Tough on young offenders: harmful or helpful?*

12th February 2015

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 was 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 the local linear regression estimates, the young offenders exposed to the harsher punishment commit on average 3 offences more than their counterpart in the 9 years subsequent to their custody.

JEL: K42, Z13

* We thank particularly Fabian Waldinger and Sascha O. Becker for their constant guidance in this project. We thank Victor Lavy, Roland Rathelot, Mirko Draca, Marian Vidal-Fernandez and seminar participants at Warwick CAGE work in progress seminars for useful comments and suggestions.

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. Nowadays 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 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 was 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. Indeed, youth custody centres and detention centres in Britain had become more punitive, as it was reflected in the way the centres were managed.

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. We exclude from the sample offenders who committed their first crime when they were younger than 14 years old to get rid of the most dangerous criminals. As a robustness check we will re-conduct the analysis in the full sample, including offenders who committed their first crime when younger than 14. 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 5 we describe the empirical strategy and the results. In Section 6 we conduct some robustness checks and in Section 8 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 offenders' intrinsically higher propensity of recidivate 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 evaluate the specific deterrence effects only. 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: he is damaged and becomes more likely to reoffend in the future or he does not want to engage with 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 year 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 derives from the city where the first centre was opened in 1902: Borstal, Kent, England. During the 1930's borstals appeared to be successful. However, across the years Borstals did not adapt to the new generations and 70% of those who left the borstals were reconvicted after two years. By the end of the 1950's the Government had changed its attitude towards young offenders and its focus went back to the idea of punishment. In the 1970's borstals were not successful anymore: "A system which began as the expression of all that was most liberal and progressive in English penal thinking is now barely distinguishable in its organisation and its results from the prison system proper" [Warder and Wilson, 1973].

At the end of the 1970's the change in the public attitude towards young offenders was even more radical. First, in 1979 the conservative party had 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]. Second, the 1982 Criminal Justice Act had replaced borstals 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 exactly 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.

The law was implemented on the 24th of May 1983. We will therefore include in our sample only offenders who were 20/21 years old after that date.

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, ethnicity[1], the offences for which the transgressors appeared in court, the sentence length they were given, whether they pleaded guilty or not, type of proceeding (e.g. summoned by police, committed to Crown Court for trial, beach of probation order, etc.) and month of birth. Year of birth is not necessary, since they were all born in the same year.

We are able to access the offenders' crime records since they are born until 30 years old. We measure the age at which they committed their first offence to have a measure of previous 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 was sent to court in the

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

following 9 years and the number of times the offender appeared to court again in the following 9 years. 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 can 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 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, burglary/robbery, fraud, criminal damage, drug offences, minor offences or others. 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 weeks[2] 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. 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).

Sample means 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.

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

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 illustrate 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, the number of crimes committed in the subsequent 9 years, 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 old[3].

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

Our main specification is estimated through a nonparametric 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 proceed this way as in a recent article Gelman and Imbens (2014) argue that controlling for higher polynomials (third, fourth, etc.) of the forcing variable in a regression discontinuity analysis can 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.

5.2 Results

Our first stage is strong: the estimated coefficient ρ in equation (1) is 0.76, very precisely estimated. Indeed, 230 offenders out of the 243 who were 20 in our sample were sent to youth custody/detention centres and 297 young offenders out of the 315 who were 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 find the estimated coefficient in the full sample (one year before and after the threshold[4]). In the second column we restrict the bandwidth so that we have 75% of our original sample. In columns 3 and 4 we present the estimates with the bandwidths suggested by Imbens and

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

[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.

Kalyanaraman (2012) and by Ludwig and Miller (2007). Finally, in column 5 we reduce the bandwidth so that we have 50% of our original sample.

We find that in the 9 years subsequent to their custody, young offenders who experienced a milder punishment are 25% 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 ¾ of a year or to the optimal bandwidths suggested by Imbens and Kalyanaraman (2012) and by Ludwig and Miller (2007). Only if we reduce the bandwidth to ½ 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 3 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 experienced a harsh treatment go on average 1.8 times more to court 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 who experienced the tougher regime are more likely to be sentenced to prison in the future.

Moreover, in Table 3 we examine the type of crime carried out and we realize that they are not minor offences, but 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 mentioned. We find no significant differences instead in minor offences, motoring offences, fraud, 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

All the results hold also when the analysis is carried out through the parametric approach up to a second-order polynomial (Tables 4-17).

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 offences between the two groups. However, we do not have any reason to believe there was.

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. We find evidence that young offenders who experience a tougher regime are more likely to re-offend in the long-term. This is also evident in the number of offences that are committed in the future and in the degree of danger that these offences entail, proxied by the number of sentences to prison. Not only does the quantity of crimes committed in the

future increase, but also their quality worsens: they are not minor offences. Indeed, young offenders who are condemned to a tougher punishment are more likely to commit major crimes in the future, such as violent offences, thefts, burglaries and robberies. Our results are robust to various robustness checks.

