

Deterrence and age thresholds in punishment in British criminal law

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Abstract:

This paper investigates the impact of three age thresholds in British criminal law on self-reported offending: the possibility of custody at age 15, the switch from juvenile to adult law at age 18 and the switch from young offender institutions to adult prisons at age 21. Using longitudinal data from 2003 to 2006 I find strong evidence of discontinuous drops in self-reported crime at age 18 and 21. The effects are robust to various specifications of the age-crime relationship and to the inclusion of a wide range of controls, including arrests, court appearances and imprisonment.

Keywords: deterrence; economic model of crime; juvenile law; severity of punishment; crime

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All analyses used Stata 11.2. Do-Files are available from the corresponding author on request. All analyses and opinions expressed in this paper as well as any possible errors are under the sole responsibility of the author.

I. Introduction

In many countries the severity of expected punishment for a criminal depends at least partially on the criminal's age: Adults are generally subjected to harsher punishments than juveniles, often young adults are treated more leniently than older adults and children below a certain age are usually exempt from any punishment. This paper uses longitudinal data on a sample of British individuals ages 10 to 29 to investigate self-reported criminal behavior around three relevant age thresholds in British criminal law. The first is at age 15 when individuals can be sent to a youth offenders institute for punishment, i.e., custodial sentences become possible. The second is at age 18 when individuals are tried in adult courts and can be sent to prison, in this case young offenders institutes, which are similar to adult prisons but have somewhat better staff-prisoner. Finally, there is another threshold at age 21 from which on individuals will be sent to regular prisons. My main findings are strong drops in self-reported criminal behavior at the ages of 18 and 21. These findings are robust to the inclusion of a wide range of control variables and different specifications of the age-crime relationship. They are also stronger for individuals who offended prior to reaching the threshold.

In general, any drop in offending at the thresholds could be due to deterrence or incapacitation effects, i.e., individuals could refrain from offending as they fear the tougher potential punishment (deterrence) or because they are more likely to be incarcerated and consequently not in a position to commit any crime (incapacitation). My data contain information on incapacitation as well as on arrests by the police and court appearances, which allow me to check whether effects differ when only looking at individuals without contact with the police. The estimates for this subgroup are essentially identical to the base estimates, which is not surprising as only 12

individuals in the data have ever been to prison (and in fact only 2% have ever appeared in court and only 5% have ever been arrested). This implies that my estimates can essentially be seen as deterrence effects.

This paper is related to two strands of literature. The first is the large and well-established literature on the effects of tougher punishments on crime (see, e.g., Freeman, 1999, and Klick and Tabarrok, 2012, for surveys).¹ The second is the much smaller and recently emerging literature on the effects of increases in punishment severity when an individual transfers from juvenile to adult criminal law on (re-)offending.² In an analysis of US states Levitt (1998) finds large drops in crime rates at the age of majority, which are stronger for states where the switch to adult courts results in more punitive sanctions. Hjalmarsson (2009) and Lee and McCrary (2009) both exploit discontinuities in the probability of being convicted to a prison sentence at age 18. Based on court data from Washington Hjalmarsson (2009) finds evidence that these tougher punishments reduce recidivism, while Lee and McCrary (2009) find decreases in the likelihood of offending at the age of 18 in a sample of convicted felons in Florida. In contrast to these two studies that both use micro-data from court records on arrested offenders, I focus on self-reported crime in a random sample of young people living in England and Wales. My dataset – the longitudinal version of the Offending, Crime and Justice Survey for 2003 to 2006 – primarily covers crimes

¹ For recent contributions see, e.g., Levitt (1996), Helland and Tabarrok (2007), Drago, Galbiati and Vertova (2009), Iyengar (2009) or Sloan et al. (2013) on general increases in the toughness of sanctions and Katz, Levitt and Shustorovich (2003) on prison conditions.

² There is also a small literature on the determinants of youth crime more broadly, see, e.g., Levitt and Lochner (2001) or Mocan and Rees (2005).

for which the offender was not arrested, charged or convicted and also contains a range of background characteristics that can be used for sensitivity analyses.

In terms of identification, my research design is similar to a within-person sharp regression discontinuity design, where I use individual fixed effects regressions to estimate changes in self-reported offending when individuals cross one of the age thresholds at 15, 18 and 21. As these threshold effects are effectively discontinuities in an age-offending profile it is crucial to model the functional form of age correctly. In this paper I rely on two approaches: The first is a global polynomial in age, which fits the commonly observed cross-sectional pattern that crime rates increase until the mid-teens and then decrease again (e.g., Levitt, 1998). The second approach uses restricted cubic splines with knots set at the respective age thresholds. This approach is similar to allowing for different trends in the forcing variable at each side of the threshold in a normal regression discontinuity design. In practice, the results are robust to these choices. The results, including the magnitude of effects, are also robust to the inclusion of a large set of controls, including education, employment status, marital status, attitudes towards crime and the local area and a range of lifestyle variables capturing things like victimization, peer problems with the police, going out or drinking. In line with the standard Becker model of crime (Becker, 1968), its later dynamic extensions (Lee and McCrary, 2009; McCrary 2012) and the evidence mentioned earlier I find strong drops in offending at both age 18 and 21. There is very little change in offending at age 15, which might be due to a variety of reasons such as youth offenders institutes being seen as less punitive than jails (see Levitt, 1998, for some anecdotal evidence on this) or individuals at that age being not mature enough to think the consequences of their actions through.

The remainder of this paper is organized as follows: Section 2 briefly describes the institutional background. The data is described in section 3, section 4 deals with identification and estimation. Results are in section 5. Section 6 concludes.

