



Annex A: Impact of sentencing on proven reoffending for young offenders in England and Wales, 2012 to 2014

Summary

This paper compares one year proven reoffending rates for young offenders aged between 15 and 17 receiving different types of sentences at courts in England and Wales, using reoffending data for 2012 to 2014. The analysis utilises a statistical method called Propensity Score Matching (PSM) to estimate the reoffending impact of young offenders getting the 'treatment' sentence instead of a 'comparison' one after consideration of demographic characteristics, offence and criminal history.

While the results cannot be regarded as definitive as there may be important factors that could not be included within the modelling, the comparisons indicate that:

- Custodial sentences were associated with higher reoffending rates than matched referral orders or youth rehabilitation orders regardless of whether the latter included intensive supervision and surveillance or not.
- Longer custodial sentences were associated with lower reoffending rates than shorter ones.
- Youth rehabilitation orders were associated with higher reoffending rates than matched referral orders, although this could be explained by not matching on plea data.

Introduction

The reoffending rates for sentences provided in the main section of this publication are based on offenders with different demographic, offence and criminal history characteristics. It is therefore unclear whether any difference in reoffending rates is due to the difference in sentence or differences in other characteristics between the groups. This Annex therefore provides sentencing comparisons for juveniles aged between 15 and 17 after adjusting for these other characteristics, where observable.

The analysis builds on that presented in the 2012 Compendium of Reoffending in several ways. First, this analysis updates the figures using more recent 2012

to 2014 reoffending data¹ and an improved matching methodology than used in the 2012 Compendium of Reoffending analysis.

Second, community sentencing options for youth have been reformed since the publication of the 2012 Compendium of Reoffending analysis. Specifically, a range of higher-end community sentences have been consolidated into the youth rehabilitation order (YRO). Available since 2009, the YRO is issued with requirements selected from a suite of 18 options.

Lastly, the comparisons in this analysis include youth referral orders (ROs). ROs are the mandatory sentence for a child who has appeared in court for the first time and pleaded guilty, unless the sentence for the offence is fixed by law, is so serious that custody is the only option or unless the court believes that an absolute or conditional discharge or a hospital order is the appropriate disposal. Discretionary ROs can also be imposed for second or subsequent offences, provided that a guilty plea is entered. These features of the RO mean that identifying a suitably matched comparison group to compare with those that have been given an alternative sentence is more difficult. Also, importantly, plea is not available for inclusion in the analysis; there will be variation in plea across groups which could explain some of the differences in reoffending propensities. For these reasons, the findings on the effectiveness of ROs should be treated with particular caution.

Methodology

As with the previous analysis, Propensity Score Matching (PSM) was used as the method of creating matched sentencing occasion groups for each sentencing comparison. The PSM approach involves calculating the conditional probability of receiving the 'treatment' sentence (a propensity score between 0 and 1) using factors associated with both the likelihood of the offender being given this sentence and the probability that the offender will reoffend. Offenders given the 'treatment' sentence are then matched to offenders receiving the 'comparison' sentence on the basis of the propensity scores². The difference between the mean reoffending rates of the matched 'treatment' and 'comparison' groups then represents the average 'treatment' effect for those who received the 'treatment' sentence.

The PSM approach assumes a level of variation in sentencing decisions. This assumption imposes its own limitations to how PSM should be used, since similar cases should be given different sentences only where sentencing decisions are marginal. Following cases being matched, the PSM approach assumes that the choice is, in effect, random – i.e. all non-random variation is

¹ While 2015 and 2016 data could have been used, there was a change in data source from October 2015. Using 2012 to 2014 data therefore ensured consistency.

² Numerous algorithms for generating a comparison group using propensity score matching are available; this analysis largely used Epanechnikov Kernel matching on the logit of the propensity score with bandwidth 0.045. This algorithm involves treatment observations being matched to as many comparison observations as possible with the latter being weighted according to the proximity of their propensity scores to those of the treatment observations (the closer the propensity scores the higher the weighting).

controlled. However, as unmeasured factors may influence both the sentencing decision and reoffending outcomes, the conclusions of such analyses cannot be regarded as definitive.