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Appendix

Figures and Tables

Fig.1

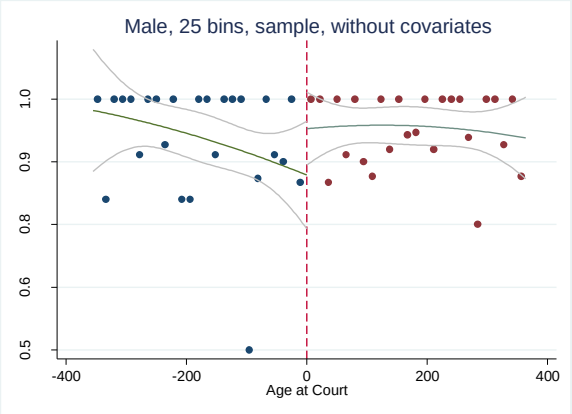

Fig. 2

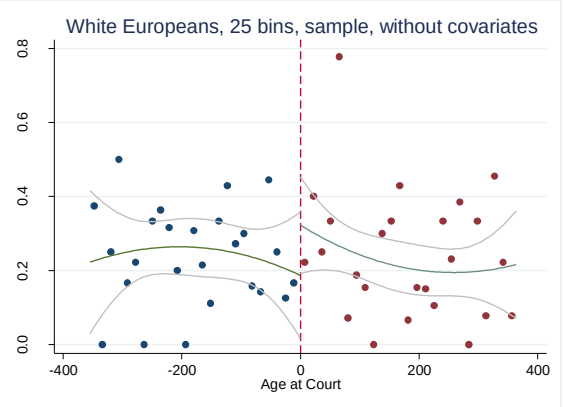

Fig. 3

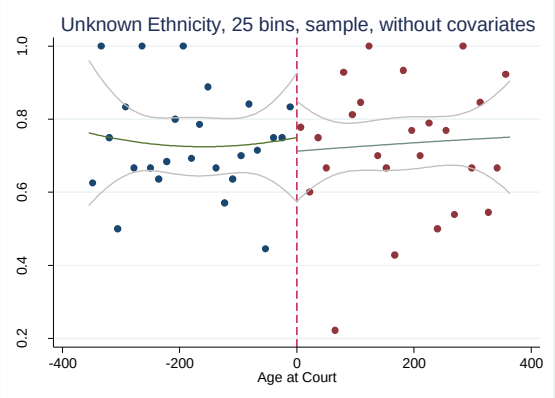

Fig.4

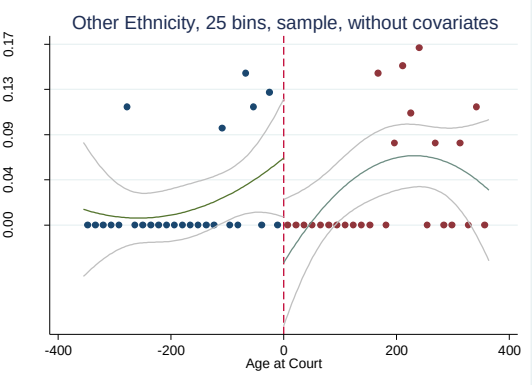

Fig.5

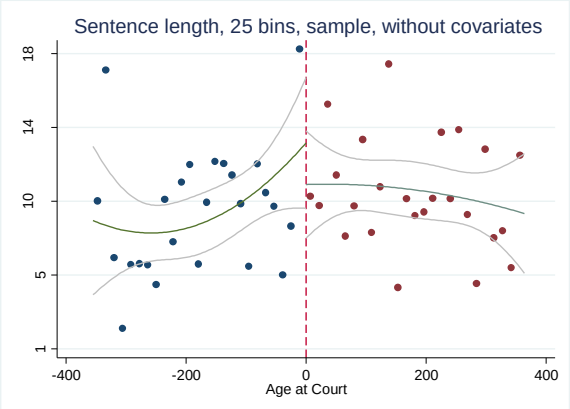

Fig.6

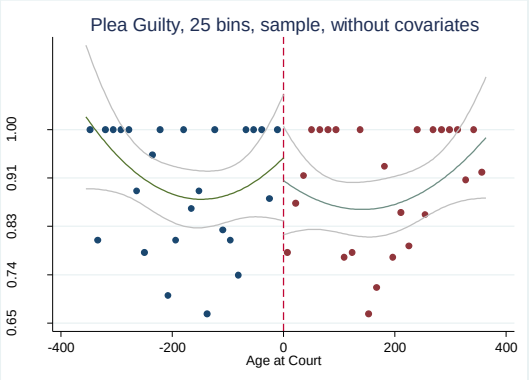

Fig.7

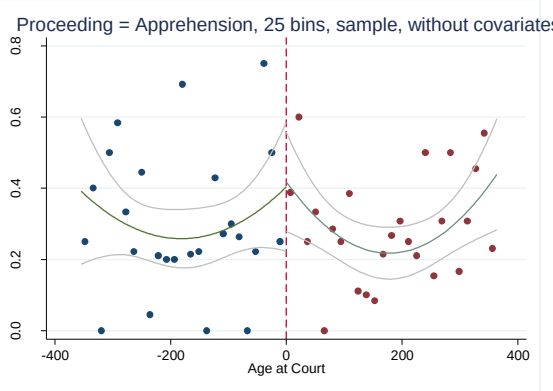