II. Institutional details

The age of criminal responsibility in the UK is 10 (Crime and Disorder Act 1998, section 34). Up to their 18th birthday, individuals would generally be tried in a youth court, even though they can be tried as adults in exceptional circumstances.³ Youth courts can sentence individuals under the age of 18 to a detention and training order for offences that would normally lead to imprisonment. Under the age of 15 they can only do so if the individual is considered to be a persistent offender (Power of Criminal Courts (Sentencing) Act 2000, section 100). These sentences would generally be served in a youth offender institution or a secure training center, while convicted offenders under 15 would serve an eventual sentence in a secure children's home. For a very limited set of offences, notably some sexual offences and firearm offences, the Crown Court can sentence a juvenile to be detained for a period up to the length of a corresponding prison sentence for an adult (Power of Criminal Courts (Sentencing) Act 2000, section 91). Finally, juveniles convicted of murder must be sentenced to detention at Her Majesty's Pleasure (Power of Criminal Courts (Sentencing) Act 2000, section 90), i.e., for an indefinite amount of time with regular reviews of whether the sentence can be deemed complete.

³ These cases are very rare. A prominent example is the trial of Robert Thompson and Jon Venables, who abducted, tortured and murdered the two-year old James Patrick Bulger in 1993, when they were 10.

From the age of 18 onward, offenders are generally tried in adult courts, i.e., depending on the severity of the offence in Magistrate courts or the Crown Court. Until the age of 21 offender would generally be detained in a young offenders institution (Power of Criminal Courts (Sentencing) Act 2000, sections 96 to 98), which are similar to adult prisons but tend to have somewhat better conditions than regular jails and a stronger focus on education and training.

This system creates the following three discontinuities in the severity of punishment:

- At the age of 15 it becomes possible (except for some very rare circumstance) to be sentenced to a custodial sentence, usually a detention and training order.
- At the age of 18, individuals are generally tried according to adult law and can be sent to prison – in this case usually young offender institutions.
- At the age of 21, custodial sentences would be served in regular adult prisons.

III. Data and descriptive statistics

This paper uses the four-year panel version of the Offending, Crime and Justice Survey (OCJS) for the years 2003 to 2006. The data were collected by BMRB Social Research and the National Centre for Social Research (NatCen) on behalf of the Home Office with the aim to provide a longitudinal picture of the prevalence of offending and drug use among the general population, in particular among young people. Consequently, the sample covers individuals living in England and Wales who were between 10 and 25 years of age at the time of the first wave in 2003. In each wave individuals from the previous waves were re-interviewed. In addition, refreshment samples were drawn in each year the survey was conducted. The version of the OCJS used here is the longitudinal version provided by the Home Office via the

Economic and Social Data Service. It covers all individuals who were interviewed in each of the four waves the survey was conducted, in total 2539 individuals and 10,156 person-year observations.

Questions regarding criminal behavior were asked through computer-assisted self-completion to minimize the risk of individuals over- or understating their activities. The main outcomes of interest are three dummy variables indicating whether an individual has committed any offence, a violent offence or a property offence in the respective year. I also consider various subtypes of crime, specifically theft of or from vehicles, criminal damage, burglary, robbery, other theft, assault and drug offences (production and distribution of drugs). The data also contains information on the age when specific offences were first committed, as well as information on imprisonment, court appearances and arrests that will be used in additional robustness checks. The key right-hand side variable is age, measured in years at the time of the survey.

Finally, the data contains a large set of control variables that can also be used to assess the robustness of the estimates. These are standard socio-demographics such as education, marital status, employment status, whether the respondent has been brought up by both parents, self-rated health and whether the respondent owns or rents the house he lives in. Furthermore, the data also contain some information on an individuals lifestyle, specifically whether they go out to visit nightclubs and pubs and the frequency of these visits, whether they live in an area plagued by disorder problems, whether they get along with their parents and whether they have friends or family who are in trouble with the police. Finally, the dataset also has some information on individuals' attitudes. These include information on whether they consider crime to be okay, whether they trust local people and whether they have a negative attitude towards the area they live in.

After dropping observations with missing values from the estimation sample, we end up with an unbalanced panel of 2559 individuals with 9561 individual-year-observations. Table 1 present descriptive statistics for the whole estimation sample. A substantial number of individuals have offended in one or more years with 23% admitting any offence, 13% a property offence and 15% a violent offence. Looking at the detailed crime categories suggests that the majority of crimes are either assaults or other theft, while drug offences, criminal damage or theft of or from vehicles are much rarer. Robberies and burglaries play essentially no role. Not surprisingly given the age range in the sample, the vast majority of respondents have not completed any education (yet), are still students and are neither cohabiting nor married.

(TABLE 1 ABOUT HERE.)

IV. Empirical strategy

The basic idea underlying the estimation strategy is that crossing one of the age thresholds in British criminal law should lead to discontinuities in an otherwise smooth age-crime-profile. One can think of this as a within-person regression discontinuity design based on panel data, not dissimilar to the ones used in Hjalmarsson (2009) and Lee and McCrary (2009), where the same individual faces a different risk of punishment as soon as it crosses one of the age thresholds. Similar to a normal (cross-sectional) regression discontinuity design there are two major threats to identification – the need to specify the functional form of age correctly and the assumption that a change in criminal behavior at the respective age can be attributed to a change in the relevant laws, i.e., the assumption that nothing else (that cannot be controlled for) changes at the respective age thresholds.

