimate equations (1) and (2) through a parametric approach. To allow for non-linearities we will use polynomials, but up to the second order only. We do not control for higher polynomials (third, fourth, etc.) of the forcing variable as in a recent article Gelman and Imbens (2014) argue that in a regression discontinuity analysis it could lead to misleading results. We also allow the treatment to have a different impact before and after the cut-off by including an interaction of the centred variable and the treatment variable. Finally, for a further robustness check we can also include in the parametric approach control variables such as gender, month of birth, ethnicity, age at which the offender committed the first offence, sentence length, plea, proceedings and type of offence when the offender was sentenced to youth custody/detention centres or adult prisons.

³ The centred running variable is equal to 1 the day after the offender turned 21 and -1 the day before his 21st birthday.

5.2 Results

Our first stage is strong: the estimated coefficient ρ in equation (1) is 0.761 (Table 4), very precisely estimated. Indeed, 230 offenders out of the 243 who appeared in court when 20 in our sample were sent to youth custody/detention centres and 297 young offenders out of the 315 who appeared in court when 21 were sent to adult prisons. We can visualize the strength of our first stage in Figure 15.

In Table 2 we present the results of estimating equation (2) through the local linear regression. In the first column we report the estimated treatment effect in the full sample⁴. In column 3 we restrict the bandwidth to $\frac{3}{4}$ of a year and in column 5 we reduce the bandwidth to half a year. In columns 2 and 4 we present the estimates with the bandwidths suggested by Ludwig and Miller (2007) and by Imbens and Kalyanaraman (2012) respectively.

We find that in the 9 years subsequent to their custody, young offenders who experienced a milder punishment are 19.3% less likely to re-offend than those who were exposed to a harsher treatment (Table 2). The effect is significant and does not change even when we reduce the bandwidth around the cut-off from one year to $\frac{3}{4}$ of a year or to the optimal bandwidths suggested by Ludwig and Miller (2007) and by Imbens and Kalyanaraman (2012). Only if we reduce the bandwidth to $\frac{1}{2}$ a year the effect vanishes, but this is likely to be due to the very small sample size.

The reduced likelihood to reoffend is also reflected in the number of future offences committed: young offenders exposed to a harsher punishment commit on average 2.88 offences more than their counterpart after being released. This is true across all different bandwidths. Not only young offenders who experienced the harsher treatment are more likely to be sentenced for more offences in the future, but also the number of times that they go to court is higher. The two outcomes differ in magnitude because an offender can go to court once and be sentenced for more offences at the same court appearance. Young offenders who experience a harsh treatment are brought to court on average 1.39 times more in the future.

We now investigate on the seriousness of the crimes committed in the 9 subsequent years. Using the number of future sentences to prison as a proxy for severe crimes, we find that offenders

⁴ That is, when we include in our sample young offenders who appear in court since they turn 20 years old up to young offenders who are sentenced the day they turn 22, i.e. +/- 1 year from the threshold of 21.

who experience the tougher regime are more likely to be sentenced to prison in the future, but not significantly.

Moreover, in Table 3 we examine the type of crime carried out and we realize that they are not minor offences, but mainly violent offences, thefts, burglaries and robberies. These differences between the two groups of young offenders are significant even when we restrict the bandwidth as previously detailed. We find no significant differences instead in the number of future minor offences, motoring offences, frauds, sexual offences or drug offences. There seems to be an effect on criminal damage too, but it vanishes when we restrict the bandwidth around the threshold.

In summary, offenders who are sentenced to a harsher treatment are more likely to re-offend in the future, to commit a greater number of offences and to commit offences that are more dangerous for society.

6. Robustness Checks

Results hold also when the analysis is carried out through the parametric approach up to a second-order polynomial (Table 5). In the even columns of Table 5 we also add control variables as a further check: gender, sentence length, ethnicity, plea, proceedings, month of birth, type of offence, age at which the offender committed the first offence. Estimated coefficients tend to appear slightly smaller in size when control variables are included, but they are not significantly different from the coefficients estimated without control variables. In Table 6 we show the different treatment effects according to offence type: the estimated effects go in the same direction as through the non-parametric estimation, but they are less likely to be significant.

One could worry if there is a discontinuity in the distribution of the forcing variable (the age at which offenders go to court) at the threshold (21 years). This would suggest that people (judges, police, the offenders themselves) can manipulate the forcing variable around the threshold. For example, young offenders, knowing ex-ante the harsh conditions of youth custody and detention centres, could wait to commit their crimes until they turn 21 years old. Reassuringly, the McCrary test shows no manipulation of the assignment variable (Figure 14).

We also need to bear in mind that the number of offences captured in the analysis underestimates the true level of re-offending because only a part of crimes are detected, sanctioned and recorded. Our estimated effects would be biased if there was a difference in the easiness to detect, sanction and record the offences of the two groups. However, we do not have any reason to believe there was.