Fig. 8

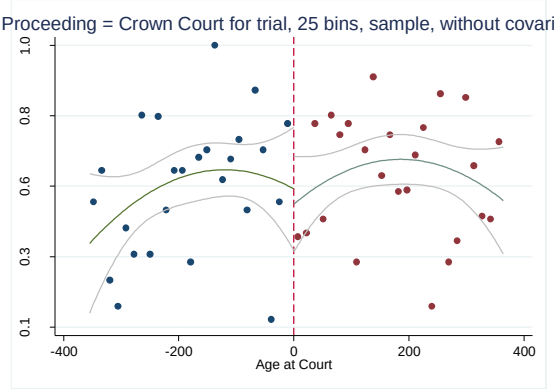

Fig. 9

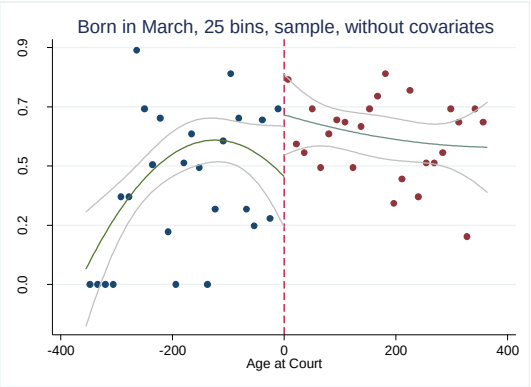

Fig.10

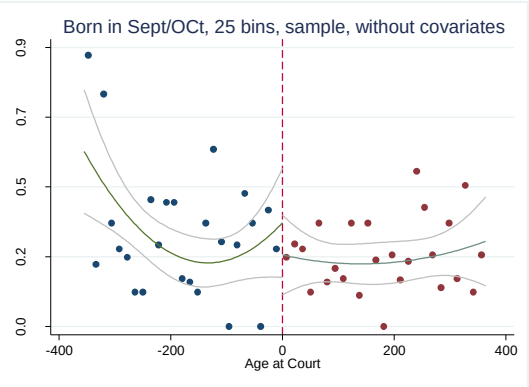

Fig.11

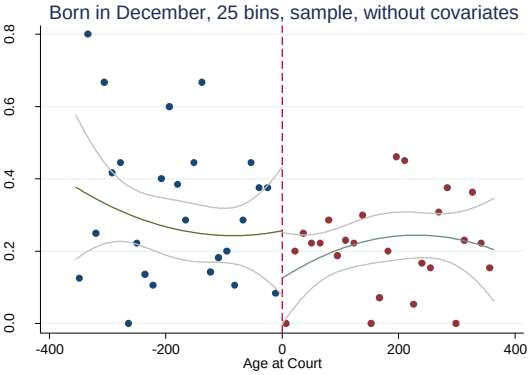

Fig.12

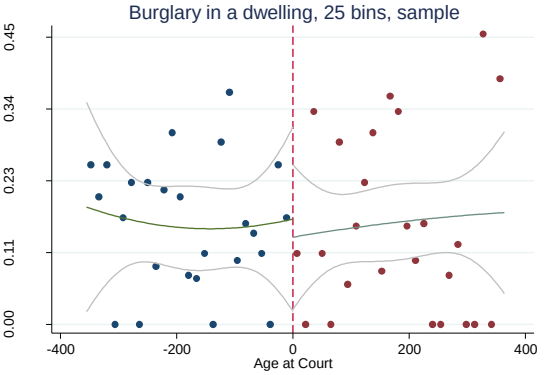

Fig. 13

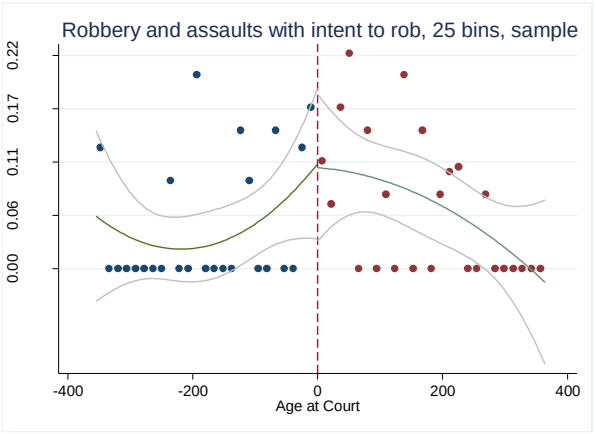
Robbery and assaults with intent to rob, 25 bins, sample
0.22
0.17
0.11
0.06
0.00
-400
-200
0
200
400
Age at Court