In terms of the functional form, I rely on two different specifications. First, a global polynomial in age, which fits the findings by, e.g., Levitt (1998), that criminal behavior increases until the mid-teens and decreases afterwards. Figure 1, which plots age against the share of individuals having committed one the broad offences based on my estimation sample, suggests that this functional form might be reasonable. Figure 1 also suggest the existence of some discontinuities at age 18 and 21 for both general offences and property offences (panels a and b), while the picture is less clear for violent offences (panel c). These figures may provide a different picture than the estimates as they use variation within and between individuals, while the estimates will only use the former.

(Figure 1 about here.)

The second specification uses a highly flexible restricted cubic spline in age with knots being placed at the respective age thresholds. This specification assumes that the relationship is linear up to the first and after the last knot. Between the respective knots it is assumed to follow a piecewise cubic polynomial, where the slope may be change at each knot (see, e.g., Harrel, 2001, p. 20-26). This specification is essentially equal to the usual practice of allowing the slope of the forcing variable in a regression discontinuity design to differ on both sides of the relevant threshold. We will see that both approaches yield essentially identical results.

The second assumption is obviously a bit trickier as several things might change at a certain age, in particular at age 18. Not all of these will have a very strong relationship with crime, for instance the fact that from the age of 18 individuals can marry without their parents' consent would not necessarily be expected to have a huge impact on criminal behavior. However, as I use annual data it is entirely possible that children move out from their parents' house or start working in they year they turn 18.

Fortunately, my data contains a relatively rich set of controls that can be used to assess the robustness of the results when attempting to control for changes in socio-demographic characteristics, attitudes or variables capturing lifestyles and peers. As we will see the results barely change when including a wide range of observable variables, which makes the possibility of unobservables playing a large role seem somewhat less likely.

My basic estimation equation is

$$C_{it} = \alpha_{(i)} + \beta'X_{it} + g(\text{age}_{it}) + \tau_1 * \text{below } 15_{it} + \tau_2 * \text{between } 18 \text{ and } 20_{it} + \tau_3 * \text{over } 21_{it} + \varepsilon_{it}, \quad (1)$$

where C_{it} is a measure of crime, $\alpha_{(i)}$ is an individual fixed effect or in an alternative specification a normal constant, X_{it} are individual level control variables that differ between specifications, $g(\text{age}_{it})$ is either a second-order polynomial in age or the cubic splines described earlier and ε_{it} is an error term assumed to be uncorrelated with all the age variables conditional on α_i and X_{it} . Standard errors are adjusted for clustering within individuals. The key variables of interest are three dummies for being below 15, being between 18 and 20 and being over 21. τ_1 to τ_3 give the effects of passing the respective age thresholds on criminal behavior. If the tougher punishments at each age threshold matter, we would expect τ_1 to be greater than zero and τ_2 and τ_3 to be smaller than zero.

Note that in the specifications including individual fixed effects, τ_1 to τ_3 are identified through those individuals who cross one of the age thresholds. Given the length of the panel, this implies that these estimates effectively rely on a sample within 3 years of each age threshold. This in turn attenuates further concerns about the specification of the age variable, as the resulting design is similar to a regression discontinuity design using only observations in the neighborhood of the threshold.

There is a final problem with equation (1) due the way age and crime information is collected: Age generally refers to the age at the time of the survey while the information on crime refers to the previous year. This fact implies that the observation where we observe, say, a switch from 17 to 18 will contain some information on crime that relates to a time when the individual was still 17. This measurement error will bias the estimates downward, which means that all estimates at the thresholds should be seen as lower bounds.

V. Results

Table 2 shows the base estimates based on equation (1). Columns (i) to (v) are based on the specification using a polynomial in age, columns (vi) to (viii) use the cubic splines. Columns (i) and (vi) are based on simple linear regressions without the individual fixed effects. Columns (i), (ii), (vi) and (vii) only include age and the age threshold dummies. Control variables are added in blocks in columns (iii) and (iv). Columns (v) and (viii) are based on a specification using all control variables.

(Table 2 about here.)

The first thing to note is that results are generally very similar across columns, implying a strong robustness of the results to the functional form used for age and to the addition of further control variables. As age is clearly exogenous, it is also reassuring that the estimated effects do not change when including individual fixed effects. The second thing to note is there does not appear to be any effect at the age-15 threshold. Point estimates are always close to zero and never statistically significant. For the other two thresholds, all estimates suggest an economically large and statistically significant decline in criminal behavior. When turning 18 individuals become between 8% and 10% less likely to commit any offence, between 4% and 6% less likely to commit a violent offence and between 8% and 9% less likely to commit

a property offence. At age 21 the effects are even larger with individuals becoming 15% less likely to commit any offence, between 8% and 9% less likely to commit a violent offence and between 12% and 14% less likely to commit a property offence. Note that this pattern of results is plausible if offenders consider youth or young offenders institutions to be less severe than adult prisons, which seems plausible in light of the (anecdotal) evidence found by Levitt (1998). It is also plausible to find stronger effects for property crimes, which can be considered to be more rationally planned than (more affectual) violent crimes.

As already mentioned in the introduction it is usually not clear whether drops in crime rates through tougher punishments are due to deterrence or due to incapacitation. My data contain information on contacts with the criminal justice system, be it imprisonment, court appearances or arrests by the police, which allows me to investigate this issue. In table 3 I re-estimate the base estimates omitting individuals who ever had a prison sentence in column (i) and individuals who ever were arrested, ever had a court appearance or were ever sentenced to prison in column (ii). The resulting estimates can be seen as pure deterrence effects as the individuals remaining in the sample never had any contact with the criminal justice system.

(Table 3 about here.)

The estimates are broadly similar to the results in column (vi) in table 2, which are based on the same specification. Turning 15 again has no discernible effects on any sort of criminal behavior, while turning 18 or 21 both lead to economically large reductions in criminal behavior. All point estimates are of broadly the same size as those in table 2 with an overall tendency of slightly smaller effects in table 3. However, differences in the point estimates between tables 2 and 3 are never statistically significant.