We also re-conduct the whole of the analysis in the full sample of offenders who went to either youth custody/detention centres or to adult prisons, including the offenders who committed their first crime before turning 14 years old. In total they are 708 offenders. The treatment and control groups are well balanced across all the observable characteristics, but the age at which the young committed their first offence. Indeed, it seems that young offenders who went to youth custody/detention centres were more likely to have committed their first offence when they were younger than their counterpart. We need to bear in mind that this difference may bias the results. However, it is interesting to conduct this analysis as a further check. As expected, the magnitude of the treatment effects is often even greater than in our main sample (Tables 7-8): young offenders who experienced a tougher punishment are 17.9% more likely to re-offend in the future (19.3% in our original sample), they commit on average 3.53 offences more (2.87 in our original sample), they are brought to court 1.66 times more (1.39 in our original sample) and they are sentenced to prison 1.55 times more (0.928 in our original sample). All of these estimates are significantly different from zero and remain so even when the bandwidth around the threshold is reduced. Even when we analyse the type of offence committed (Table 8), we find that young offenders who went to youth custody/detention centres are significantly more likely to commit thefts, violent offences, burglaries and robberies, as we found in our original sample.

Our first stage is very strong, but as a placebo test we also check if there are other jumps in the forcing variable. Following Imbens and Lemieux (2008) we only look at one side of the discontinuity, take the median of the forcing variable in that side and test whether there is a discontinuity. Reassuringly, we find none.

7. Conclusion

Thanks to a quasi-natural experiment that we exploit through a fuzzy regression discontinuity design, we are able to contribute to the literature and current public debate on whether societies should aim at punishing harshly young offenders or not in order to protect the citizens' wellbeing.

We find evidence that a tougher custodial regime increases the young offenders' propensity to recidivate in the long-term. Indeed, young offenders exposed to a tougher regime are 19.3% more likely to re-offend in the future, they commit on average 2.88 offences more than their counterpart, and they are brought to court 1.39 times more often. The crimes that young offenders exposed to a harsher regime commit also appear to be more serious, as suggested by the fact that they are sentenced more often to prison, even though the effect is not significantly different from zero. Moreover, their felonies are not minor, but major crimes, such as violent offences, thefts, burglaries and robberies. Our estimates hold to different robustness checks.

These results suggest that the toughness of a treatment can have negative long-term consequences on the offenders and therefore on the entire society. The evidence is significant, with the caveat that it relates to a specific group of offenders: law breakers who are sentenced to custody when 20/21 years old. While being an interesting result per se, it cannot be generalized to juvenile or adult offenders. Finally, more research on the mechanisms behind these effects would be beneficial for a better understanding of what drives the offenders' behavior and tailor appropriate policy responses.