Table 1: Sample Means

	Mean
	(1)
A. Offenders Characteristics	
Male	0.932
White European	0.237
Afro-Caribbean	0.027
Oriental	0.002
Arab	0.002
Born in March	0.513
Born in Sept/Oct	0.247
Born in December	0.240
Age at first court appearance	16.783
B. Offence Characteristics	
Sentence length	
Sentence length (months)	9.527
Plea	
Plea: guilty	0.896
Proceedings	
Apprehension	0.292
Summons by police	0.016
Committed for sentence - young offenders institution (over 6 months)	0.000
Committed for sentence for offences triable either way	0.032
Committed to High/Crown Court for trial on indictment	0.573
Committed to High/Crown Court for sentence for offences tried summarily	0.002
Appearance for sentence after deferment without further conviction	0.004
Notice of Transfer	0.004
Breach of an order for conditional discharge	0.002
Breach of requirements of probation order	0.002
Breach of requirements of probation order over 1 year and up to 2 years (dealt with for original offence)	0.007
Breach of requirements of probation order over 2 years (dealt with for original offence)	0.004
Breach of probation order for 6 months following the commission of a fresh offence	0.002
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
Breach of requirements of community service order	0.002
Breach of requirements of community service order; order revoked (dealt with for original offence)	0.016
Breach of sentence of imprisonment suspended for 1 year, no supervision order ever in force Breach of fully suspended sentence of imprisonment	0.007
Breach of sentence of imprisonment suspended for over 1 year and up to 2 years, no supervision order ever in force	0.027
Sample Size	558

Table 1 (continued): Sample Means

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

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

Independent variable: adult prison	Non-parametric approach				
	365 days	274 days	Imbens and Kalyanaraman (2012)	Ludwig and Miller (2007)	183 days
	(1)	(2)	(3)	(4)	(5)
Likelihood to reoffend	-0.252**	-0.253**	-0.255**	-0.238**	-0.143
	(0.105)	(0.107)	(0.111)	(0.121)	(0.165)
Mean in Control Group	0.737				
Offences	-3.750***	-3.776***	-3.730***	-3.577***	-3.056**
	(1.139)	(1.147)	(1.172)	(1.198)	(1.508)
Mean in Control Group	5.243				
Times to court	-1.812***	-1.837***	-1.862***	-1.864***	-1.757**
	(0.586)	(0.594)	(0.636)	(0.645)	(0.848)
Mean in Control Group	2.749				
Sentences to prison	-1.211*	-1.244*	-1.246*	-1.261*	-0.943
	(0.668)	(0.673)	(0.699)	(0.703)	(0.808)
Mean in Control Group	1.848				
Observations	558	542	496	459	289

Each column corresponds to a different bandwidth selection: Model1 = 365 days; Model2 = 274 days; Model3 = Imbens and Kalyanaraman (2012); Model4 = Ludwig and Miller (2007); Model5= 183 days. Each row corresponds to different procedures: conventional RD estimate with conventional variance. 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	274 days	Imbens and Kalyanaraman (2012)	Ludwig and Miller (2007)	183 days
		(1)	(2)	(3)	(4)	(5)
Thefts	Adult prison	-1.267**	-1.156*	-1.334**	-1.332***	-1.160*
		(0.523)	(0.603)	(0.521)	(0.517)	(0.601)
	Mean of Dependent Variable in Control Group	1.835				
Violent offences	Adult prison	-0.836**	-0.840**	-0.834**	-0.853**	-1.053*
		(0.359)	(0.367)	(0.356)	(0.420)	(0.571)
	Mean of Dependent Variable in Control Group	0.613				
Sexual offences	Adult prison	-0.030	-0.031	-0.028	-0.022	-0.012
		(0.042)	(0.041)	(0.042)	(0.036)	(0.010)
	Mean of Dependent Variable in Control Group	0.041				
Burglaries/robberies	Adult prison	-0.581**	-0.594**	-0.607**	-0.575**	-0.333
		(0.275)	(0.277)	(0.282)	(0.290)	(0.375)
	Mean of Dependent Variable in Control Group	0.716				
Minor offences	Adult prison	-0.413	-0.408	-0.393	-0.345	-0.348
		(0.325)	(0.332)	(0.343)	(0.375)	(0.519)
	Mean of Dependent Variable in Control Group	0.663				
Frauds	Adult prison	-0.184	-0.163	0.091	0.001	0.323
		(0.238)	(0.240)	(0.252)	(0.248)	(0.267)
	Mean of Dependent Variable in Control Group	0.514				
Criminal Damage	Adult prison	-0.196**	-0.190**	-0.072	-0.134	-0.076
		(0.085)	(0.086)	(0.105)	(0.094)	(0.120)
	Mean of Dependent Variable in Control Group	0.144				
Drug offences	Adult prison	0.155	0.151	0.144	0.137	0.156
		(0.111)	(0.112)	(0.123)	(0.120)	(0.146)
	Mean of Dependent Variable in Control Group	0.165				
Motoring Offences	Adult prison	-0.057	-0.060	-0.052	-0.101	-0.164***
		(0.094)	(0.093)	(0.094)	(0.085)	(0.061)
	Mean of Dependent Variable in Control Group	0.082				
Other offences †	Adult prison	-0.443**	-0.439**	-0.446**	-0.447**	-0.469**
		(0.178)	(0.178)	(0.179)	(0.182)	(0.212)
	Mean of Dependent Variable in Control Group	0.453				
Observations		558	542	496	459	289