Table 4 presents estimates stratified by prior offending. The basic specification is again identical to column (vi) in table 2. The estimating equation is

$$C_{it} = \alpha_i + \beta'X_{it} + g(\text{age}_{it}) + \tau_1 * \text{below } 15_{it} + \tau_2 * \text{between } 18 \text{ and } 20_{it} + \tau_3 * \text{over } 21_{it} \\ + \tau_4 * (\text{below } 15_{it} * \text{offended before } 15_i) + \tau_5 * (\text{between } 18 \text{ and } 20_{it} * \text{offended before } 18_i) \\ + \tau_6 * (\text{over } 21_{it} * \text{offended before } 21_i) + \varepsilon_{it}, \quad (2)$$

where *offended before* T_i are a set of dummies that are “1” if an individual has committed an offence before age T . Column (i) introduces interactions with prior property offences, while column (ii) looks at prior violent offences. There are some reasons why we might expect effects to differ between individuals with and without prior offending. First, individuals with prior offending might already be hardened criminals for whom deterrence is less effective than for the general population. Second, individuals might become more cautious if a future arrest increases the probability that past crimes are detected and are subsequently treated as aggravating factors in sentencing decisions. Remember, however, that most individuals did not have any prior contact with the criminal justice system, i.e., the second effect would run through the higher detection probability of past crimes once the individual has the attention of the police, not just mechanistically through past convictions being taken into account in sentencing decisions. In the first case, we would expect lower changes in criminal behavior for those with prior offences (i.e., τ_4, τ_5 and $\tau_6 > 0$), whereas the second case would imply a stronger reaction for those individuals (i.e., τ_4, τ_5 and $\tau_6 < 0$).

(Table 4 about here.)

The evidence in both column (i) and (ii) suggests that deterrence is stronger for individuals who have already offended: Effects for individuals without prior property offences are always close to zero, while effects for individuals with prior property

offences are negative and large at all age thresholds for general offending and property offences and negative and large at the age-18 and 21 thresholds for violent offences. For prior violent offences the picture is slightly more complex: We observe declines in all crimes at all age thresholds for individuals with prior offending. For those without, we observe declines in property crimes at age 18 and 21, while violent crimes tend to increase at both thresholds. There is a certain risk that these patterns just represent regression to the mean effects, where prior offenders become less likely to offend and prior non-offenders become more likely to offend. However, there are two reasons why this explanation appears to be less likely: First, the prior offending might lie several years in the past and second, if it was a case of pure regression to the mean, we would expect to see an increase in offending for individuals without prior offences in addition to the decline in offending for those with prior offences, which is clearly not the case.

(Table 5 about here.)

Finally, table 5 looks into several sub-categories of criminal offences, specifically theft of or from vehicles, criminal damage, burglary, robbery, other theft, assaults and drug offences (distribution and production). For violent crimes, it is apparent that drops in assaults can explain all reductions observed in table 2 as point estimates are practically identical. There are also large decreases in drug offences at all thresholds. In terms of property crimes, the largest decreases are observed for other theft, followed by vehicle theft and criminal damage. The effects on burglary and robbery are much smaller and often practically zero. These effects are not particularly surprising in light of the descriptive evidence in table 1, as burglary and robbery are both relatively rare events, while vehicle theft, criminal damage and other theft are considerably more common.

Overall, the estimates indicate strong reductions in criminal behavior around two relevant age thresholds – the switch from juvenile to adult law at age 18 and the threshold from which individuals can be sent to adult prisons at age 21. These reductions are found for both property and violent crime and appear to be robust to the specification of the age-crime-relationship and the inclusion of a wide range of control variables. The effects appear to be primarily driven by individuals with prior offending and by reductions in assaults and theft. They are also in line with earlier evidence from the US that uses court records instead of self-reported crime (Hjalmarsson, 2009; Lee and McCrary, 2009).

VI. Conclusion

This paper investigated changes in self-reported criminal behavior around three relevant age thresholds in British criminal law – the possibility to be sentenced to a custodial sentence at age 15, the possibility of being sent to prison instead of youth offenders institutions at age 18 and the switch from young offenders institutions to regular prisons at age 21. I used longitudinal data from the Offenders, Crime and Justice Survey, covering a random sample of young people between 10 and 29 residing in England and Wales for the time period 2003 to 2006. My estimates, relying on sharp deviations from otherwise smooth age-crime-profiles in individual fixed effects regressions, suggest sharp decreases in criminal activity at both age 18 and 21. These results are robust to two different specification of the age-crime relationship and to the inclusion of a wide range of control variables, including socio-demographics and proxies for attitudes and lifestyle. My data also allows me to control for contacts with the police or the criminal justice system. These estimates suggest that the effects are due to deterrence, but not due to incapacitation. Finally, there is evidence for considerable effects heterogeneity with drops in criminal

behavior being strongest for individuals with prior offences. Effects are also strongest for theft and assaults.

Overall, the evidence presented here suggests that tougher sentences, in this case various switches from juvenile to adult criminal law, indeed deter criminals. This finding is in line with US evidence on recidivism based on court records (Hjalmarsson, 2009; Lee and McCrary, 2009). The current paper adds to this literature by adding evidence for drops in criminal behavior that is never recorded by the police or the courts.