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Appendix

Figures and Tables

Fig.1

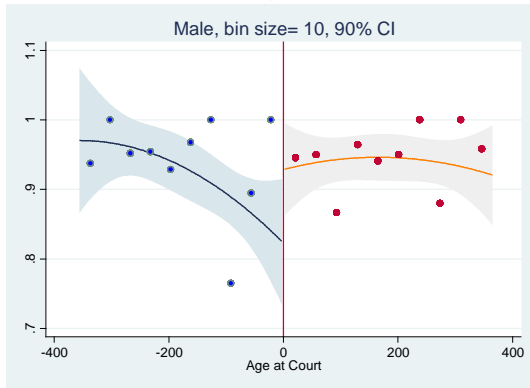


Fig. 2

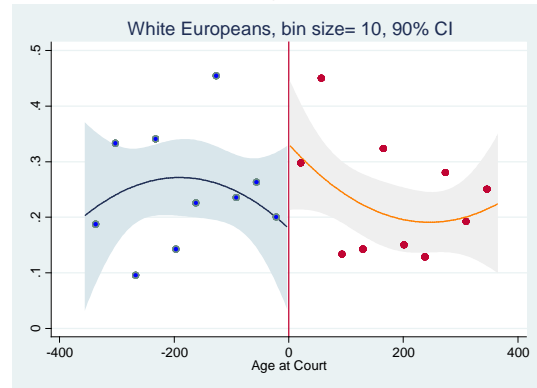


Fig. 3

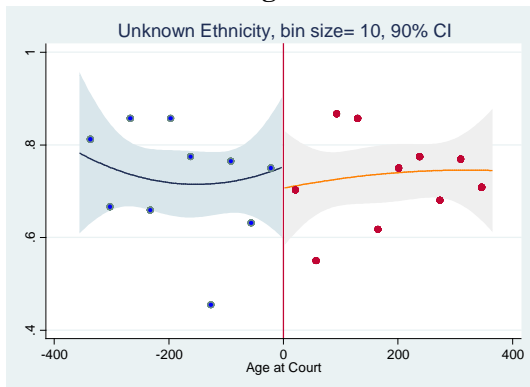


Fig.4

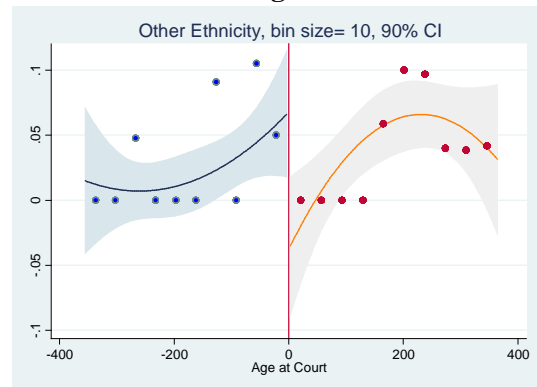


Fig.5

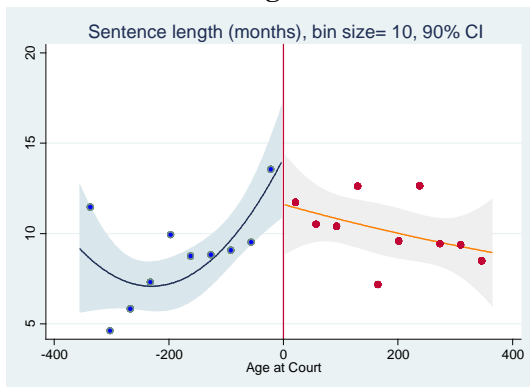


Fig.6

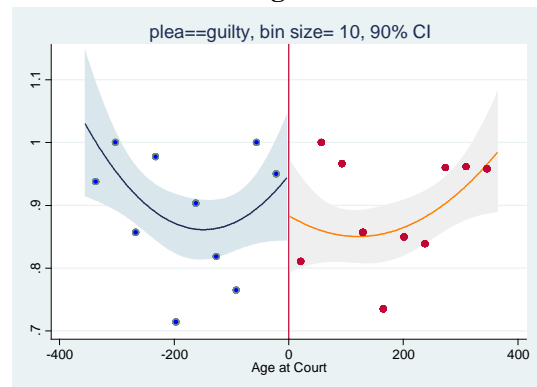


Fig.7

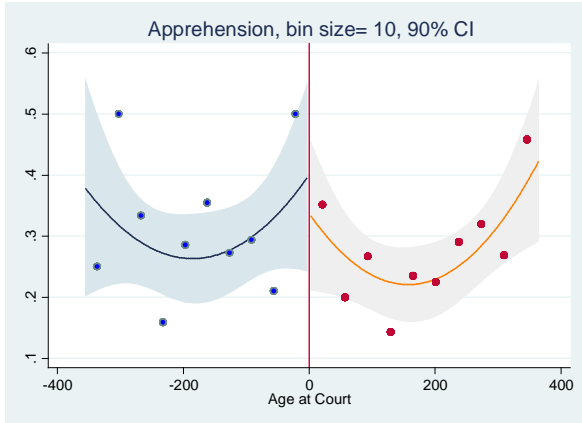


Fig. 8

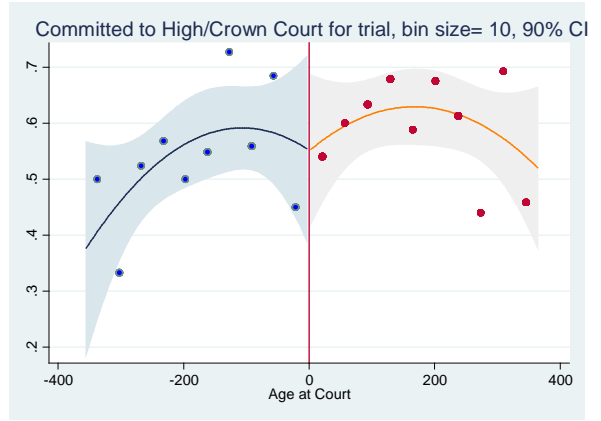


Fig. 9

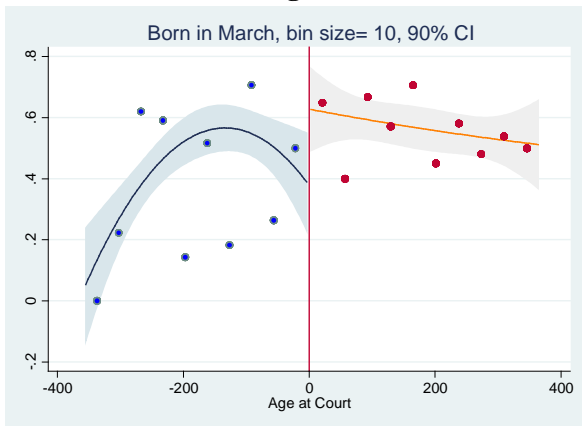


Fig.10

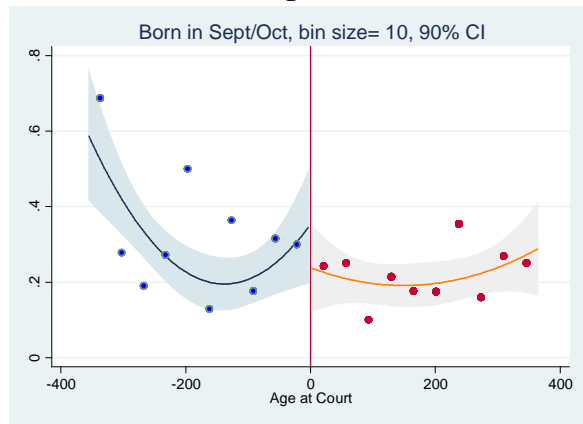


Fig.11

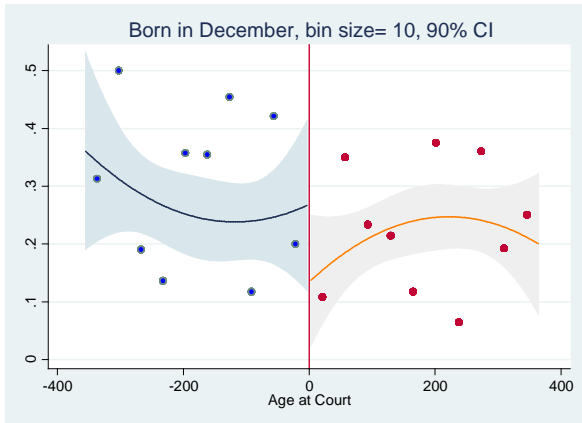


Fig.12

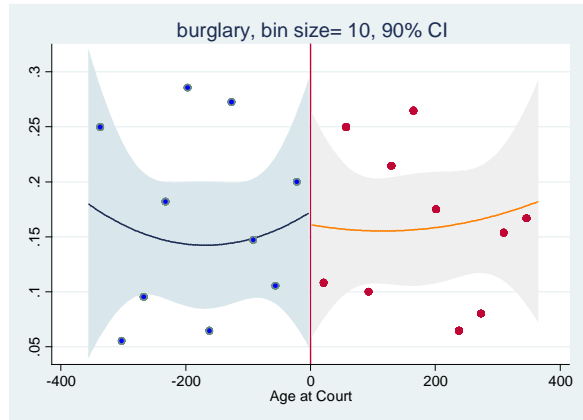


Fig. 13

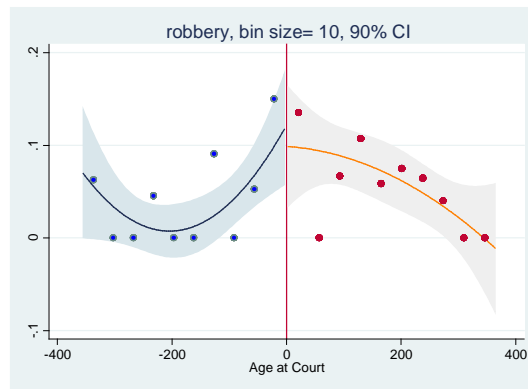


Table 1: Summary Statistics

	Mean	Sd	Min	Max
	(1)	(2)	(3)	(4)
<i>A. Offenders Characteristics</i>				
Male	0.932	0.252	0	1
White European	0.237	0.425	0	1
Afro-Caribbean	0.027	0.162	0	1
Oriental	0.002	0.042	0	1
Arab	0.002	0.042	0	1
Born in March	0.513	0.500	0	1
Born in Sept/Oct	0.247	0.432	0	1
Born in December	0.240	0.428	0	1
Age at first court appearance	16.783	2.274	14	21
<i>B. Offence Characteristics</i>				
<i>Sentence length</i>				
Sentence length (months)	9.528	9.793	0.467	60
<i>Plea</i>				
Plea: guilty	0.896	0.305	0	1
<i>Proceedings</i>				
Apprehension	0.292	0.455	0	1
Summons by police	0.016	0.126	0	1
Committed for sentence - young offenders institution (over 6 months)	0.002	0.042	0	1
Committed for sentence for offences triable either way	0.032	0.177	0	1
Committed to High/Crown Court for trial on indictment	0.573	0.495	0	1