Each column corresponds to a different bandwidth selection: Model1 = 365 days; Model2 = 274 days; Model3 = Imbens and Kalyanaraman (2012); Model4 = Ludwig and Miller (2007); Model5= 183 days. Each row corresponds to different procedures: conventional RD estimate with conventional variance. 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

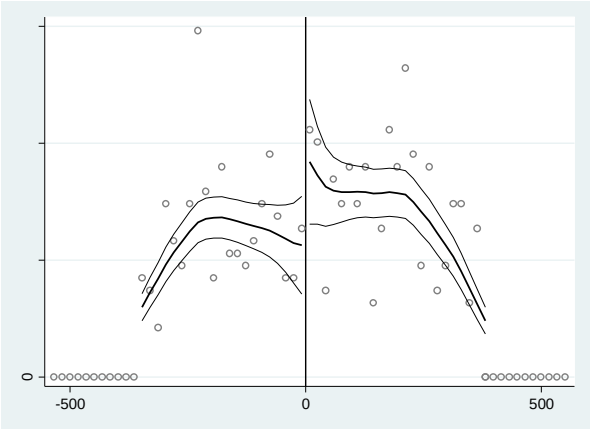

Fig. 15 First Stage

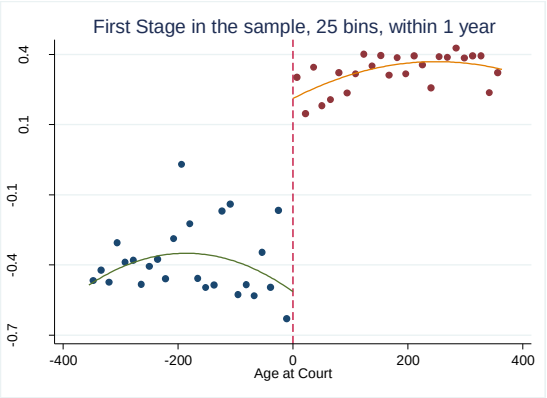

Fig. 16 Second Stage, Likelihood to Re-offend

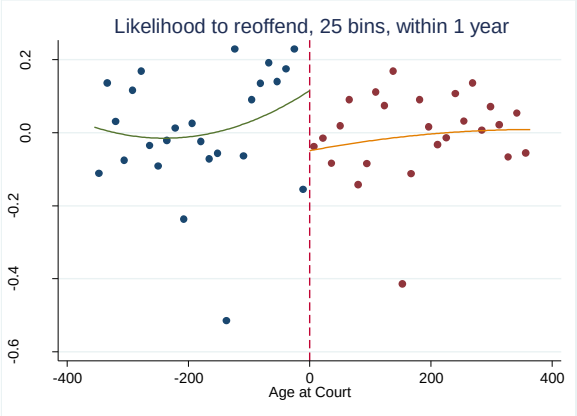

Fig. 17 Second Stage, Number of future offences

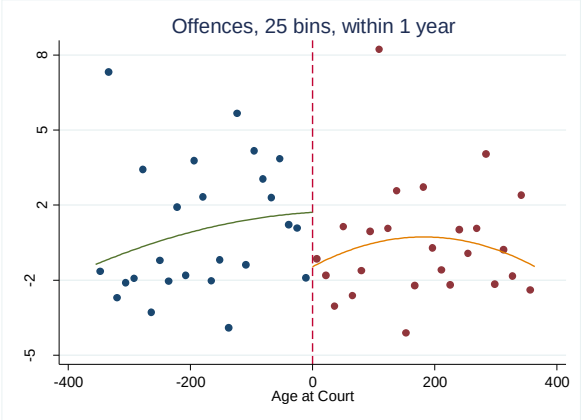

Fig. 18 Second Stage, Times to Court

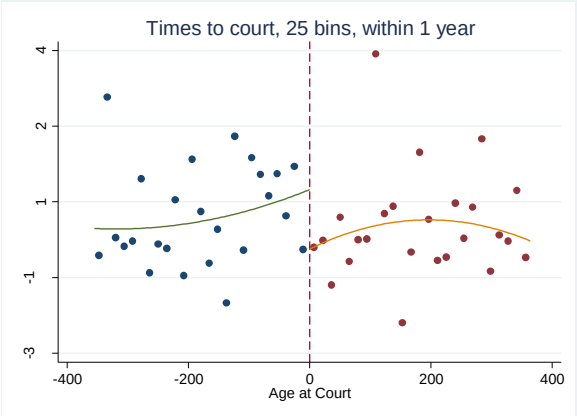

Fig. 19 Second Stage, Times to Prison

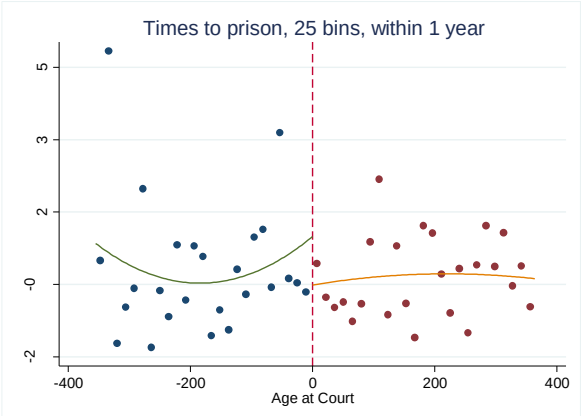

Table 4 Results – Parametric Approach

	(1) Offences in the next 9 years	(2) Offences in the next 9 years	(3) Offences in the next 9 years	(4) Offences in the next 9 years	(5) Offences in the next 9 years	(6) Offences in the next 9 years
Adult prison	-3.180**	-2.444*	-3.325**	-2.616**	-3.232*	-2.553
	(1.303)	(1.323)	(1.329)	(1.328)	(1.714)	(1.729)
Age at Court	0.006**	0.004	0.008**	0.007*	-0.018	-0.014
	(0.003)	(0.003)	(0.004)	(0.004)	(0.017)	(0.017)
Age*prison			-0.003	-0.005	0.045**	0.035
			(0.005)	(0.005)	(0.020)	(0.022)
Age^2*prison					0.000	0.000
					(0.000)	(0.000)
Age at Court^2					-0.000	-0.000
					(0.000)	(0.000)
Controls	No	Yes	No	Yes	No	Yes
Observations	558	557	558	557	558	557

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5 Results – Parametric Approach

	(1) Likelihood to reoffend in the next 9 years	(2) Likelihood to reoffend in the next 9 years	(3) Likelihood to reoffend in the next 9 years	(4) Likelihood to reoffend in the next 9 years	(5) Likelihood to reoffend in the next 9 years	(6) Likelihood to reoffend in the next 9 years
Adult prison	-0.223**	-0.159*	-0.229**	-0.161*	-0.254*	-0.229*
	(0.101)	(0.092)	(0.099)	(0.090)	(0.148)	(0.130)