References

- Becker, Gary S., 1968. Crime and Punishment: An Economic Approach. *Journal of Political Economy* 78(3), pp. 526–536.
- Drago, Francesco, Roberto Galbiati, and Pietro Vertova, 2009. The Deterrent Effects of Prison: Evidence from a Natural Experiment. *Journal of Political Economy* 117(2), pp. 257-280.
- Freeman, Richard F., 1999. The economics of crime. In Orley Ashenfelter and David Card (eds.), *Handbook of Labor Economics* 3C, Elsevier, Amsterdam et al., pp. 3529-3571.
- Harrel, Frank E., 2001. *Regression Modeling Strategies*. Springer, Heidelberg et al.
- Helland, Eric and Alexander Tabarrok, 2007. Does Three Strikes Deter: A Non-Parametric Investigation. *Journal of Human Resources* XLII(2), 309-330.
- Hjalmarsson, Randi, 2009. Juvenile Jails: A Path to the Straight and Narrow or to Hardened Criminality? *Journal of Law and Economics* 52(4), pp. 779-809.
- Iyengar, Radha, 2009. Does the certainty of arrest reduce domestic violence? Evidence from mandatory and recommended arrest laws. *Journal of Public Economics* 93(1-2), pp. 85-98.

- Katz, Lawrence, Steven D. Levitt and Ellen Shustorovich, 2003. Prison Conditions, Capital Punishment, and Deterrence. *American Law and Economics Review* 5(2), pp. 318-343.
- Klick, Jonathan and Alexander Taberrok, 2012. Police, Prisons and Punishment: The Empirical Evidence on Crime Deterrence. In Bruce L. Benson and Paul R. Zimmerman (eds.), *Handbook of the Economics of Crime*. Edward Elgar Publishing, Cheltenham, UK and Northampton, MA, pp. 127-144.
- Lee, David S. and Justin McCrary, 2012. The Deterrence Effect of Prison: Dynamic Theory and Evidence. *Mimeo*.
- Levitt, Steven D., 1996. The Effect of Prison Population Size on Crime Rates: Evidence from Prison Overcrowding Litigation. *Quarterly Journal of Economics* 111(2), pp. 319-351.
- Levitt, Steven D., 1998. Juvenile Crime and Punishment. *Journal of Political Economy* 106(6), pp. 1156-1185.
- Levitt, Steven D. and Lance Lochner, 2001. The Determinants of Juvenile Crime. In Jonathan Gruber (ed.), *Risky Behavior among Youths*. University of Chicago Press, Chicago, pp. 327-374.
- McCrary, Justin, 2012. Dynamic Perspectives on Crime. In Bruce L. Benson and Paul R. Zimmerman (eds.), *Handbook of the Economics of Crime*. Edward Elgar Publishing, Cheltenham, UK and Northampton, MA, pp. 82-108.
- Mocan, H. Naci and Daniel I. Rees, 2005. Economic Conditions, Deterrence and Juvenile Crime: Evidence from Micro Data. *American Law and Economics Review* 7(2), pp. 319-349.

Sloan, Frank A., Alyssa C. Platt, Lindsey M. Chepke and Claire E. Blevins, 2013.

Deterring domestic violence: Do criminal sanctions reduce repeat offences?

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Table 1: Descriptive statistics

Variable	Mean	Std.dev.	Min.	Max.
Age	17.380	4.538	10	29
Has degree	0.081	0.273	0	1
Completed A-level	0.176	0.380	0	1
Completed GCSE	0.189	0.391	0	1
No education	0.555	0.497	0	1
Employed	0.252	0.434	0	1
Unemployed	0.024	0.153	0	1
Inactive (other than student)	0.070	0.254	0	1
Student	0.655	0.476	0	1
Married	0.042	0.200	0	1
Cohabiting	0.074	0.262	0	1
Has not been brought up by both parents	0.324	0.468	0	1
Tenant	0.287	0.452	0	1
Bad self-rated health	0.127	0.332	0	1
Victim of a personal crime	0.255	0.436	0	1
Victim of any crime	0.465	0.499	0	1
Disorder problems in local area	0.678	0.467	0	1
Does not get along with parents	0.037	0.190	0	1
Peers or family in trouble with the police	0.196	0.397	0	1
Visits nightclubs occasionally	0.424	0.494	0	1
Visits nightclubs regularly	0.083	0.275	0	1
Visits pubs occasionally	0.380	0.485	0	1
Visits pubs regularly	0.226	0.418	0	1
Ever drunk	0.148	0.355	0	1
Considers crime to be okay	0.090	0.286	0	1
Trusts local people	0.309	0.462	0	1
Negative attitude towards local area	0.205	0.404	0	1
Any offence last year	0.226	0.418	0	1
Any property offence last year	0.125	0.330	0	1
Any violent offence last year	0.145	0.352	0	1
Any theft form or of vehicle	0.013	0.115	0	1
Any criminal damage	0.039	0.193	0	1
Any burglary	0.009	0.096	0	1
Any robbery	0.002	0.046	0	1
Any other theft	0.102	0.303	0	1
Any assault	0.145	0.352	0	1
Any drug offence (production & distribution)	0.029	0.168	0	1
Individuals		2536		
Person-year-observations		9561		