Datasets featuring juvenile³ offenders in England and Wales in 2012-2014 were constructed for each sentence category to be compared using information taken from the Police National Computer (PNC)⁴, prison-NOMIS⁵, eAsset⁶ and probation data from probation trusts and nDelius⁷. The datasets contain offender demographics, offence, criminal history and reoffending information for each occasion when a juvenile offender received one of the selected sentences. Offenders were included in each sentence dataset for as many times as they had received the relevant sentence during 2012-2014. So, an offender who received two youth rehabilitation orders on separate sentencing occasions during the period, for example, would have two records eligible for matching when comparing youth rehabilitation orders to another sentence. To ensure the sentencing comparisons included a large number of cases, they were performed for the three-year period rather than separately for each year. As the majority of offenders receiving the sentences were 15 to 17-year-olds, the comparisons were only made for this age group.

Two outcome variables were used to measure reoffending; the one year proven reoffending rate (a binary yes / no measure) and the (mean) number of proven reoffences per offender (sentencing occasion).

The variables used to create the propensity scores are as listed below, with squared terms also included for those asterisked⁸:

Offender Demographics

- Age at date of sentence*
- Year of sentence
- Gender
- Ethnicity

³ Juvenile offenders are defined as offenders aged under 18 at the time of their sentence. This is also referred to as the start point or the index date.

⁴ The Police National Computer is the administrative data system used by all police forces in England and Wales. It is managed by the Home Office. The Ministry of Justice receive monthly extracts of data from the PNC.

⁵ Prison-NOMIS is the case management system for prisons.

⁶ Information about secure training centres (STCs) and secure children's homes (SCHs) comes from the Youth Justice Board's (YJB) eAsset database.

⁷ Detailed information on the supervision of offenders was submitted by probation trusts from their operational systems before the Transforming Rehabilitation programme was launched in June 2014. From June 2014, the nDelius case management system has been used by Community Rehabilitation Companies (CRCs) and the National Probation Service (NPS) for the management of offenders.

⁸ These had statistically significant relationships at the 0.2 significance level with both the probability of receiving the 'treatment' sentence and with reoffending for some or all of the sentencing comparisons. The 0.2 level of statistical significance is consistent with guidance from the academic literature (e.g. Apel & Sweeten, 2010; Hahs-Vaughn & Onwuegbuzie, 2006; Rosenbaum, 2002) and with previous Ministry of Justice sentencing comparison analyses.

Index Offences (these are the offences that led to the sentence):

- Primary⁹ offence code (condensed 20 categories for the index offence, e.g. robbery, violence, burglary and so on, as in the Offender Group Reconviction Scale 3)
- Severity of primary index offence (ranked 1 to 3 with 1 being the most severe¹⁰).
- Number of index offences with breakdown by whether the offender is a first time or second time offender.

Offending History¹¹ (prior to index offence)

- Whether the offender is a first time, second time or further time offender, as based on the number of previous convictions and cautions.
- Number of previous offences* with breakdown by severity of offence and by whether the conviction or caution was in the last year, not in the last year but within the last five years, or was more than five years before the current sentencing date
- Copas Rate for further time offenders (those with more than one previous conviction or caution)^{12*}
- Number of previous custodial sentences*
- Number of previous court orders*
- Number of previous convictions*
- Number of previous cautions*
- Age at first contact with the criminal justice system*

While a reasonably wide range of variables have been used, particularly in reflecting offending history, there may be other characteristics that influence both the sentencing decision and the probability of reoffending, such as the offender's plea, family relationships and education placements. It is therefore possible that some of the differences in reoffending rates could be explained by unobserved characteristics. This may be more of an issue for certain comparisons than others, for example everyone who receives a referral order must have pleaded guilty whereas other sentences covered do not require this. In general, extra caution is advised when interpreting comparisons featuring referral orders due to the lack of plea data.