Committed to High/Crown Court for sentence for offences tried summarily	0.002	0.042	0	1
Appearance for sentence after deferment without further conviction	0.004	0.060	0	1
Notice of Transfer	0.004	0.060	0	1
Breach of an order for conditional discharge	0.002	0.042	0	1
Breach of requirements of probation order	0.002	0.042	0	1
Breach of requirements of probation order over 1 year and up to 2 years (dealt with for original offence)	0.007	0.084	0	1
Breach of requirements of probation order over 2 years (dealt with for original offence)	0.004	0.060	0	1
Breach of probation order for 6 months following the commission of a fresh offence	0.002	0.042	0	1
Breach of probation order with a term of over 1 year and up to 2 years following the commission of a fresh offence	0.007	0.084	0	1
Breach of requirements of community service order	0.002	0.042	0	1
Breach of requirements of community service order; order revoked (dealt with for original offence)	0.016	0.126	0	1
Breach of sentence of imprisonment suspended for 1 year, no supervision order ever in force	0.007	0.084	0	1
Breach of fully suspended sentence of imprisonment				
Breach of sentence of imprisonment suspended for over 1 year and up to 2 years, no supervision order ever in force	0.027	0.162	0	1
Observations	558			

Notes: Means of the offenders' observable characteristics at the time they were sentenced to either youth custody/detention centres or adult prisons are measured. If the offender was sentenced for multiple offences at the court appearance, the characteristics of the offence for which the sentence was longer are reported.