Table 2: Age thresholds and self-reported crime

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)
	Any offence							
Below 15 (1 = yes)	0.010 (0.019)	0.002 (0.019)	0.006 (0.018)	0.019 (0.019)	0.018 (0.019)	0.021 (0.021)	0.008 (0.020)	0.025 (0.020)
Between 18 and 20 (1 = yes)	-0.104*** (0.019)	-0.099*** (0.019)	-0.083*** (0.021)	-0.090*** (0.021)	-0.090*** (0.021)	-0.107*** (0.019)	-0.101*** (0.019)	-0.091*** (0.021)
21 or older (1 = yes)	-0.153*** (0.031)	-0.157*** (0.031)	-0.147*** (0.032)	-0.156*** (0.032)	-0.156*** (0.032)	-0.128*** (0.031)	-0.145*** (0.032)	-0.145*** (0.033)
	Any violent offence							
Below 15 (1 = yes)	-0.002 (0.017)	-0.005 (0.017)	-0.001 (0.017)	0.007 (0.017)	0.007 (0.017)	-0.001 (0.018)	-0.009 (0.018)	0.006 (0.018)
Between 18 and 20 (1 = yes)	-0.067*** (0.015)	-0.062*** (0.016)	-0.041** (0.018)	-0.046** (0.018)	-0.045** (0.018)	-0.067*** (0.015)	-0.062*** (0.016)	-0.045** (0.018)
21 or older (1 = yes)	-0.094*** (0.024)	-0.095*** (0.026)	-0.083*** (0.027)	-0.087*** (0.027)	-0.087*** (0.027)	-0.083*** (0.024)	-0.094*** (0.025)	-0.086*** (0.027)
	Any property offence							
Below 15 (1 = yes)	0.010 (0.016)	0.000 (0.016)	0.003 (0.016)	0.013 (0.016)	0.011 (0.016)	0.019 (0.017)	0.007 (0.017)	0.019 (0.016)
Between 18 and 20 (1 = yes)	-0.091*** (0.015)	-0.092*** (0.018)	-0.080*** (0.019)	-0.082*** (0.019)	-0.082*** (0.019)	-0.095*** (0.015)	-0.094*** (0.018)	-0.083*** (0.019)
21 or older (1 = yes)	-0.128*** (0.024)	-0.139*** (0.027)	-0.130*** (0.029)	-0.134*** (0.029)	-0.135*** (0.029)	-0.109*** (0.024)	-0.126*** (0.028)	-0.123*** (0.029)
Age	Quadratic	Quadratic	Quadratic	Quadratic	Quadratic	Cubic spline	Cubic spline	Cubic spline
Individ. fixed effects	No	Yes	Yes	Yes	Yes	No	Yes	Yes
Socio- demog. variables	No	No	Yes	Yes	Yes	No	No	Yes
Lifestyle variables	No	No	No	Yes	Yes	No	No	Yes
Attitude variables	No	No	No	No	Yes	No	No	Yes
Individuals	2536	2536	2536	2536	2536	2536	2536	2536
Person- year observatio ns	9561	9561	9561	9561	9561	9561	9561	9561

Coefficients, standard errors adjusted for clustering on the individual level in parentheses. */**/** denote statistical significance on the 10%, 5% and 10% level respectively. Socio-demographic variables are: Dummies for having a university degree, having A-levels, having a GCSE, for being employed, unemployed and inactive, for being married and for cohabiting with a partner, for not having grown up with both parents, for living in a rented accommodation and for having bad self-rated health. Lifestyle variables are dummies for going to clubs or pubs regularly or occasionally, for having ever been drunk, for living in an area with disorder problems, for having ever been the victim of any or a personal crime, for not getting along with one's parents and for having peers or family who have trouble with the police. Attitude variables are dummies for considering crime to be okay, for trusting people in the local area and for having a bad attitude towards the local area one lives in.

Table 3: Robustness check: Dropping individuals with prison sentences, court appearances or arrests

	(i) No individuals with prison sentences	(ii) No individuals with prison sentences, court appearances or arrests
Any offence		
Below 15 (1 = yes)	0.024 (0.020)	0.027 (0.020)
Between 18 and 20 (1 = yes)	-0.092*** (0.021)	-0.093*** (0.022)
21 or older (1 = yes)	-0.145*** (0.032)	-0.137*** (0.035)
Any violent offence		
Below 15 (1 = yes)	0.007 (0.018)	0.018 (0.019)
Between 18 and 20 (1 = yes)	-0.045** (0.018)	-0.050*** (0.018)
21 or older (1 = yes)	-0.082*** (0.026)	-0.070*** (0.027)
Any property offence		
Below 15 (1 = yes)	0.020 (0.016)	0.016 (0.017)
Between 18 and 20 (1 = yes)	-0.084*** (0.019)	-0.082*** (0.021)
21 or older (1 = yes)	-0.122*** (0.029)	-0.114*** (0.0301)
Age	Cubic spline	Cubic spline
Socio-demog. variables	Yes	Yes
Lifestyle variables	Yes	Yes
Attitude variables	Yes	Yes
Individuals	2524	2190
Person-year observations	9522	8263

Coefficients, standard errors adjusted for clustering on the individual level in parentheses. ***/*** denote statistical significance on the 10%, 5% and 10% level respectively. See footnote to table 2 for variable details.