When interpreting the results, it is important to consider which sentence is the 'treatment'. For example, when comparing custodial sentences of less than 6 months with youth rehabilitation orders the analysis shows what would have happened to those receiving custodial sentences of less than 6 months if they had instead received youth rehabilitation orders, not the other way around. This means that the focus of the comparison is on the particular offences that might

⁹ The index sentence may relate to more than one offence, the most severe of which is categorised as the primary offence.

¹⁰ Sexual and violent offences are ranked with a tier 1 severity, acquisitive crime such as burglary, theft from vehicles are ranked as tier 2 and tier 3 covers all offences not included in tier 1 or tier 2.

¹¹ All offending history variables exclude Penalty Notices for Disorder.

¹² The Copas Rate controls for the rate at which an offender has built up convictions. The higher it is, the more likely the offender is to re-offend. The formula is as follows;

$$\text{copas rate} = \log_e \left(\frac{\text{Number of court appearances or cautions} + 1}{\text{Length of criminal career in years} + 10} \right)$$

receive a custodial sentence of less than 6 months, rather than the less serious offences warranting a youth rehabilitation order but not a custodial sentence of less than 6 months.

Matching quality

The impact estimates exclude ‘treatment’ sentencing occasions where there is no common support – that is, which don’t have a similar propensity score to any ‘comparison’ sentencing occasions. The comparisons involve less than 0.5 per cent of the treatment group being lost in the matching with the following exceptions:

- The comparisons involving referral orders all see more than 50% of the treatment group (whether youth rehabilitation orders or custodial sentences) being excluded in the matching.
- The comparison of under six months custodial sentences with matched youth rehabilitation orders with intensive surveillance and supervision saw 31 per cent of short-term custodial sentences being lost in the matching.

The results of these comparisons can only be considered representative for the matched treatment group of sentencing occasions. The number of treatment cases on support and off support for all comparisons is shown by Table 1.

Following the matching for each comparison, the closeness of the matched groups on characteristics selected for the model was tested using standardised (mean) differences¹³. These can be interpreted as follows:

- Standardised differences <=5% = groups are closely matched on that particular offender or offence characteristic.
- Standardised differences of 5–10% = a reasonable match quality.
- Standardised differences >10% = a poor quality of matching which could alter the interpretation of the final result.

In this analysis, 97 per cent of standardised differences were five per cent or lower, with none being more than 8.3 per cent. Only one comparison involved more than five standardised differences being more than five per cent¹⁴. This suggests the propensity score matching succeeded in creating well-balanced groups on the observed characteristics.

¹³ The formula for the standardised (mean) difference is as follows, where the x represents the characteristic selected (e.g. age) and s the standard deviation of that characteristic:

$$\text{Standardised difference} = \frac{(x_{\text{treatment}} - x_{\text{control}})}{\sqrt{\frac{s_{\text{treatment}}^2 + s_{\text{control}}^2}{2}}}$$

As the propensity score matching algorithm used for this analysis involved a treatment observation being matched to more than one comparison observation, the means and standard deviations were weighted.

¹⁴ The comparison of custodial sentences of six months or more but less than 12 months with matched referral orders saw nine standardised differences being between 5 and 8.3 per cent.