Age at Court	0.000**	0.000	0.001*	0.000	-0.000	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Age*prison			-0.000	-0.000	0.001	0.000
			(0.000)	(0.000)	(0.002)	(0.002)
Age^2*prison					-0.000	-0.000
					(0.000)	(0.000)
Age at Court^2					-0.000	0.000
					(0.000)	(0.000)
Controls	No	Yes	No	Yes	No	Yes
Observations	558	557	558	557	558	557

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6 Results – Parametric Approach

	(1) Sentences to prison in the next 9 years	(2) Sentences to prison in the next 9 years	(3) Sentences to prison in the next 9 years	(4) Sentences to prison in the next 9 years	(5) Sentences to prison in the next 9 years	(6) Sentences to prison in the next 9 years
Adult prison	-0.793	-0.548	-0.815	-0.552	-1.655*	-1.664
	(0.719)	(0.710)	(0.749)	(0.719)	(0.989)	(1.013)
Age at Court	0.002	0.001	0.002	0.001	0.005	0.010
	(0.002)	(0.002)	(0.003)	(0.003)	(0.009)	(0.010)
Age*prison			-0.000	-0.000	0.004	-0.004
			(0.003)	(0.003)	(0.011)	(0.012)
Age^2*prison					-0.000	-0.000
					(0.000)	(0.000)
Age at Court^2					0.000	0.000
					(0.000)	(0.000)
Controls	No	Yes	No	Yes	No	Yes
Observations	558	557	558	557	558	557

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 7 Results – Parametric Approach

	(1) Times to court in the next 9 years	(2) Times to court in the next 9 years	(3) Times to court in the next 9 years	(4) Times to court in the next 9 years	(5) Times to court in the next 9 years	(6) Times to court in the next 9 years
Adult prison	-1.460**	-1.155*	-1.482**	-1.205*	-1.812**	-1.645*
	(0.621)	(0.621)	(0.629)	(0.619)	(0.902)	(0.871)
Age at Court	0.003**	0.002	0.003*	0.003	-0.005	-0.002
	(0.001)	(0.001)	(0.002)	(0.002)	(0.009)	(0.009)
Age*prison			-0.001	-0.002	0.019*	0.013
			(0.002)	(0.002)	(0.010)	(0.011)
Age^2*prison					-0.000	-0.000
					(0.000)	(0.000)
Age at Court^2					-0.000	-0.000
					(0.000)	(0.000)
Controls	No	Yes	No	Yes	No	Yes
Observations	558	557	558	557	558	557