Table 4: Effects by prior offending

	(i) Prior property offence	(ii) Prior violent offence
Any offence		
Below 15 (1 = yes)	-0.005 (0.020)	-0.026 (0.020)
Between 18 and 20 (1 = yes)	-0.026 (0.021)	-0.033 (0.021)
21 or older (1 = yes)	-0.020 (0.034)	-0.061* (0.033)
First offence younger than 15 * between 15 and 17	-0.132*** (0.035)	-0.188*** (0.033)
First offence younger than 18 * between 18 and 20	-0.263*** (0.044)	-0.307*** (0.043)
First offence younger than 21 * 21 and older	-0.386*** (0.060)	-0.348*** (0.061)
Any violent offence		
	b/se	b/se
Below 15 (1 = yes)	0.003 (0.018)	-0.043** (0.017)
Between 18 and 20 (1 = yes)	-0.016 (0.019)	0.044*** (0.016)
21 or older (1 = yes)	-0.018 (0.029)	0.047** (0.023)
First offence younger than 15 * between 15 and 17	-0.016 (0.033)	-0.183*** (0.034)
First offence younger than 18 * between 18 and 20	-0.082** (0.040)	-0.387*** (0.041)
First offence younger than 21 * 21 and older	-0.170*** (0.051)	-0.470*** (0.055)
Any property offence		
	b/se	b/se
Below 15 (1 = yes)	-0.022 (0.016)	-0.000 (0.017)
Between 18 and 20 (1 = yes)	-0.004 (0.018)	-0.070*** (0.020)
21 or older (1 = yes)	-0.003 (0.026)	-0.096*** (0.029)
First offence younger than 15 * between 15 and 17	-0.180*** (0.036)	-0.072** (0.029)
First offence younger than 18 * between 18 and 20	-0.336*** (0.045)	-0.093** (0.038)
First offence younger than 21 * 21 and older	-0.405*** (0.057)	-0.122** (0.052)
Age	Cubic spline	Cubic spline
Socio-demog. variables	Yes	Yes
Lifestyle variables	Yes	Yes
Attitude variables	Yes	Yes
Individuals	2536	2536
Person-year observations	9561	9561

Coefficients, standard errors adjusted for clustering on the individual level in parentheses. ***/**/* denote statistical significance on the 10%, 5% and 10% level respectively. See footnote to table 2 for variable details.

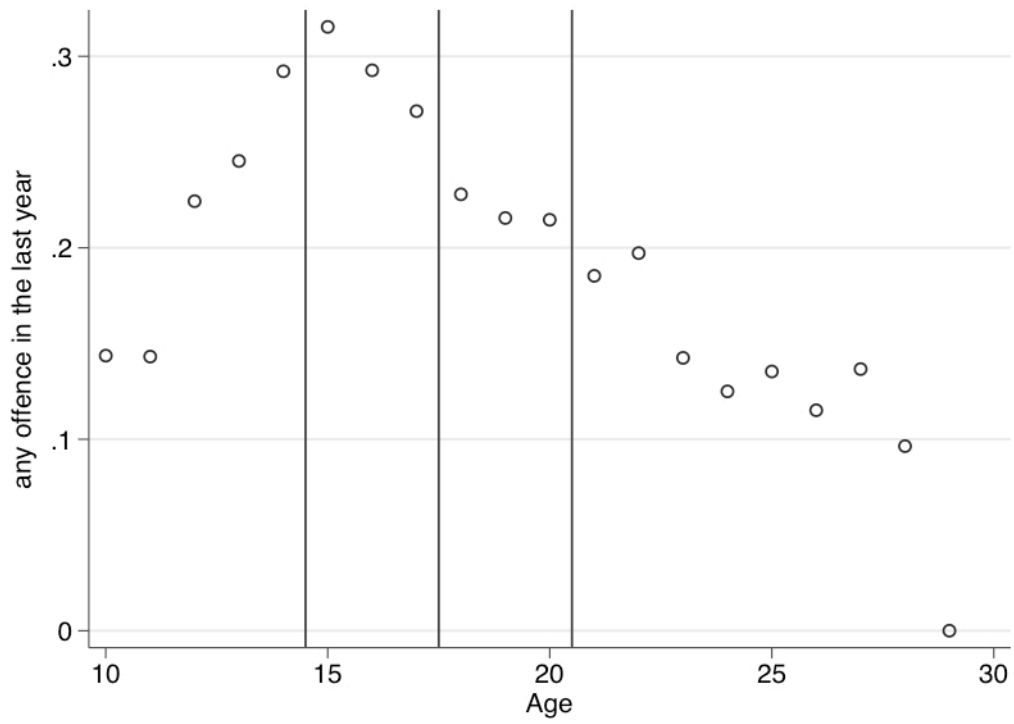
Table 5: Effects for crime sub-types

	(i)	(ii)
Theft of or from vehicle		
Below 15 (1 = yes)	-0.000 (0.005)	-0.001 (0.006)
Between 18 and 20 (1 = yes)	-0.016** (0.008)	-0.016** (0.008)
21 or older (1 = yes)	-0.021** (0.009)	-0.021** (0.009)
Criminal damage		
Below 15 (1 = yes)	0.004 (0.010)	0.007 (0.011)
Between 18 and 20 (1 = yes)	-0.019* (0.011)	-0.019* (0.011)
21 or older (1 = yes)	-0.046*** (0.015)	-0.041*** (0.015)
Burglary		
Below 15 (1 = yes)	0.002 (0.006)	0.003 (0.006)
Between 18 and 20 (1 = yes)	-0.007 (0.005)	-0.007 (0.005)
21 or older (1 = yes)	-0.013** (0.006)	-0.012* (0.006)
Robbery		
Below 15 (1 = yes)	-0.003 (0.003)	-0.003 (0.003)
Between 18 and 20 (1 = yes)	-0.001 (0.002)	-0.001 (0.002)
21 or older (1 = yes)	-0.001 (0.002)	-0.001 (0.002)
Other theft		
Below 15 (1 = yes)	0.010 (0.015)	0.016 (0.015)
Between 18 and 20 (1 = yes)	-0.084*** (0.019)	-0.085*** (0.019)
21 or older (1 = yes)	-0.120*** (0.027)	-0.111*** (0.028)
Assault		
Below 15 (1 = yes)	0.007 (0.017)	0.006 (0.018)
Between 18 and 20 (1 = yes)	-0.045** (0.018)	-0.045** (0.018)
21 or older (1 = yes)	-0.087*** (0.027)	-0.086*** (0.027)
Drug offences (production and distribution)		
Below 15 (1 = yes)	-0.015*** (0.005)	-0.016*** (0.005)
Between 18 and 20 (1 = yes)	-0.019** (0.010)	-0.019** (0.010)
21 or older (1 = yes)	-0.056*** (0.017)	-0.056*** (0.017)
Age	Quadratic	Cubic spline
Socio-demog. variables	Yes	Yes
Lifestyle variables	Yes	Yes
Attitude variables	Yes	Yes
Individuals	2536	2536
Person-year observations	9561	9561