Table 1 (continued): Summary Statistics

	Mean	Sd	Min	Max
	(1)	(2)	(3)	(4)
<i>Offence</i>				
Manslaughter	0.002	0.042	0	1
Wounding and other acts endangering life (felonies)	0.014	0.119	0	1
Malicious wounding and other like offences (misdemeanours)	0.131	0.338	0	1
Assault	0.009	0.094	0	1
Rape	0.005	0.073	0	1
Indecent assault on a female	0.004	0.060	0	1
Unlawful sexual intercourse with girl under 16	0.002	0.042	0	1
Burglary in a dwelling (1979-)	0.158	0.365	0	1
Burglary, other than a dwelling	0.156	0.363	0	1
Going equipped for stealing	0.005	0.073	0	1
Robbery and assaults with intent to rob	0.054	0.226	0	1
Stealing in a dwelling other than from automatic machines and meters	0.002	0.042	0	1
Stealing by an employee (1976-)	0.004	0.060	0	1
Theft from vehicle	0.018	0.133	0	1
Stealing from shops and stalls (shoplifting) (1976-)	0.043	0.203	0	1
Stealing from automatic machines and meters (1976-)	0.009	0.094	0	1
Other stealings and unauthorised takings	0.115	0.319	0	1
Other frauds	0.038	0.190	0	1
Receiving/handling stolen goods	0.052	0.222	0	1
Arson	0.005	0.073	0	1
Other criminal Damage	0.005	0.073	0	1
Uttering or possessing counterfeit coin	0.011	0.103	0	1
Other offences (against the State and Public Order)	0.023	0.151	0	1
Perjury and false statements	0.002	0.042	0	1
Misuse of Drugs	0.020	0.139	0	1
Possession of firearms by persons previously convicted of crime	0.002	0.042	0	1
Bail Act 1976	0.005	0.073	0	1
Assault	0.014	0.119	0	1
Interference with a motor vehicle	0.004	0.060	0	1
Criminal and malicious damage	0.013	0.111	0	1
Non-patrial having only limited leave remains in United Kingdom beyond the time limit	0.002	0.042	0	1
Theft or unauthorised taking of motor vehicle	0.059	0.236	0	1
Dangerous driving	0.002	0.042	0	1
Driving licence offences	0.014	0.119	0	1
Observations	558			

Notes: Means of the offenders' observable characteristics at the time they were sentenced to either youth custody/detention centres or adult prisons are measured. If the offender was sentenced for multiple offences at the court appearance, the characteristics of the offence for which the sentence was longer are reported.

Table 2: Results
Effects of Adult Prison in the next 9 years

Independent variable: adult prison	Non-parametric approach				
	365 days	Ludwig and Miller (2007)	274 days	Imbens and Kalyanaraman (2012)	183 days
	(1)	(2)	(3)	(4)	(5)
Likelihood to reoffend	-0.193** (0.094)	-0.194** (0.096)	-0.182* (0.108)	-0.191* (0.103)	-0.107 (0.147)
<i>Mean in Control Group</i>	0.737				
Observations	558	542	459	493	289
Offences	-2.875*** (1.016)	-2.893*** (1.023)	-2.742** (1.075)	-2.325* (1.308)	-2.287* (1.333)
<i>Mean in Control Group</i>	5.243				
Observations	558	542	459	294	289
Times to court	-1.390*** (0.519)	-1.408*** (0.525)	-1.428** (0.572)	-1.244 (0.790)	-1.315* (0.738)
<i>Mean in Control Group</i>	2.749				
Observations	558	542	459	254	289
Sentences to prison	-0.928 (0.612)	-0.953 (0.617)	-0.966 (0.647)	-0.883 (0.690)	-0.706 (0.726)
<i>Mean in Control Group</i>	1.848				
Observations	558	542	459	339	289

Notes: The estimation is conducted through a local linear regression constructed with a triangular kernel regression. Each column corresponds to a different bandwidth selection: Column 1 = 365 days; Column 2 = Ludwig and Miller (2007); Column 3 = 274 days; Column 4 = Imbens and Kalyanaraman (2012); Column 5 = 183 days. Each set of rows corresponds to a different outcome variable. Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 3: Effects of Adult Prison in the next 9 Years by Offence Type

Dependent Variable:		Non-parametric approach				
		365 days	Ludwig and Miller (2007)	274 days	Imbens and Kalyanaraman (2012)	183 days
		(1)	(2)	(3)	(4)	(5)
Thefts	Adult prison	-0.972** (0.458)	-0.866* (0.503)	-1.021** (0.447)	-0.863* (0.505)	-0.868* (0.502)
	Mean of Dep. Variable in Control Group	1.835				
	Observations	558	289	459	289	289
Violent offences	Adult prison	-0.641** (0.298)	-0.643** (0.304)	-0.654* (0.348)	-0.729* (0.421)	-0.788* (0.465)
	Mean of Dep. Variable in Control Group	0.613				
	Observations	558	542	459	339	289
Sexual offences	Adult prison	-0.023 (0.037)	-0.024 (0.037)	-0.017 (0.032)	-0.011 (0.020)	-0.009 (0.009)
	Mean of Dep. Variable in Control Group	0.041				
	Observations	558	542	459	343	289
Burglaries/robberies	Adult prison	-0.446* (0.246)	-0.455* (0.248)	-0.441* (0.261)	-0.462* (0.254)	-0.249 (0.327)
	Mean of Dep. Variable in Control Group	0.716				
	Observations	558	542	459	496	289
Minor offences	Adult prison	-0.316 (0.293)	-0.313 (0.298)	-0.265 (0.339)	-0.245 (0.414)	-0.260 (0.463)
	Mean of Dep. Variable in Control Group	0.663				
	Observations	558	542	459	339	289
Frauds	Adult prison	-0.141 (0.207)	-0.125 (0.208)	0.001 (0.212)	0.244 (0.214)	0.241 (0.213)
	Mean of Dep. Variable in Control Group	0.514				
	Observations	558	542	459	289	289
Criminal Damage	Adult prison	-0.150** (0.072)	-0.145** (0.073)	-0.103 (0.079)	-0.053 (0.109)	-0.057 (0.098)
	Mean of Dep. Variable in Control Group	0.144				
	Observations	558	542	459	218	289
Drug offences	Adult prison	0.119 (0.096)	0.116 (0.097)	0.105 (0.104)	0.115 (0.119)	0.117 (0.122)
	Mean of Dep. Variable in Control Group	0.165				
	Observations	558	542	459	311	289
Motoring Offences	Adult prison	-0.044 (0.085)	-0.046 (0.085)	-0.077 (0.076)	-0.123** (0.054)	-0.123** (0.052)
	Mean of Dep. Variable in Control Group	0.082				
	Observations	558	542	459	296	289
Other offences †	Adult prison	-0.340** (0.158)	-0.337** (0.158)	-0.343** (0.159)	-0.351** (0.179)	-0.351* (0.180)
	Mean of Dep. Variable in Control Group	0.453				
	Observations	558	542	459	291	289