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 8 Results – Parametric Approach

	(1) Thefts in the next 9 years	(2) Thefts in the next 9 years	(3) Thefts in the next 9 years	(4) Thefts in the next 9 years	(5) Thefts in the next 9 years	(6) Thefts in the next 9 years
Adult prison	-0.867	-0.454	-0.932	-0.510	-1.085	-0.705
	(0.622)	(0.650)	(0.633)	(0.651)	(0.702)	(0.752)
Age at Court	0.002	0.000	0.002	0.001	-0.011	-0.013
	(0.001)	(0.001)	(0.002)	(0.002)	(0.007)	(0.008)
Age*prison			-0.001	-0.002	0.027***	0.027**
			(0.002)	(0.002)	(0.009)	(0.011)
Age^2*prison					-0.000	-0.000
					(0.000)	(0.000)
Age at Court^2					-0.000*	-0.000
					(0.000)	(0.000)
Controls	No	Yes	No	Yes	No	Yes
Observations	558	557	558	557	558	557

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 9 Results – Parametric Approach

	(1) Violent offences in the next 9 years	(2) Violent offences in the next 9 years	(3) Violent offences in the next 9 years	(4) Violent offences in the next 9 years	(5) Violent offences in the next 9 years	(6) Violent offences in the next 9 years
Adult prison	-0.769**	-0.793**	-0.786**	-0.820**	-0.838	-0.895
	(0.301)	(0.324)	(0.322)	(0.336)	(0.566)	(0.583)
Age at Court	0.001**	0.001*	0.002	0.002	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.005)
Age*prison			-0.000	-0.001	0.003	0.003
			(0.001)	(0.001)	(0.005)	(0.006)
Age^2*prison					-0.000	-0.000
					(0.000)	(0.000)
Age at Court^2					-0.000	-0.000
					(0.000)	(0.000)
Controls	No	Yes	No	Yes	No	Yes
Observations	558	557	558	557	558	557

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 10 Results – Parametric Approach

	(1) Sexual offences in the next 9 years	(2) Sexual offences in the next 9 years	(3) Sexual offences in the next 9 years	(4) Sexual offences in the next 9 years	(5) Sexual offences in the next 9 years	(6) Sexual offences in the next 9 years
Adult prison	-0.016	-0.026	-0.018	-0.021	-0.032	-0.023
	(0.049)	(0.056)	(0.053)	(0.057)	(0.055)	(0.063)
Age at Court	-0.000	0.000	0.000	-0.000	-0.000	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Age*prison			-0.000	0.000	0.001	0.001
			(0.000)	(0.000)	(0.001)	(0.001)
Age^2*prison					-0.000	-0.000
					(0.000)	(0.000)
Age at Court^2					-0.000	-0.000
					(0.000)	(0.000)
Controls	No	Yes	No	Yes	No	Yes
Observations	558	557	558	557	558	557

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 11 Results – Parametric Approach

	(1) Burglary/robbery in the next 9 years	(2) Burglary/robbery in the next 9 years	(3) Burglary/robbery in the next 9 years	(4) Burglary/robbery in the next 9 years	(5) Burglary/robbery in the next 9 years	(6) Burglary/robbery in the next 9 years
Adult prison	-0.403	-0.313	-0.440	-0.350	-0.635*	-0.551
	(0.337)	(0.359)	(0.340)	(0.355)	(0.385)	(0.389)
Age at Court	0.001*	0.001	0.002*	0.002*	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.004)
Age*prison			-0.001	-0.001	0.006	0.005
			(0.001)	(0.001)	(0.005)	(0.006)
Age^2*prison					-0.000	-0.000
					(0.000)	(0.000)
Age at Court^2					-0.000	-0.000
					(0.000)	(0.000)
Controls	No	Yes	No	Yes	No	Yes
Observations	558	557	558	557	558	557

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 12 Results – Parametric Approach

	(1) Minor offences in the next 9 years	(2) Minor offences in the next 9 years	(3) Minor offences in the next 9 years	(4) Minor offences in the next 9 years	(5) Minor offences in the next 9 years	(6) Minor offences in the next 9 years
Adult prison	-0.380	-0.358	-0.451	-0.427	-0.414	-0.475
	(0.296)	(0.299)	(0.313)	(0.308)	(0.522)	(0.494)
Age at Court	0.000	0.000	0.001	0.002	0.002	0.004
	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.004)
Age*prison			-0.002	-0.002**	-0.003	-0.007
			(0.001)	(0.001)	(0.005)	(0.005)
Age^2*prison					0.000	-0.000
					(0.000)	(0.000)
Age at Court^2					0.000	0.000
					(0.000)	(0.000)
Controls	No	Yes	No	Yes	No	Yes
Observations	558	557	558	557	558	557