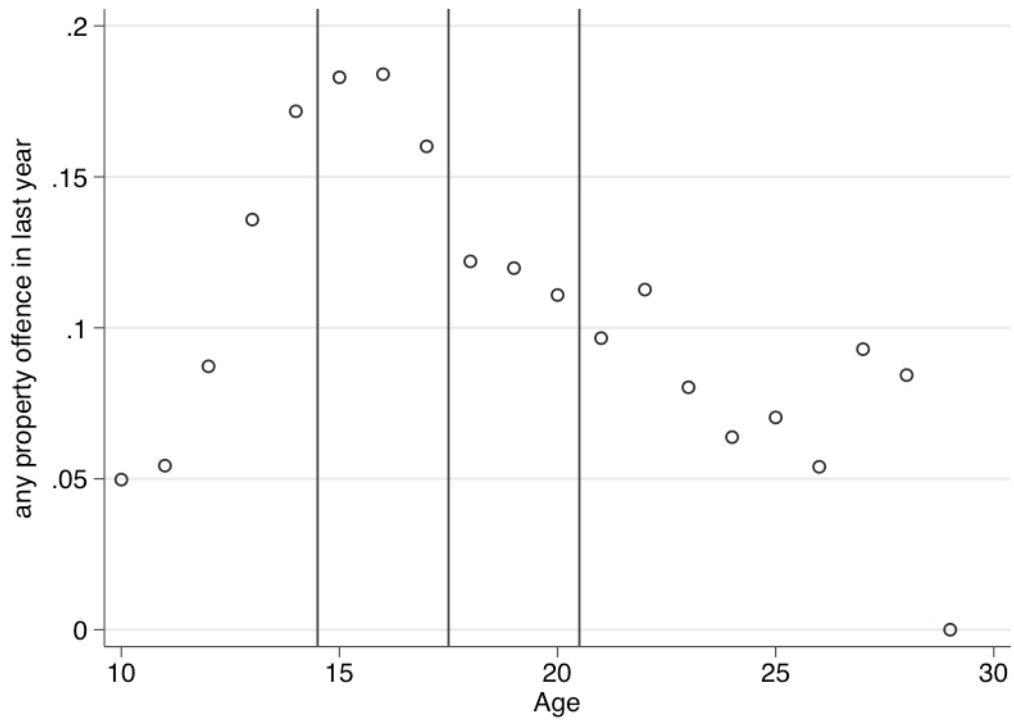
Coefficients, standard errors adjusted for clustering on the individual level in parentheses. ***/*** denote statistical significance on the 10%, 5% and 10% level respectively. See footnote to table 2 for variable details.

Figure 1: Age-crime profiles

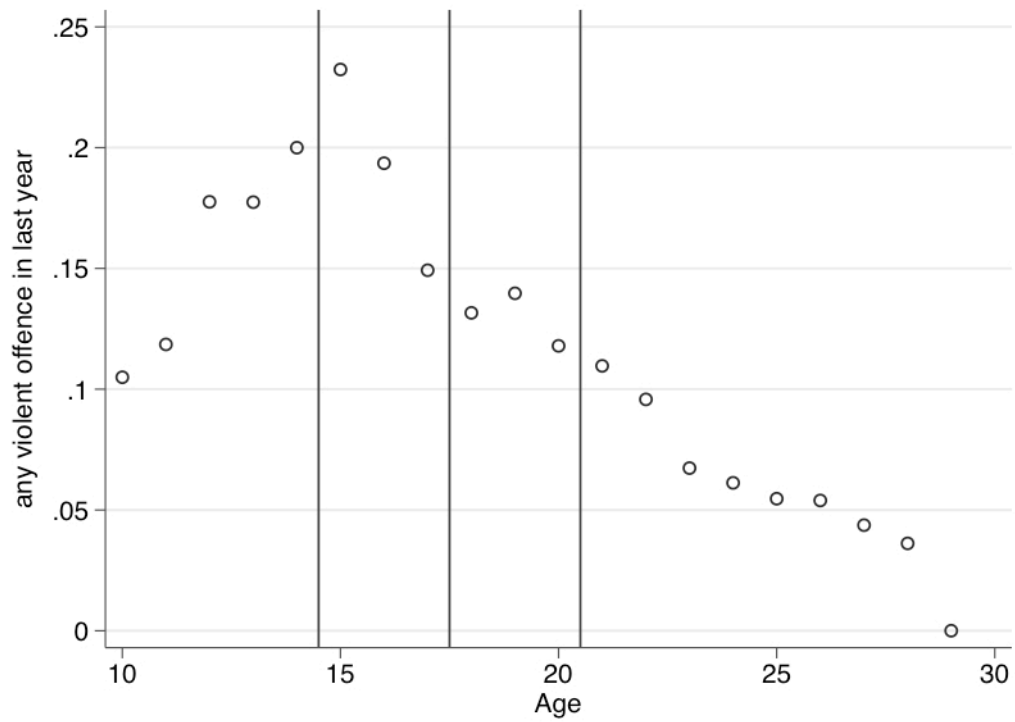
Panel (a): Any offence



Panel (b): Property offences



Panel (c): Violent offences



Note: The vertical lines mark the three age thresholds (between 14 and 15, between 17 and 18 and between 20 and 21). Figures are based on the estimation sample.