Notes: The estimation is conducted through a local linear regression constructed with a triangular kernel regression. Each column corresponds to a different bandwidth selection: Column 1 = 365 days; Column 2 = Ludwig and Miller (2007); Column 3 = 274 days; Column 4 = Imbens and Kalyanaraman (2012); Column 5= 183 days. Each set of rows corresponds to a different outcome variable. Standard errors in parentheses, * p < 0.1, ** p < 0.05, *** p < 0.01.

† Other offences include mainly: failing to surrender to bail (65.63%), going equipped for stealing (20.79%) and other offences against the state or public order (6.55%).

Fig. 14 McCrary Test

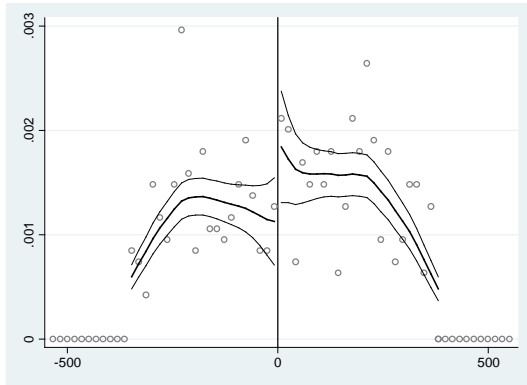


Fig. 15 First Stage

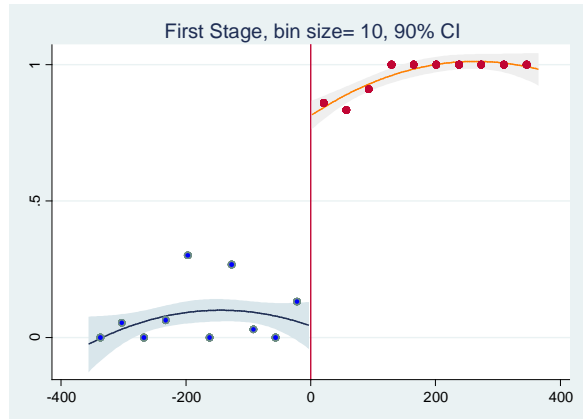


Fig. 16 Second Stage, Likelihood to Re-offend

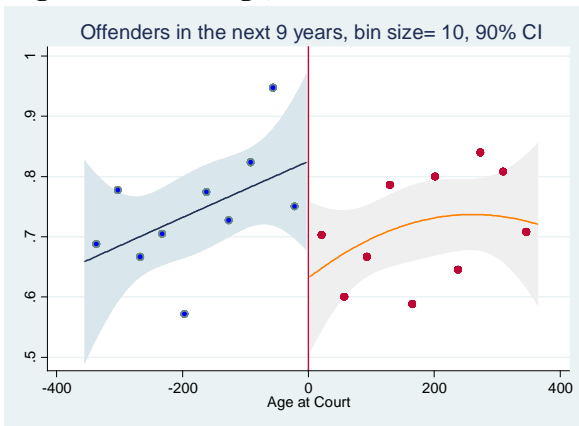


Fig. 17 Second Stage, Number of future offences

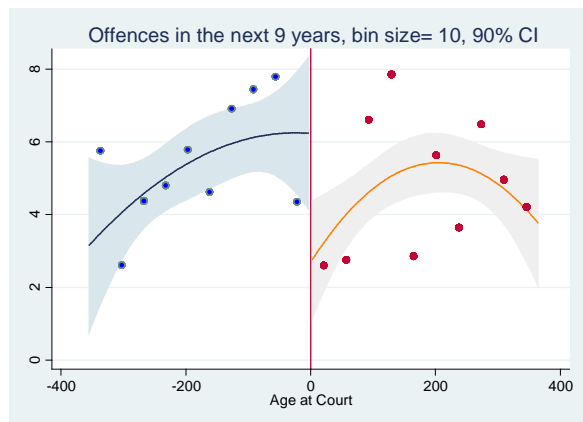


Fig. 18 Second Stage, Times to Court

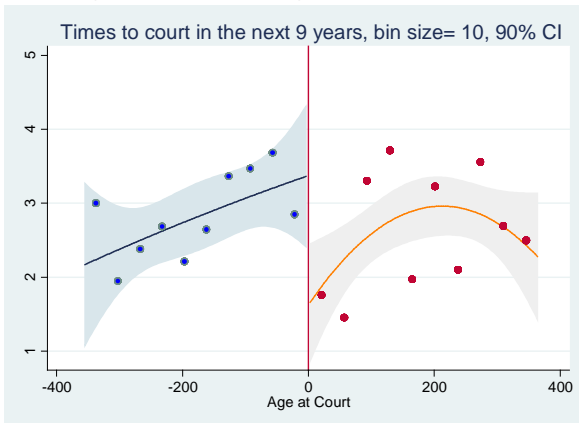


Fig. 19 Second Stage, Sentences to Prison

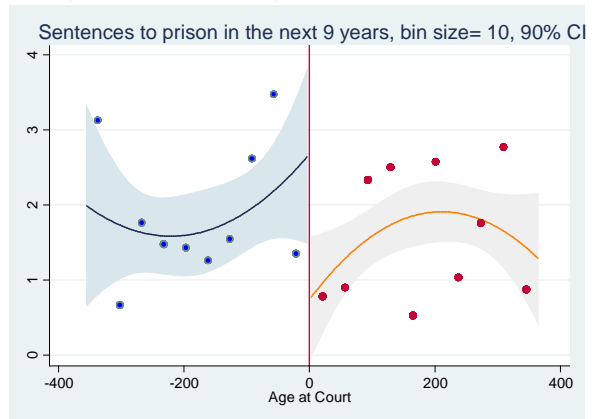


Table 4: Parametric Approach – First Stage

	<i>Independent Variable: dummy=1 if offender is 21 at court appearance</i>	
	(1)	(2)
Sentence to Adult Prison	0.761 ^{***} (0.039)	0.748 ^{***} (0.039)
Age at Court	0.000 ^{***} (0.000)	0.000 ^{***} (0.000)
Male		-0.038 (0.053)
Sentence Length		0.002 (0.002)
Other Controls		X
Centered R ²	0.793	0.806
Uncentered R ²	0.910	0.916
Observations	558	

Notes: Robust standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Other controls include ethnicity, plea, proceedings, month of birth, type of offence, age at which the offender committed the first offence.

Table 5: Effects of Adult Prison in the next 9 Years – Parametric Approach

		<i>Independent Variable: Adult Prison</i>					
<i>Dependent Variable:</i>		(1)	(2)	(3)	(4)	(5)	(6)
Likelihood to reoffend	-0.223** (0.101)	-0.159* (0.092)	-0.229** (0.099)	-0.161* (0.090)	-0.254* (0.148)	-0.229* (0.130)	
Offences	-3.180** (1.303)	-2.444* (1.323)	-3.325** (1.329)	-2.616** (1.328)	-3.232* (1.714)	-2.553 (1.729)	
Times to court	-1.460** (0.621)	-1.155* (0.621)	-1.482** (0.629)	-1.205* (0.619)	-1.812** (0.902)	-1.645* (0.871)	