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 13 Results – Parametric Approach

	(1) Fraud in the next 9 years	(2) Fraud in the next 9 years	(3) Fraud in the next 9 years	(4) Fraud in the next 9 years	(5) Fraud in the next 9 years	(6) Fraud in the next 9 years
Adult prison	-0.335	-0.285	-0.346	-0.304	0.214	0.344
	(0.271)	(0.268)	(0.260)	(0.256)	(0.280)	(0.283)
Age at Court	0.001	0.001	0.001	0.001*	-0.007**	-0.006*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)
Age*prison			-0.000	-0.001	0.007	0.004
			(0.001)	(0.001)	(0.004)	(0.005)
Age^2*prison					0.000***	0.000***
					(0.000)	(0.000)
Age at Court^2					-0.000***	-0.000**
					(0.000)	(0.000)
Controls	No	Yes	No	Yes	No	Yes
Observations	558	557	558	557	558	557

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 14 Results – Parametric Approach

	(1) Criminal damage in the next 9 years	(2) Criminal damage in the next 9 years	(3) Criminal damage in the next 9 years	(4) Criminal damage in the next 9 years	(5) Criminal damage in the next 9 years	(6) Criminal damage in the next 9 years
Adult prison	-0.237***	-0.267***	-0.242***	-0.262***	-0.076	-0.115
	(0.085)	(0.090)	(0.089)	(0.091)	(0.124)	(0.138)
Age at Court	0.000***	0.000**	0.001**	0.000	-0.002	-0.002
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Age*prison			-0.000	0.000	0.002	0.003*
			(0.000)	(0.000)	(0.001)	(0.002)
Age^2*prison					0.000*	0.000
					(0.000)	(0.000)
Age at Court^2					-0.000*	-0.000*
					(0.000)	(0.000)
Controls	No	Yes	No	Yes	No	Yes
Observations	558	557	558	557	558	557

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 15 Results – Parametric Approach

	(1) Drug offences in the next 9 years	(2) Drug offences in the next 9 years	(3) Drug offences in the next 9 years	(4) Drug offences in the next 9 years	(5) Drug offences in the next 9 years	(6) Drug offences in the next 9 years
Adult prison	0.188	0.330**	0.214*	0.336***	0.065	0.191
	(0.129)	(0.132)	(0.123)	(0.127)	(0.149)	(0.158)
Age at Court	-0.000	-0.001*	-0.001	-0.001*	0.001	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.002)
Age*prison			0.001	0.000	-0.000	-0.001
			(0.001)	(0.001)	(0.002)	(0.003)
Age^2*prison					-0.000	-0.000
					(0.000)	(0.000)
Age at Court^2					0.000	0.000
					(0.000)	(0.000)
Controls	No	Yes	No	Yes	No	Yes
Observations	558	557	558	557	558	557

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 16 Results – Parametric Approach

	(1) Motoring offences in the next 9 years	(2) Motoring offences in the next 9 years	(3) Motoring offences in the next 9 years	(4) Motoring offences in the next 9 years	(5) Motoring offences in the next 9 years	(6) Motoring offences in the next 9 years
Adult prison	-0.008	-0.024	-0.024	-0.036	-0.076	-0.100
	(0.116)	(0.110)	(0.115)	(0.110)	(0.112)	(0.118)
Age at Court	0.000	0.000	0.000	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Age*prison			-0.000	-0.000	0.001	0.001
			(0.000)	(0.000)	(0.001)	(0.001)
Age^2*prison					-0.000	-0.000
					(0.000)	(0.000)
Age at Court^2					-0.000	-0.000
					(0.000)	(0.000)
Controls	No	Yes	No	Yes	No	Yes
Observations	558	557	558	557	558	557

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 17 Results – Parametric Approach

	(1) Other offences in the next 9 years	(2) Other offences in the next 9 years	(3) Other offences in the next 9 years	(4) Other offences in the next 9 years	(5) Other offences in the next 9 years	(6) Other offences in the next 9 years
Adult prison	-0.488**	-0.400*	-0.437**	-0.368	-0.364	-0.229
	(0.224)	(0.239)	(0.221)	(0.236)	(0.263)	(0.299)
Age at Court	0.001**	0.001	0.000	0.000	-0.002	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)
Age*prison			0.001	0.001	0.004	0.001
			(0.001)	(0.001)	(0.004)	(0.005)
Age^2*prison					0.000	0.000
					(0.000)	(0.000)
Age at Court^2					-0.000	-0.000
					(0.000)	(0.000)
Controls	No	Yes	No	Yes	No	Yes
Observations	558	557	558	557	558	557

Standard errors in parentheses
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$