Results (*Table 1*)

The comparisons indicate that for 15 to 17-year-olds over a one-year follow-up period:

- Custodial sentences were associated with higher reoffending rates than matched referral orders or youth rehabilitation orders regardless of whether the latter included intensive supervision and surveillance or not. In particular
 - custodial sentences of less than six months were associated with around four percentage points higher reoffending (and 0.4 more reoffences on average) than matched youth rehabilitation orders;
 - although the difference may be exaggerated by not matching on plea data, a subset of custodial sentences of less than six months (including offenders with an average of five previous offences compared with an average of 16 for the total less than six months custodial population) were associated with around 13 percentage points higher reoffending (and 0.5 more reoffences on average) than matched referral orders.
- Longer custodial sentences were associated with lower reoffending rates than shorter ones. In particular, custodial sentences of 12 months or more but less than 24 months were associated with 9.8 percentage points lower reoffending (and 0.65 fewer reoffences on average) than matched custodial sentences of less than six months, and 0.4 fewer reoffences on average than matched custodial sentences of six months or more but less than 12 months.
- While these differences may be explained by not matching on plea data, youth rehabilitation orders were associated with at least 10 percentage points higher reoffending (and at least 0.56 more reoffences on average) than matched referral orders.

Table 1: Proven reoffending outcomes for matched juvenile sentences in England and Wales, 2012-2014

Treatment	Control	Treatment Size, Matched & Off support	Matched Control Size	Binary & Frequency (Treatment)	Binary & Frequency (Control)	Impact estimate
Youth rehabilitation order	Referral order	9,850 21,729	24,431	57.8% 2.09	45.8% 1.43	12.1pp*** 0.65***
Youth rehabilitation order with ISS	Referral order	1,271 1,408	24,138	65.1% 2.83	55.2% 1.89	10.0pp*** 0.94***
Youth rehabilitation order with ISS	Youth rehabilitation order without ISS	2,670 11	24,270	71.3% 3.17	70.7% 3.03	0.7pp 0.14*
Youth rehabilitation order without ISS	Referral order	7,986 16,309	24,431	57.9% 2.05	46.0% 1.49	11.8pp*** 0.56***
Custody (<6 months)	Referral order	468 1,106	23,901	61.1% 2.16	47.8% 1.70	13.4pp*** 0.46***
Custody (<6 months)	Youth rehabilitation order	1,576 1	31,350	78.4% 3.88	74.4% 3.47	4.0pp*** 0.42***
Custody (<6 months)	Youth rehabilitation order with ISS	1,082 495	2,664	75.7% 3.55	71.8% 3.16	3.9pp* 0.40**
Custody (<6 months)	Youth rehabilitation order without ISS	1,577 0	24,106	78.4% 3.88	74.3% 3.50	4.1pp*** 0.39***
Custody (<6 months)	Custody (>=6 & <12 months)	1,561 0	859	78.7% 3.89	77.3% 3.67	1.4pp 0.22
Custody (>=6 & <12 months)	Referral order	405 453	23,557	60.0% 2.12	52.0% 1.73	8.0pp** 0.39**
Custody (>=6 & <12 months)	Youth rehabilitation order	857 2	30,917	72.2% 3.19	70.0% 2.85	2.3pp 0.34**
Custody (>=6 & <12 months)	Youth rehabilitation order with ISS	859 0	2,635	72.3% 3.20	70.0% 2.74	2.3pp 0.47**
Custody (>=6 & <12 months)	Youth rehabilitation order without ISS	857 2	23,777	72.2% 3.19	70.0% 3.01	2.3pp 0.18
Custody (>=12 & <24 months)	Custody (<6 months)	1,209 2	1,577	64.5% 2.43	74.3% 3.08	-9.8pp*** -0.65***
Custody (>=12 & <24 months)	Custody (>=6 & <12 months)	1,232 1	872	64.1% 2.39	65.6% 2.79	-1.5pp -0.40**

Notes:

* = significant at 0.1 level, ** = significant at 0.05 level, *** = significant at 0.01 level, pp = percentage points

1. ISS is Intensive Supervision and Surveillance.

2. The number of youth rehabilitation orders is greater than the combined numbers of youth rehabilitation orders with and without intensive supervision and surveillance (ISS) requirements as it was sometimes not possible to tell from the relevant database field whether or not ISS was involved.

Further information

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