Sentences to prison	-0.793 (0.719)	-0.548 (0.710)	-0.815 (0.749)	-0.552 (0.719)	-1.655* (0.989)	-1.664 (1.013)	
Age at Court	X	X	X	X	X	X	
Age*prison			X	X	X	X	
Age^2*prison					X	X	
Age at Court^2					X	X	
Controls		X		X		X	
Observations	558	557	558	557	558	557	

Notes: Robust standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Controls include gender, sentence length, ethnicity, plea, proceedings, month of birth, type of offence, age at which the offender committed the first offence.

Table 6: Effects of Adult Prison in the next 9 Years by Offence Type – Parametric Approach

<i>Independent Variable: Adult Prison</i>						
<i>Dependent Variable:</i>	(1)	(2)	(3)	(4)	(5)	(6)
Thefts	-0.867 (0.622)	-0.454 (0.650)	-0.932 (0.633)	-0.510 (0.651)	-1.085 (0.702)	-0.705 (0.752)
Violent offences	-0.769** (0.301)	-0.793** (0.324)	-0.786** (0.322)	-0.820** (0.336)	-0.838 (0.566)	-0.895 (0.583)
Sexual offences	-0.016 (0.049)	-0.026 (0.056)	-0.018 (0.053)	-0.021 (0.057)	-0.032 (0.055)	-0.023 (0.063)
Burglary/robbery	-0.403 (0.337)	-0.313 (0.359)	-0.440 (0.340)	-0.350 (0.355)	-0.635* (0.385)	-0.551 (0.389)
Minor offences	-0.380 (0.296)	-0.358 (0.299)	-0.451 (0.313)	-0.427 (0.308)	-0.414 (0.522)	-0.475 (0.494)
Fraud	-0.335 (0.271)	-0.285 (0.268)	-0.346 (0.260)	-0.304 (0.256)	0.214 (0.280)	0.344 (0.283)
Criminal damage	-0.237*** (0.085)	-0.267*** (0.090)	-0.242*** (0.089)	-0.262*** (0.091)	-0.076 (0.124)	-0.115 (0.138)
Drug offences	0.188 (0.129)	0.330** (0.132)	0.214* (0.123)	0.336*** (0.127)	0.065 (0.149)	0.191 (0.158)
Motoring offences	-0.008 (0.116)	-0.024 (0.110)	-0.024 (0.115)	-0.036 (0.110)	-0.076 (0.112)	-0.100 (0.118)
Other offences†	-0.488** (0.224)	-0.400* (0.239)	-0.437** (0.221)	-0.368 (0.236)	-0.364 (0.263)	-0.229 (0.299)
Age at Court	X	X	X	X	X	X
Age*prison			X	X	X	X
Age^2*prison					X	X
Age at Court^2					X	X
Controls		X		X		X
Observations	558	557	558	557	558	557

Notes: Robust standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. † Other offences include mainly: failing to surrender to bail (65.63%), going equipped for stealing (20.79%) and other offences against the state or public order (6.55%). Controls include gender, sentence length, ethnicity, plea, proceedings, month of birth, type of offence, age at which the offender committed the first offence.

Table 7: Robustness Check
Effects of Adult Prison in the next 9 years in the Full Sample

Independent variable: adult prison	Non-parametric approach				
	365 days	Ludwig and Miller (2007)	274 days	Imbens and Kalyanaraman (2012)	183 days
	(1)	(2)	(3)	(4)	(5)
Likelihood to reoffend	-0.179** (0.080)	-0.180** (0.081)	-0.173* (0.091)	-0.162* (0.096)	-0.128 (0.116)
<i>Mean in Control Group</i>	0.737				
Observations	706	690	581	532	383
Offences	-3.529*** (0.990)	-3.544*** (0.997)	-3.438*** (1.062)	-3.847*** (1.349)	-3.885*** (1.379)
<i>Mean in Control Group</i>	5.243				
Observations	706	690	581	388	383
Times to court	-1.664*** (0.487)	-1.683*** (0.493)	-1.759*** (0.535)	-2.190*** (0.798)	-2.086*** (0.683)
<i>Mean in Control Group</i>	2.749				
Observations	706	690	581	296	383
Sentences to prison	-1.547*** (0.535)	-1.561*** (0.538)	-1.509*** (0.565)	-1.524** (0.620)	-1.486** (0.676)
<i>Mean in Control Group</i>	1.848				
Observations	706	690	581	388	383

Notes: Here we consider the full sample of young offenders, including offenders who committed their first offence when they were younger than 14 years old. The estimation is conducted through a local linear regression constructed with a triangular kernel regression. Each column corresponds to a different bandwidth selection: Column 1 = 365 days; Column 2 = Ludwig and Miller (2007); Column 3 = 274 days; Column 4 = Imbens and Kalyanaraman (2012); Column 5 = 183 days. Each row corresponds to a different outcome variable. Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Robustness Check: Effects of Adult Prison in the next 9 Years in the Full Sample by Offence Type

		Non-parametric approach				
Dependent Variable:		365 days	Ludwig and Miller (2007)	274 days	Imbens and Kalyanaraman (2012)	183 days
		(1)	(2)	(3)	(4)	(5)
Thefts	Adult prison	-0.928** (0.460)	-1.507** (0.679)	-1.094** (0.483)	-1.574** (0.749)	-1.426** (0.618)
	Mean of Dependent Variable in Control Group	1.835				
Violent offences	Adult prison	-0.850*** (0.246)	-0.840*** (0.250)	-0.763*** (0.280)	-0.830** (0.348)	-0.839** (0.364)
	Mean of Dependent Variable in Control Group	0.613				
Sexual offences	Adult prison	-0.018 (0.030)	-0.020 (0.029)	-0.028 (0.027)	-0.041* (0.024)	-0.042* (0.023)
	Mean of Dependent Variable in Control Group	0.041				
Burglaries/robberies	Adult prison	-0.775*** (0.276)	-0.779*** (0.278)	-0.758** (0.296)	-0.729** (0.331)	-0.686* (0.355)
	Mean of Dependent Variable in Control Group	0.716				
Minor offences	Adult prison	-0.341 (0.225)	-0.330 (0.228)	-0.231 (0.250)	-0.217 (0.262)	-0.253 (0.317)
	Mean of Dependent Variable in Control Group	0.663				
Frauds	Adult prison	-0.226 (0.197)	-0.220 (0.199)	-0.152 (0.214)	-0.147 (0.215)	-0.081 (0.260)
	Mean of Dependent Variable in Control Group	0.514				
Criminal Damage	Adult prison	-0.111* (0.059)	-0.086 (0.060)	-0.048 (0.061)	-0.030 (0.073)	-0.026 (0.070)
	Mean of Dependent Variable in Control Group	0.144				
Drug offences	Adult prison	0.119 (0.081)	0.115 (0.081)	0.092 (0.088)	0.078 (0.106)	0.078 (0.108)
	Mean of Dependent Variable in Control Group	0.165				
Motoring Offences	Adult prison	-0.050 (0.077)	-0.053 (0.076)	-0.088 (0.074)	-0.199** (0.088)	-0.180** (0.079)
	Mean of Dependent Variable in Control Group	0.082				
Other offences †	Adult prison	-0.398*** (0.122)	-0.399*** (0.121)	-0.417*** (0.122)	-0.461*** (0.138)	-0.464*** (0.146)
	Mean of Dependent Variable in Control Group	0.453				
Observations		706	690	581	388	383

Notes: Here we consider the full sample of young offenders, including offenders who committed their first offence when they were younger than 14 years old. The estimation is conducted through a local linear regression constructed with a triangular kernel regression. Each column corresponds to a different bandwidth selection: Column 1 = 365 days; Column 2 = Ludwig and Miller (2007); Column 3 = 274 days; Column 4 = Imbens and Kalyanaraman (2012); Column 5 = 183 days. Each row corresponds to a different outcome variable. Standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

† Other offences include mainly: failing to surrender to bail (65.63%), going equipped for stealing (20.79%) and other offences against the state or public order (6.55%).